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ICESCO

ICESCO Education Ministers Conference

ICESCO EMC 3

Beyond Transforming
Education Summit:
from Commitments to Actions

3.2

Greening Education for ICESCO Member States

Muscat,
Sultanate of Oman

2-3
October

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Document summary



Name of the draft

Framework for Greening Education in the Islamic World



Implementation place

ICESCO member countries



Responsible for the project

ICESCO



Concerned topics

Quality education, Climate action, Decent work



Beneficiaries

All member countries



Final beneficiaries

Decision-makers, technical staff, teachers, policymakers, universities and research centres, youth, women and civil society



Start of the project

October 2024



Project duration

Short-term targets (by 2030)

Long-term target (by 2035)

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Preface

The Islamic World Educational, Scientific and Cultural Organization (ICESCO) has collaborated with Cambridge University Press & Assessment (Cambridge) to produce this Framework for Greening Education in the Islamic World. Together, ICESCO and Cambridge share an unwavering commitment to working with governments to improve the quality of education systems around the world – so everyone has the knowledge and skills they need to thrive and contribute to a prosperous, inclusive and greener future. Both organisations recognise the education crises this sector continues to face, as the United Nations (UN) General Assembly identified back in 2022 at the Transforming Education Summit – it is a crisis of equity, quality and relevance. In a world facing increasing climate disasters and disruption, we know that relevant and quality education for all plays a critical role in tackling some of the biggest challenges. Our collaboration aims to position education as a central and long-term solution to the climate crisis, to mitigation, to adaptation and to transition.

A 2021 UNESCO analysis of 100 national curriculum frameworks revealed that nearly half (47%) do not mention climate change. Only one third of teachers felt able to properly explain the effects of climate change in their regions and 70% of the youth surveyed could not describe the broad principles of climate change due to the ineffective way in which it is currently taught. (UNESCO, 2024f)

This co-developed policy framework spotlights the need to integrate climate into education systems to promote sustainable practices and to prepare future generations to be tomorrow's changemakers. It draws on a wealth of interdisciplinary climate research and evidence generated from across University of Cambridge departments and centres, from Cambridge University Press & Assessment, to Cambridge Zero and the Faculty of Education.

ICESCO and climate education

Providing education and making it accessible to all, and then expanding it and improving its quality, is the primary focus of the Education Sector at ICESCO. To achieve this, the sector is expanding its efforts to provide full support to member states to help them develop their education systems. The aim is to achieve UN Sustainable Development Goal 4 (SDG 4): to “ensure inclusive and equitable quality education and promote lifelong learning opportunities for all”. In this context, the sector provides technical, material and moral support to member states. This aims to improve their capacity to meet current and future demand for education, and to continue accelerating the progress made in providing quality, equitable and inclusive education for all.

Therefore, ICESCO's Education Sector (through the 2022–25 strategy) is implementing several projects, programmes and activities. These express the needs and desired goals of ICESCO's member states to advance the future of education in the Islamic world, in order to achieve SDG 4.

The major strategic orientations of ICESCO's Education Sector are:

- Implementing the human right to quality education
- Improving the skills and competences of learners
- Rational value acquisition
- Effective investment in information and communication technologies and artificial intelligence techniques in education
- Continuous professional development of teachers
- Promotion of the literacy of youth and adults, especially girls and women, and enhancing their capacities
- Engaging in a forward-looking and proactive approach in planning based on scientific foundations
- Meeting the educational needs and priorities of member states



Cambridge and climate education

Cambridge works with governments as well as national and international organisations to develop the education systems they need to create stronger, more prosperous and more equitable societies.

At every stage of learning, from early years to primary and secondary education, we work collaboratively with you to improve the entirety of your educational system or just certain aspects of it, always paying close attention to their interdependence. We use an evidence-based approach to analyse your current education system, developing aligned curricula, resources, assessment and teacher training that will achieve your learner outcome goals. Every partnership is unique, based on your country's individual context, needs and vision.

As part of our work with governments and beyond, we believe that education is key to tackling the climate crisis. Together with our partners, we can empower young people with the skills and knowledge to act on climate change.

To achieve its aims, climate change education needs to be high quality, holistic across the curriculum and school ages, and able to set global issues in a local context. We believe that greening education should be a central part of your education system transformation agenda – not a separate initiative.

We recently published a paper on 'Empowering learners through climate change education'. In it we state:

"Only by understanding the origins and impacts of climate change can learners develop appropriate policies and technologies to innovate in ways that can save our planet. Moreover, improved understanding of the disproportionate impacts of climate change on vulnerable communities helps drive equitable climate action, and climate change education enables learners to discern accurate information from misinformation and

claims of environmental benefits that do not exist (greenwashing)." (Cambridge University Press & Assessment, 2024)

We believe that amplifying student voices and developing their critical, creative and communication skills is key to finding solutions to the climate crisis. We want to inspire and empower learners to solve problems by considering the challenge from different perspectives – global and local.

Read more at [cambridge.org/partnership](https://www.cambridge.org/partnership)

Defining green education

There are many ways to describe education that responds to the various environmental challenges faced by humanity. The sources consulted during the formation of this paper refer to education for sustainable development (ESD), sustainability and climate education, sustainability education, green skills, climate change education, etc. These terms themselves frequently overlap with other debates in education such as different models of inter- or multidisciplinary learning. We believe that all these definitions have at their heart a desire to ensure that education prepares learners for the opportunities and challenges of future adulthood. We see these definitions as valuable contributions to defining a relevant education aligned to SDG target 4.4 ("relevant skills [...] for employment, decent jobs and entrepreneurship"). For the avoidance of doubt, and clarity of purpose, we have focused these guidelines and recommendations on 'green education' as defined at the Transforming Education Summit in 2022 and the specifics of that call to action. This includes using the term green education where authors may have used a different term in their original text.

Executive summary

The world needs climate action

The UN has urged nations to demonstrate increased ambition and implement transitions across their entire economies to limit global temperature rise to 1.5°C. The steps necessary to avoid the worst of climate chaos are clear. Drastic reductions in global greenhouse gas emissions must take place by 2030 and reach net zero by 2050. The global average temperature on the planet is rising due to human-induced greenhouse gas emissions. The effect of this global warming is climate change. Climate systems are being disrupted by more intense storms, heatwaves, flooding and droughts.

The UN Secretary-General calls the climate crisis “a battle for our lives” (UN, 2019) and the impacts of climate change on humanity are widespread. There are serious threats to our environment, food security, health and livelihoods. The World Meteorological Organization (WMO) has reported that disasters increased fivefold over the past 50 years, and it is projected that 560 disaster events could occur annually by 2030 (WMO, 2021). The catastrophic impact of these disasters will be greater in least developed countries. The total cost of disruption due to climate change will be counted in the trillions of dollars. Nations need plans for both reducing damage to the environment and mitigation against the effects of environmental damage that has already happened. Mitigations, risk reduction strategies, warning systems and resilience plans are key to minimising impacts on people and economies.

Climate action needs greener education

In an increasingly complex and interconnected world with a real, existential threat such as climate change, there is a growing call for education to enable individuals, as agents of change, to acquire knowledge, skills, values and attitudes that lead to the green transition of our societies [...]. (UNESCO, 2024g)

Education globally plays a vital role in shaping a sustainable future. Where environmental stewardship and climate resilience are central to global education priorities, education can give learners of all ages the knowledge, skills and agency to address interconnected global challenges. It empowers them to make informed decisions and take action to change society and care for the planet. However, the UNESCO Climate Change Communication and Education (CCE) country profiles (UNESCO, 2022b) indicate the gaps between the education we need and the current state of the world’s education systems. Only 27 percent of countries surveyed had budgets for climate change communication and education, 39 percent had national laws or policies for climate change education, and 63 percent included a focus on climate change in their teacher training.

A green education is a good education for children

Good education provides children with a better future. It gives them fair access to knowledge and skills from the local, national and international communities they are a part of. The future has always held new challenges for young people. Those with access to good education have always been better prepared for these challenges through the relevance and usefulness of their learning. What learning is relevant and useful for today’s youth? What will enable them to thrive in economies progressing to net zero and mitigating increased environmental hazards? A green education system is a good education system because it ensures all learners leave school ready to be part of societies and economies that are adaptable and resilient to climate change.

Green education needs a green education system

Green education cannot be achieved through short-term initiatives alone. The ambitions seen in national commitments made at the Transforming Education Summit 2022 will only be



realised when the drivers and incentives within an education system are aligned and reinforce each other. This requires a consensus across curriculum, textbooks, assessments, teacher training, inspection, funding and infrastructure.

The UNESCO Greening Education Partnership describes four pillars of transformative education: schools, curriculum, teacher training, and communities. These pillars are part of a system and should not be seen in isolation from each other. Transforming the curriculum will have little impact if teaching is not also transformed. Nor are these pillars unique to green education. A systems-based approach to reform will better achieve the aims of green education, Covid-19 recovery, pedagogical reforms, foundational skills and health education than individual, short-term initiatives focusing on just one of these. This framework focuses on green education. Its greatest impact will be seen where it is unified with new or existing system-wide programmes of development or reform.

A green education framework for and from the Islamic world

This Framework for Greening Education in the Islamic World provides policy guidelines and recommendations aligned to the four pillars proposed by the UNESCO Greening Education Partnership following the Transforming Education Summit in 2022. They advocate education that includes: the scientific facts of climate change, the social, economic and behavioural facets of climate justice, eco-anxiety, and action-based solutions.

The guidelines and recommendations reflect the ambition to make rapid progress towards the SDGs by 2030 through education contextualised to learners' real-life experience and aspirations. Realising these ambitions will require stakeholder engagement, through national networks. These guidelines and recommendations propose a direction of travel. The definition of the route will require national consultation and collaboration in the same way

that the National Statements of Commitment at the Transforming Education Summit 2022 were to be informed by national consultations (including national and / or youth consultations). ICESCO member states are diverse in the size of their land, people and economies and one size cannot fit all. These national conversations will start at the ICESCO conference in Muscat in October 2024. At this conference, ministers of education from ICESCO member states will respond to this call for action and agree measurable targets for the transition to green education over the next 11 years.

A summary of the policy guidelines and recommendations

Policy guidelines and recommendations for a green curriculum

A curriculum is the intention and philosophy of an education system. It describes what should be learnt and how it should be learnt. It is therefore critical in setting the ambition for the whole education system. The three guidelines and recommendations describe how ministries of education need to **create curricula and assessments that give all learners the essential knowledge, skills, values and attitudes needed to understand and respond to the climate crisis**. The aim must be for this new learning to **provide pathways to decent employment** in climate-resilient industries that are compatible with a net zero world.

Policy guidelines and recommendations for a green teacher workforce

Teachers are key actors in an education system. They transform curriculum statements and content into learning experiences. They are often responsible for deciding what successful learning looks like. Successful implementation of a green curriculum requires a teacher workforce that has relevant pedagogical content knowledge about the climate crisis, its impacts, solutions and mitigations. The three guidelines and recommendations describe how ministries of education need to **embed green knowledge and pedagogy in teacher**

education programmes and professional communities. Teachers also need to be resilient to future environmental hazards, which means their education needs to cover emergency responses such as the **use of digital technology and remote learning to minimise learning loss.**

Policy guidelines and recommendations for green schools

Schools are where children go to learn knowledge and skills beyond those found in their home environment. The buildings and infrastructure they use at school are both tools of education and part of education itself. The guidelines and recommendations for schools describe how **ministries of education need to transform educational institutions** into hubs of environmental stewardship, climate resilience, participatory governance and partnership.

Policy guidelines and recommendations for greening communities

A green curriculum will provide relevant learning about the impact of the climate crisis on learners' environments, societies and economies. Everyone in a community is impacted by the climate crisis and all members of a community can find solutions to environmental harms. A broader community engagement with green education will lead to a stronger implementation. The guidelines and recommendations for

greening communities describe how ministries of education need to **create platforms to promote community voice** in the development of children's education, linking learning to the solutions and mitigations relevant to their communities. Increasing investment in girls' education will ensure that all learners have the opportunity to learn relevant knowledge and skills that are valuable to them and their roles in society and the economy.

Using the policy guidelines and recommendations

ICESCO and Cambridge believe that these guidelines and recommendations will support governments and partners to develop strong education systems with better educational outcomes for learners. We recognise that ministers of education will face many practical challenges to adopt them – and indeed, effective implementation is one of the greatest challenges across the Transforming Education agenda. Under the auspices of this framework, ICESCO will launch a greening education campaign across all 53 member states. This includes the development of a dashboard to support ministers of education in monitoring progress towards greening education. ICESCO will undertake regular updates of the dashboard to review progress and promote action.



Background

The climate crisis and education

The 2024 *Sustainable Development Goals Report* from the UN gave a blunt assessment of progress towards Goal 13, Climate Action: “Climate records were shattered in 2023 as the climate crisis accelerated in real time. Rising temperatures have not abated and global greenhouse gas emissions continue to climb. Communities worldwide are suffering from extreme weather and increasingly frequent and more intense disasters, destroying lives and livelihoods daily” (UNESCO, 2024c).

Countries face significant challenges in accelerating transformations through ambitious climate action plans. 2023 saw the highest ever greenhouse gas emissions and was the warmest year on record. At the same time as planning to limit global temperature rises, administrations in national governments and city halls face the challenges of mitigating the current impacts of climate change to create sustainable cities and communities (SDG 11). The London Climate Resilience Review is typical of these, setting out the steps and expenditure necessary to protect the population from heat, drought, wildfires, rising sea levels, surface water flooding, subsidence, and combinations of all of these. As the 2024 *Sustainable Development Goals Report* from the UN acknowledges, “as disasters become more probable, better preparedness has lowered mortality rates” (UNESCO, 2024c).

This is the challenge humanity faces with just one of the 17 SDGs. To meet all the challenges of sustainability requires people with the right knowledge, skills, attitudes and values to collaborate on, commit to and create new and innovative solutions that both reduce harm to the environment and protect people from increasingly likely disasters. This means that education should be part of our sustainable future across all sectors.

Why education is part of the response to the climate crisis

All 17 SDGs are strongly interconnected and in each of them there is at least one target that focuses on learning, training or raising awareness of sustainable development issues. Education, therefore, is widely acknowledged as essential for addressing “environmental and sustainability issues and ensuring human wellbeing” (UNESCO, 2016a, p. 17). Education is a critical component in the global response to the climate crisis, and educational systems, from nursery through to university, need to reflect this.

Knowing the accurate, scientific mechanisms of anthropogenic climate change is just a starting point. It is also important to have educational programmes that “include a clear focus on the development of knowledge, skills, perspectives and values related to sustainability” (UNESCO, 2005, p. 5). A high-quality green education prepares learners to make informed decisions, adopt sustainable lifestyles and participate in environmental governance. By understanding the complexities of climate change, its impacts and potential solutions, educated individuals can advocate effective policies and practices that mitigate environmental degradation and promote sustainable living (UNESCO, 2021c).

Through its 2022–25 strategy, ICESCO’s Education Sector addresses the needs and goals of its member states by promoting educational policies and programmes aligned with international frameworks. It supports educators by organising programmes and workshops to enhance climate literacy, developing educational resources, engaging in research and policy development, fostering partnerships with international organisations, and conducting awareness campaigns to boost public understanding and community involvement in climate action (ICESCO, 2022).

Green education and green teachers

Investing in teachers is crucial for maximising the impact of greening education. Supported teachers gain knowledge and skills to effectively teach environmental concepts, integrating sustainability principles across subjects and developing engaging curriculum materials. When teachers are well prepared to integrate environmental themes into their teaching, they can inspire and motivate students to adopt sustainable practices and become proactive in addressing climate change and sustainability challenges. Investment in teachers not only improves the quality of education but also ensures that the principles of sustainability are embedded in the educational experience of students. International research highlights the approaches that are more cost-effective in teacher training and those that are less cost-effective (World Bank, 2020) as well as approaches to enhance the teaching profession and education for global competence and civic engagement (OECD, 2023).

Education and the green economy

Responsible climate change education prepares the workforce for a green economy and creates pathways for youth employment in emerging green sectors. The International Labour Organization (ILO) estimates that the shift towards sustainable practices will result in net job gains and that just “taking action in the energy sector to limit global warming to 2 degrees Celsius by the end of the century can create 24 million new jobs, largely offsetting any job losses” (ILO, 2018, p. 4). By integrating vocational training and education programmes focused on green technologies and sustainable practices, educational institutions can ensure that young people are equipped with the skills required for these emerging job markets. The World Bank (2019) and ICESCO have also highlighted the need for education systems to adapt to the evolving demands of the labour market, and invest in skills development and in areas related to the green economy.

One of the recommendations made by ICESCO for the Organisation of Islamic Cooperation countries is to “invest more in green skills and jobs by increasing training programmes and uptake of innovative green technologies that drive green jobs creation, to compensate for job losses in other industries in the pursuit of a just transition” (ICESCO, 2023a, p. 33). This aligns with international research which consistently highlights the dual benefits of climate education: fostering environmental stewardship and opening up new employment opportunities for youth.

Furthermore, education fosters entrepreneurship and innovation. By promoting creativity, critical thinking, research and development in education, educational institutions can play a crucial role in driving the innovations needed to address the climate crisis effectively. ICESCO has previously recommended that member states “promote the mainstreaming of disaster risk reduction and resilience education in primary, secondary and tertiary education through the integration of Disaster Risk Management concepts into the curriculum” (ICESCO, 2023b, p. 20). Thus, an educated future workforce in charge of policymaking would have the technical expertise and holistic understanding required to navigate and address the multifaceted challenges posed by natural disasters in the Islamic world and beyond.

Green education and the transforming education agenda

At the Transforming Education Summit in 2022, the statements of commitment made by 105 nations covered a range of education policies. The statements referenced Covid-19 recovery, resilience, inclusivity, teaching, curriculum, higher education, digital education, finance and governance. In arguing for a system-focused approach to transforming and greening education, we identify the intersections between these priorities. Greening education was explicitly referenced in statements about curricula renewal and resilience. In these guidelines and recommendations we illustrate



broader connections. A green curriculum requires a green workforce to deliver it; green education needs to be inclusive and reach all children; digital education is both a mitigation for green education and a contributor to environmental harm and climate change if not managed well. Greening education is part of transforming education, not additional to it.

Green education and the education of women and girls

Studies have shown that educating girls and women is highly effective in empowering them to participate in economic and leadership roles, leading to better environmental outcomes. It has implications for population growth too. Educated women are more likely to engage in sustainable practices, advocate environmental policies and contribute to community resilience against climate change (UNESCO, 2016b; UNICEF, 2019). Through its initiatives, ICESCO also underscores the importance of providing equal access to quality education for girls, empowering them to contribute meaningfully to their communities and societies. The ‘Societies We Want’ initiative aligns with global efforts by emphasising gender equality and the transformative impact of educating girls (ICESCO, 2022).

Green education and digital education

Digital education enhances the impact of greening education by using digital tools and platforms to increase accessibility and engagement. Interactive modules, virtual reality experiences and online courses can bring climate change concepts to life, making them more relatable and easier to understand. Digital education can facilitate the dissemination of climate change knowledge on a global scale, bridging geographical gaps and reaching students in remote areas. Digital platforms “can stimulate a transformation to a new model for creating data which results in more inclusive, social, robust knowledge for decision-making, where there is broader understanding and access to policy-relevant knowledge” (UNEP, 2019, p. 70). However, there is a digital divide well documented in the

literature that hinders inclusion in education: “Digital literacy skills are crucial, yet unequally distributed” (UNESCO, 2022a, p. 57). This raises the issue of effective interventions to address issues of the digital divide. The environmental cost of digital innovation is also a concern, as artificial intelligence (AI) dramatically increases carbon emissions of computing companies such as Google.

Green education and wellbeing

In the fallout from the Covid-19 pandemic, a third of countries at the Transforming Education Summit in 2022 recognised the need to support the wellbeing of both students and teachers. Wellbeing, both physical and mental, has its own intrinsic value. The climate crisis is having a marked impact on student wellbeing, and education is well placed to use curriculum and pedagogy to embed the knowledge, skills and behaviours that will increase wellbeing. At the same time, it will empower students to respond to the current and ongoing emergency presented by the climate crisis.



Climate education should ensure students are aware of how to deal with the existing physical effects of climate change (e.g. staying safe during extreme weather events), and should build resilience through the use of coping strategies to handle the mental impact of climate anxiety. One such coping strategy is the use of green-space therapy. Time spent learning outside the classroom is a valuable part of climate education, and time spent outside in natural environments is valuable for its positive impact on our personal wellbeing (Weir, 2020). Green spaces in nature are not only necessary for creating a physical environment within which humans can

exist, they can also impact our mental health by lowering cortisol levels, reducing anxiety (Park et al., 2010) and improving cognitive function (Berman et al., 2012).

Failure to ensure that wellbeing is immediately and consistently addressed can impact on students' capacity to succeed in their education (Public Health England, 2014). This has the potential to limit the impact of other components of climate education on the students themselves, which would consequently limit the opportunities for 'reverse socialisation' (Singh et al., 2020) with wider society.



Greening education in the Islamic world

Islamic environmentalism

Islamic countries are both exposed to environmental harms and contributors to environmental damage. Bangladesh has estimated that one in seven of its population will be displaced by climate change by 2050, and areas in the Middle East and North Africa are increasingly prone to droughts and damaging floods.

The creation of the heavens and the earth is indeed greater than the creation of mankind; yet, most of the people do not know. (40:57 Quran)

There is a strong philosophical foundation for and history of environmentalism and climate action in Islam. Islamic principles of kindness and care in the treatment of animals led the Indonesian council of Ulama to declare trade in endangered species as ***haram*** in 2014, one of seven ***fatwa*** issued to improve sustainability since 1983. In 2022, Egypt's Dar al-Ifta issued a ***fatwa*** to prohibit environmental harms in the run-up to the UN Climate Change Conference in Cairo. Preparing to host COP28 in the United Arab Emirates (UAE), the Muslim Council of Elders organised the Abu Dhabi Interfaith statement to demand "transformative action to keep 1.5°C within reach and serve affected and vulnerable communities" (PaRD, 2023). These examples highlight how Muslims around the world are inspired by their religion and local communities to take action to preserve God's creation, the Earth. The increasing awareness of the innate environmentalism in Islam is calling the world's 1.8 billion Muslims to climate action.

Adaptation to climate change is a priority in many ICESCO member states. The ***Arab Sustainable Development Report 2024*** (UNESCWA, 2024) included sessions on building climate resilience and transforming education through greening



and inclusiveness. The report described shared understanding that environmental and climate crises required changes to work, education, health and social care systems. It acknowledged that adaptation to climate change needed to be based on a just transition with youth participation and green job creation. They concluded that all stages of education should be greened to bring about desired changes in behaviour.

One of the main objectives of education is to establish tolerant values, healthy attitudes, and behaviours to prepare learners to contribute effectively to the establishment of fairer, more equitable, more peaceful and more sustainable societies. Assuming its central role in this regard, the Education Sector seeks to strengthen efforts to provide learners with a tolerant Islamic value system, and to strengthen their willingness to act in accordance with it, by focusing on activating this value system within the educational process.

ICESCO's commitment to green education

Despite the international community's commitment to achieving SDG 4, which aims to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all", millions of children, youth and adults are deprived of education and lack opportunities to learn. Girls and women are particularly deprived of their educational rights

owing to several social, political and economic challenges. In addition, a large proportion of young people in school are not receiving a quality education, with more than half of the world's children and adolescents not achieving minimum standards of literacy and mathematical proficiency. Educational opportunities are unevenly distributed, and the barriers to quality education are still hindering accessibility and reachability for a large cohort.

In addition, almost one billion adults have been denied real learning opportunities. Therefore, more efforts are urgently needed to accelerate progress in expanding and improving the quality of learning opportunities, especially for the most vulnerable groups.

Under ICESCO's new vision, education is a major priority, as it represents a basic human right that everyone should enjoy without discrimination. It is also the most effective way to change the world, meet challenges and shape the future. Education is the power of the future and the greatest hope for humanity. It is also the main pillar for building peace, citizenship, tolerance, social justice and respect for human rights, and eradicating poverty, hunger, unemployment and inequality, preserving the planet and achieving sustainable development.

There is a need to develop education to better prepare learners for what the future may bring. The Education Sector, therefore, plays a leading role in empowering learners to become creative and responsible citizens. It can do this by focusing on improving the quality of the educational process and developing curricula, teaching methods and materials, as well as methods of assessing learning outcomes.



Policy guidelines and recommendations for greening the curriculum

A green curriculum is central to defining the strategic ambitions of green education. In 2022, the Transforming Education Summit agreed a goal for at least 90 percent of countries to include climate education in school curricula at the pre-primary, primary and secondary levels. This was inspired by a vision of a lifelong learning approach that will integrate climate education into school curricula, technical and vocational education and training, workplace skills development, teaching materials, pedagogy and assessment. This calls for a green curriculum that goes beyond teaching about the science of climate change and sustainability.

Preparing learners for green jobs

For many learners, the complex and intangible impacts of climate change are not a strong motivation for learning. A more proximate concern for older students is finding decent work. Delegates at the 2012 UN Conference on Sustainable Development (Rio+20) agreed that the green economy would drive inclusive sustainable development. Twelve years later, there is a gap in our ability to prepare students for emerging economic opportunities. Multiple surveys have revealed that young people believe their education is not preparing them for the modern economy. World's Largest Lesson reports that 48 percent of 37,000 students from 150 countries said developing skills for the real world would be their priority for improving education (World's Largest Lesson, 2023). Plan International surveyed 2,230 young people in 53 countries and found only 29 percent felt competent in the skills needed to do jobs that tackle climate change (Plan International, 2022). A UNICEF survey of 40,000 young people in over 150 countries found that 31 percent

believed that education did not provide them with the skills they need to get jobs (UNICEF, 2020).

The ILO defines decent work as the aspiration for work that is productive, paid, secure, offers development, is socially integrating, and provides equality of opportunity and treatment for all women and men. Decent work (SDG 8), quality education (SDG 4) and climate action (SDG 13) are highly complementary, and making progress on one can quickly positively influence another. For example, energy efficiency improvements may provide employment opportunities (Allan et al., 2017).

Reforming curriculum content

The climate crisis has necessitated a fundamental shift in our conception of foundational knowledge across the pre-primary, primary and secondary levels, which should be reflected in updates to national curricula (Cambridge Assessment, 2017). Within the school curriculum, knowledge of the climate crisis has commonly been associated with geography and science-related subjects. However, as this is a far-reaching issue facing our global society that extends beyond the limits of these subjects, it is important to acknowledge the role that other subjects within the curriculum can play in response to the climate crisis. A multi- and interdisciplinary approach is essential in supporting students to develop both their knowledge **of** the climate crisis, and the skills to **understand** and **address** the climate crisis (Cambridge University Press & Assessment, 2024). The World's Largest Lesson report, **Ready, Willing and Able?** proposes a taxonomy of 17 sustainability competences based on the European sustainability competence framework. These are grouped in competences dealing with action, values, vision, science and complexity. This emphasises the need for a curriculum that prepares students for the challenges and opportunities of climate change.

Case studies for greening the curriculum

Earthna lesson plans for the unique Qatar marine ecosystems

Earthna has six lesson plans for the unique Qatar marine ecosystems: Coral Reef, Intertidal, subtidal and beach, Mangrove, Open Gulf, Sabkha and Seagrass. These place-based lesson plans aim to foster a sense of identity and responsibility among students towards their surrounding nature and environment. The lesson plans include many local resources that provide teachers and students with a thorough knowledge of the ecosystems' biodiversity, with prudently designed in-classroom and nature-based activities. The highlight features of the lesson plans are the maps that were meticulously prepared for six destinations to explore the six ecosystems with activities, and best practices to care for the fragile environment of Qatar. Read more: <https://www.earthna.qa/publications/educational-materials/qatar-marine-ecosystem-lesson-plans>

UNESCO MGIEP guide to embedding ESD

The UNESCO Mahatma Gandhi Institute of Education for Peace and Sustainable Development (MGIEP) published a guide to embedding education for sustainable development (ESD) in 2017, written for publishers and authors. The guide provides a useful model for successfully embedding values and attitudes within a range of curriculum subjects. It proposes the embedding of ESD through practical guidance for publishers and authors based on overarching principles and subject-specific approaches. Exemplar models of ESD embedded in subject content alongside discussion help authors understand the intentions and provide a model of the approach. Read more: <https://mgiep.unesco.org>

Action following COP28

The United Arab Emirates hosted COP28, and as part of the Greening Education Partnership has implemented a series of initiatives to green the curriculum. The Environmental Sustainability Cross-curricular Framework (ESF) provides an outline of how cross-curricular concepts, competencies and dispositions relating to environmental sustainability are developed. The ESF has been fully implemented and is supported by a set of resources for 5- to 10-minute activities called the Environmental Sustainability Toolkit (EST). Availability is a priority, and the EST is accessible as offline PowerPoints in five languages: Arabic, English, French, Spanish and Chinese. The UAE Ministry of Education has also worked alongside national and international partners to create the BIG GREEN lesson. These are lessons for all ages that can be delivered as part of any subject. They equip students with foundational knowledge and empower them to become active participants in driving positive environmental change.

Read more: <https://erthzayed.com/greening-curriculum>



Recommendation 1: Create a green curriculum and assessment framework

Why create a green curriculum and assessment framework?

The developers and signatories of the Sustainable Development Goals (SDGs), through SDG targets 4.7 and 13.3, already recognise that national education systems globally should mainstream climate education to empower students to understand, and be responsive to, the climate crisis. To achieve this, we recommend all countries should review and redevelop a coherent national curriculum (including a national curriculum framework, subject-specific curricula and an assessment framework) to incorporate high-quality, holistic climate education across all phases of education that is inclusive of diverse stakeholder voices and provides direct relevance for students.

The learning outcomes relevant to green education are more likely to be achieved if climate education and sustainability are integrated into national curriculum and assessment frameworks, with specific expectations of what knowledge and skills should be learnt and assessed in each subject and grade.

Focused interdisciplinary collaboration is a key factor in addressing the multifaceted issues presented by the climate crisis (Goodman & Mesa, 2022). Discourses, including those relating to the climate crisis, are not usually discrete within any system or context, but are pluralistic. They represent 'a truth' and not 'the truth'. Education is a key element of our complex societal structures that creates, maintains and gives legitimacy to particular discourses (Apple, 1979). Therefore, codifying the discourse around the climate crisis through the design of the national curriculum can provide an opportunity for presenting a standardised, coherent and inclusive discourse. This can guide the approach for implementation

across the different disciplines, as expressed through the subject-specific curricula.

What will success look like?

In development, a successful greening of a national curriculum will be observed when it includes the essential knowledge and skills that students need to understand and effectively respond to the climate crisis in terms of environment, society and economics.

The ultimate success of a curriculum is seen through the achievements and outcomes of the students who follow it. These take time to be realised and are dependent on allied changes in other areas of educational and social policy. For these students, a successful greening of the curriculum will be the basis of engaging and relevant learning experiences that lead to them graduating ready to be part of green societies and economies progressing to net zero. There should be a framework for monitoring and evaluating success in developing and implementing the updated national curriculum. This will ensure that it continues to meet the success criteria, and set out what to do when it does not.

1. All references to climate education within the national curriculum and assessment frameworks align to relevant broader national and international policies, and all outputs are aligned with each other.

- The curriculum framework clearly articulates its vision, values and aims, and aligns these to relevant broader national and international policies on climate education
- Each subject-specific curriculum clearly articulates the aims of the subject, aligning directly to those in the curriculum framework
- The assessment framework clearly articulates how the climate education-related knowledge and skills within the subject-specific curricula will be assessed through formative and summative assessment for all phases of education

2. There is internal coherence within all outputs to ensure they all provide a useful contribution to climate education, drawing on the strengths of the given discipline while avoiding repetition of content.

- The national curriculum provides progression mapping to show how the essential knowledge and skills needed to understand the climate crisis, and its potential solutions and mitigations, are covered within each subject and how they progress across all phases of education
- There is no unintended repetition of climate education content identified within or between subjects
- Cross-curricular links relating to climate education across subjects and phases of education are clearly articulated

3. The development process should be inclusive of diverse stakeholder voices (including ethnic minorities, indigenous groups and students). It provides personal, local and global lenses through which to engage with the climate education content to ensure it has direct relevance for students.

- There is evidence of stakeholder engagement in the planning and development process for climate education within the national curriculum. This includes engaging those belonging to ethnic minority and indigenous groups, and students.
- There is a clear and justifiable rationale for any instances where stakeholder voices have not been actioned in the development of climate education within the national curriculum
- The subject-specific curricula provide opportunities to engage with personal, local and global issues related to the climate crisis

Short-term targets (by 2030)

At the Transforming Education Summit in 2022, a third of countries committed to integrating climate change education into curricula. UNESCO has described in more detail a 10-step plan to achieve this. If greening the curriculum in ICESCO member states is successful, by 2030 **90 percent of countries** will have:

- Completed a consultation process for curriculum analysis and redevelopment
- Completed a skills audit of their curriculum developers in relation to their ability to incorporate climate education into the national curriculum, and have planned any upskilling as required
- Initiated their national curriculum analysis and / or redevelopment, with a timeline for rollout of the analysis and / or redeveloped national curriculum for each phase of education

Long-term target (by 2035)

By 2035, **ALL countries** will have published the redeveloped national curriculum (or identified green knowledge and skills in the existing curriculum) and completed the rollout to all phases of education.

Creating conditions for success

Curriculum analysis and redevelopment should be part of a system-wide greening of education. Step 7 of the UNESCO curriculum development roadmap focuses on collaboration with those working on other facets of the education sector to ensure coherence and improve impact. Orientation to the curriculum should be provided for textbook writers, exam board staff and other stakeholders.

Creating high-quality curriculum content requires curriculum developers that have the required knowledge and skills related to climate education to effectively redevelop the national curriculum. Where this is not the case, upskilling should be provided ahead of the start



of any redevelopment work. Creating a robust quality assurance process for the national curriculum redevelopment should identify who is accountable for technical oversight and approval across the whole redevelopment. This will ensure the quality of outputs from the curriculum developers.

Countries attending the Transforming Education Summit in 2022 made statements of commitment recognising the need to address levels of basic literacy and numeracy. These skills should be seen as critical to accessing the broader content needed to understand and respond to the challenges and opportunities of climate change. The redevelopment of curriculum content placement should take into account which phases of education are available to all¹ and which are optional, and whether subjects are mandatory or optional. This is to ensure that all students² have access to the essential knowledge and skills required to understand and respond to the climate crisis.

A note on green education and pedagogy

Many countries at the Transforming Education Summit in 2022 made statements of commitment about reforming pedagogical approaches. These emphasised competency-based and interdisciplinary approaches as well as project-based learning, collaborative methods, problem solving and research. While each of these has value in certain learning contexts, there is no evidence that a single pedagogical approach should be adopted to the exclusion of all others. We recommend that these approaches are integrated into a toolkit of pedagogies to be used when they have the greatest impact on learning.

¹ This assumes that all children have an enabled right to access the primary and secondary phases of the education system covered by the national curriculum, as outlined in Goal 4 of the SDGs.

² This assumes children do not face barriers to enrolment and retention.

Green education has been implemented in a variety of ways in different countries, including embedding it within subjects, as a cross-curricular theme, through interdisciplinary activities, and as part of a whole-school approach to sustainability. Many authors have explicitly linked green education to specific pedagogies (Eilam, 2022; Ross, 2000). This is based on limited evidence of effectiveness and should be treated cautiously. Field trips, flipped classrooms, role plays and community projects are effective approaches to climate change education (Khadka et al., 2020; Monroe et al., 2019). Innovative interventions that use participatory and arts-based modes of engagement, as well as emotions, to motivate students and to foster hope and self-efficacy are also highlighted, together with the use of technology, games and virtual reality as tools to enhance learners' engagement (Bottin et al., 2023; Rousell & Cutter-Mackenzie-Knowles, 2019). However, it is not possible to conclude that these are more, or less, effective than other pedagogies.



Recommendation 2: Create pathways to green careers

Why create pathways to green careers?

There is a significant gap between the skills of graduates, the needs of the labour market and the skills of the future. There is ample evidence that the output of many educational institutions is not adapted to the requirements of current situations and the skills of the future, in terms of the knowledge, skills and abilities needed. So, ICESCO member states' efforts to improve the quality of education and to develop their curricula are vital.

The importance of human capacity development can also be seen in the SDGs related to education (SDG 4: “[...] affordable and quality technical, vocational and tertiary education [...]”, “relevant skills [...] for employment, decent jobs and entrepreneurship”) and decent work (SDG 11: “Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation”). Coherent strategies are needed to align the education opportunities for children and the employment opportunities available to them later on.

If curriculum and assessment pathways linked to economic opportunities are available to all youth, nations will have the human capacity necessary to strengthen their green economies. They will also have the innovators and entrepreneurs necessary to design, realise and implement solutions to challenges of climate change and environmental degradation.

In our recommendation to create a green curriculum, we referenced the guidance produced by UNESCO to achieve this. That guidance defines economics as one of the domains. We recommend that the curriculum should not only teach learners about post-carbon economies but also prepare them to be part of

them. This is consistent with the intention that a green curriculum should be action orientated and promote just transitions.

In 2019, the ILO reported the skills needed for a green economy based on 32 countries (including eight ICESCO members). They highlighted the relationship between education, employment and green transitions. Transitions to sustainability and inclusive economies and societies can only take place if the necessary skills are available in the labour market.

Forward-looking skills strategies are necessary to train young people and reskill the current workforce to meet the skills needs of the new jobs generated in the transition [...]. (ILO, 2019)

The ILO and UNEVOC (the UNESCO-UNEVOC International Centre for Technical and Vocational Education and Training) have both identified the need to focus these education programmes on technical, sector-specific skills and core (or soft) skills such as problem solving, communication, creative thinking, teamwork, strategic thinking, digital and planning skills. The UNEVOC survey ‘Building TVET resilience’ (UNESCO-UNEVOC, n.d.) across 50 countries found that these soft skills are essential to resilience and employability in youth. For countries where there is a large informal economy, these skills are associated with the entrepreneurship that will grow new green businesses. Most countries planning for climate-related economic shifts do not yet have sufficient targeted strategies for developing the necessary skills base. This limits access to the 100 million new jobs that could be created in renewable energy, waste management, water management, tourism, transportation and construction (UNESCO-UNEVOC, 2024).

What will success look like?

A successful greening of the curriculum pathways to jobs of the future will be observed when the pathways through the national curriculum (particularly upper secondary and tertiary) offer



learners the opportunity to develop knowledge, skills and competencies relevant to opportunities in the green economy. The knowledge, skills and competencies required to access these careers should be identified and validated through engagement with higher education institutions and employers in the relevant sectors.

The ultimate success of these curriculum pathways will be seen in the satisfaction of students with their transition to meaningful opportunities in higher education and employment. It will take time for the first full cohorts to make this transition, and success will depend on allied changes in higher education and economic policy. For these students, a successful greening of the curriculum pathways will mean preparation for and transition to meaningful roles in sustainable societies and economies. There should be a framework for monitoring and evaluating the success of this transition and the satisfaction of students with their careers after leaving school.

1. An established and systematic mechanism exists for assessment of skills requirements.

- Information on supply and demand is regularly collected and analysed in collaboration with the private sector
- Skills policies are implemented and reviewed regularly
- General, technical and vocational education institutions are engaged in policy development
- Information on post-school careers is regularly collected and analysed to inform management of the curriculum pathways

2. Pathways in the upper secondary and tertiary curriculum align to opportunities in the green economy.

- Early pathways develop the foundational knowledge and skills needed to access more specialised learning in later stages of education

- Children have curriculum options that allow them to focus on areas of strength and development in their summative years of education
- The content of the pathways is aligned to the goals of general education and does not create overlap with the skills and training provided through employment or apprenticeships

3. Youth that are not in formal education have opportunities to develop the sector-specific and soft skills needed for jobs in the green economy.

- Programmes are based on local networks and characterised by a high level of trust, collaboration and participation in their design
- Programmes are accessible to youth through rigorous understanding of entry requirements and availability
- Programmes are sponsored, endorsed and recognised by local private sector actors and other employers

Short-term targets (by 2030)

The low- and middle-income countries attending the Transforming Education Summit in 2022 made statements of commitment recognising the overall need to develop post-secondary technical and vocational programmes to strengthen education systems and to support national economic development plans. To create meaningful education pathways to further education and employment in net zero and sustainable societies, by 2030 **90 percent of countries** will have:

- Completed a consultation process with higher education institutions and employers to understand knowledge, skills and competences associated with existing and emerging opportunities for decent work in the green economy
- Held a multi-sectoral conference to identify the workforce requirements for a just transition to a green economy

- Published the outcomes of an audit of their upper secondary and tertiary curriculum indicating the pathways to decent work in the green economy
- Funded and evaluated at least one sector-specific upskilling programme for out-of-school youth seeking employment in the green economy

Long-term targets (by 2035)

By 2035, **ALL countries** will have created and publicised inclusive curriculum pathways that prepare any learner for careers in established and emerging green industries.

By 2035, **ALL countries** will have created and publicised a range of upskilling programmes focusing on sector-specific and soft skills for careers in established and emerging green industries.

Creating conditions for success

The work of creating educational pathways to further education, employment or other adult roles in society is likely to focus on older learners in secondary education. However, access to these pathways is dependent on successful achievement of the commitments to address levels of basic literacy and numeracy. There is likely to be an interim period where basic education does not adequately prepare students for this level of study, and temporary short courses may be needed to bridge the gap.

Creating the workforce needed to drive a just green transition will require an education system that can teach the required knowledge, skills, values and attitudes, including sector-specific and soft skills. This in turn requires skilled teachers who can support this learning. Where this is lacking, upskilling should be provided ahead of the start of any redevelopment work.

Step 2 of the UNESCO curriculum development roadmap focuses on inclusive participation of stakeholders. This should include the higher education institutions, employers and sectoral bodies that are responsible for employment. Creating a just transition to a green economy and capitalising on the economic benefits is dependent on the alignment between policy, investment, infrastructure and workforce.



Recommendation 3: Promote green values and attitudes

Why promote green values and attitudes?

We recommend ICESCO member states adopt a policy goal of creating learning resources and environments that promote the values and attitudes required to respond to the climate crisis across the curriculum. Learners' values and attitudes towards the climate crisis are shaped by their experiences in the classroom. High-quality teaching and learning materials, whether print or digital, have a significant impact on teachers' classroom practice.

Climate education is most effective when it is personally relevant and meaningful, and uses engaging learner-centred pedagogies. Approaches to teaching and learning should facilitate deliberative discussions, provide opportunities to interact with scientists, elicit and address misconceptions, and include school or community projects.

Centralised support for the development and effective implementation of teaching and learning materials that embed green values and attitudes should include:

- Development of a descriptive framework of the values and attitudes that learners are expected to develop by the end of each cycle or curriculum stage. Authors and publishers will need structured descriptions of the target values and attitudes, and how they progress through different curriculum stages, in order to embed these in a coherent and planned way.
- Development and delivery of training and support for authors and publishers, and teaching and learning material reviewers to operationalise the descriptive framework (UNESCO, 2024e)

- Integrating the descriptive framework throughout the curriculum using combined subject planning, taking a holistic approach to learners' development across subjects
- Holding student voice sessions during authoring to ensure local relevance and that content is relatable

What will success look like?

A student who is experiencing a successful green curriculum is likely to identify the link between their learning and their context. These students will have developed both values and attitudes from their local context (in addition to more diverse examples) and be able to apply their understanding and skills to developing solutions that reflect these values and attitudes. Students who demonstrate resilience, empathy and creativity in solving problems related to environmental risks are the best evidence of success.

Teaching and learning materials that promote green values and attitudes should support teachers in adapting their delivery to the needs and interests of their students and their local context. Rather than being treated as a standalone requirement, these values and attitudes should be integrated into subject content across the curriculum. They will then support the intended curriculum outcomes with natural opportunities to develop and demonstrate green values and attitudes. The ability to take local action means understanding local context. The successful reflection of values and attitudes in teaching and learning materials will be seen in the strength of the consultation that produced them.

1. The development of values and attitudes necessary to respond to the climate crisis is holistically supported, modelling learner progression coherently across subjects and through grades.

- Clear subject-agnostic descriptions of the target values and attitudes describe progressive development through the

curriculum by stage (i.e. groups of grades, such as 1–4, 5–9, 10–12)

- Formal approval criteria for teaching and learning materials explicitly require reviewers to assess how effectively the materials under review provide opportunities for developing target values and attitudes

2. Examples are provided in teaching and learning materials to respond to learners' interests, experiences and local environment.

- Training for authors and reviewers is available on demand and, where authoring is the responsibility of non-ministry organisations, incorporated into author briefing and training
- The descriptive framework and effective pedagogies for developing attitudes and values are incorporated into professional development for teachers

3. Teaching and learning materials explicitly signpost opportunities to develop attitudes and values within individual subjects and provide mapping across subjects.

- Mapping of attitudes and values is provided for teachers to support cross-subject planning and collaboration
- Learners are made aware of the green values and attitudes through classroom teaching and the teaching and learning materials

Short-term targets (by 2030)

Most countries making a statement of commitment at the Transforming Education Summit in 2022 reflected the need to provide free access to quality education as a public good. In the context of greening the curriculum, this means providing access to good-quality teaching and learning materials, which will promote values and attitudes to all learners including: learners from economically vulnerable communities, learners with disabilities, learners from cultural and linguistic minorities and

learners with different legal and migratory status. To achieve this, by 2030:

- **90 percent of countries** will have developed and embedded a descriptive framework of learner values and attitudes into their curriculum process
- **90 percent of countries** will have embedded values and attitudes in teaching and learning materials for national subjects
- **>95 percent of authors** for national subjects in embedding countries will have received practical training on implementing the descriptive framework
- **>95 percent of reviewers** for national subjects in embedding countries will have received training on the descriptive framework
- **>75 percent of lead teachers** for national subjects in embedding countries will have received orientation on the descriptive framework and student-centred pedagogical approaches

Long-term targets (by 2035)

By 2035, **ALL countries** should have fully established a green curriculum supported by textbooks and teacher guides that promote the values and attitudes necessary to respond to challenges of climate change.

- **ALL countries** will have descriptive frameworks supplemented with real examples of good practice selected from teaching and learning materials in use to support authors and reviewers
- **ALL countries** will have embedded values and attitudes in teaching and learning materials for science, technology, engineering and maths (STEM) subjects
- **90 percent of schools** will be part of a network sharing planning and resources to localise climate education content and create more learner-centred approaches to teaching and learning



Creating conditions for success

A key requisite for embedding green values and attitudes in teaching and learning materials is clear and explicit integration into the curriculum. Effective signposting and well-articulated curriculum intentions help individuals (who may not have been part of the curriculum development process) work to ensure greater fidelity between policy planning documents and models of teaching and learning.

Where an open market exists, the production of good-quality teaching and learning materials requires collaboration between ministries of education and third-party publishers. To support effective embedding of values and attitudes within teaching and learning materials there needs to be an effective communication strategy to ensure publishers, authors, editors and evaluators have a shared understanding of green values and attitudes.



Policy guidelines and recommendations for a green teacher workforce

Establishing a green teacher workforce is vital to achieving the strategic ambition of green education. In 2022, the Transforming Education Summit agreed a goal for all school leaders and at least one teacher per school to be trained on how to integrate climate education into teaching and learning. This was inspired by a vision of a green education workforce who would learn how to integrate climate education through pre-service and in-service teacher training, as well as other training initiatives. This calls for the integration of climate education in teacher training, and consolidation of these competencies and values through teacher communities of practice. Educators worldwide are increasingly recognising their pivotal role in addressing the climate crisis. International research, reports and frameworks showcase general strategies for greening education (UNESCO, 2024a) and underscore the need for these educational efforts to be urgent and effective in preparing future generations to confront climate challenges (IPCC, 2022).

The importance of teacher education

Teachers are enablers and agents of change in the development of young people. They are uniquely placed to mould future global citizens who have the knowledge, competencies and dispositions to respond to mounting challenges to environmental sustainability. Teachers' knowledge and competencies in this area and related pedagogy are crucial for structuring educational processes, provisions and institutions towards sustainability (Evans, 2020; UNESCO, 2017).

Teacher education needs to orientate itself towards green education in a systemic way. Teachers must be equipped with knowledge about the climate crisis, and its potential solutions, to enable learners to develop systems and critical thinking, problem-solving skills and a sense of global citizenship, empowering them to address complex climate and sustainability challenges effectively. They also need to acquire key pedagogical content knowledge – the knowledge of how to teach the content – and develop the values and motivations to embed sustainability into their professional practice (Bottin et al., 2023; Bürgener & Barth, 2018).

However, creating a green education workforce is about much more than teaching individual-level behaviour change. The focus needs to be on creating a school community that is capable of and motivated to give students the knowledge, skills, values and attitudes to understand the climate crisis and its potential solutions. This should be in a systemic way that additionally enables them to enter the green jobs market. These changes can only be accomplished with the support of school leaders and other education stakeholders who are also sufficiently versed in the significance and impact of sustainability and climate education through their own training programmes (Abidin et al., 2023; Falkenberg & Babiuk, 2014; Leo & Wickenberg, 2013; UNESCO, 2014).

A holistic approach to workforce development

Professional development of teachers through pre-service and in-service training has been identified as a major trend in international and national-level policymaking to achieve sustainable development, social and environmental responsibility (UNESCO, 2014). ICESCO members already have teacher training and development programmes. These guidelines and recommendations are to enhance these programmes rather than to create new ones.



The advancement of technology in an age of digitisation, education technology and remote learning can play an essential role in education for sustainability by increasing resilience in access to education, and promoting sustainability more widely (Costa et al., 2023; Pradhan et al., 2021; Thomas et al., 2024). Digital technology is a tool for collaboration in local teaching communities to foster professional learning and best practices. It can also contribute to the development of shared knowledge, cultivate a sense of belonging to a wider community and promote the achievement of SDGs through education (Beach, 2012; Brandt et al., 2021).

Case studies for a green teacher workforce

Nigeria's compulsory advanced diploma in climate education for teachers

Nigeria's National Policy on the Environment (Federal Ministry of Environment, 2016; NESREA, 2017) saw education as the catalyst and instrument for change to address environmental problems and promote sustainable development. One crucial aspect of this change lies in the vocational training and continuous professional development of teachers, administrators and other stakeholders in environmental education and sustainability. Inspired by this policy, the National Teachers' Institute (NTI) initiated the Green Teacher Nigeria (GTN) Project in partnership with the Commonwealth of Learning (COL) to offer a 12-month Advanced Diploma in Environmental Education. This targets primary and secondary school teachers as well as staff of environmental protection agencies and other education stakeholders.

The programme was delivered through a blended model using digital technology for distance learning (Commonwealth of Learning, 2018; Ezeh, 2018; Kaduna, 2018). It equipped teachers with the necessary knowledge and skills for implementing environment and sustainability education in schools. It also created holistic environmental awareness and understanding in teachers, learners, communities and other stakeholders, contributing to collaborative community actions to solve environmental issues. More advocacy and clear career progression paths for teachers could be provided in the future to further increase teacher enrolment and participation (Ndem & Shuaibu, 2019).

Recommendation 4: Green existing teacher education

Why green teacher education?

We recommend ICESCO member states adopt a policy goal of integrating sustainability education into existing pre-service and in-service teacher education programmes. Teachers are capable of unlocking learners' potential, shaping the future of our planet and achieving SDG 4. However, the shortage of qualified teachers around the world in both developing nations and high-income regions poses a major threat to this goal. This matter demands urgent attention not only to the quantity but also to the quality of teachers (UNESCO, 2024d). Therefore, the success of greening education is also contingent upon effective teacher education programmes that can create a qualified teacher workforce.

This policy goal of teacher education should take a holistic, systemic approach with alignment to the professional development of school leaders and other educators. If educators are equipped with the domain knowledge, pedagogical skills and values relevant to green education, they are more likely to create learning environments in which learning outcomes related to climate and sustainability are more effectively achieved.

Pre-service and in-service professional development enable and empower teachers to develop necessary content knowledge, pedagogical content knowledge as well as key values, attitudes and motivations for tackling the challenge of climate change and promoting sustainable development (Álvarez-García et al., 2015; Martin et al., 2007; Nousheen et al., 2020; Santone et al., 2014). An approach to workforce development is needed that looks holistically at all types of knowledge and competencies related to sustainability. It should be implemented in a systemic way through concerted efforts from education policymakers, teacher education institutions and school leaders.

What will success look like?

A student being taught by a green teacher will recognise their competence through their knowledge of the key concepts, their engagement in making the learning interesting and relevant, and their supportiveness in allowing students to question, explore and learn more about how they can solve some of the problems created by climate change. They will see a teacher capable of “enabling learners to develop systems and critical thinking, problem-solving skills and a sense of global citizenship, empowering them to address complex climate and sustainability challenges effectively” (UNESCO, 2024a). Successful implementation of a policy for greening teacher education can be identified through the existence and implementation of a strategy by all stakeholders in teacher education. In schools, there should be a tangible commitment to professional learning about climate and sustainability, and implementation of a vision that guarantees sustainability and climate learning for all.

1. A national framework and strategy for teacher education in sustainability and climate education is published and adopted.

- A national framework policy document, detailing the importance of education for sustainability, key competencies and values is required for teachers to deliver sustainability and climate education, and standards in line with a respected framework (e.g. The International Standard Classification of Teacher Training Programmes, UNESCO, 2021b)
- A national strategy is developed in partnership with key education stakeholders including policymakers at different levels, school leaders, teachers and teacher trainers for effective implementation of the framework above



2. Higher education and other institutions evidence coverage of sustainability and climate education in their programmes.

- Institutions make subject and pedagogical content knowledge on sustainability and climate education prominent in their pre-service teacher education programmes
- Confidence in delivering sustainability and climate change education in the classroom is part of teacher certification and licensure
- Teachers promote sustainability and climate change education in their classroom practices, values and attitudes

3. School leaders have received appropriate training in sustainability and climate education.

- School leaders are trained in sustainability and climate education
- The confidence level of school principals in promoting green education in their schools is part of school inspections and approvals
- Supporting in-service teachers' continuous professional development in sustainability is integrated into expectations of high-quality school leadership

Short-term targets (by 2030)

Countries at the Transforming Education Summit in 2022 focused on the existing workforce in their statements of commitment. They committed to improving working conditions, social status and professional development opportunities. These commitments revealed professional development as a major tool for recruiting and motivating teachers. These tools for motivating the teacher workforce are also tools to achieve the ambitious goals required for greening the workforce. By 2030:

- **ALL countries** will have published and implemented a holistic, systemic and coherent national framework and strategy for teacher education in sustainability and climate education

- **The LARGEST provider** of pre-service and in-service teacher education will have embedded sustainability and climate education into their programmes
- **ONE teacher per school** will have been trained on how to integrate climate education into teaching and learning throughout the school
- **ALL school leaders** will have been trained on how to integrate climate education into teaching and learning throughout the school

Long-term targets (by 2035)

By 2035, countries should have fully established the national framework and strategy.

- **ALL countries** will have conducted and published an impact evaluation of their national framework and strategy for teacher education in sustainability and climate education
- **ALL** higher education and other institutions that offer pre-service and in-service teacher education will have embedded sustainability and climate education into their programmes
- **At least 90 percent of teachers** will have received professional certification on integration of climate education into teaching and learning throughout the school
- **ALL schools** will have been inspected to confirm quality climate education and leadership throughout the school

Creating conditions for success

A recent African Union Commission (AU)–UNICEF report on *Transforming Education in Africa* noted that 17 million additional teachers are needed to achieve targets for universal education (AU-UNICEF, 2021). The phenomenon of teacher shortages is not limited to Africa, and many countries have experienced challenges in recruiting and retaining the necessary teacher workforce. SDG Target 4C requires signatories to “substantially increase the supply of qualified

teachers, including through international cooperation for teacher training in developing countries, especially least developed countries and small island developing States”. Existing initiatives to make teaching an attractive occupation by enhancing its social status, increasing income and providing opportunities for career development and training (especially in climate and environmental change), will contribute to the development of a sustainable teacher workforce.

Introducing its research-based guidance on effective professional development, the Education Endowment Fund (EEF, 2024) in the UK states that: “Supporting high quality teaching is pivotal in improving children’s outcomes. Indeed, research tells us that high-quality teaching can narrow the disadvantage gap”. This recommendation is to integrate green knowledge and pedagogies into existing

professional development programmes rather than invest in new ones. This requires joint, concerted efforts of education policymakers, school leaders, teachers and higher education or professional training institutions. Teachers are key to system-focused education reforms. Their professional development and communities need to be aligned to the green curriculum and supported by green schools to ensure alignment and effective implementation.

Public–private partnerships between the state and industries or non-governmental organisations (NGOs) can also contribute to these targets through pooled funding for teacher professional development and widening participation, especially in lower-income, marginalised areas or groups. This will help increase the number of qualified teachers, improve quality of teaching and promote education for sustainability more widely.



Recommendation 5: Create green communities of teaching practice

Why create green communities of teaching practice?

We recommend ICESCO member states adopt a policy goal of creating communities of practice to champion teachers with the values and attitudes needed to respond to the climate crisis. This recommendation will require the identification and promotion of local and inter-institutional communities of practice for teachers within and across all ICESCO member states. If educators are supported by local professional networks, they will sustain the implementation of programmes promoting the knowledge, skills and values relevant to green education. Therefore, learning outcomes related to climate and sustainability are more likely to be achieved.

Professional learning is not constrained to one-off training events or courses. Rather, it is a prolonged, ongoing process of formal and informal interactions. Off-site training, typical at the start of professional learning, is most useful for developing new skills, while on-site training is valuable for ongoing problem-solving and encouragement (De Barros et al., 2021). The Education Endowment Fund identifies practical social support as one of five mechanisms necessary for developing teaching techniques.

Teacher communities of practice can be established at different levels: locally within schools, nationally between institutions, and internationally across borders. Communities of practice, both local and inter-institutional, support the continuous professional development of teachers and school leaders, and enhance their quality of teaching and leadership skills (Guberman et al., 2021; Laksov et al., 2008; McCauley-Smith et al., 2015). These communities can also unite teachers on a joint mission for

sustainability education and champion the values, attitudes and best practices needed to respond to the climate and environment crisis (Alkather & Avissar, 2018; Meesuk et al., 2021; Warr Pedersen, 2017).

What will success look like?

Teachers who are members of a green community of practice will be well placed to deal with emerging challenges in implementing green education. As part of a team, they will find solutions and innovations more effectively than unnetworked peers. For a student, being taught by these teachers will be characterised in more impactful and diverse learning opportunities which their teacher has accessed through their peers.

Successful implementation of this policy for supporting green communities of practice will be seen in the presence of supportive conversations in existing and new professional networks.

1. Local communities of practice champion the values, attitudes and best practices of education for sustainability.

- Teachers have access to professional community networks
- Teachers are encouraged to engage with local professional networks to address challenges of teaching climate and sustainability

2. Inter-institutional teacher communities facilitate collaboration between teachers from different schools on climate and sustainability education.

- Inter-institutional teacher communities are accessible across the nation
- Teachers are encouraged to engage with inter-institutional networks to address the challenges of teaching climate and sustainability
- Community meetings and communications between institutions include challenges of teaching climate and sustainability

3. International teacher communities promote sharing of knowledge and best practices.

- International teacher communities are accessible across the nation
- Teachers are encouraged to engage with international networks to share knowledge of teaching climate and sustainability
- International community communications include sharing news and research about teaching climate and sustainability

Short-term targets (by 2030)

UNESCO has set a goal for 90 percent of countries to have greened their curriculum and 50 percent of schools to meet green school standards by 2030. To achieve this, professional communities of practice need to be in place to share good practice and address challenges. By 2030:

- **50 percent of schools** will have established a forum for teachers to discuss the values, attitudes and practices needed to respond to the climate and environment crisis
- **ONE teacher per school** will have become an active member of a local teacher community
- **At least ONE** inter-institutional teacher community will have been established and funded to facilitate continuous professional development and champion the values, attitudes and practices of climate and sustainability education
- **ONE** online platform will have been developed and funded to facilitate an international community of practice for teachers

Long-term targets (by 2035)

By 2035, teacher communities should be self-sustaining with active promotion and funding provided by government.

- **90 percent of schools** will have established a forum for teachers to discuss the values, attitudes and practices needed to respond to the climate and environment crisis
- **90 percent of teachers** will be members of a local teacher community
- **At least ONE** inter-institutional teacher community will be funded to facilitate regular webinars and conferences to champion the values, attitudes and practices of climate and sustainability education

At least 10 percent of teachers will be registered on the international online platform

Creating conditions for success

A system-thinking approach to managing the teacher workforce requires analysis of the wider community of education professionals that teachers work with. Encouragement and support from school leaders and policymakers at all levels are essential for enhancing teachers' continuous professional development and collaboration. Inspection and licensure arrangements also need to be supportive of collaboration and networking, recognising the value of time spent on this as a professional activity. A supportive environment and acknowledgement of teachers' agential capacity can encourage teachers to participate in professional communities and empower them to take ownership of these communities.

In contemporary society, communities are established and strengthened through digital connectivity. IT infrastructure including access to electricity and the internet, computers and a suitable online platform need to be in place for the online community of practice. Public-private partnerships between the government, schools and edtech providers can help improve IT infrastructure.



Recommendation 6: Prepare climate- resilient teachers

Why prepare climate-resilient teachers?

We recommend ICESCO member states adopt a policy goal of using training in digital technology and pedagogy as part of creating a climate and environment crisis resilient teacher workforce. This policy will require both the development and implementation of training as well as the introduction of fit-for-purpose technology to facilitate collaborative professional development, teacher–learner interactions and communication with parents and the wider community. The Covid-19 pandemic revealed the fragility of many education systems across the world and highlighted the importance of preparedness and resilience in times of crisis. The need for fit-for-purpose technology and high-quality remote learning has reached unprecedented heights (Kang, 2021; Qurotul et al., 2020). It became evident that digital technology is pivotal in (although not sufficient for) building more resilient education and a more resilient teacher workforce. If educators are knowledgeable and capable users of digital technology, they will be better prepared to use it to sustain learning when climate and environmental emergencies prevent learners from attending schools. We note that climate resilience requires other skills such as emergency planning. Many of these are highly contextual, and we focus here on a policy that is likely to be applicable to all ICESCO member states, even if the policy implementation may vary.

The complementary relationship between teachers and technology has been widely recognised. Digital technology is a means of delivery for education and optimising conditions for teacher–student interactions (UNESCO, 2023; Zhang et al., 2020). With adequate training in the use of digital technology and digital pedagogy for online teaching, teachers

can be equipped with the necessary knowledge and innovative digital pedagogy to deliver education remotely and become more resilient to climate and environment crisis (Burbules et al., 2020; Mishra & Koehler, 2006). In addition, digital technology has transformative power that can be harnessed to create a greener teacher workforce. It can facilitate teacher professional development by breaking down barriers related to location or time, fostering teacher-to-teacher collaboration and improving teaching practices. This includes appropriate use of AI. AI has the potential to assist teachers in providing more personalised learning experiences for learners, provide data-driven insights into learner engagement and motivation, and help teachers deliver sustainability education more efficiently. However, AI also presents challenges in relation to ethics, infrastructure and investment (Abulibdeh et al., 2024; Kamalov et al., 2023; Lin et al., 2023).

What will success look like?

A student being taught by a climate-resilient workforce will experience less learning loss than peers taught by teachers who lack this resilience. They will see their teachers move swiftly and effectively to online and home learning. They and their parents will receive clear instructions on learning they can achieve without the instruction of a teacher. Their teacher will use digital technology to have meaningful interactions that minimise learning loss. A measure of success will come from the continued monitoring of learning outcomes and the reduced loss of learning during climate-related school disruptions.

Successful implementation of this policy for creating a climate-resilient workforce can be identified through the certification of teachers' digital skills and the availability of digital technology.

1. Teachers are trained in the use of digital technology, both hardware and software.

- Teachers are certificated, competent and confident in using and maintaining computers
- Teachers are certificated, competent and confident in using online learning management systems and other software, including AI assistants where appropriate

2. Teachers are trained in digital pedagogy suitable for online teaching and learning.

- Teachers are certificated, competent and confident in digital pedagogies
- Teachers use digital technology and pedagogy in their professional practices

3. Teachers have access to necessary digital technology at school (hardware and software).

- Teachers and learners have electrical supply and internet access at school and home
- Teachers and learners have access to computers (including shared access)

Short-term targets (by 2030)

Many countries at the Transforming Education Summit in 2022 recognised the need to improve resilience to future crises, including environmental crises linked to climate change. These commitments on resilience often focused on strengthening digital learning solutions as part of climate change mitigation. To promote school safety and educational continuity during climate-related emergencies it is important to have goals for continuation of learning when schools become inaccessible. This should be seen as part of a more holistic risk management strategy in each school. By 2030:

- **75 percent of teachers** will have access to digital technology at school (hardware, software)

- **50 percent of teachers** will be trained and certificated in the use of digital technology (hardware, software)
- **50 percent of teachers** will be trained and certificated in digital pedagogy
- **25 percent of teachers** will regularly use digital technology and pedagogy

Long-term targets (by 2035)

By 2035, digital technology should be fully established and understood as part of the education continuity planning for climate emergencies.

- **90 percent of teachers** will have access to digital technology at school (hardware, software)
- **90 percent of teachers** will be trained and certificated in the use of digital technology (including as part of their pre-service training)
- **90 percent of teachers** will be trained and certificated in digital pedagogy (including as part of their pre-service training)
- **50 percent of teachers** will regularly use digital technology and pedagogy

Creating conditions for success

Creating a climate-resilient workforce means enabling teachers to continue teaching during disruption due to climate emergencies. This recommendation focuses on digital technology as one part of this response. It should be seen as part of a wider risk management strategy which would include (as advised by the UNESCO green school standards) setting up an emergency response team who conduct regular drills (the regular use of digital in lessons is analogous to a drill in this recommendation) and maintaining emergency supply kits. Plans for digital learning should connect with local disaster risk management and be based on the most up-to-date data and information from local and international research centres.





Digital initiatives focused on schools will not be adequate to improve climate resilience. Many countries are already investing in digital technology as part of efforts to modernise education and take advantage of the efficiencies it offers. Digital learning was a major theme in the statements of commitment made at the Transforming Education Summit in 2022. Eighty percent of countries referenced it, recognising the challenges of universal connectivity, quality of content and digital competences of teachers, students and parents. Providing access to the necessary IT infrastructure to enable the use of digital technology and online learning during climate-related emergencies means extending access beyond schools and into homes. Existing policies to provide access to electricity and the internet need to be extended to all areas nationally, including remote rural areas, for this policy to succeed. Schools, teachers and learners need to be provided with access to technologies that can be used for online teaching and learning activities.

The commitments made at the Transforming Education Summit also recognised a need for budget elasticity. For many countries, the transformation of digital education will take time, and the accessibility of emergency funds and additional institutional capacity varies with economic capacity. Public-private partnerships between the government, schools and edtech providers may play a role in mitigating this. Through pooled funding, provision of IT equipment and online platforms with rich teaching and learning materials, such collaborative efforts will alleviate the lack of infrastructure in some countries. It will also empower teachers to make best use of digital technology for sustainability education.

Policy guidelines and recommendations for greening schools

Introduction

The SDG for quality education includes a target (4A) that signatories should “Build and upgrade education facilities that are child, disability and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all”. The UNESCO Greening Education Partnership has proposed that this will be achieved through a green school accreditation scheme. The vision is for all schools, across all age groups, to achieve this accreditation. The 2030 goal is for all countries to have such a scheme and for 50 percent of institutions to have become accredited.

The design of physical spaces profoundly influences the physical, emotional and psychological wellbeing of individuals, and educational spaces are no exception. Research demonstrates that the built environment of schools significantly impacts students’ performance, comfort, wellbeing and satisfaction. Climate change has made it exigent for educational spaces to be climate resilient.

Additionally, climate anxiety is an epidemic among current school goers. Sustainable, neurodivergent affirmative design of the school environment not only provides climate resilience in school-built environments but also impacts opportunities for experiential learning. Such learning experiences make climate resilience a visible and integral part of their educational outcomes.

Decarbonisation efforts should not only aim at reducing the carbon footprint of the school built environment but also enhance the quality and effectiveness of the learning experience. Schools should be active living laboratories where students can interact with the decarbonisation intervention and experience it firsthand. This

way, schools can significantly enhance the educational experience while fostering a deep commitment to sustainability and environmental stewardship.

For example, a green wall can be made part of student coursework or projects. Here, the students interact with the green wall to understand the science and technology, develop creative solutions using the principles of a green wall, or are simply made aware that such strategies help mitigate and adapt to climate change. Another example is making rainwater harvesting a part of the school landscape and playground areas. This will allow students to have tactile experience of building decarbonisation systems.

Case studies for greening schools

Eco-Schools

[Eco-Schools](#) is a large sustainable school programme. It aims to achieve education for sustainable development through a seven step framework. This includes fostering student-led sustainability programmes and using the school buildings and their surrounding areas as educational laboratories. It awards a Green Flag accreditation to schools that successfully implement their methodology for at least two years. Young people play a vital role in the programme, which starts with a student-led eco committee. The programme is run by partners in many ICESCO countries, for example [Probha Aurora](#) in Bangladesh, [The Royal Marine Conservation Society of Jordan](#) in Jordan, the [Green Growth Asia Foundation](#) in Malaysia and the [Mohammed VI Foundation for the Protection of the Environment](#) in Morocco.

Clean Green School Programme in Pakistan

A similar programme is run by WaterAid Pakistan on the [Clean Green School Programme \(CGSP\)](#) to promote climate literacy and environmental education among students. This initiative aims at teaching practical skills for reducing



environmental footprints, and promoting sustainability. It involves activity-based learning, focusing on issues like climate change, water conservation, waste management and hygiene. The programme collaborates with the Federal

Directorate of Education and the Ministry of Climate Change, aiming to expand to more schools across Pakistan. There are 432 schools currently under the programme and it aims to expand to include 30,000 schools in the country.



Recommendation 7: Transform educational institutions

Why transform educational institutions?

We recommend ICESCO member states adopt a policy goal of transforming educational institutions into hubs of environmental stewardship, climate resilience, participatory governance and community partnership to achieve the SDGs. A third of countries at the Transforming Education Summit in 2022 committed to creating school infrastructure that exemplifies carbon neutrality. The aim of this goal is to meet these commitments by making schools both part of a net-zero future as well as spaces where learners can be made ready to contribute to the societies and economies of a net-zero world.

A transformative shift in how educational space is designed and used will empower students, teachers and staff to make data-informed decisions that promote positive climate outcomes. By integrating visible and accessible sustainable design principles into educational spaces, schools can create environments that are not only resilient to climate impacts but also serve as living laboratories for sustainability. These transformed spaces will provide hands-on learning opportunities, allowing students to engage directly with greening practices and understand their importance in addressing the climate crisis. It is envisioned that these spaces will enable a reduction in climate anxiety by implementing principles of neuroarchitecture. This comprehensive educational approach will prepare students to be proactive, informed citizens capable of contributing to a sustainable future.

What will success look like?

Although they may not notice it, a student learning in a transformed education institution will learn the knowledge and skills of environmental

stewardship not only from the curriculum but also from their interactions with the buildings themselves. Understanding their own net-zero building, they will learn about the climate crisis without the hypocrisy of contributing to the problem. They will benefit from spaces that promote participatory governance and community partnerships needed to create climate mitigations and solutions in their communities and beyond.

If successful, students in these institutions will see better academic performance and wellbeing metrics due to the improved learning environment. Wellbeing is further enhanced where the space designs are neurodivergent friendly, using principles of neuroarchitecture to reduce climate anxiety among future generations.

1. Decarbonised school built environments improve energy efficiency and reduce the carbon footprint of the school buildings.

- Resources like water, energy and waste management are audited, ensuring equitable distribution
- Energy consumption of the school building is audited to account for energy savings before and after decarbonisation interventions
- Priority areas, spaces and / or rooms are identified in buildings that need immediate retrofit to ensure thermal comfort and reduce energy consumption. Building retrofit or redesign is prioritised in active areas of learning like classrooms, student recreation rooms, staff rooms etc.
- Clean energy sources are audited

2. Low-cost nature-based design strategies provide resource efficiency while enhancing wellbeing.

- Decarbonisation strategies that respond to local context and the natural environment are connected
- Recreational areas are designed to bring nature and its elements indoors



- Nature-based solutions like green roofs, green facades, permeable paving and ventilation systems are made accessible to students in their daily school activities

3. Academic performance is enhanced through environmental comfort, passive habitability and satisfaction with the learning environment

- Thermal autonomy of classrooms meets adaptive thermal comfort standards defined by ASHRAE Standard 55-2023 with a comfort zone of 20–27°C, specific to the climate zone and region
- Daylighting and ventilation standards meet the WELL Building Standards
- Passive survivability is ensured in case of extreme climate events
- Educational performance is tracked with classroom environment metrics such as daylight autonomy and ventilation rate
- Classrooms and student recreation spaces have higher accessibility and connectivity
- Access and circulation spaces provide equality, diversity and inclusivity, retrofitted using neurodivergent affirmative design principles that reduce climate anxiety

4. Climate-resilient infrastructure supports the educational curriculum through creation of living labs.

- Climate-resilient infrastructure like green roofs and rainwater harvesting areas are installed in the learning environments and used as living laboratories
- Building retrofit strategies are made visible and tangible in learning spaces
- Passive design strategies are prioritised over active design interventions in learning space designs

5. Opportunities for co-design of school environments through participatory workshops create a supportive learning environment and foster community identity.

- Co-design workshops, seminars or hackathons are hosted through collaboration with green industry, policymakers and NGOs
- Energy and water (in)efficiencies are made visible to students through interactive digital infrastructure
- Greening initiatives are supported through financial allocations and social sources

Short-term targets (by 2030)

The commitments made at the Transforming Education Summit in 2022 reflected a desire to ensure school infrastructure demonstrated a net-zero future. Learning in net-zero buildings gives learners inspiration and mental models for a sustainable future. Transformation of learning environments can achieve more than carbon neutrality, biodiversity enhancement, waste reduction and water efficiency. It can be part of a wider programme to improve learning and wellbeing in more habitable spaces. This means these targets also help to achieve commitments to improve socio-emotional development, intercultural knowledge and health education.

Accrediting schools as green should mean acknowledging the quality of the buildings in terms of reduced energy consumption and quality of learning environment. An environmentally sustainable school is of little benefit if it does not contribute to effective learning. Schools have to decarbonise their built environment and realise the benefits and co-benefits to educational and learning outcomes.

By 2030 schools will need to do the following:

Energy transition

- Create interactive digital dashboards demonstrating the actual energy consumption and space use of a variety of spaces in the educational buildings
- Generate annual reports linking temperature conditions to specific educational outcomes and implement adjustments as needed

- Reduce energy consumption within five years, documented through annual energy audits
- Publish biannual reports detailing thermal performance data and improvement measures
- Complete short-term retrofit projects, such as improving the fabric of buildings that have the poorest performance, with documented improvements in thermal comfort and energy savings
- Increase the proportion of energy sourced from renewables to 30 percent within five years

Environment co-benefits

- All classrooms should meet an 80 percent acceptability limit for thermal autonomy from ASHRAE Standard 55-2023
- All regularly occupied spaces have operable windows that provide access to outdoor air and daylight
- All regularly occupied circulation spaces like corridors have ambient light ensured through both natural and artificial systems, to maintain an average light intensity of 215 lux
- At least a 50 percent area of all classrooms receives at least 300 lux of sunlight for at least 50 percent of operating hours each year
- All classrooms should have passive systems to ensure habitability to 5°C above the neutral temperature for the ASHRAE Standard 55-2023

Living laboratories to foster climate leadership and skills

- Create green living laboratories (built environments that learners can study) in recreation spaces for students to interact with
- Make retrofit strategies visible and integrate them into 25 percent of learning spaces such as classrooms
- Create dedicated spaces as calming sensory areas to support the reduction of climate anxiety among students

- Make circulation areas neurodivergent affirmative through signage and access elements
- Design and implement nature-inspired indoor and outdoor recreational areas in 50 percent of schools
- Host annual seminars / workshops delivered by people from urban local bodies and NGOs showcasing nature-based solutions implemented in the community
- Host at least one co-design workshop, seminar or hackathon annually
- Secure sustainable financial and social support for all co-design initiatives within five years

Long-term targets (by 2035)

To align to commitments made at the Transforming Education Summit in 2022, the long-term targets need to aspire beyond short-term achievements. The long-term targets should preserve and further the momentum built by the short-term goals of achieving green accreditation. A whole-school approach to greening should be ensured through actions in three specific areas: energy efficiency, sustainability and co-design.

Whole-school approach to energy efficiency

- Achieve carbon neutrality for all school buildings through comprehensive energy audits demonstrating net-zero carbon emissions
- Retrofit 100 percent of buildings, with significant reductions in energy consumption and improved thermal comfort, incorporating sensory-friendly materials and designs
- Transition to 100 percent renewable energy sources
- Fully integrate climate-resilient infrastructure into educational spaces such as classrooms, recreation spaces, toilets and other amenity spaces
- Ensure reducing, reusing, recycling and upcycling are part of school governance



Environmental sustainability

- Ensure all classrooms maintain thermal comfort conditions as per ASHRAE Standard 55-2023 year-round
- Ensure all occupied spaces meet a 90 percent acceptability limit for thermal autonomy from ASHRAE Standard 55-2023
- Ensure at least a 50 percent area of all occupied spaces for active learning receives at least 300 lux of sunlight for at least 50 percent of operating hours every year
- Ensure all occupied areas have passive systems to ensure habitability to 5°C above the neutral temperature for ASHRAE Standard 55-2023
- Redesign school layouts to minimise distances from classrooms to essential amenities
- Increase areas like open green spaces and reduce paved or built-up areas

Co-design of schools

- Ensure all learning spaces have standardised passive design strategies
- Ensure daily accessibility to nature-based solutions for all students
- Institutionalise a culture of co-design involving students, staff and the community
- Ensure long-term funding and community backing for co-design projects to focus on inclusivity and neurodivergent needs

Creating conditions for success

Building an inclusive environment requires participation from students, teachers, parents and community members in planning and decision-making processes to ensure embedding of diverse perspectives. From these engagements it is possible to develop and implement school policies that prioritise sustainability, inclusivity and climate resilience. A culture of innovation and experimentation through student-led pilot initiatives will test and refine innovative solutions for climate resilience and sustainability.

These guidelines and recommendations are designed to be applicable to all schools in all countries. We recognise that local consultation may lead to necessary variations, and that it may be necessary to make aligned changes to building codes and construction regulations. School redevelopment and building programmes will already exist. This recommendation requires resources to be allocated efficiently to these infrastructure projects, educational programmes and co-design initiatives in line with green education aims.

Providing evidence of the effectiveness of new buildings will improve building standards. It will also provide educational opportunities to understand the relationship between buildings and climate. For example, make energy, water and resource efficiency data visible by implementing smart technologies to ensure data is accessible and understandable for all stakeholders. Set up systems for continuous monitoring, evaluation and reporting, and build strong partnerships with local government to make the school a case study of a successful greening project for the community to learn from.

In line with our system-focused approach, ICESCO members are encouraged to look beyond the transformation of school infrastructure and to also consider how transport to and from school can be transformed. Providing safe routes to school with range of active transport options (walking, cycling, etc.) will reduce carbon emissions even further. This requires considering where schools are built, particularly when planning new housing developments.

Policy guidelines and recommendations for greening communities

Engaging with communities is a key enabler of the strategic ambitions of green education. In 2022, the Transforming Education Summit agreed a goal for all countries to report at least three different ways learning opportunities are made available for adults outside the formal education system. This was inspired by a vision that the entire community should be engaged with climate education in lifelong learning through community learning centres and learning cities. This calls for the engagement of communities in the design and development of the education programmes that they need, and for the establishment of inclusive education. In particular, we recommend that initiatives on the education of girls and women include climate education.

The importance of communities

Community sits at the heart of greening education. It takes a village to raise a child. In the same way, it also takes a whole community to green education in order to tackle climate and environmental crisis in a collective manner.

As a major supporting network additional to school systems, community enables a holistic approach for greening education, which situates greening education locally and regionally. When communities are actively involved, they contribute local knowledge, resources and perspectives that enrich greening educational initiatives. The collaboration between schools and communities ensures that the greening curriculum is relevant and culturally sensitive, enhancing its effectiveness and acceptance. It strengthens social cohesion and builds networks of support for environmental action.

Community engagement in greening education also helps create a sense of ownership and responsibility towards the

environment, encouraging lifelong commitment to sustainability. Practically, without the support of community and intergenerational communication, a greening education strategy can be difficult to implement.

Working towards sustainable, resilient and inclusive communities

A resilient community reduces vulnerability in the face of climate and environmental crises. Integrating communities as part of greening education not only contributes to environmental benefits, but also feeds back to the sustainable growth of each local community. It empowers individuals in the community with social, cultural, economic and emotional resources to innovatively adapt and mitigate the effects of climate crisis.

The vision is to engage the entire community by integrating climate education in lifelong learning, as UNESCO has identified in the Greening Education Partnership. The vision needs to be achieved not only by actively empowering the community to cope with climate and environmental change, but also by recognising the knowledge, skills, values and agency that already exist within the community. At the same time, we also need to address existing inequities in society, such as gender issues, through the promotion and implementation of greening communities.

Through greening communities, we aim to improve their resilience and adaptive capacity, reduce vulnerability, identify innovations, and empower individuals to be part of the solution to climate and environmental change.

Case studies for greening communities

Gwani Ibrahim Dan Hajja Academy

In Nigeria, students at Gwani Ibrahim Dan Hajja Academy have proposed a project to construct a solar dryer for smallholder farmers to prevent



post-harvest losses and increase their income. The project aims to train 300 students and 50 teachers as Solar Green Ambassadors. Students expect that 13,000 smallholder farmers and 200,000 community members will be directly impacted by the project. Farmers are expected to increase their income by 40 percent. Gwani Ibrahim Dan Hajja Academy won the 'Global High Schools' category for the [Zayed Sustainability Prize](#) 2024. This is a notable prize founded in the UAE to recognise and support schools and organisations that propose innovative and sustainable solutions to address environmental challenges.

Reaching adults outside of formal education

Reaching adults outside of formal education requires many strategies. For example, the Maldives is one of the world's countries most vulnerable to climate change, and empowering the population to adapt to climate change is a strategic priority. Several national initiatives describe local lifelong education, developed and delivered by local communities (for example, the [National Adaptation Program of Action](#), 2007; [Communication Strategy and Action Plan \(2019–2023\)](#), 2018; and the [Strategic Action Plan \(2019 – 2023\)](#), 2019). The communication plan includes a wide variety of approaches such as broadcasts, songs and sermons as well as training and sessions for journalists, business leaders and local and national politicians.



Recommendation 8: Engage communities

Why engage communities?

We recommend ICESCO member states adopt a policy goal of engaging communities in the development, delivery and assessment of climate learning. To collectively tackle the climate and environmental crisis, we need to engage all possible stakeholders and allies from all kinds of communities at every step of greening education from development to implementation. This includes but is not limited to parents, schools, community leaders, NGOs, local authorities, environmental experts, local business, green industries, etc. This engagement will empower all community members in the process of greening education.

Effective community participation requires a combination of broad and deep engagements. A diverse range of community participants is required to ensure it is reflective and respectful of local community groups and structures. When community participation is broadened to more participants, it generates diverse resources and insights to maximise its social impact. Creating deeper and more meaningful community engagements encourages a sense of responsibility and ownership by community members. These strong connections between the impacts of the climate crisis and the future of the community enhance the relevance and impact of learning. Representing the agency of community members in their responses to the climate crisis motivates learners to take climate action in a more accountable manner.

What will success look like?

Students in schools that have engaged with their local communities will readily connect their learning about climate and sustainability from the green curriculum with the challenges and opportunities in their community. They will be informed and motivated by their own

experience to find meaningful solutions to challenges on a range of scales. Led by a green teacher to connect their understanding of local and international impacts of climate change, they will reinforce and deepen their learning.

Where communities are engaged with the development and implementation of education there will be wide participation and awareness of lifelong learning. This will be evident from long-term, in-depth involvement in climate education programmes from community members. Local community voices and local environmental issues will be incorporated into the development of greening curriculum materials. These voices will create diverse and engaging forms of delivery of greening education programmes both in and outside schools. Innovative green education initiatives that are well supported will connect green education with the wider community.

1. There is wide participation and awareness of lifelong climate learning.

- An increasing diversity of community members from different professional areas engage with climate education design and / or participate in climate education programmes

2. There is long-term, in-depth involvement in climate education programmes from community members.

- Community members devote considerable time to supporting green education programmes frequently every year, and positively review their engagement in specific greening education programmes as 'in-depth', 'engaging', and 'personal'

3. A localised, community-based greening curriculum is developed.

- During the development or amendment of greening the curriculum, various community voices are involved
- The greening curriculum materials are connected to local environmental issues, local knowledge, skills, values and attitudes



4. There are diverse and engaging forms of community integration in the delivery of greening education.

- Various forms of community participation in climate education programmes are available for community members to get involved, including some directly led by the community

5. Innovative green education initiatives are supported.

- Multiple climate education programmes are initiated or run by various organisations in the entire community, both in and outside the formal education system, and they are well supported in terms of financial and social sources
- Assessment and awarding systems are in place to monitor and expand the influence of climate education initiatives

Short-term targets (by 2030)

Local consultation is more important for this guideline and recommendation than it is for any other in this document. The National Statements of Commitment made at the Transforming Education Summit in 2022 were to be informed by national and youth consultations. This is reflected in the targets for these guidelines and recommendations, which will require local consultation to determine what methods and scale of community engagement are appropriate within different ICESCO member states. These targets focus on a direction rather than set specific numerical targets.

Most of the commitments made at the Transforming Education Summit in 2022 acknowledged that the transformation of education requires collaboration and dialogue across a broad range of actors. Government, teachers, parents, communities and students negotiate decision-making for curriculum contextualisation, delivery and recognition, with models for this varying across countries. To foster community engagement with green education we recommend ICESCO member states target the following by 2030:

Create community-based green education programmes.

- Introduce curriculum-aligned activities focused on green education and based in the community, with at least one activity led from the community
- Support the adaptation of green curriculum materials to local contexts using community awareness of local knowledge, skills, values and attitudes

Diversify community voices in the green curriculum.

- Increase the number of adults from outside the formal education system who engage with and / or participate in green education programmes
- Increase the range of community members participating in the delivery of green education in their local school
- Increase the number of national or regional green education initiatives run and supported by organisations, and linked to environmental targets

Promote green education in the community.

- Invite community monitoring and reporting of green curriculum implementation
- Recognise school and student engagement through local competitions and accreditations, such as Best Green School Competitions and Green Student Ambassadors Awards

Long-term targets (by 2035)

Built on the momentum of short-term goals, by 2035, community engagement should be based on varied and in-depth engagements.

Diverse and engaging forms of participation.

- Increase the number of adults from outside the formal education system frequently engaging with and / or participating in green education activities for over 30 hours a year

- Increase community participants in greening education to cover all major profession types existing in the community
- Increase the proportion of community participants positively reviewing their engagement in specific greening education activities as ‘important’, ‘engaging’ and ‘personal’
- Increase the available methods for community engagement in greening education
- Increase the number of schools inviting wider community participation in green education activities

Localised greening education materials.

- Increase the availability of locally developed materials aligned to the green curriculum
- Increase the availability of materials aligned to the green curriculum which critically examine the relationships between climate crisis and local knowledge, skills, values and attitudes, including alignment and discrepancies

Well-supported and monitored climate education initiatives.

- Increase the number of national or regional green education initiatives run and funded by private organisations, linked to environmental targets
- Recognise school and student engagement through competitions and accreditations at national levels, such as Best Green School Competitions and Green Student Ambassadors Awards

Creating conditions for success

The nature and character of community engagement is highly variable. The extent to which this needs to be centrally organised and funded will depend on the strength of local commitment to education and the environment. To engage any community, it is crucial to recognise the knowledge, skills, values and agency that already exist within communities. It is also important to identify leaders who can support this work, such as valuing and optimising the influence of the existing green NGOs. Various platforms and channels are encouraged to facilitate communication between schools and wider communities. Green community outreach roles in schools and other organisations can be set up to consolidate the communication.

We also suggest Green Volunteer Days to be included in national holiday schemes, to create time and space for all community members to participate in environmental programmes. It is advisable to use social media channels to promote community engagement in greening education.



Recommendation 9: Invest in girls' education

Why invest in girls' education?

We recommend ICESCO member states adopt a policy goal of ensuring girls and women have access and opportunities to high-quality education to empower women's participation in tackling the climate crisis. When women's voices are hidden and devalued, the potential to enhance community resilience to climate change can remain unfulfilled. Girls' education directly addresses existing gender inequalities, which exacerbate girls' vulnerability to climate impacts, as highlighted by UN Women and UNICEF. Girls' education also has positive impacts on family planning, child mortality and financial practices, thus creating healthier, better educated families with economic stability. As a result, it dramatically reduces vulnerability to death from weather-related disasters, and better enables families and communities to recover from climate shocks.

Educating girls is one of the most cost-effective development investments in greening communities. Studies show strong evidence that women's empowerment and participation improve resilience to extreme weather events and ill effects of climate change at a community level, offering broad intergenerational benefits. For example, educated girls are more likely to adopt and advocate sustainable practices. Emerging evidence indicates that women's participation in national politics can lead countries to adopt environment-friendly policies, allowing for investments in sustainable technologies and practices, which further reduces environmental impact.

Greening communities should not leave any groups behind. If we want to achieve an equal and lasting greening community, we need to unlock the potential of every woman by providing them with equal access and opportunities to

high-quality education at every level to enhance community resilience in the face of climate crisis.

What will success look like?

For women and girls, access to a green education will mean equitable access to knowledge and skills related to climate, the environment and sustainability.

Girls and women should all complete foundational education to acquire basic knowledge and skills to enhance problem-solving abilities to build up climate resilience. Girls and women should have equal access and opportunities to higher education to fulfil their potential in different professional areas. This leads to a larger chance of adopting and promoting sustainable practices for the entire community.

1. Foundational education exists for all girls.

- Girls gain foundational skills including literacy, numeracy, and other transferable skills such as socio-emotional skills, critical thinking and problem solving by completing primary and secondary education
- There is a reduced drop-out rate for girls in primary and secondary education

2. Access and opportunities exist for higher education.

- Girls have opportunities and necessary social and financial resources to go into and complete higher education

3. Balanced subject choices are available.

- Girls will be equally encouraged to take STEM subjects as well as arts, humanities and social science subjects

Short-term targets (by 2030)

Three-quarters of the statements of commitment made at the Transformation of Education Summit in 2022 recognised gender equity as an important part of transformative education policy,

without specifying measures to address this. Many statements also acknowledged concerns about equity in the allocation of public funds for education. The level of female participation in education varies across ICESCO member states. In some, female participation exceeds that of male enrolment in primary education. These targets may have already been exceeded, and more ambitious targets can be set through local consultation.

Gender equity in terms of educational opportunities can be measured by the coverage and retention rate of girls at different school levels. We suggest ICESCO member states focus on foundational education for the majority of girls by 2030, as well as the following targets:

- A high number (e.g. 90 percent) of girls at appropriate ages will receive primary education, with a reduced drop-out rate (e.g. lower than 5 percent)
- A high number (e.g. 75 percent) of girls at appropriate ages will receive secondary education, with a reduced drop-out rate (e.g. lower than 15 percent)
- A moderate number (e.g. 40 percent) of female students leaving secondary education will report high satisfaction with their education as a motivator to create solutions and mitigations for climate and environmental problems
- A moderate number (e.g. 60 percent) of girls at appropriate ages will be able to receive higher education (e.g., high schools, universities, vocational education), with a reduced drop-out rate (e.g. lower than 35 percent)
- A reasonable number (e.g. 25 percent) of female students in higher education will be motivated to study by concerns related to climate and / or sustainability

Long-term targets (by 2035)

By 2035, gender equity in education should be achieved. All girls should be able to complete foundational education with considerable opportunities to access higher education, employment and meaningful roles in society. There should be no obstacles to access high-quality education at any level for girls. The subject choices for girls' education should be well balanced. By 2035:

- All girls at appropriate ages will be able to complete primary and secondary education with near zero drop-out rates
- An increased number (e.g. 75 percent) of girls at appropriate ages will be able to receive higher education, with a reduced drop-out rate (e.g. lower than 20 percent)
- An increased number (e.g. 50 percent) of female students in higher education will be motivated to study by concerns related to climate and / or sustainability

Creating conditions for success

A system approach to education considers how the various components of an education system interact to create good learning outcomes. Strong systems are characterised by coherence and equity. To create an equal educational environment for both girls and boys, we suggest ICESCO member states support gender-sensitive education and ensure the protection and promotion of girls' rights in educational settings. This supports the aims of transforming and greening education by ensuring that girls have access to knowledge and skills needed to respond to the climate crisis. It can also be part of creating solutions for both their own and international communities. It is important to do this by mobilising existing community cultures and values, such as encouraging community and religious leaders' engagement to advocate girls' education, emphasising its importance in line with Islamic values. Moreover, women's network communities can be established in different professional areas to provide mentorship and female role models for young girls.



Proper infrastructure is essential to meet the needs of girls in educational institutions. Providing adequate sanitation facilities and access to health services, including clean and private restrooms, can ensure a safe and hygienic learning environment that supports their continued attendance and participation.

Financial support is also critical in reducing the economic barriers that often prevent girls from attending school. Offering scholarships, stipends and financial incentives to families can alleviate the economic burden and remove obstacles to girls' education. This will ensure that more girls have the opportunity to learn and thrive in sustainable societies and economies progressing towards net zero.



Policy implementation and monitoring

These policy guidelines and recommendations have been drafted for discussion at the ICESCO Education Ministers conference in Muscat in October 2024. It is anticipated that the discussion at this conference will lead to refinement of the goals before they are agreed by the delegates.

Multi-sectoral policymaking

Greening education involves a paradigm shift that extends beyond immediate environmental gains. It not only cultivates environmentally conscious future citizens, but also intersects beneficially with other critical areas, such as health and wellbeing, economic development, community engagement, policy and governance, creating a holistic approach to sustainability. Greening education is closely linked to and brings benefits to other critical educational priorities, such as girls' education, digital education and investment in teachers.

Inter-ministerial collaboration is a key enabler of green education (O'Donnell & Higginson, 2021; UNESCO, 2021c). It allows for effective laws, policies and regulations to be put in place, supported by official curriculum support, guidance and resources. By embracing interconnected strategies, policymakers can accelerate the progress achieved so far towards a more sustainable and equitable future documented in *The Sustainable Development Goals Report 2024* (UNESCO, 2024c). For example, the cross-pollination of greening education with girls' education, digital education and investing in teachers generates extensive benefits that resonate beyond the classroom. It fosters a holistic educational approach where environmental awareness is intertwined with gender equity, technological advancement and high-quality teaching. However, only two of the statements of commitment made at the Transforming Education Summit in 2022 referenced inter-departmental co-operation.

Many other aspects of social policy, such as social development, impinge on education (welfare policy, health policy, economic policy). It is made more complex by the nature of the interactions in and around the system, including the role of aligned and conflicting ideas about education. Hopes are often pinned on a single initiative, or 'cherry picking' from other systems. Avoiding this 'one-dimensional' approach to system improvement is important.

This has important implications for policymakers and those managing educational improvement. Educational improvement cannot be directed towards a static ideal state, but requires constant monitoring, fine-tuning and 'shepherding' in order to secure outcomes such as high equity and high attainment. Attention to the detail of each element of an education system is important. However, the 'coherence' research suggests that the interaction and alignment of a system should be a deliberate and constant focus of monitoring activity and policy attention – the complex and constant interaction of factors in the system determines the outcomes which it provides.

Education stakeholder engagement

Interest in green education has surged in recent decades to meet the UN's goal of addressing global warming, a key aspect of sustainability that demands urgent and co-ordinated global action (UNESCO, 2018). SDG 13 (Climate Action) emphasises the need for comprehensive education and awareness programmes to effectively address climate change challenges and enhance understanding and skills related to climate change at both individual and institutional levels (Target 13.3 of the SDGs).

Climate action is often focused on big industries and the government departments that govern them. As experts in their area, these departments often have limited experience in the education sector while being dependent on the children that graduate from it. It is important



that education stakeholders are prominent in discourse about green education, drawing on this wider expertise collaboratively and vice versa.

Many of the enablers of green education need to be created within the education system, such as teacher readiness through teacher training, teacher professional standards and professional development support (O'Donnell & Higginson, 2021; UNESCO, 2021c). Through stakeholder engagement and preparedness, whole-school approaches, networks and initiatives can be implemented more effectively. Modern analysis of the performance of education systems suggests that 'curriculum coherence' is vital, and is associated with high-performing systems. This is not just a trivial use of the term 'coherence'. A system is regarded as 'coherent' when the national curriculum content, textbooks, teaching content, pedagogy, assessment, and drivers and incentives all are aligned and reinforce one another. "Curricular materials in high-performing nations focus on fewer topics, but also communicate the expectation that those topics will be taught in a deeper, more profound way..." (Schmidt & Prawat, 2006).

Monitoring and evaluation

It is critical that all the policies that evolve from these guidelines are monitored and reported. We recommend that evaluation of the policies should take a realist perspective and ask, **what** works for **who** in what **circumstances**? Disaggregated data can reveal deprivations and inequalities that may not be fully reflected in aggregated data. This can help you to:

- Refine your targeting
- Meet the specific needs and perceptions of a particular group
- Assess the extent to which a particular group engages with or responds to an intervention
- Understand the extent to which certain groups benefit more or less from a particular intervention when compared with others

Therefore, any data that is collected should include information that allows for it to be disaggregated by any relevant factors that may disenfranchise individuals, such as sex, ethnicity, age, disability, etc.

- Data should focus on the known barriers to implementing green education including (UNESCO, 2021c):
- Lack of support at home and in school
- Political conflict between and within countries
- Limited resources
- Overcrowded classrooms
- Emphasis on grades and competition
- Lack of teacher training in climate change education
- Interdisciplinarity of content for teachers to cover
- High rates of early school leaving

This will ensure that policymakers have access to data which shows the impact of these policies on specific members of society.

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