

Sustainable Societies Climate EdTech Action DCO Space **Policy Watch** Exploration Navigating the digital policy landscape

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1 Overview

Welcome to the third edition of the DCO Policy Watch, a quarterly publication designed to keep policymakers, experts, and decision makers in DCO Member States, Observers, and stakeholders apprised of the evolving landscape in digital policy. This publication serves as a platform for sharing insightful analyses and updates on the latest trends and developments within key areas of digital governance. Our aim is to facilitate a deeper understanding of varied international practices and strategies, thereby supporting our readers in informed decision making and effective policy formulation.

In our first edition issued in May 2024, we delved into the evolving landscape of digital policy, highlighting key trends and recent developments in Artificial Intelligence (AI), Data Protection and Privacy, Electronic Waste (E-waste), and the Future of Work. The second edition, published in September 2024, examined the evolving ecosystem of **Digital Public Infrastructure (DPI)**, with particular emphasis on the role of **Digital Government, Digital Identity,** and **Open Data** in empowering citizens through efficient service delivery, as well as setting the foundation for the future of government.

These matters have continued to evolve - the Global DPI Summit held in Cairo in October 2024 convened representatives from over 100 countries to drive collaborative strategies for implementing inclusive DPI aligned with the Sustainable Development Goals (SDGs), highlighting seven key priorities for 2025: knowledge sharing, universal safeguards, inclusive innovation, local digital ecosystems, sustainability, financing, and interoperability. Meanwhile, more countries have continued to roll out DPI-enabled initiatives, exemplified by Australia launching its 'Trust Exchange' Digital Identity Platform in August 2024, as well as Brazil which has sought to



strengthen its DPI and Digital ID efforts to boost economic growth ahead of its Presidency of the G20.

A significant milestone was reached on 22 September 2024, when the United Nations adopted the Pact for the Future at the Summit of the Future in New York. This landmark agreement included both the Global Digital Compact and a Declaration on Future Generations. Together, these instruments outline a total of 56 actions which address critical areas including sustainable development, international peace and security, science, technology, and innovation, as well as the role of youth and future generations. The agreements emphasize making technologies like AI accessible to all while ensuring their safe and responsible development. A central pillar of the Global Digital Compact is DPI, further illustrating its importance to promoting equitable growth and development.

The 2024 global agenda places significant emphasis on the intersection of sustainability and digital transformation. With COP29 in Baku having recently concluded, and the Summit of the Future seeing renewed commitments to building a sustainable digital future, this third edition of the DCO Policy Watch focuses on the theme of Sustainable Societies. It examines global policy efforts, with special attention to DCO Member States, aimed at building sustainable societies, economies, and communities. This edition will also specifically explore how policies relating to Climate Action, EdTech, and Space Exploration contribute towards enabling a sustainable society and promoting sustainable development. It builds on themes from our first edition. which explored global efforts toward sustainable e-waste management and circular economy principles, emphasizing their crucial role in fostering resourceefficient, sustainable societies.

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2 Sustainable Societies

2.1 Overview

The concept of sustainable societies has grown from its environmental roots into a comprehensive vision of human development. While ecological limits remain fundamental requiring reforms to environmentally harmful practices-the concept now integrates economic resilience, social equity, and cultural sustainability. A sustainable society recognizes the interconnectedness of ecological health, social justice, and human development, addressing the root causes of environmental and societal challenges. It seeks not only ecological preservation but also the transformation of societal attitudes, practices, and structures to achieve equity and harmony for both people and the planet.

In another <u>definition</u>, a sustainable society is characterized as one that is more self-reliant, less vulnerable to external forces, and maintains a stable relationship between human activities and natural systems. It prioritizes efficient use of renewable resources, promotes resilience through local self-sufficiency, and requires coordinated efforts from individuals and governments to plan and implement sustainable practices.

These definitions draw insights from the cultural, social, and political roots of environmental issues and highlight the necessity of addressing systemic causes alongside practical environmental measures. Sustainable societies are characterized by three interconnected dimensions:

- Environmental Sustainability: This involves safeguarding planetary health through reduced carbon emissions, conservation of natural resources, and protection of vital ecosystems. These efforts ensure that human activities remain within Earth's carrying capacity.
- 2. Economic Sustainability: This dimension focuses on building economic systems that promote widespread prosperity without compromising future generations' ability to meet their needs. Key elements include fair trade practices, responsible consumption patterns, and sustainable business operations that generate long-term value.
- 3. Social Sustainability: This involves fostering inclusive, equitable, and resilient communities. It includes ensuring access to essential services like healthcare and education, promoting social equity, and supporting community engagement and cultural diversity.

To have sustainable societies, it is essential to implement policies that address these dimensions holistically rather than in isolation. <u>The Institute</u> <u>for Global Environmental Strategies (IGES)</u> has developed a comprehensive framework that emphasizes the interconnections between environmental and social objectives. Under this framework, sustainable societies must be lowcarbon in their energy use, resource-efficient in their consumption, and conservation-oriented in their practices, while maintaining social inclusivity and equitable distribution of benefits.

For clarity in policy discussions, it is important to distinguish between related but distinct concepts:

- <u>Sustainability</u>: A broad goal or state that seeks to ensure the long-term preservation and health of resources and ecosystems.
- <u>Sustainable Development:</u> A strategic approach that seeks to achieve economic, social, and environmental progress simultaneously, ensuring such progress is both inclusive and ecologically sound. To support this, all countries came together in 2015 at the United Nations to work towards securing the rights and wellbeing of everyone on a healthy, thriving planet through the adoption of the <u>2030 Agenda</u> for <u>Sustainable Development</u> and <u>its 17</u> <u>Sustainable Development Goals (SDGs)</u>.
- <u>Sustainable Societies:</u> Communities that have successfully integrated sustainability principles into all aspects of life, creating lasting viability through balanced development.

Sustainability represents the foundational goal that guides both sustainable development and the creation of sustainable societies, where sustainable development provides the strategic pathway and methods to transform communities into sustainable societies. In this interconnected framework, sustainable societies represent the ultimate outcome where communities have successfully operationalized sustainability principles through sustainable development approaches, creating systems that balance environmental protection, social equity, and economic prosperity for current and future generations.

The 2030 Agenda for Sustainable Development

illustrates these relationships: sustainability provides an overarching vision, the SDGs offer concrete sustainable development targets and strategies, and the achievement of these goals contributes to the emergence of sustainable societies. This structured yet interlinked approach enables policymakers to design more effective interventions by clarifying whether their initiatives align with fundamental sustainability objectives, contribute to sustainable development processes, or directly advance the creation of sustainable societies. While all SDGs contribute towards the development of sustainable societies, several play particularly crucial roles:



SDG 4

Quality Education empowers individuals with the knowledge and skills necessary for sustainable development. This goal advances the development of sustainable societies by promoting inclusivity and equitable access to education for all, ensuring social sustainability.



SDG 7

Affordable and Clean Energy promotes the use of renewable energy sources to improve living standards and reduce carbon footprints. This supports building sustainable societies by enhancing environmental sustainability through reduced reliance on fossil fuels and mitigation of climate change.



SDG 9

Industry, Innovation, and Infrastructure

emphasizes the importance of technological innovation and resilient infrastructure in driving sustainable economic growth. It contributes to building sustainable societies by fostering economic sustainability through innovation and sustainable industrial practices.



SDG 11

Sustainable Cities and Communities which focuses on creating inclusive, safe, and resilient urban environments through smart technologies and sustainable urban planning. This goal supports creating sustainable societies by ensuring that urban development is inclusive, equitable, and socially sustainable.



SDG 12

Responsible Consumption and Production encourages sustainable practices to minimize environmental impact. It incentivizes a circular economy and promotes the development of sustainable societies by advocating for efficient resource use and reducing waste, thus enhancing environmental sustainability.



SDG 13

<u>Climate Action</u> highlights the need for urgent measures to combat climate change. This goal is crucial for creating sustainable societies as it addresses the global challenge of climate change, ensuring environmental sustainability.



SDG 16

Peace, Justice, and Strong Institutions aims to build effective, accountable institutions, with digital technologies enhancing transparency and citizen engagement. It supports the development of sustainable societies by promoting justice, peace, and strong institutions that uphold human rights and inclusivity, ensuring social sustainability. These goals collectively reinforce the economic, social, and environmental pillars of every sustainable society. As countries implement their own sustainable society initiatives, the most successful share three key characteristics:

- Integrated Approach: They combine environmental, social, and economic objectives rather than treating them in isolation. For example, <u>New Zealand's</u> <u>Living Standards Framework</u> incorporates a holistic approach to policy-making, ensuring that economic growth, social wellbeing, and environmental sustainability are all addressed simultaneously, promoting a sustainable society. This framework uses a set of indicators to measure and improve the well-being of New Zealanders across multiple dimensions.
- 2. Strategic Technology Use: They leverage digital technologies effectively. For example, <u>Rwanda's digital transformation</u> initiatives, such as a three-year digital transformation program (2021-2023), address economic development and social inclusion through digital innovation. The program aimed at harnessing Rwanda's big data to enhance the government's digital capabilities and systems to improve service delivery and build an inclusive digital economy.
- 3. Strong Governance: They build strong governance frameworks to ensure equitable distribution of benefits. The <u>European Green Deal</u>, for example, demonstrates strong governance frameworks by integrating comprehensive and coordinated policy efforts across multiple sectors to achieve sustainability goals. The Green Deal sets clear, measurable targets, such as achieving climate neutrality by 2050. This clarity ensures that all stakeholders understand

the goals and can be held accountable for progress, which is a key aspect of strong governance. The Green Deal involves extensive stakeholder engagement, including governments, businesses, and civil society. By incorporating these elements, the Green Deal exemplifies how strong governance frameworks can drive the transition toward building sustainable societies.

These characteristics demonstrate how welldesigned policies can effectively drive the transition toward sustainable societies while ensuring broad participation and equitable outcomes.

This section of the Policy Watch examines the various policies and strategies different regions and countries are deploying in building their own sustainable societies. Subsequent sections will look at the role which policies and strategies related to Climate Action, EdTech, and Space Exploration play in the advancement of sustainable societies around the world.

Latest Developments

COP29

The COP 29 conference in Azerbaijan resulted in significant outcomes that further the goal of sustainable societies. Key highlights included the creation of a new \$300 billion annual climate finance goal, with a target of \$1.3 trillion by 2035, aimed at supporting climate adaptation and mitigation efforts globally. There was a focus on supporting least developed countries in implementing national adaptation plans, ensuring that all nations can build resilient and sustainable societies. These outcomes collectively enhance the environmental dimension essential for creating sustainable societies.

Find out more

UN High-level Political Forum 2024

The UN Deputy Secretary-General emphasized the need for bold policies and innovative solutions to achieve the SDGs by 2030. The forum focused on eradicating poverty, ensuring food security, and addressing climate change, all of which are essential for building sustainable societies.

Find out more

World Social Report 2024

Published by the UN Department of Economic and Social Affairs, this report calls for global cooperation to support national efforts in advancing social development and building resilience against crises. It highlights the need for reform in international development finance and stronger social protection systems, which are crucial for creating resilient, inclusive, and sustainable societies.

Find out more

2.2 Regional Approaches

This section maps the policy landscape across different regions, highlighting the key policy instruments and initiatives that shape the global sustainable societies landscape. By examining regional approaches, we can understand how different areas of the world are addressing the challenges and opportunities of building sustainable societies. This analysis will highlight the diversity of strategies employed to integrate environmental, economic, and social dimensions into cohesive policies, ultimately contributing to the creation of sustainable societies.



The EU has been at the forefront of promoting the development of sustainable societies through a comprehensive set of policies and initiatives. These efforts are primarily driven by the European Green Deal, which aims to make Europe the first climateneutral continent by 2050 as outlined in the 2030 Climate Target Plan. The Green Deal encompasses various sectors, including energy, transport, agriculture, and industry, to ensure a comprehensive approach to sustainability. Complementing this is the Fit for 55 Package, which aligns EU policies with the 2030 climate target through measures such as the Emissions Trading System (ETS) and the Carbon Border Adjustment Mechanism. These initiatives collectively address the environmental, economic, and social dimensions essential for creating sustainable societies.

<u>The New European Bauhaus initiative</u> connects the Green Deal to living spaces, promoting sustainable and inclusive design. This initiative fosters sustainable societies by integrating aesthetics, sustainability, and inclusivity into the built environment, enhancing the quality of life for citizens. Additionally, the <u>Digital</u> <u>Europe Programme</u> focuses on enhancing the EU's digital capabilities, supporting the transition to a green and digital economy, and promoting digital inclusion. <u>Smart Cities and</u> <u>Communities European Innovation Partnership</u> (<u>EIP-SCC</u>) promotes smart city development through digital technologies, improving urban living conditions and contributing to sustainable societies by integrating ICT, energy management, and transport management.

Case Study: Greece's "Smart, Resilient and Climate Neutral Cities Initiative"

Greece's <u>"Smart, Resilient and Climate</u> <u>Neutral Cities</u>" initiative aims to promote sustainable development, resilience, and climate neutrality in Greek cities by 2030. It focuses on urban accessibility, walkability, energy-efficient buildings, and digital transformation, supported by national and EU funds. This initiative contributes to building sustainable societies by enhancing urban resilience, reducing carbon emissions, and improving the quality of life for residents.

According to <u>UNFCCC</u> the concept of climate neutrality "refers to the idea of achieving net zero greenhouse gas emissions by balancing those emissions, so they are equal to (or less than) the emissions that get removed through the planet's natural absorption."

Case Study: UK's Digital Development Strategy 2024-2030

The UK's <u>Digital Development Strategy</u> <u>2024-2030</u> leverages digital technologies to achieve SDGs by promoting inclusive, responsible, and sustainable digital transformation. It emphasizes digital inclusion, responsibility, and addressing the gender digital divide, aiming to support twenty partner countries in halving their digital divides by 2030. By promoting digital inclusion and sustainability, this strategy supports the development of sustainable societies in the UK.

Overall, the EU's multifaceted approach to sustainability, encompassing environmental, economic, and social dimensions, demonstrates a robust commitment to fostering the creation of sustainable societies. By addressing regional disparities and leveraging digital and green technologies, Europe continues to advance toward a more sustainable and inclusive future.



The policy landscape for sustainable societies in North America is multifaceted, shaped by the region's diverse geography, economic disparities, and cultural, social, and political variations. These complexities demand tailored strategies to address the unique challenges of building sustainable societies across environmental, social, and economic dimensions.

Canada has prioritized sustainable development through its <u>2030 Agenda for Sustainable</u> <u>Development</u>, aligning with the SDGs. The country has committed to reducing greenhouse gas (GHG) emissions, promoting clean technology, and advancing indigenous rights. The promotion of clean technology supports environmental goals and drives economic growth by creating green jobs and fostering innovation. Therefore, these efforts reflect an integrated approach to sustainability, addressing environmental protection, economic growth, and social inclusion, which are essential for building sustainable societies.

In contrast, the United States presents a more fragmented landscape, with policies varying significantly across states. The <u>Green New Deal</u> proposal, although not enacted at the federal level, has sparked debates around economic restructuring to address climate change and inequality.

Mexico has also made strides with its <u>General</u> <u>Law on Climate Change</u>, establishing a framework for emission reduction targets and adaptation strategies. The country's commitment to increasing renewable energy generation and enhancing social development programs, particularly in vulnerable communities, illustrates an integrated approach to creating sustainable societies. By addressing both environmental and social dimensions, Mexico's policies support the development of sustainable societies by ensuring that economic growth does not come at the expense of environmental degradation or social inequality.

By implementing these varied and region-specific policies, North American countries are working towards creating societies that harmonize environmental, economic, and social dimensions, ensuring a resilient and inclusive future.



The policy landscape for sustainable societies in LAC is intricate and diverse, shaped by the region's unique blend of challenges and opportunities. The region is rich in biodiversity and natural resources, presenting vast potential for sustainable economic growth. However, the region also faces pressing challenges, including poverty, inequality, deforestation, and high vulnerability to climate change impacts. A paper published by the OECD titled "Sustainability Initiatives and Responsible Business Conduct in Latin America and the Caribbean" highlights that sustainability initiatives are gaining momentum, particularly in the agriculture and minerals sectors, contributing to the development of sustainable societies by addressing environmental preservation, social equity, and economic resilience.

LAC's agriculture sector has witnessed a rise in certifications for commodities like coffee, soy, and palm oil, which are integral to global supply chains. These certifications ensure environmentally responsible production and adherence to labor standards, directly promoting more equitable societies by empowering local communities and enhancing transparency. For example, initiatives like the certification system Fairtrade and the international non-governmental organization Rainforest Alliance integrate due diligence processes, aligning businesses with international <u>Responsible Business Conduct</u> standards, ensuring that benefits reach marginalized communities.

Similarly, in the minerals sector, initiatives such as the Copper Mark and Initiative for Responsible Mining Assurance emphasize sustainable resource extraction, addressing human rights and environmental concerns. These efforts reduce socio-environmental conflicts and foster inclusive development by creating employment opportunities and mitigating adverse impacts on local populations.

Sustainable development in LAC thus extends beyond environmental goals, embedding the principles of building sustainable societies. This involves multi-stakeholder initiatives, policy coherence, and grassroots involvement, ensuring an integrated approach to addressing inequality and promoting long-term socioeconomic and environmental well-being.

Case Study: Colombia's Green Jobs Strategy

Colombia's <u>Green Jobs Strategy</u> is a key example of fostering sustainable societies by integrating economic diversification, social equity, and environmental stewardship. Recognizing the challenge of transitioning away from coal—a sector central to its economy—the Colombian government has prioritized green jobs as a cornerstone of its strategy. These green jobs, emerging in renewable energy, sustainable agriculture, and eco-tourism, not only provide alternative livelihoods for coal-dependent regions but also contribute to social inclusion and economic stability. This comprehensive approach ensures that vulnerable communities are supported while advancing broader sustainability goals, demonstrating how targeted policy actions can enhance societal well-being and environmental health simultaneously, which directly supports the development of a sustainable society.

Overall, while the foundations for sustainable societies are being laid, ensuring long-term success will require addressing equity concerns, securing steady investments, and building resilience across the diverse socioeconomic landscapes of LAC.



Asia-Pacific (APAC)

The APAC region faces complex challenges related to rapid urbanization, economic inequality, and environmental degradation. However, its response reflects a growing commitment to building sustainable societies, with countries aligning their policies with the SDGs. This involves addressing critical environmental concerns such as deforestation, pollution, and climate change while tackling social disparities and fostering inclusive economic development.

Case Study: New Zealand – Living Standards Framework

The Living Standards Framework (LSF)

developed by New Zealand's Treasury is a comprehensive tool designed to measure and improve the well-being of New Zealanders. It integrates various dimensions of well-being, including economic, social, and environmental factors, to provide a holistic view of living standards. The <u>2019 Well Being Budget</u> in New Zealand represented a major shift in government policymaking by incorporating the LSF to guide investment priorities and funding decisions, focusing on long-term well-being, mental health services, child well-being, support for Māori and Pasifika aspirations, a more productive economy, and transitioning to a low-emissions, sustainable economy.

Case Study: ASEAN-EU Dialogue – Example of APAC-EU Cooperation

The EU-ASEAN Dialogue on Green Technology and Innovation Mapping (GreenTech) initiative highlights the transformative role of international cooperation in promoting sustainable societies. By facilitating technology transfer and capacity-building, the initiative addresses pressing issues like plastic waste management and integrates green technologies into manufacturing. Such partnerships underscore the potential of cross-regional collaboration to foster technological innovation that supports environmental sustainability and social inclusivity.

The APAC region demonstrates that while challenges persist, a unified commitment to sustainability can create transformative change. Through inclusive policies, innovative technologies, and international cooperation, APAC nations are fostering sustainable societies that balance economic growth with social equity and environmental preservation.



Middle East and North Africa

The MENA region's journey toward building sustainable societies is shaped by its unique challenges and opportunities. While historically dependent on fossil fuel revenues, countries in the region are increasingly recognizing the need to integrate economic diversification, environmental stewardship, and social inclusion into their development frameworks. Efforts vary widely, with some nations adopting ambitious strategies, while others are navigating initial stages of reform.

Saudi Arabia's <u>Vision 2030</u> represents a massive policy move toward transforming its economy away from oil dependence while fostering sustainability in multiple dimensions. The plan prioritizes renewable energy projects, such as the NEOM city initiative, which focuses on clean energy, green infrastructure, and futuristic urban living. With a goal of generating 50% of electricity from renewables by 2030, the strategy integrates environmental objectives with social welfare improvements and economic innovation, creating a pathway for building sustainable societies in the region.

Egypt Vision 2030, aligns closely with the SDGs, aiming to balance economic growth, environmental sustainability, and social inclusion. Egypt has prioritized renewable energy through projects such as the <u>Benban</u> <u>Solar Park</u>, one of the world's largest solar installations. Furthermore, the strategy includes measures to empower women and young people, reduce poverty, and improve education, underscoring the integration of societal goals within the broader sustainability framework.

The MENA region is increasingly embracing a vision of creating sustainable societies, with sustained investments, enhanced cooperation, and policies that prioritize equity and

resilience. By leveraging its unique assets such as abundant solar energy and a youthful workforce—MENA has the potential to lead transformative global efforts in sustainability.



Sub-Saharan Africa (SSA) confronts a unique blend of challenges in its pursuit of creating sustainable societies, including high poverty rates, limited access to quality education and healthcare, widespread unemployment, and acute vulnerability to climate change. These interconnected issues underscore the critical need for sustainability efforts that holistically address social, economic, and environmental dimensions.

Sustainable societies thrive on equitable access to resources and opportunities. In SSA, improving healthcare is fundamental for building resilience and ensuring societal well-being. Robust healthcare systems reduce disease burdens, increase life expectancy, and enable individuals to contribute to their communities and economies. Similarly, accessible and quality education empowers people with the skills needed for employment and innovation, driving inclusive economic growth.

With regard to climate resilience, another essential pillar of sustainable societies, SSA's dependence on agriculture, a sector deeply vulnerable to climate change, highlights the need for sustainable farming practices and water management. Climate-resilient infrastructure and policies not only protect livelihoods but also ensure food security and energy access, which are foundational for stable and cohesive communities. Climate resilience strategies focus on adaptation and mitigation, with regional organizations such as the African Union (AU) and the Economic Community of West African States (ECOWAS) guiding environmental sustainability policies. Notable frameworks include the <u>AU's Agenda</u> 2063 and the African Strategy on Climate Change.

Case Study: African Union's Digital Transformation Strategy for Africa

The AU's Digital Transformation Strategy for Africa (2020-2030) directly supports sustainable societies by harnessing technology to promote inclusivity and resilience. Universal broadband access and digital literacy equip individuals with tools to improve their livelihoods, while digital healthcare initiatives expand access to essential services. E-agriculture solutions enhance productivity and sustainability in farming, ensuring food security and economic stability for rural populations. These innovations address current challenges and also seek to futureproof societies against technological and economic shifts, aligning with the core tenets of the development of sustainable societies.

2.3 Road Ahead

The examination of initiatives across six regions underscores both advancements and persistent obstacles in achieving the development of sustainable societies. These societies are characterized by their ability to harmonize environmental stewardship, social equity, and economic prosperity, ensuring well-being for current and future generations. The findings reveal that sustainable societies emerge when policies address interconnected challenges holistically, laying the foundation for resilience, inclusivity, and equity.

Regional cooperation is expected to deepen, particularly through organizations like the African Union, ASEAN, and the European Union. Shared initiatives may address cross-border challenges such as climate resilience, equitable resource distribution, and regional technology hubs to foster innovation and collaboration. These efforts can significantly contribute to creating sustainable societies that are interconnected and resilient.

Globally, greater alignment with frameworks like the SDGs is anticipated. Upcoming international agreements may prioritize climate action, digital governance, and financial mechanisms to support the development of more sustainable societies. Technology transfer and capacity-building initiatives will also play a crucial role in ensuring all nations can participate in and benefit from sustainability efforts.

Therefore, the journey toward creating sustainable societies requires deliberate and unified efforts across all levels of governance. By aligning sustainability initiatives with the principles of social equity, economic resilience, and environmental balance, nations and regions can build communities that thrive within ecological limits. Tackling challenges such as financing, digital access, and policy coherence will be critical in ensuring that progress is inclusive and enduring. With thoughtful policymaking and international cooperation, the vision of sustainable societies can become a reality for all countries.

Upcoming events

World ESG Summit

Riyadh, Saudi Arabia | 10-11 February 2025

Find out more

World Sustainable Development Summit 2025

New Delhi, India | 5-7 March 2025

Find out more

10th Multi-Stakeholder Forum on Science, Technology, and Innovation for the SDGs

New York, US | 7-8 May 2025

Find out more

The Sustainability Research and Innovation Congress Chicago, US | 16-19 June 2025

Find out more

The DCO'S Member States are taking significant strides toward fostering sustainable societies through integrated policies that encompass environmental, social, and economic dimensions. This section explores the policy landscape across these nations, highlighting key initiatives and strategies aimed at achieving sustainable societies.

| Member State | Key Initiatives and Strategies |
|---------------------------|--|
| Bahrain | Bahrain's pursuit of sustainable societies is anchored in its Economic Vision 2030, a roadmap designed to prioritize economic diversification to reduce dependence on oil revenues while promoting sustainability. This approach supports the economic dimension of building sustainable societies by creating resilient economic structures and reducing vulnerability to market fluctuations. Social welfare programs, such as affordable housing schemes and universal education investments, address inequalities and foster community stability. These interconnected policies collectively advance the pillars of sustainable societies, ensuring equitable development, environmental stewardship, and societal cohesion. |
| Bangladesh | The Bangladesh Vision 2041 (Vision 41) represents a roadmap for building sustainable societies by fostering socioeconomic advancement and addressing key development challenges. This comprehensive strategy, structured through four consecutive five-year plans (2022–2041), seeks to elevate Bangladesh to the status of a developed nation while ensuring inclusivity and sustainability. The vision promotes economic diversification, aiming to reduce dependency on traditional agriculture by advancing technology-driven sectors and industrialization. Social inclusion is a cornerstone, with goals to eradicate extreme poverty, expand healthcare access, and improve education outcomes, fostering equity and upward mobility. Additionally, Vision 2041 emphasizes environmental sustainability through climate-resilient infrastructure, renewable energy adoption, and improved disaster management systems. Together, these initiatives create a holistic foundation for building sustainable societies that integrate economic resilience, social equity, and ecological balance. |
| OO OOC OO Cyprus | Cyprus is pursuing a holistic path to sustainable societies through a blend of environmental, economic, and social policies. The National Energy and Climate Plan, which aligns with the European Union's Green Deal, sets targets for reducing emissions and increasing renewable energy. This includes expanding solar and wind energy and modernizing the energy grid to support decentralized power generation. The focus on smart technologies in urban areas enhances energy efficiency and optimizes resource use, improving urban living and reducing waste. Additionally, sustainable tourism initiatives promote eco-tourism and cultural preservation, aligning economic growth with environmental and community benefits. These integrated efforts are creating a resilient, inclusive society where environmental goals are directly linked to economic stability and social equity. |
| Djibouti | Djibouti is working on the Vision 2035 plan, which is a comprehensive development plan aimed at transforming the country into a regional trade and logistics hub while promoting broader socioeconomic progress. Beyond its environmental focus, the plan highlights key initiatives aimed at economic diversification, infrastructure development, and social inclusivity. |
| Gambia | In Gambia, the government is implementing the National Development Plan, which is a key policy framework aimed at building a sustainable society through economic growth, poverty reduction, and the achievement of the SDGs. The plan integrates poverty reduction as a central objective, working to address basic needs like education, healthcare, and housing for all citizens. It highlights the importance of human capital development, particularly in empowering youth and women, to ensure that the benefits of growth are widely shared. By aligning with the African Union's Agenda 2063 and the SDGs, the NDP supports the creation of a more equitable and resilient society, tackling inequality and promoting social welfare. |
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Member State 🔰 Key In

Key Initiatives and Strategies

Ghana

Greece

Jordan

Kuwait

Morocco

Ghana's National Climate Change Policy includes strategies to reduce GHG emissions, promote renewable energy, and enhance climate adaptation measures. This aligns with Ghana's broader vision of creating a sustainable society, where both environmental protection and socioeconomic growth go hand in hand. By addressing climate change and fostering sustainable resource management, the NCCP contributes to a society that can withstand environmental challenges while continuing to develop. The country is also pursuing the Digital Ghana Agenda, which aims to increase access to digital services in both urban and rural areas, boosting connectivity, improving access to education, and creating job opportunities in the technology sector. This is key to building an inclusive and sustainable society, where technology becomes a driver of social mobility and economic resilience.

Key policies like the National Energy and Climate Plan, promote a transition to a low-carbon economy by reducing emissions, expanding renewable energy, and improving energy efficiency. The Greece 2.0 Recovery and Resilience Plan includes significant investments in digital infrastructure and digital skills, ensuring equitable access to essential services like healthcare, education, and e-commerce. Through these efforts, Greece is working to build a resilient, inclusive society that combines environmental responsibility with economic growth and social equity.

Jordan's National Strategy for Green Growth 2021–2025 outlines a roadmap for integrating environmental sustainability into the country's economic framework. The strategy prioritizes renewable energy, water conservation, and sustainable agriculture, supported by digital technologies to enhance efficiency and monitoring. The strategy complements these efforts by promoting inclusive economic growth, particularly through youth and women's empowerment and job creation, alongside fostering a diversified economy. These comprehensive strategies are foundational in shaping a more resilient, inclusive, and environmentally responsible society in Jordan.

Kuwait is focusing on building a sustainable society through the ambitious New Kuwait Vision 2035, a national development plan linked to international goals such as the SDGs. This vision seeks to support human and social development.

Morocco is taking significant steps toward building a sustainable society through a series of policies and strategies that focus on environmental, social, and economic resilience. The National Strategy for Sustainable Development (2017-2030) emphasizes a transition to a green economy, with policies aimed at reducing the country's reliance on traditional resources while promoting renewable energy, efficient water management, and sustainable agriculture. Morocco's approach to sustainable societies also integrates social inclusion and human development. The country has undertaken initiatives to empower local communities, with a focus on enhancing the role of civil society in decision-making processes. Notably, programs like the rehabilitation of historical sites, such as the Marrakech Mellah, combine cultural preservation with economic development by involving local communities in planning and promoting eco-tourism. Through these integrated policies and initiatives, Morocco is fostering a resilient, inclusive society where economic diversification, social equity, and environmental sustainability are key to long-term prosperity.

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| 000 | c o | $\begin{array}{cccccccccccccccccccccccccccccccccccc$ |
| | Member State | Key Initiatives and Strategies |
| 00 00 | 000 Nigeria 0000 00000 00000 00000 | Nigeria is actively pursuing the goal of building a sustainable society through comprehensive policies aimed at addressing economic, environmental, and social challenges. Central to these efforts is the Nigeria Vision 20:2020 and its successor, the National Development Plan (2021–2025), which focuses on economic diversification, poverty reduction, and inclusive growth. These plans seek to reduce Nigeria's dependence on oil, promote industrialization, and provide decent jobs and economic opportunities, particularly for youth and women. |
| 0000 | 00000 0000 0000 000 000 | Oman's Vision 2040 aims to create an inclusive, diversified, and resilient economy while safeguarding the environment and promoting social justice. This vision focuses on achieving economic growth, social inclusion, and environmental protection, with an emphasis on innovative infrastructure, green energy, and smart cities. Key initiatives within Vision 2040 include the development of sustainable urban environments, food, water, and energy security, and the implementation of decentralization for regional development. |
| | Pakistan | Pakistan is working towards the creation of sustainable societies through various policies and initiatives. Central to this is the Vision 2025, which provides a comprehensive framework for inclusive growth, poverty reduction, and environmental sustainability. The vision emphasizes diversifying the economy, enhancing human development, and integrating SDGs into national planning. By embedding the SDGs into its national framework and focusing on economic, social, and environmental dimensions, Pakistan is laying the foundation for a sustainable, inclusive society that aims to leave no one behind. |
| - | Qatar | Qatar's National Vision 2030 sets a framework for balancing economic growth, social development, and environmental protection. The vision outlines four main pillars: human development, social development, economic development, and environmental development, aiming to provide a high standard of living while safeguarding resources for future generations. |
| - | Rwanda | Rwanda's Vision 2050 aims to transition to a middle-income economy and ultimately achieve high-income status by 2050. Key to this vision is economic diversification beyond agriculture, human capital development, and a focus on social equity. Rwanda has made significant strides in poverty reduction, education, and healthcare, with an emphasis on creating a knowledge-based society through improved technical education and skills development. |
| | Saudi Arabia | Saudi Arabia's Vision 2030 is a blueprint for transforming the country into a more diversified, sustainable society, focusing on economic, social, and environmental development. The vision's emphasis on economic diversification aims to reduce the Kingdom's dependence on oil by investing in non-oil sectors, such as renewable energy and digital technologies. This shift is intended to foster a knowledge-based economy that supports long-term prosperity and job creation across various sectors. On the social front, Vision 2030 promotes gender equality, youth empowerment, the enhancement of public services. The vision also emphasizes creating sustainable cities, such as NEOM, which will be powered by clean energy and feature green infrastructure. |

To explore how societies can achieve sustainability in practice, this edition of the DCO Policy Watch examines three critical enablers of sustainable societies: Climate Action, Educational Technology (EdTech), and Space Exploration. Each of these domains plays a unique and complementary role in building communities that can thrive within environmental boundaries while ensuring social equity and economic resilience.

Technology is a crucial enabler for achieving clean energy targets and fostering sustainable societies. Innovations such as AI-enabled climate action, EdTech, and space technologies enhance resource efficiency, mitigate environmental impacts, and promote social inclusion through improved digital access. For instance, smart grid systems not only enhance energy efficiency and reliability but also help reduce greenhouse gas emissions, bolstering environmental sustainability. Digital platforms expand educational access, fostering social equity and inclusion. Additionally, renewable energy technologies like solar and wind power lessen our reliance on fossil fuels and foster economic resilience by creating green jobs.

Climate Action lays the environmental groundwork for sustainable societies. Through innovative policies and cuttingedge technologies, nations are pioneering methods to lower emissions, boost climate resilience, and conserve natural resources. The integration of AI-powered climate modelling, blockchain-enabled carbon trading, and IoT- based monitoring systems is transforming our approach to climate challenges, enabling communities to respond more effectively.

EdTech strengthens the social dimension of sustainable societies by democratizing access to quality education and building essential skills for the future. Digital platforms, adaptive learning systems, and virtual classrooms are transforming how knowledge is shared and acquired, enabling more inclusive and equitable educational opportunities. This technological transformation of education is crucial for developing human capital that can drive sustainable societies.

Space Exploration and its associated technologies provide vital tools for monitoring and managing Earth's resources while expanding human capabilities. Satellite technology supports climate monitoring, disaster preparedness, and agricultural efficiency, while space-based communications help bridge the digital divide.

These applications demonstrate how space technology can enhance both environmental stewardship and social inclusion. The following sections examine each of these enablers in detail, analyzing global policy developments, regional approaches, and emerging trends. By understanding how these three domains interact and complement each other, policymakers can better design integrated strategies that support the development of truly sustainable societies.

3 Climate Action

3.1 Overview

Climate action has emerged as a fundamental enabler of sustainable societies, playing a crucial role in ensuring the long-term viability and resilience of communities worldwide. Effective climate action strategies are essential for creating environmentally conscious, resilient, and forward-thinking communities. Nations worldwide are actively working to fulfill their commitments to key climate action agreements, such as the Paris Agreement, striving toward ambitious global targets for reducing GHG emissions and limiting global warming. Under the Paris Agreement, countries submit Nationally Determined Contributions (NDC), which are climate action plans outlining individual countries' efforts to reduce national emissions and adapt to climate change impacts. NDCs are updated every five years to monitor progress and reflect increasing ambitions. Climate action initiatives are integral to our transformation into more sustainable societies. and as these efforts are brought together in comprehensive policies and overarching, innovative strategies, they magnify their contribution to overall global climate action.

The integration of digital technologies is a significant advancement within the global climate action policy landscape and this connection is formally recognized in the SDGs, particularly SDG 13 (Climate Action), which calls for urgent action to combat climate change and its impacts. It is important to note the dual role that digital technologies occupy within these strategies:

- Technological innovations, such as Alpowered climate modeling, blockchainenabled carbon markets, and IoT-based monitoring systems are revolutionizing how nations monitor, manage, and mitigate climate change impacts, yet
- 2. These strategies are equally intended to alleviate environmental concerns related to the increased use of technology, such as e-waste and energy consumption.

Different regions are adopting varied approaches to climate action, reflecting their unique challenges and priorities. The EU and UK are leading with comprehensive policies such as the EU Green Deal and the UK's Climate Change Act, aiming for climate neutrality by 2050. Countries such as Kenya and Singapore are leveraging digital technologies to enhance climate resilience and sustainability, while the Middle East focuses on regional collaboration and ambitious environmental targets through initiatives such as the Middle East Green Initiative. This section seeks to provide a comprehensive overview of the broader policies, strategic initiatives, and use-cases that contribute to global efforts to advance climate action.

3.2 Latest Developments

With regard to climate action, there are significant developments pertaining to digital technologies and their applications of note in 2024:

Digital Innovation

- Researchers have made significant advances in AI-powered climate modeling, improving the accuracy and speed of climate projections. For instance, Google's new AI model, NeuralGCM, has shown accuracy in both short-term weather forecasts and long-term climate projections.
- The U.S. National Oceanic and Atmospheric Administration's <u>GOES-U satellite</u>, launched in June 2024, is the latest in a series of advanced environmental monitoring satellites, providing critical data for climate research and disaster prediction.
- <u>Nasdaq</u> launched a pioneering technology to digitize the issuance, settlement, and custody of carbon credits*, aiming to scale global carbon markets.
- <u>5G technology is being leveraged to</u> <u>enhance climate action</u>, such as optimizing energy distribution through smart grids and improving real-time data collection in agriculture.
- Major cloud providers have set <u>ambitious</u> <u>sustainability targets</u>. <u>Google</u> aims for netzero emissions by 2030, focusing on 24/7 carbon-free energy and carbon removal solutions. <u>AWS</u> achieved 100% renewable energy usage ahead of schedule and maximizes energy efficiency in its data centers. <u>Microsoft</u> plans to be carbonnegative by 2030 and remove all historical emissions by 2050, with investments in carbon removal technologies.



• The UAE issued Federal Decree Law No. 11 of 2024 'On the Reduction of Climate Change Effects,' which comes into effect in May 2025.

- The Biden-Harris Administration released updated <u>Climate Adaptation Plans</u> that integrate digital tools and data to enhance climate resilience across federal agencies.
- The <u>Partnership for Atlantic Cooperation</u>, launched at the UN General Assembly, aims to address shared economic and environmental challenges in the Atlantic basin, including sustainable ocean economy and resource management.
- The <u>US Framework for Climate Resilience and</u> <u>Security</u> emphasizes the integration of digital technologies to enhance climate resilience and protect critical infrastructure.
- The EU has adopted the <u>"Fit for 55" legislation</u>, which includes comprehensive measures to reduce GHG emissions by 55% by 2030 and achieve climate neutrality by 2050.
- According to the European Commission, as of 2024, digital technologies account for 5 to 9% of global electricity consumption. The Commission is currently <u>conducting</u> a study titled 'Greening cloud computing and electronic communications services and networks: towards climate neutrality by 2050' to address the lack of commonly accepted definitions and methods to assess the energy-efficiency, climate-neutrality

and overall sustainability of data centers.

 In February 2024, the UAE Ministry of Energy and Infrastructure launched a <u>Digital Twin</u> <u>Platform</u>, which displays live data on the livability and sustainability of cities.

* Carbon credits: An equivalence measure representing the right to emit one ton of carbon dioxide, or its equivalent in other GHGs. Companies are allocated a certain number of credits by their respective government, which are capped within each jurisdiction. A company emitting less carbon dioxide than allocated by its credits can sell the surplus credits to emitters who have exceeded their limit.

- In November 2024, Kenya expanded its <u>digital</u> <u>climate-smart agriculture program</u>, reaching over five million farmers with personalized crop management advice via mobile apps.
- In September 2024, Japan implemented <u>Al-powered energy management systems</u> in major cities, reducing urban energy consumption by up to 15%.
- In October 2024, it was reported that South Africa is developing a <u>digital early warning system</u> for extreme weather events, leveraging AI and big data to improve disaster preparedness and response.
- In August 2024, Colombia received \$99.9 million from the Development Bank of Latin America and the Caribbean and the Green Climate Fund to strengthen its <u>agricultural</u> <u>sector</u> against the impacts of climate change.
- <u>The Circular Electronics Partnership</u> was launched in 2020 by the <u>UN University</u> and the <u>Global E-Waste Statistics Partnership</u>. The program promotes the circular economy approach, focusing on prolonging the lifecycle of electronic devices through recycling and repurposing. It encourages the sustainable design of electronics to reduce e-waste and improve resource efficiency, helping organizations manage and recycle their old devices.



The EU and UK stand at the forefront of global climate action, having developed some of the most comprehensive and ambitious climate policies. The main EU initiative is the <u>EU Green Deal</u>, a comprehensive set of policy initiatives by the European Commission aimed at making the EU the first climate-neutral continent by 2050. It includes measures to reduce GHG emissions, promote renewable energy, enhance energy efficiency, and foster a circular economy. The EU has also taken specific measures to address the environmental impact of technology through the <u>European Green</u> <u>Digital Coalition</u>, launched in 2021. This initiative brings together key ICT companies to create methodologies and guidelines for assessing the environmental impact of digital solutions.

The UK's post-Brexit climate strategy maintains a similar ambition. The UK <u>Climate Change Act</u> <u>2008</u> sets legally binding targets for reducing GHG emissions. It aims to reach net zero by 2050, compared to 1990 levels. The Act also introduces a system of carbon budgeting and establishes the <u>Climate Change Committee</u> to provide independent advice on reducing emissions and adapting to the impacts of climate change. Additionally, the UK <u>Net</u> <u>Zero Strategy</u> outlines a plan to achieve net zero GHG emissions by 2050, with a detailed roadmap for the country to be powered entirely by clean electricity by 2035.

Case Study: Finland's Climate Watch

Finland's <u>Climate Watch</u> is an innovative open-source digital platform designed to track the capital Helsinki's progress toward its climate goals. This platform exemplifies how digital technologies can enhance accountability and public participation in climate action strategies. It is also being used as a reporting tool on the implementation of the <u>Carbon-Neutral Helsinki 2035 Action</u> <u>Plan</u>. The Climate Watch tool includes:



Al-powered emissions monitoring and forecasting.



Interactive dashboards for public engagement and transparency.



Integration with IoT devices for real-time data collection and timely assessments of environmental conditions.



Machine learning algorithms for policy impact assessment.



The North American climate action landscape is characterized by a mix of federal, state, and local initiatives. The U.S. has recommitted to climate action through its Nationally Determined Contribution of reducing net GHG emissions by 50-52% by 2030 upon rejoining the Paris Agreement, followed by the launch of the Long-Term Strategy to achieve net-zero greenhouse gas emissions by 2050. The Inflation Reduction Act (IRA) represents the largest climate investment in U.S. history, providing \$ 369 billion for climate and clean energy programs.

Canada's approach centers on the <u>Pan-Canadian</u> <u>Framework on Clean Growth and Climate</u> <u>Change</u>, supported by the <u>Net-Zero Emissions</u> <u>Accountability Act</u>. The country has implemented a national carbon pricing* system and set ambitious targets for clean electricity generation. Both countries have placed significant emphasis on electric vehicle adoption and clean energy infrastructure.

Moreover, various governmental initiatives focus on reducing the environmental impact of technology. For instance, the U.S. introduced <u>Clean Electricity Tax Provisions</u> within its IRA, offering financial incentives for companies developing and deploying clean energy technologies.

Case Study: New York's PlanNYC

<u>PlaNYC</u> is New York City's comprehensive climate action plan, led by the Mayor's Office of Climate and Environmental Justice, and designed to achieve sustainability and resilience in the face of climate change. The plan outlines initiatives and policies aimed at reducing GHG emissions, enhancing climate resilience, and promoting environmental justice. PlaNYC has set ambitious targets, including reducing GHG emissions by 80% by 2050 and cutting transportation emissions in half by 2030. It leverages digital technologies such as smart sensors and data analytics to monitor air quality and energy usage, integrates renewable energy sources into the city's power grid, and uses advanced modeling tools to predict and mitigate climate impacts.

Latin America and the Caribbean

The LAC region has shown increasing commitment to climate action, with many countries enhancing their Nationally Determined Contributions (NDCs) under the Paris Agreement. Brazil's new climate policies focus on Amazon preservation and renewable energy expansion. Colombia has implemented comprehensive climate legislation focusing on biodiversity protection and sustainable agriculture. Mexico's General Law on Climate Change includes sectoral emission targets, along with the creation of coordinating institutions across ministries and sub-national authorities.

Case Study: Mexico's Extensio

Extensio, a social enterprise in Mexico, has employed mobile communication to empower smallholder farmers. By utilizing simple SMS messaging, the platform delivers crucial information such as weather forecasts, market prices, and sustainable farming practices. This empowers farmers to make informed decisions, improve their livelihoods, and adopt climate-smart agriculture. Extensio's services have reached 19,000 farmers directly and 60,000 indirectly in Mexico, Colombia, and Ecuador, who have also benefited from increased productivity, improved farming practices, reduced vulnerability to climate change, and enhanced market access.

* Carbon pricing: A method to curb GHG emissions by placing a fee on emitting and/or offering an incentive for emitting less, thus adjusting the fee paid by emitters according to their emission levels.



Middle East and North Africa

Regionally, the Middle East Green Initiative (MGI), launched by the Kingdom of Saudi Arabia in 2021, aims to combat climate change through regional collaboration and ambitious environmental targets. It seeks to plant 50 billion trees across the Middle East, restore 200 million hectares of degraded land, and reduce carbon emissions by 670 million tons annually. By fostering economic diversification, job creation, and private sector investment, MGI addresses environmental challenges while promoting sustainable development in the region. The MGI Ministers Communiqué emphasizes the importance of technology transfer to support climate action, highlighting the need for sharing innovative solutions and best practices among member countries. It also mentions the establishment of digital platforms to facilitate regional collaboration, data sharing, and monitoring of environmental projects.

Individual governments are also setting ambitious climate targets. The UAE's <u>Net Zero</u> by 2050 Strategic Initiative combines ambitious emissions reduction targets with investments in clean technology. Saudi Arabia's <u>Green Initiative</u> demonstrates growing commitment to climate action, aiming to combat climate change and protect the planet for future generations.

Some initiatives are being implemented to address the environmental impact of technology. One notable example is the development of the region's largest solarpowered data center by Moro Hub, a subsidiary of the Dubai Electricity and Water Authority. This facility was awarded the status of the world's largest solar-powered data center by Guinness World Records. It has a capacity of over 100 MW and is the largest Uptime Institute Tier IIIcertified green data center in the Middle East and Africa.

Case Study: Egypt's Benban Solar Park

The Benban Solar Park in Egypt, a project integrated into the strategy developed by the New and Renewable Energy Authority, is one of the largest solar installations globally – a complex of more than 41 solar power plants – designed to harness solar energy to reduce GHG emissions. The project leverages digital technologies to optimize the performance and management of the solar park. It uses advanced monitoring systems and data analytics to track solar panels' performance in real-time, and Al-powered predictive maintenance to anticipate and resolve potential issues.

Benban Solar Park is expected to generate up to 1.8 GW of electricity, enough to power thousands of homes. The Park reduces carbon emissions by 2 million tons per year. The project also creates jobs and contributes to the development sustainable of sustainable societies.



APAC presents a diverse landscape of climate action approaches, reflecting varying levels of economic development and different environmental challenges. Developing countries such as **Bangladesh** and, Cambodia have yet to integrate low-carbon and climate-resilient transformations into their development pathways. China's 14th Five-Year Plan for Economic and Social Development (2021-2025) emphasizes green development and carbon neutrality by 2060. Japan has strengthened its emissions reduction target to 46% by 2030. South Korea's Green New Deal aims to strengthen climate action, with investments focused on green infrastructure, renewable energy, and fostering green industry. Korea's

Framework Act on Low Carbon Green Growth

seeks to shift business and society toward green growth through a process of strategy setting and action plans.

There are efforts to address the environmental impact of technology. For instance, Singapore has introduced <u>sustainability standards</u> specifically for data centers operating in its tropical climate. These standards aim to improve energy efficiency and reduce emissions associated with the high demand for cooling in such environments.

Case Study: Singapore's Digital Twin for Climate Resilience

Singapore's Digital Twin for Climate Resilience, or Virtual Singapore, created a dynamic 3D city model to enhance urban planning and climate resilience. This digital platform integrates high-resolution 3D mapping with real-time data from IoT sensors deployed throughout the city-state. By utilizing AI and data analytics, Virtual Singapore enables urban planners to simulate various climate change scenarios, assess their potential impacts, and optimize adaptation strategies. The system has reduced urban flooding incidents by 45% and improved building energy efficiency by 35%. The digital approach includes:

- City-scale digital twin for climate impact modeling.
- Al-powered building energy optimization.
- Smart drainage systems with predictive maintenance.
- Public engagement through augmented reality visualization.



SSA's approach to climate action reflects the unique challenges faced by the region, including rapid urbanization, vulnerability to climate impacts, and the need for sustainable development. The African Union (AU)'s <u>Green</u> <u>Recovery Action Plan (2021-2027)</u> provides a framework for climate-resilient development across the continent. Under Renewable Energy, the Action Plan emphasizes technology transfers, including grid expansion and distribution. Under Climate Resilient Agriculture, it emphasizes making the best use of emerging technologies, including clean energy technologies, within the agriculture sector.

Individual countries have developed specialized approaches to climate action – countries such as Rwanda and Ethiopia are leading with comprehensive climate strategies. Rwanda's <u>Revised Green Growth and Climate Resilience</u> <u>Strategy and Ethiopia's Climate Resilient Green</u> <u>Economy National Adaptation Plan</u> represent leading examples of comprehensive climate action planning in the region. Moreover, as mentioned above, the MGI, the first Afro-Asian environmental initiative of its kind, includes African countries such as Djibouti and Mauritania.

In SSA, one notable government-led initiative focusing on green data centers is the partnership between EcoCloud, a leading Kenyan sustainable data center provider, and G42, a UAE-based technology holding group. The two parties have signed a memorandum of understanding to build a geothermal-powered mega data center in Kenya. This facility is set to leverage the country's vast geothermal energy potential, estimated at 10 gigawatts, to power the data center.

Case Study: Digital Earth Africa

Digital Earth Africa (DE Africa) is an initiative that leverages Earth observation data to address environmental and socioeconomic challenges across Africa. By providing open and accessible satellite data, it enables policymakers, scientists, and communities to make informed decisions on issues such as water resource management, agriculture, and urban planning. For instance, in Tanzania, DE Africa's data has been instrumental in monitoring Lake Sulunga, helping local authorities manage drought conditions more effectively, including by improving policy to protect the lake and its surrounding communities dependent on it for water, food, and income.

Case Study 2: Weather Information using WhatsApp in Malawi

In Malawi, the Weather Chasers initiative was launched in January 2016 by the Department of Climate Change and Meteorological Services (DCCMS) following floods that caused \$500 million in damage. It uses WhatsApp to provide real-time weather alerts and reports. This community-driven approach leverages the widespread use of mobile phones to disseminate critical weather information quickly and efficiently, while also enabling citizens to submit "spotter reports" that help verify forecasts and improve warning services. The WhatsApp group serves as a two-way communication channel sharing daily observations from 21 weather stations and enabling ground-truthing of satellite data.

3.4 Road Ahead

Digital technologies are fundamentally reshaping how societies address climate change. Regional approaches to digital climate solutions show varying levels of maturity and effectiveness.

While the global community has made strides in recognizing and addressing climate change, there is still a significant gap between current efforts and what is needed to meet global climate goals. To fully leverage digital technologies for climate action, stakeholders must focus on infrastructure development, regional and international collaboration, policy development, and digital upskilling.

The path forward requires balancing ambitious climate targets with practical implementation strategies. As we move forward, it is also crucial that climate action strategies leverage the potential of digital technologies to drive meaningful change.

COP29 presented a key opportunity to realign global efforts to accelerate the integration of digital solutions into global climate action, and in this way, the transition to a sustainable, lowcarbon future.

Key outcomes of COP29 include:

- Endorsement of the <u>Declaration on Green</u> <u>Digital Action</u> by over 1,000 governments, companies and other organizations, emphasizing the role of digital technologies in enhancing climate resilience, reducing GHG emissions, and supporting sustainable development.
- Publication of the <u>Climate Resilient</u> <u>Infrastructure Report</u>, which focuses on platforms, tools, and emerging digital technologies that advance climate-resilient infrastructure.

- The inclusion of reducing the environmental impact of digital technologies as a priority within initiatives to enhance socioeconomic development.
- Adoption of the Baku Guiding Principles for Human Development for Climate Resilience, emphasizing commitments to enhancing support to greening skills and qualifications, and investing in talent for the application of new and green technologies with job creation potential.

Looking ahead, the success of digital solutions within global climate action will depend on:



Strengthening coordination between public and private sector initiatives on national, regional, and international levels.



Ensuring equitable access to digital Climate solutions.

Fostering innovation while maintaining environmental safeguards.



Building robust international partnerships for technology deployment.

Upcoming events

Cleantech Forum North America

California, US | 27-29 January 2025

Find out more

2025 UN Climate Change Conference (COP30)

Brazil | 10-21 November 2025

Find out more

DCO Landscape

A sustainable digital economy and climate action are integral to the DCO policy objectives and are being explored across all DCO Member States. DCO is committed to raising awareness about the environmental and climate impacts of digital technology and sharing best practices to reduce energy consumption and pollution within the digital economy.

The below map provides a non-exhaustive list of the climate action landscape within the DCO ecosystem, showcasing that Member States are at varying stages of climate action adoption and maturity. With that said, Member States have recognized the potential of digital technologies in advancing climate action.

| Member State | Climate Action Policy Environment | Reference to Digital Technologies |
|--|---|---|
| Bahrain 0 00000000000000000000000000000000000 | Law No. 7 of 2022 on the Environment National Renewable Energy Action Plan | Law: Considers technology innovation and deployment at scale as a vital enabler. Emphasizes Bahrain's support of key technologies. Mentions investigating novel technologies linked to renewable energy. Emphasizes technology transfers to support mitigation and adaptations measures. NREAP: Proposes a renewable energy mix which includes waste-to-energy technologies. Emphasizes integrating renewable energy technologies in large infrastructure projects. Refers to the Economic Vision 2030, which stresses on investments in carbon-reduction technologies. |
| Bangladesh | Bangladesh Climate Change Strategy and Action Plan (2009) | Seeks technology transfers from developed countries. Revises technology policies and incentives to promote efficient production, consumption, distribution, and use of energy. Seeks to review all government policies to ensure they account for climate change. Seeks to mainstream climate change in national, sectoral, and spatial development planning. |
| Cyprus | National Energy and Climate Plan (2021- 2030) | Seeks to remove entry barriers for new technologies. Emphasizes continued investment in renewable energy technologies. Posits that the transition to climate neutrality generates technological development opportunities. |
| Djibouti | Nationally Determined Contribution (NDC) | The NDC aims to encourage the use of low-carbon technologies. Emphasizes the necessity of technology transfers. |
| Gambia | Strategic Program for Climate Resilience (SPCR) 2017-2030 | Access to technology outlined as a need. |
| Ghana | Updated Nationally Determined Contribution under the Paris Agreement (2020 - 2030 | Actions to upscale renewable energy, reducing emissions from deforestation and enhancing clean energy and energy efficiency. |
| Greece | National Energy and Climate Plan (2021- 2030) | Aims to promote new technologies, including emission reduction technologies. |

| Member State | Climate Action Policy Environment | Reference to Digital Technologies |
|---|---|--|
| Jordan | National Climate Change Policy (2022- 2050) | Emphasizes technology transfer. Encourages research on innovation. Highlights investments in technology. Promotes the use of innovative technologies. |
| Kuwait | Kuwait National Adaptation Plan 2019-2030: Enhanced Climate Resilience to Improve Community Livelihood and Achieve Sustainability | Identifies a lack of modern technologies as a gap in the water sector. Emphasizes the need for technology transfers. |
| 2 000000000000000000000000000000000000 | National Strategic | Emphasizes cooperation for the promotion of technologies. Emphasizes strengthening cooperation for technology transfers. Seeks to enhance resilience to climate change, including water resource management and coastal protection, Emphasizes the importance of sustainable development and climate considerations in national policies. |
| | National Climate Change Policy for Nigeria (2021-2030) | Aims to enhance Nigeria's capacity to participate in technological cooperation on climate change. Emphasizes technology transfers. Emphasizes the role of the private sector in developing local technological capabilities and in developing and adopting low carbon technologies. |
| | Oman Vision 2040 | Emphasizes the development of a sustainable economy based on technology and innovation. Emphasizes embracing technology and innovation, including the use of modern technology in wastewater treatment, agriculture, and energy production. |
| 00000000000000000000000000000000000000 | National Climate Change Policy (2021) | Emphasizes technology transfers. Emphasizes developing water-efficient technologies. Promotes appropriate technologies for agriculture. Emphasizes the identification of technology options to improve resilience in the water, sanitation, and hygiene sectors. |
| | National 2030 Vision | Qatar's 2030 vision mentions that environmental degradation can be reduced through investment in advanced technologies. Encourages the use of environmentally sound technologies. |
| 0 0 | National Strategy for Climate Change and Low Carbon Development (2011- 2050) | Emphasizes the importance of technology and smart digital systems as efficient features of the Green Growth and Climate Resilient development pathway. Aims to position Rwanda at the forefront of green technology. Aims to create jobs related to green technologies. Emphasizes technology transfers of renewable power generation. |
| Saudi Arabia | Saudi Green Initiative | Aims to reduce emissions, contribute to 'greening' Saudi Arabia, and protect the land and sea. Emphasizes the contribution of technology, including Al and robotics, to produce a clean future, reduce carbon emissions, and impact climate change. Al used to monitor the initiative. |

Carbon Pricing: A method to curb GHG emissions by placing a fee on emitting and/or offering an incentive for emitting less, thus adjusting the fee paid by emitters according to their emission levels.

Carbon Credits: An equivalence measure representing the right to emit one ton of carbon dioxide, or its equivalent in other GHGs. Companies are allocated a certain number of credits by their respective government, which are capped within each jurisdiction. A company emitting less carbon dioxide than allocated by its credits can sell the surplus credits to emitters who have exceeded their limit.

4 EdTech

4.1 Overview

Quality education is fundamental to building sustainable societies, as it empowers individuals to contribute meaningfully to economic, social, and environmental progress. By fostering critical thinking, creativity, and innovation, education equips people to address global challenges such as poverty, inequality, and climate change. It also promotes social equity, reduces disparities, and enables inclusive growth, thereby strengthening the resilience and cohesion of communities. In preparing individuals for a future shaped by technological and environmental shifts, quality education lays the foundation for resilient, sustainable societies.

Educational Technology (EdTech) integrates these advancements, reshaping education globally, enhancing access, personalization, and fostering skills for a digital future. EdTech is <u>understood</u> as a concept encompassing all digital technologies (both hardware and software) used in educational settings. This includes technologies specifically developed for learning, teaching, and assessment, as well as those supporting administrative functions and everyday infrastructural technologies. Beyond improving delivery, EdTech equips learners with the critical skills required to address complex societal challenges and embrace sustainable practices. By aligning with sustainability goals, EdTech enhances the accessibility and quality

of education while driving progress toward inclusive, informed, and sustainable societies. As such, EdTech enables the accomplishment of the SDGs and the development of sustainable societies, especially:



SDG 4 Quality Education, aimed at ensuring

inclusive and equitable quality education.



SDG 9 Industry, Innovation, and Infrastructure,

aimed at fostering resilient infrastructure and inclusive, sustainable industrialization.

On one hand, EdTech presents significant opportunities for advancing sustainable societies: democratizing access to education, bridging gaps for marginalized communities, and enabling lifelong learning. It equips individuals with skills critical for the digital economy, fostering economic stability and innovation. Moreover, EdTech, by promoting virtual classrooms and digital resources, supports environmental sustainability through the reduced need for physical infrastructure and travel.

However, on the other hand, EdTech comes with notable challenges, including the digital divide, where unequal access to technology and connectivity exacerbates existing inequalities. There is also the risk of data privacy breaches when increased reliance on digital platforms is not accompanied by robust systems to protect sensitive information. Additionally, overdependence on technology may marginalize traditional educational practices and create disparities between tech-enabled and offline learning environments. Moreover, GenAl models, widely used in EdTech for personalized learning, content creation, and automation, require substantial computational resources, contributing to the rapid growth of global data center electricity consumption, which is projected to more than double between 2022 and 2026. To realize the full potential of EdTech, it is essential to address these challenges through inclusive policies, infrastructure investments, and frameworks that prioritize ethical, equitable, and sustainable practices.

| Opportunities | Challenges |
|---|---|
| Enhanced engagement and interactivity. Improved accessibility to information. Facilitation of collaboration and communication | Potential for distraction. High implementation costs. Technical issues and reliability concerns. Pick of over- |
| Personalized learning experiences. Preparation for a technology-driven workforce. | dependence on technology. Privacy and data security concerns. Tech-related high energy demand. |

The EdTech industry has experienced rapid technological advancements, particularly in personalized and immersive learning environments, which are reshaping how students interact with educational content. In modern classrooms, a variety of technology tools are employed to enhance the learning experience.

These include:



Learning Management Systems (LMS) such as <u>Google Classroom</u> and <u>Moodle</u>, allowing educators to manage, deliver, and assess learning materials online.



Al systems such as adaptive learning platforms, tailoring instruction to individual students' needs, and helping personalize education. Examples include <u>ALEKS</u> and <u>Q-interactive</u> which adjust learning difficulty based on student responses, while platforms like <u>Carnegie Learning</u> and <u>DreamBox</u> offer personalized feedback. Specifically, generative Al tools, such as <u>EdGPT</u>, <u>Quillbot</u>, and <u>Almanack</u> assist in personalizing learning, and can be used to create new content and automate tasks.



Virtual Reality (VR)/ Augmented Reality

(AR), enabling students to experience historical events, scientific concepts, or cultural simulations.

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Gamification, through game-based learning platforms such as <u>Kahoot</u> and <u>Quizlet</u>, is used to motivate students through enhanced interaction and engagement.



Data analytics tools, helping educators assess student performance and provide feedback, fostering targeted interventions.

These developments indicate a global shift towards more personalized, data-driven, and immersive learning experiences. They also highlight the commitment of policymakers and technology companies to make EdTech a permanent part of the education system, striving to ensure that educational opportunities are equitable and accessible. <u>Studies</u> have shown that when used appropriately, technology can enhance learning outcomes by catering to diverse learning styles and providing interactive, immersive experiences.

Latest Developments

Al Integration in Education

The growing use of AI in education, as evidenced by over 60% of U.S. educators employing AI tools for teaching and administrative tasks, highlights its transformative potential to personalize learning and enhance efficiency.

Extended Reality (XR) in Learning

The adoption of XR technologies such as Google Expeditions has revolutionized experiential learning, making education more engaging and accessible.

World Bank EdTech Initiative Expansion

The World Bank's Digital Technologies in Education initiative in developing countries aims to improve digital infrastructure and teacher training. This initiative highlights the importance of international cooperation and funding to overcome barriers such as connectivity gaps and lack of digital literacy.

UNESCO's AI Efforts

- United Nations Educational, Scientific and Cultural Organization (UNESCO) Issued a Guidance for generative AI in education and research in 2023. The guideline underscores the need for governments to adopt regulatory frameworks that ensure AI tools are inclusive and culturally sensitive.
- UNESCO held a global meeting of Ministers of Education to explore the immediate challenges and opportunities regarding GenAl in education, where it presented a roadmap on generative Al and education, including open, multistakeholder dialogue.

EU Digital Education Action Plan 2024 Progress Report

The European Commission's progress report on its Digital Education Action Plan reveals advancements in integrating digital literacy and skills across Member States. However, there are still gaps regarding harmonizing digital education standards across the EU and allocating resources to rural and underserved areas. The plan also underscores the importance of fostering collaboration between educational institutions and the technology industry to co-create scalable, inclusive, and innovative solutions.

4.2 Regional Approaches

As the global expenditure on education is projected to reach <u>\$10 trillion by 2030</u>, according to the World Economic Forum, the role of EdTech in shaping the future of learning cannot be overstated. Various regions have adopted diverse approaches to EdTech policies. While regions such as the EU and North America have focused on scaling up advanced digital learning tools, others such as Sub-Saharan Africa and the MENA region, are striving to overcome infrastructural challenges to achieve equitable access.



The EU has taken a proactive approach on EdTech through its <u>Digital Education Action Plan (2021-</u><u>2027</u>). This policy aims to create a high-performing digital education ecosystem and enhance digital skills across its member states. A key initiative under this plan is the <u>European Digital Education</u> <u>Hub</u>, which facilitates cooperation and exchange of best practices in digital education at the EU level. While educators have generally welcomed this initiative for its potential to improve resource access and professional development, <u>concerns</u> about exacerbating the digital divide between wellresourced and under-resourced schools persist. However, more is needed to achieve the objectives set out by the <u>European Commission (EC) in the</u> <u>Digital Decade Report</u>, namely supplying the EU labor market with at least 20 million ICT specialists and ensuring that at least 80% of the population has basic digital skills by 2030.

The UK's EdTech Strategy, outlined in the Department for Education's "Realising the potential of technology in education" report, aims to support the education sector in developing and embedding technology in a way that supports inclusion and drives improvements in educational outcomes. The strategy focuses on ten key challenges where technology can have a significant impact, including reducing teacher workload, improving assessment processes, and providing lifelong learning opportunities. The UK EdTech sector has seen significant expansion in recent years valued at \$4.1 billion in 2021, it is expected to grow to \$4.4 billion by 2025. This growth is driven by factors such as increased investment, government support, and the acceleration of digital adoption in education due to the COVID-19 pandemic. The UK is now home to over 1,000 EdTech companies, with London being a major hub for EdTech startups and innovation. Much of the focus has thus been on supporting EdTech startups, improving procurement processes, and addressing regulatory challenges. The UK government has been particularly interested in exploring the use of AI in education, with initiatives aimed at personalizing learning and reducing teacher workload.

Case Study: Estonia's E-School System

Estonia has pioneered the digital transformation of its education system through its e-School initiative. This <u>digital</u> <u>platform</u> connects students, teachers, and parents, enabling them to track academic progress, access educational resources, and communicate effectively.

Estonia's education system has become highly digitized, with 100% of schools using the platform. Students show improved performance in international assessments such as the OECD's <u>Programme for</u> <u>International Student Assessment</u>, and teachers report increased engagement and efficiency in managing classroom activities. Moreover, Estonia's high level of digital penetration, coupled with strong government support for technological innovation, has made it a model for other EU countries. EU policymakers view Estonia's success as evidence of the potential for digital education systems, particularly in enhancing transparency and efficiency.



The U.S. has adopted a decentralized approach to EdTech policies, resulting in variation between states and school districts. The U.S. <u>2024 National</u> <u>Educational Technology Plan</u> promotes publicprivate partnerships and includes examples from all 50 states – addressing three key divides: digital use, digital design, and digital access (K-12). The federal <u>Every Student Succeeds Act</u> includes provisions for funding digital learning and encouraging the integration of technology in primary and secondary education. Moreover, the US Department of Education released, in 2024, its <u>Al toolkit</u> to guide K-12 leaders integrating Al into their school districts.

Canada, while similarly focused on improving digital literacy, sees its provinces setting their own policies related to EdTech. Ontario, for instance, has been a leader in promoting digital education, launching platforms such as e-Learning Ontario to facilitate virtual learning for students across the province. In addition, the province launched its Virtual Learning Strategy (2020-23) to support postsecondary institutions, learners, and educators. This strategy aims to improve access to highquality virtual postsecondary education, support life-long learning, and strengthen Ontario's leadership in online learning. However, due to its decentralized education system, Canadian provinces have the autonomy to set their own EdTech policies and initiatives.

For example:

- Alberta developed the <u>Learning and</u> <u>Technology Policy Framework</u>, which guides school authorities in using technology to support student-centered, personalized, and authentic learning experiences.
- Quebec implemented the <u>Digital Action Plan</u> for Education and Higher Education, which aims to integrate digital technologies into teaching and learning practices, develop digital skills, and promote innovative uses of technology in education.

Case Study: New York City's iLearnNYC

New York City's iLearnNYC, launched in response to COVID-19, provided online courses to ensure continuity of education, <u>reaching 1 million students</u>.

In response to the COVID-19 pandemic, New York City launched iLearnNYC, a digital platform offering online courses for students across the city's public schools. The platform provides interactive content, live lessons, and resources to students, making it an essential tool during school closures. Over 1.1 million students gained access to online learning, ensuring continuity in education despite the pandemic. Teachers adapted quickly to the digital format, and student engagement remained high. While the platform was widely praised for its timely rollout and effectiveness in ensuring learning continuity, concerns arose over the disparities in internet access and device availability, particularly among lowincome families. Teachers also expressed the need for further professional development to effectively use digital tools.

Latin America and the Caribbean

Latin America has 180 million students across its 33 countries. The EdTech ecosystem has grown to more than 1,500 EdTech companies, creating over 4,500 jobs and attracting \$1 billion in investment over the last 10 years in 500 fundraising rounds. In recognition of EdTech's growing importance, LAC countries are implementing national strategies and policies to promote its adoption. Common elements among these policies include improving connectivity and the overall digital education infrastructure, increasing students and teachers' competencies, and collaborating with international organizations and the private sector to promote technology initiatives. As in other regions, however, implementation challenges remain, including infrastructure limitations, funding constraints, and the need for continued teacher training and support.

For example, Brazil has established a Digital Transformation Strategy (E-Digital) to integrate digital technologies into education. The country is working on a comprehensive digital public education strategy, with existing policies already in place to support connectivity in schools and digital inclusion initiatives. Mexico has implemented the Agenda Digital Educativa, a national digital education strategy focusing on improving digital education and access to resources, particularly in underserved areas. Argentina has developed the Digital Agenda and specific connectivity initiatives to enhance educational infrastructure. The government is working on connecting schools and building digital classrooms. Finally, Chile's government promotes equitable access to digital technology and supports the effective use of EdTech through various laws, regulations, and strategic plans. The government is <u>collaborating</u> with international organizations like UNESCO to enhance digital competencies among teachers.

Case Study: Buenos Aires Aprende Strategic Plan

The Buenos Aires Aprende 2024-2027 is a strategic educational plan recently unveiled by Buenos Aires City Government in Argentina, targeting primary and secondary school students in the city. It is part of the "Schools in Focus" program, covering 70,000 students in primary and secondary levels. The plan encourages new teaching and learning methods as well as the integration of technology into the educational process, with a focus on pedagogical and didactic approaches. The goal is to facilitate the mediation of curriculum content, develop related competencies, and foster the digital education skills necessary for utilizing, sharing, and creating with technologies in digital environments. The program has been implemented in five hundred public and private schools, focusing on vulnerable contexts and schools with low evaluation results.



Asia-Pacific (APAC)

This region exhibits a spectrum of EdTech adoption, from highly advanced systems in South Korea, Singapore, and Japan to emergent digital infrastructures in India, Indonesia, and Vietnam. With its comprehensive and forwardlooking approach, Singapore's "<u>Transforming</u> <u>Education through Technology</u>" Masterplan 2030" will see the government focusing on greater customization of students' learning experience, strengthening digital literacy and technological skills and improving teachers' EdTech practices. This will be executed through learning analytics as well as changes in the learning spaces to support technology-enabled learning.

In India, the Interim Budget 2024-25 <u>allocated</u> <u>a record amount</u> for the Department of School Education and Literacy, which could foster key aspects of the National Education Policy 2020, including promoting digital integration in learning to democratize access to quality education. South Korea's Smart Education initiative digitizes classrooms and introduces Al-powered learning tools, enhancing critical thinking and problemsolving skills among students. In India, the National Education Policy 2020 aims to bridge rural-urban divides by promoting mobile learning and affordable digital devices, addressing educational access disparities.

Case Study: South Korea's Smart Education Initiative

South Korea's government launched the Smart Education initiative to digitize classrooms and provide students with access to advanced learning technologies. Al-powered tools, interactive e-textbooks, and cloud-based platforms have been rolled out nationwide. South Korea's students rank among the highest globally in digital literacy, and the initiative has led to improvements in critical thinking and problem-solving skills. Teachers and students have responded positively to the increased interactivity and personalized learning opportunities. However, concerns about the impact of excessive screen time on students' health have prompted discussions about finding a balance between digital and traditional teaching methods.



Middle East and North Africa

In the MENA region, EdTech policies are increasingly being adopted as part of broader national strategies aimed at digital transformation. The EdTech industry globally was valued at nearly <u>\$123.4 billion</u> in 2022, with an annual projected growth rate of 13% until 2030, and the MENA region is contributing to this growth.

Nations such as the UAE and Saudi Arabia are at the forefront, implementing comprehensive digital education strategies that align with their broader visions for economic diversification. A notable initiative in the region is the UAEbased platform, the Digital School, launched in November 2020. This Arabic-language online education platform targets underserved communities and aims to reach 1 million students by 2026. In its first year, it reached 20,000 students in five countries, including children in a refugee camp in Jordan.

Case Study: UAE's Mohammed bin Rashid Smart Learning Program

Launched in 2012, the Mohammed bin Rashid Smart Learning Program seeks to digitize education in the UAE by providing students with tablets, access to e-learning platforms, and training teachers in using digital tools. The program has been successfully implemented in public schools, with a noticeable improvement in digital literacy and student engagement. During the COVID-19 pandemic, the program facilitated a seamless transition to remote learning. Stakeholders have been positive about the program, especially parents and students who appreciate the convenience and accessibility of digital tools. However, some educators have expressed the need for more comprehensive training in using EdTech tools to maximize their potential.



Sub-Saharan Africa

The African Union (AU) launched its <u>Digital</u> <u>Education Strategy and Implementation Plan</u> (2023-2028), which establishes a framework for engagement and acceleration of digital technology adoption. It focuses on three key areas:

- Digital technology appropriation in education.
- Education in digital technology for digitally empowered citizens and the digital economy.
- Building the capacity of AU Member States in digital infrastructure for digital education.

A <u>study examining EdTech adoption</u> in 10 Sub-Saharan Africa (SSA) countries revealed both progress and persistent challenges. Key findings include:

- Insufficient budgetary allocation and lack of supportive infrastructure hinder EdTech adoption.
- High levels of inequality in EdTech access, particularly in rural areas.
- Most EdTech initiatives are led and financed by NGOs and startups due to insufficient government funding.
- Political transitions often undermine the sustainability of EdTech policies.

Despite these challenges, several countries are leading efforts to overcome these barriers by leveraging mobile technology and low-cost solutions. For instance, Kenya has developed M-Shule, a mobile learning platform that uses text messaging to provide students with lesson plans and activities. Since its launch in 2017, M-Shule has reached over 20,000 households and has shown positive effects on student learning and parental engagement.

Case Study: Rwanda's Smart Classroom Initiative

Rwanda has made significant strides in its efforts to digitize education. Through its Smart Classroom initiative, part of the government's Smart Rwanda 2020 vision, it aims to provide digital tools to both urban and rural schools to improve access to quality education. Schools are equipped with computers, internet access, and e-learning platforms to facilitate modern teaching methods. By 2021, over 5,000 schools in Rwanda had smart classrooms, and student digital literacy rates have steadily improved. The initiative has also allowed rural students to access learning materials previously unavailable to them. Rwanda aims to expand the program to 82% of primary and secondary schools by end of 2024.

4.3 Road Ahead

The integration of digital platforms, AI, and immersive technologies such as VR/AR has already proven impactful in classrooms worldwide, enhancing interactivity, personalization, and flexibility of learning. However, the future of EdTech will require sustained cooperation among governments, international organizations, and the private sector to meet the technical and logistical challenges of digital education. Investments in infrastructure, teacher training, and supportive policy frameworks will be essential in enabling EdTech's potential to improve educational outcomes, foster equity, and contribute to sustainable development.

In some regions, EdTech strategies are expected to evolve with increased support for digital literacy, online safety, and adaptive learning models. The U.S. and Canada are focusing on strengthening digital health, safety, and citizenship resources to equip students with the knowledge and skills to thrive in digital spaces. The EU and its Member States are expected to continue the implementation of the Digital Education Action Plan and support other initiatives such as the European Digital Skills and Jobs Coalition and its National Coalitions and the European Digital Skills and Jobs Platform. Finally, the EC also plans to make use of <u>AI and</u> data-driven feedback and guidance, as well as adopt targeted measures to boost the provision of digital skills.

In Canada, where <u>nine out of ten jobs</u> are projected to require digital skills within a decade, authorities are likely to revisit and expand digital education policies (such as Québec's 2019-2023 Government Digital Transformation Strategy or Ontario's Virtual Learning Strategy (2020-23), to ensure the workforce is prepared for a technology-driven economy. Similarly, and in light of the on-going conflict, Lebanon will continue the development of a <u>blended learning</u> <u>framework</u>, bringing together formal and nonformal learning as well as ICT in education – exemplifying the growing commitment to adaptable and future-ready education systems.

In regions such as MENA, innovative EdTech models and government initiatives are emerging as foundational components of educational advancement. Saudi Arabia, for example, is scaling up digital classrooms, e-learning platforms, and Al-driven resources under its Vision 2030 goals to transform education and support economic diversification. The UAE's initiatives to develop Al-driven tutors and virtual classrooms highlight the region's emphasis on future-ready education frameworks.

The projected growth of the global EdTech industry – <u>expected to grow at a CAGR of 13.4%</u> <u>between 2024 and 2030</u> – reflects both the demand and need for these transformative educational tools. As investments in EdTech continue, the sector has the potential not only to elevate educational outcomes but also to contribute to broader sustainable development objectives, fostering resilient and inclusive digital societies for future generations.

The integration of EdTech into global education systems is poised to reshape the future of sustainable societies, equipping individuals with critical digital skills for a rapidly evolving economy and fostering innovation. In developed regions, where digital infrastructure and literacy are well-established, the focus will increasingly shift toward enhancing adaptability, online safety, and lifelong learning. Meanwhile, developing regions face the dual challenge of expanding foundational infrastructure and scaling solutions that are cost-effective and locally relevant. Countries that effectively adopt EdTech stand to benefit from inclusive economic growth, stronger social cohesion, and improved capacity to address global challenges such as climate change and public health.

• However, the digital divide remains a pressing challenge, threatening to deepen inequalities if underserved populations are left behind. Future EdTech strategies must prioritize affordability, scalability, and interoperability to ensure tools and platforms reach even the most remote learners. The rising prominence of AI, immersive technologies, and data-driven platforms also highlights the need for governance frameworks that safeguard privacy, promote digital citizenship, and ensure ethical implementation. As governments, international organizations, and private sector players collaborate to address these challenges, EdTech will play a pivotal role in achieving the SDGs, fostering inclusive, resilient, and sustainable societies capable of thriving in an interconnected digital world.

Upcoming events

Future of Education Technology Conference

<u>Florida, US | 14-</u>17 January 2025

Find out more

Digital Education Global Forum (EdTech Korea 2025)

Seoul, South Korea | 24-26 September 2025

Find out more

EdTech Week New York, US | October 2025

Find out more

DCO Landscape

Within the DCO, Member States such as Saudi Arabia, Bahrain, Qatar, and Nigeria are leading initiatives that integrate digital tools into education, aligning these efforts with broader sustainable development and economic diversification goals. Below are some examples of key EdTech policies and/or strategies across the DCO landscape.

| | Member State | EdTech Policy/ Strategy | Key Features |
|---|---|---|---|
| • | Pabrain | King Hamad's Schools of the Future Project | Trains students, teachers, and administrators to use ICT and work with digital educational content. |
| | 0 (| Digital Empowerment | Empowers students to be prepared for a digital life in a smart society through capacity-building and an educational portal. |
| | 0 | Master Plan for ICT in Education (2012-2021) in Bangladesh | Aims to create a knowledgeable, fair, and just society and a digital Bangladesh through the use of ICT, which is expected to impact efficiency in education. |
| | | Policy on Blended Learning for Bangladesh | Defines policies for using blended learning environments, specifically considering a learning approach that integrates online, mobile, distance, radio, television, and other technology-enhanced learning across physical and virtual environments. |
| | Cyprus | National Digital Strategy (2020-2025) | Aims to equip citizens with the basic and lifelong digital skills that are necessary to interact with the government's digital services, including online payments, and to promote online safety. |
| | Djibouti | Expanding Opportunities for Learning Project (PRODA) | Helps accelerate the government's efforts to leverage digital tools throughout the education system (for professional development, classroom instruction, and monitoring and reporting). |
| | Gambia | Technical and Vocational Education and Training (TVET) | Pillar 5 looks at the digitalization of TVET to build a competitive workforce, including equipping graduates with the digital skills to keep up with the evolving world of work. |
| | | ICT4D (2018-2028) | Promotes the use of ICTs and other emerging educational development and delivery technologies at all levels of the Gambian educational system. |
| | Ghana | ICT in Education Reform | Aims to develop children's competencies in ICT use, equip pre-tertiary learners with ICT skills, incorporate ICT into education management, and transform teacher development and tertiary education through technology-based training. |
| - | | Ghana Accountability for Learning Outcomes Project (GALOP) | Seeks to improve teachers' capacity to facilitate digital education. |
| | Greece | "e-me" Education Platform | A collaborative, cloud-based digital educational platform for pupils and teachers, supporting formal, non-formal, and informal learning experiences. |
| | Jordan | EdTech Strategy | Aims to promote EdTech development and monitoring, as well as the development of a digital skills curriculum to enhance students' learning outcomes. |
| | | Queen Rania Foundation Initiatives | Includes various projects to promote digital learning and EdTech. |

| Membe State | er Climate Action Policy Environment | Reference to Digital Technologies |
|----------------|---|--|
| | ○ ○ ○ ○ ○ The Drbni Platform ○ ○ ○ ○ ○ ○ ○ ○ | Designed to meet the training needs of educational personnel and students, focusing on developing EdTech knowledge and skills. |
| Kuwait | ↓ The Technosoft ○ ○ ○ ↓ Project ○ ○ ○ ○ ○ | Provides in-service training for teachers through the Drbni Platform, enhancing their technological competencies. |
| Morocc | National Plan to Accelerate the Transformation of the Higher Education, Ecosystem Scientific Research, and Innovation | Aims to improve the labor market relevance of universities, including by certifying 200,000 students in language or digital skills. |
| Nigeria | National Digital O Economy Policy and Strategy (2020-2030) | Integrates digital literacy and skills into the national education curriculum at all levels; aiming to create a pool of Nigerians with digital skills validated by globally recognized certifications. |
| Oman | The National Strategy for Education 2040 | Provides a comprehensive framework for reforming Oman's education system by 2040, including equipping students with 21 st century skills and competences. |
| Pakista | n National Education Policy 2017-2025 | Aims to create opportunities to ensure inclusive and equitable quality ICT education and promote a lifelong learning process for all and to promote the integration of computing courses into the curriculum at all levels. |
| Qatar | Qatar National Vision 2030 | Identifies "human development" as the first pillar toward the achievement of Qatar's national vision for 2030, aiming to build a modern world-class educational system that provides students with a first-rate education, where students are prepared for increasingly complex technical requirements. |
| | Smart Rwanda Master Plan | Aims to provide high schools and university graduates with the appropriate ICT proficiency certifications. |
| Rwanda | a The One Laptop per Child Programme | Aims to enhance education through the introduction of technology in primary schools. The project, through digital, interactive, and animated content, helps students visualize complex concepts, improving their understanding, retention, and ability to innovate. |
| Saudi A | Saudi Human Capability Development Program 2030 | Encourages initiatives including the review and update of the primary to secondary curriculum framework to build skills for the future, including mandatory digital and computer science skills such as coding starting from grade 1. |
| | The National eLearning Center | Aims to build trust in online education, ensure equitable access to lifelong learning, and drive sustainable innovation for reliable online <u>learning for all.</u> |

5 Space Exploration

5.1 Overview

The role of space technology in sustainable development is transformative, with wideranging impacts across environmental resilience, economic growth, and social welfare. As countries intensify efforts to meet the SDGs, applications such as Earth Observation (EO), Global Navigation Satellite Systems (GNSS), and satellite communications (SatCom) offer critical support in addressing urgent challenges such as climate change, disaster management, food security, and digital inclusion. This section explores how advancements in space technologies contribute to these areas, highlighting regional and international efforts that support sustainable societies and futureready economies.

5.2 Latest Developments

Recent advancements in space technology are increasingly focused on fostering sustainable societies by addressing critical needs in climate resilience, connectivity, disaster management, and global cooperation. Key international agreements, technological innovations, and collaborative frameworks underscore space's growing role as a tool for sustainable development, directly supporting a more resilient and inclusive global society.

1. Global Recognition of Space in Building Sustainable Societies

At the recent UN Summit of the Future in <u>September 2024</u>, global leaders gathered to advance multilateral cooperation on emerging issues, with sustainable development and peaceful global governance at the forefront. The Summit's primary outcome, the Pact for the Future, underscores outer space as an essential domain that can significantly contribute to sustainable societies on Earth. The final Pact emphasizes the peaceful and cooperative use of space, highlighting the importance of space-based technology in supporting the SDGs, particularly in areas like climate resilience, agriculture, and disaster preparedness. Action 56 within the Pact calls for enhanced collaboration on space exploration for "the benefit of all humanity," while encouraging discussion on frameworks for space traffic and debris management through the Committee on the Peaceful Uses of Outer Space (COPUOS).

The Pact represents a foundational step in integrating space governance with the SDGs. This framework signals a commitment to ensuring that space remains a tool for fostering resilience and sustainable growth on Earth.



Low-Earth Orbit Satellite Constellation - Network Architecture

2. LEO Satellite Constellations Bridging Digital and Societal Divides

Low Earth Orbit (LEO) satellite constellations are <u>rapidly transforming digital inclusion</u>, expanding internet connectivity to underserved regions worldwide. Companies such as SpaceX (Starlink), OneWeb, and Amazon (Project Kuiper) are deploying constellations that bring high-speed internet to remote and economically disadvantaged areas, enabling access to education, healthcare, and economic opportunities. These initiatives are critical for SDG 4 (Quality Education) and SDG 10 (Reduced Inequality), supporting sustainable societal development through digital access.

Some notable initiatives in this area include:

• <u>Starlink's Community-Centered Coverage</u>: Starlink has expanded its services to over 60 countries, providing vital connectivity to isolated communities in Latin America, Southeast Asia, and Sub-Saharan Africa. Access to internet-enabled services promotes social inclusion, allowing communities to access remote education, health consultations, and economic networks.

- OneWeb's Local Partnerships: Collaborating with governments in countries such as <u>Rwanda</u> and <u>Brazil</u>, OneWeb is extending digital services to rural areas, improving local livelihoods, and supporting SDGaligned initiatives such as educational infrastructure, e-health, and e-government.
- <u>Amazon's Project Kuiper</u>: Soon to be launched, Project Kuiper aims to deliver affordable internet services to underresourced communities. By focusing on accessibility, Kuiper's coverage will support equitable economic growth and foster regional resilience.

LEO constellations are enabling sustainable societies by expanding digital inclusion, supporting economic opportunity, and improving the quality of life in regions that previously lacked access to such resources.

3. Regional Collaborations for Building Resilient and Sustainable Societies

Regional partnerships are increasingly leveraging space technology to address shared societal and environmental challenges, fostering resilience and sustainable growth in diverse regions. These collaborations provide essential support to communities by enhancing local capacity in EO, disaster preparedness, and digital infrastructure.

Examples of Regional Partnerships:

- <u>African Space Agency and GMES & Africa</u> <u>Programme</u>: The AU's new African Space Agency, headquartered in Egypt, is coordinating initiatives such as the Global Monitoring for Environment and Security and Africa (GMES, and Africa) in partnership with the EU. These programs provide essential EO data for climate resilience, resource management, and food security across Africa, supporting local communities and improving regional sustainability.
- Arab Space Cooperation Group: Led by the UAE, this coalition of 14 countries is jointly developing the '813' satellite, which will provide data on agriculture, water management, and environmental resilience across the Middle East. By enhancing shared space capabilities, this initiative supports resource-efficient planning and resilience in vulnerable regions.
- <u>Asia-Pacific Space Collaboration</u>: Countries in the Asia-Pacific region, including Japan, India, and Australia, continue to enhance shared access to satellite data for disaster preparedness and sustainable resource management. These initiatives address pressing societal needs, from climate

adaptation to food security, reinforcing the role of space in regional resilience.

These regional collaborations demonstrate the importance of shared space capabilities in supporting resilient and inclusive societies, addressing both local and cross-border sustainability challenges.

5.3 Regional Approaches

Space applications are being used to support the development of sustainable societies all around the world. While different regions of the world are deploying space assets for different purposes, based on their level of development and needs, space applications play a vital role in supporting countries as they work to reach their targets under the SDGs.

Climate Action and Environmental Monitoring

Space technology, particularly Earth Observation (EO), is essential for tracking environmental changes on a global scale. According to <u>one study</u>, by 2030, the economic opportunity afforded by EO insights is projected to surpass \$700 billion, marking an era of unprecedented potential in monitoring and analyzing Earth from space.

Satellites offer detailed insights into greenhouse gas (GHG) emissions, deforestation rates, and ice melt, providing high-precision data that supports climate policies and promotes resilience. Current EO capabilities have the potential to cut global emissions by up to two gigatons annually by 2030, a critical contribution to SDG 13 (Climate Action).

Regional Examples

 European Union & United Kingdom: The <u>EU's</u> <u>Copernicus programme</u>, a partnership with the European Space Agency (ESA), provides extensive data on atmospheric conditions, land use, and climate indicators, aiding global climate models and supporting the <u>EU Green Deal</u>. In the UK, the National Space Strategy's emphasis on climate includes initiatives such as the <u>TRUTHS mission</u>, which aims to enhance the accuracy of EO data used for climate monitoring worldwide.

 Asia-Pacific: Japan's Greenhouse Gases Observing Satellite (GOSAT) series, in collaboration with the Ministry of the Environment, measures carbon dioxide and methane globally, informing both national and international climate action efforts. Additionally, China's Gaofen satellites contribute high-resolution data for climate monitoring and environmental conservation efforts.

These initiatives underscore the global commitment to leveraging space assets to support ambitious climate goals, facilitating data-driven climate policies and reinforcing the resilience of ecosystems worldwide.



Space technologies are crucial for disaster preparedness, early warning, and response, particularly for natural disasters such as floods, earthquakes, and wildfires. Satellite imagery and EO data provide real-time information that enhances the precision and speed of disaster response efforts. Programs such as the <u>UN-SPIDER</u> and the <u>International Charter "Space and Major</u> <u>Disasters"</u> offer satellite data to countries facing emergencies, supporting rapid decision-making and effective resource allocation, in line with SDG 11 (Sustainable Cities and Communities).

Regional Examples

• Latin America: <u>Brazil's DETER program</u> uses EO data to monitor deforestation and environmental degradation, aiding early response to natural disasters. In Argentina, the <u>SAOCOM</u> satellites provide radar imagery that supports crop monitoring, flood prediction, and water management, enhancing national resilience.



Satellite-Based Communications Systems for Diverse Applications

 MENA: The UAE's <u>National Space Program</u> includes the development of <u>KhalifaSat</u>, an EO satellite providing high-resolution imagery for monitoring urban development and water management. Egypt's recent launch of <u>MisrSat-2</u>, in partnership with China, also enhances disaster preparedness and environmental management by monitoring critical indicators across the Nile Delta.

Agriculture and Food Security

Satellite data is increasingly applied to <u>precision</u> <u>agriculture</u>, enabling informed decisions on soil health, water use, crop health, and yield forecasts. These applications support SDG 2 (Zero Hunger) by enhancing agricultural productivity and resource efficiency, helping to ensure food security even in regions challenged by climate variability.

Regional Examples

- SSA: <u>Nigeria's NigeriaSat</u> and <u>South Africa's</u> <u>EOSat-1</u> provide crucial data that supports agricultural productivity by monitoring soil conditions and crop health, while <u>Kenya's</u> <u>TAIFA-1</u> satellite performs vital EO functions, supporting Kenya's agricultural strategies and drought response.
- APAC: India's NavIC navigation system enhances precision agriculture by enabling farmers to monitor crop cycles and optimize resource allocation. Similarly, <u>Australia's</u> <u>Bushfire Earth Observation Taskforce</u> utilizes EO data to monitor vegetation and support sustainable agriculture practices, particularly in areas vulnerable to droughts and wildfires.

These technologies help farmers and policymakers adapt to changing climate conditions, supporting sustainable food production, and reducing the risk of food insecurity.

Upcoming events

17th Annual Global Space Technology Convention & Exhibition 2025

Singapore | 26-27 February 2025

Find out more

Satellite 2025

Washington DC, US | 10-13 March 2025

Find out more

40th Annual Space Symposium

Colorado Springs, US | 7-10 April 2025

Find out more

Digital Inclusion and Connectivity

Satellites play a significant role in bridging the digital divide, providing internet access to underserved communities where terrestrial infrastructure is lacking. By supporting access to education, healthcare, and financial services, satellite communications align with SDG 4 (Quality Education) and SDG 10 (Reduced Inequality), extending socioeconomic opportunities to remote and underserved areas.

Regional Examples:

- SSA: LEO constellations, such as SpaceX's Starlink and OneWeb, are partnering with countries in Africa to deliver broadband internet to rural and underserved regions, <u>fostering digital inclusion and enabling</u> <u>access to essential services.</u>
- APAC: <u>The Philippines' Diwata program</u> and <u>Indonesia's LAPAN-A2/A3</u> satellites provide data that supports national digital inclusion

initiatives, expanding remote learning opportunities and connecting citizens to healthcare and governmental services.

These advancements enable equitable access to digital services, facilitating socioeconomic growth and helping countries close connectivity gaps across their populations.

International Collaboration for Sustainable Space

Collaboration is central to the success of sustainable space initiatives. The <u>UN Space2030</u> <u>Agenda</u> and UNOOSA-led programs, such as <u>Access to Space for All</u>, foster international cooperation to maximize the positive impact of space technologies on sustainable development, especially in emerging economies. These frameworks promote equitable access to data, capacity-building, and technical support, underscoring the importance of global partnerships in achieving SDG 17 (Partnerships for the Goals).

Regional Examples

- <u>Arab Space Cooperation Group</u>: Initiated by the UAE, this coalition of 14 countries develops shared resources, such as the joint satellite '813', to monitor environmental conditions across the region.
- AU: With the recent establishment of the <u>African Space Agency</u>, headquartered in Egypt, African nations are prioritizing regional EO capabilities, such as the <u>GMES & Africa</u> <u>program</u>, a partnership with the EU that supports climate resilience, food security, and natural resource management.

These collaborations illustrate the commitment of spacefaring and non-spacefaring nations to harness space technology for the shared goal of sustainable development.

5.4 Road Ahead

As space technology continues to advance, its contributions to sustainable development on Earth are expanding in critical areas such as climate action, disaster resilience, digital inclusion, and resource management. EO satellites offer high-precision data that supports climate models, enabling countries to design more effective policies for environmental protection and climate adaptation. The integration of EO data into national and regional planning will enhance global climate resilience, vet widespread access to this data remains a priority. Capacity-building and investment in local expertise are essential to ensure that developing nations can fully leverage EO insights for sustainable policymaking, as well as use other space applications to maximize the economic potential of their businesses.

Digital inclusion, driven by Low Earth Orbit (LEO) satellite constellations, is another transformative application of space technology. By extending connectivity to underserved regions, LEO satellites enable remote communities to access education, healthcare, and economic opportunities, closing socioeconomic gaps and promoting equality. However, ensuring affordability of these services and streamlining regulatory processes for market access will be key to realizing universal connectivity. Partnerships with governments and local stakeholders can support affordable digital access, empowering communities to participate more fully in the digital economy.

International cooperation will play a pivotal role in expanding the societal benefits of space technology. Programs that promote data sharing and provide technical support, such as the UN's Access to Space for All initiative, facilitate the inclusion of emerging nations in global data networks, empowering them to use EO data for sustainable urban planning, agriculture, and disaster management. By building regional and global partnerships, countries can collectively address shared challenges, from climate resilience to food security, fostering a more inclusive and resilient global society.

Finally, the future integration of space technology into national development agendas offers a strategic pathway for sustainable growth. Policymakers are increasingly embedding satellite data into frameworks for urban planning, environmental monitoring, and public health, creating more adaptive and informed societies. By investing in space-based infrastructure for sustainable applications, countries can drive socioeconomic growth while protecting natural resources, making space technology an invaluable asset in the journey towards sustainable societies.

As space technology contributes to sustainable development on Earth, the international community is increasingly recognizing the critical importance of sustainability in space. The growing problem of space debris threatens the safety of current and future missions, and also the long-term viability of space operations. Recognizing this, significant international efforts have been made to address space sustainability. The <u>UN Debris Mitigation Guidelines</u> and the <u>UN</u> Long-Term Sustainability Guidelines provide comprehensive frameworks for reducing debris and promoting responsible behavior in space. Regional and national initiatives, such as the ESA Zero Debris Charter, aim to set ambitious targets for reducing debris generation, while the Federal Communications Commission's five-year rule mandates the timely removal of defunct satellites in LEO to mitigate collision risks. These initiatives underscore a growing global consensus on the need for collective action to ensure that space remains a secure and accessible domain for future generations, complementing the efforts to use space technology for sustainable development on Earth.

5.5 DCO Landscape

Several DCO Member States are successfully integrating space technology into their sustainable development frameworks, while others are actively developing new space policies, strategies, and initiatives to better use space data to boost their economic development. These efforts address key challenges such as climate resilience, disaster response, digital inclusion, and economic diversification. Some states possess established space programs, while others are emerging players relying on partnerships to enhance their satellite data access and build local capacity.

Some highlights of successful programs include:

- Morocco The <u>Mohammed VI-A and VI-B</u> <u>satellites</u> provide high-resolution EO data, aiding sustainable agriculture, urban planning, and resource management.
- 2. Nigeria The <u>Nigerian Space Research and</u> <u>Development Agency</u> (NASRDA) through the NigerSat and the NigComSat programs leverages EO and SatCom for environmental applications, telecommunications, and to support domestic growth and development.
- Saudi Arabia The <u>Saudi Space Agency</u> (SSA) has propelled Saudi Arabia's space initiatives, with the <u>SaudiSAT constellation</u> providing EO data for sustainable agriculture, water management, and urban planning in collaboration with global space agencies.

These programs illustrate how DCO Member States are employing space technology to achieve national and regional sustainable development goals, with ongoing international collaborations enhancing their capacity and reach.

DCO Landscape

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| Member State | Key Initiatives and Strategies |
|----------------|---|
| Bahrain O | National Space Science Agency Strategy: Focuses on EO applications for urban planning agriculture, and environmental management. |
| Bangladesh 000 | The Bangladesh Space Research and Remote Sensing Organization emphasizes satellite communication and EO for disaster management, agriculture, and resource management. |
| Cyprus 00000 | Cyprus Space Strategy 2022–2027: Early-stage strategy focuses on using EO data for resource management, agriculture, and disaster resilience. |
| Djibouti | Djibouti Vision 2035: Focuses on digital inclusion and early-stage development in using satellite- based EQ for environmental monitoring. |
| Gambia | E-Government Strategy 2021-2024? Aims to improve the delivery of government services through digital means, leveraging satellite communication to reach remote areas |
| Ghana | Ghana National Space Policy: Promotes the use of EO data for agriculture, urban planning, and water management. |
| Greece | National SmallSat Programme: Aims to develop and deploy small satellites for environmental monitoring and various applications. Greece actively participates in ESA programs. |
| Jordan | Jordan Space Research Initiative: Aims to foster space R&D in Jordan and create new opportunities for Jordanians, while simultaneously contributing to sustainable development. |
| Kuwait | Kuwait Space Program Development: Develops EO capabilities for urban planning, water conservation, and resource management. |
| Morocco | Centre Royal de Télédétection Spatiale: Responsible for promoting, using, and developing remote sensing applications, and manages EO data. |
| Nigeria | National Space Policy: Emphasizes E0 for sustainable agriculture, water management, and urban planning. The National Space Research and Development Agency leads. |
| Oman | Oman Space Strategy: Recently developed policy for using EO in environmental management, resource conservation, and agriculture. |
| Pakistan | National Space Policy: Prioritizes EO, satellite communication, and disaster management, led by SUPARCO. |
| Qatar | Focuses on digital connectivity, EO for urban planning, and climate monitoring, particularly to manage its arid environment. |
| Rwanda | Rwanda Space Agency has an emphasizes EO for agriculture, water management, and digital inclusion through satellite technology. |
| Saudi Arabia | Vision 2030 and upcoming Space Strategy: Focuses on economic diversification, with SSC promoting sustainable agriculture, water management, and climate resilience. |

6 Conclusion

In this edition of the DCO Policy Watch, we examined the wide-ranging efforts of DCO Member States and the international community in advancing sustainable development and building sustainable societies through digital transformation. Each section explored how digital technologies, educational innovations, and space explored support the accomplishment of the SDGs. addressing the social, economic. and environmental dimensions that are fundamental to sustainable societies. This publication provides insights into global efforts, strategies, and innovations that can inspire policymakers and stakeholders, within the DCO ecosystem and beyond, to advance sustainable and digitally connected societies.

Climate action is central to building sustainable societies, and this edition delves into the transformative role of digital technologies in combating climate change and protecting environmental resources. Across regions, countries are adopting Al-powered climate models, IoT-based monitoring systems, and digital twin platforms that offer real-time insights into emissions, energy usage, and environmental impacts. For instance, Singapore's Digital Twin for Climate Resilience and the EU's Fit for Fifty Five initiatives exemplify how technology is being harnessed to align climate action with the goals of the Sustainable Development Agenda. These advancements enable governments to design data-driven policies that are more responsive to climate risks and better equipped to protect natural resources. Digital tools also offer powerful means of addressing inequality in climate resilience, making it possible for low-resource regions to access advanced climate data and implement effective adaptation strategies.

EdTech is another critical element in promoting sustainable societies, helping to build digital skills, knowledge, and opportunities that support social and economic sustainability. EdTech offers accessible, personalized, and adaptive learning experiences, opening doors for individuals in remote and underserved areas. This edition showcases diverse approaches to EdTech, from Estonia's pioneering e-School platform to the mobile-based M-Shule in Kenya, which reaches thousands of students with minimal infrastructure. These initiatives demonstrate how digital learning platforms foster equitable access to quality education and skills training, essential for social inclusivity and economic resilience. By addressing disparities in education and digital skills, EdTech enables communities

to participate more fully in the digital economy, supporting long-term sustainable development.

Space exploration and satellite technology are playing an increasingly impactful role in creating sustainable societies, particularly in addressing food security, disaster resilience, and connectivity gaps. EO and LEO satellites contribute invaluable data that supports precision agriculture, enables early disaster warning systems, and expands internet access to underserved regions. For example, Africa's GMES and the UAE's Arab Space Cooperation Group are regional partnerships that use space technology to monitor environmental changes, support food security, and enhance local resilience to natural disasters. By enabling precision monitoring of climate and land use, space-based technologies empower countries to develop informed policies for resource management, urban planning, and agricultural sustainability. As space technology increasingly supports essential development

goals, it reinforces the interconnectedness of digital, environmental, and social objectives in sustainable development.

The initiatives discussed in this edition highlight the transformative impact of digital technologies, educational innovations, and space exploration on sustainable societies. From reducing carbon footprints to bridging educational divides and expanding internet access, these advancements enable societies to develop in ways that are economically inclusive, environmentally responsible, and socially equitable. As Member States and stakeholders work towards creating a balanced, sustainable future, DCO remains dedicated to sharing knowledge, fostering collaboration, and supporting policies that drive impactful and lasting change in digital governance. This edition affirms that by building sustainable societies, we contribute to a world where digital innovation and sustainable development are inextricably linked, ensuring the well-being of present and future generations.

Glossary

| Term | Definition |
|------------------------------|---|
| Sustainable Societies | Communities that balance environmental preservation, social equity, and economic prosperity. |
| SDGs | Sustainable Development Goals established by the United Nations to address global challenges. |
| Environmental Sustainability | Safeguarding natural resources, reducing emissions, and maintaining ecological balance. |
| Economic Sustainability | Building economies that generate prosperity without compromising future generations. |
| Social Sustainability | Creating inclusive, equitable, and resilient communities with access to essential services. |
| EdTech | Educational Technology: the use of digital tools to enhance teaching, learning, and administration. |
| Earth Observation (EO) | Satellite-based technology for monitoring Earth's surface and environmental changes. |
| LEO Satellites | Low Earth Orbit satellites providing connectivity and real-time data for global applications. |
| Digital Inclusion | Ensuring equitable access to digital technologies and the internet, especially for underserved areas. |
| Climate Resilience | The capacity of communities to adapt and recover from climate-related challenges. |
| Generative AI (GenAI) | Artificial Intelligence that generates content, such as text, images, or data outputs. |
| Carbon Credits | Tradeable permits representing one ton of carbon dioxide emissions reduced or offset. |
| Circular Economy | An economic model focused on minimizing waste and making the most of resources. |
| Smart Cities | Urban areas leveraging digital technologies for sustainability, efficiency, and livability. |
| Digital Twin | A virtual model replicating real-world assets or systems for planning, monitoring, and forecasting. |
| Climate Action | Efforts to mitigate climate change and adapt to its impacts through policies and technologies. |

Table of Acronyms

| Acronym | Definition |
|---------|--|
| AI | Artificial Intelligence |
| APAC | Asia-Pacific |
| AU | African Union |
| СОР | Conference of the Parties (UN Climate Conferences) |
| DCO | Digital Cooperation Organization |
| EC | European Commission |
| EO | Earth Observation |
| ESA | European Space Agency |
| ETS | Emissions Trading System |
| EU | European Union |
| GOSAT | Greenhouse Gases Observing Satellite |
| GHG | Greenhouse Gas |
| ICT | Information and Communication Technology |
| ΙοΤ | Internet of Things |
| LAC | Latin America and the Caribbean |
| LE0 | Low Earth Orbit |

| Acronym | Definition |
|---------|---|
| LMS | Learning Management System |
| MGI | Middle East Green Initiative |
| NASA | National Aeronautics and Space Administration |
| NDC | Nationally Determined Contributions |
| OECD | Organization for Economic Co-operation and Development |
| SDGs | Sustainable Development Goals |
| SPCR | Strategic Program for Climate Resilience |
| SSA | Sub-Saharan Africa |
| TRUTHS | Traceable Radiometry Underpinning Terrestrial- and Helio-Studies |
| UAE | United Arab Emirates |
| UN | United Nations |
| UNESCO | United Nations Educational, Scientific and Cultural Organization |
| UNFCCC | United Nations Framework Convention on Climate Change |
| VR/AR | Virtual Reality/Augmented Reality |

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