Houston Area Model United Nations
Standard Committee

UNEP

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Topic A: Environmental Sustainability with Generative Artificial Intelligence Expansion

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Background Information

The United Nations Environment Programme (UNEP) serves as the world's leading environmental authority, tasked with coordinating global efforts to protect the planet while enabling sustainable development. As nations work to achieve the Sustainable Development Goals (SDGs), UNEP increasingly addresses emerging technological forces that shape environmental outcomes. One of the most transformative forces of the 21st century is generative artificial intelligence (AI), which refers to systems capable of producing text, images, software, and scientific models at unprecedented scale. While generative AI offers powerful tools for sustainability, including climate modeling, biodiversity mapping, energy optimization, and pollution tracking, it also creates significant environmental challenges.

The rapid expansion of AI requires vast amounts of electricity, water for cooling data centers, rare earth minerals for hardware, and infrastructure that contributes to carbon emissions and electronic waste. Training and powering large AI models and the data centers that support them contribute to growing electricity demand that often still relies on fossil fuel sources, increasing overall carbon emissions and energy consumption.

Furthermore, the hardware required for AI depends on extraction of minerals such as lithium, cobalt, and rare earth metals, which leads to land degradation and water pollution in mining regions. Discarded electronics from rapidly outdated AI systems contribute to a growing global e-waste crisis, with projections estimating that generative AI could generate millions of metric tons of electronic waste by 2030.

UNEP must now confront a central question. How can the world harness generative AI to advance environmental sustainability while preventing it from becoming a new driver of ecological degradation?

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A Brief History of Technology and the Environment

Historically, major technological revolutions have reshaped humanity's relationship with the natural world. The Industrial Revolution increased productivity but also led to air pollution, fossil fuel dependence, and ecosystem destruction. The digital revolution improved efficiency but produced new environmental pressures, including electronic waste and rising energy consumption.

In the 21st century, artificial intelligence has become the newest technological frontier. Early AI systems were limited in scale, but the rise of cloud computing and machine learning enabled the creation of massive generative models that can simulate climate systems, design chemicals, and predict environmental change. However, training a single large AI model can require as much electricity as thousands of households use in a year, and water-intensive cooling systems strain local ecosystems.

UNEP's mandate now extends beyond traditional pollution and conservation. It must guide the responsible development of emerging technologies so that innovation supports, not undermines, global sustainability goals.

Topic Overview

Generative AI is being deployed across environmental sectors at a rapidly accelerating pace. Governments and companies use AI to forecast extreme weather, optimize renewable energy grids, monitor illegal deforestation, and model sustainable agriculture. These tools offer unprecedented opportunities for environmental protection and climate resilience.

At the same time, the environmental costs of AI infrastructure are growing. Data centers consume enormous quantities of electricity, much of which is still generated from fossil fuels, contributing to higher carbon emissions. AI hardware relies on mining of lithium, cobalt, and rare earth metals, which contributes to land degradation, water pollution, and human rights concerns. Additionally, discarded electronics from rapidly outdated AI systems are contributing to a growing global e-waste crisis.

This dual nature of AI as both a sustainability solution and an environmental risk creates a complex policy challenge for UNEP. The international community must determine how to regulate, guide, and deploy AI technologies in ways that advance climate action, protect ecosystems, and promote environmental justice.

International Frameworks and Environmental Governance

Several global agreements already intersect with the expansion of AI. The Paris Climate Agreement requires countries to reduce emissions, yet many national AI strategies do not account for the energy demands of data centers. The Basel Convention regulates hazardous waste, including electronic waste, which is rising as AI hardware becomes obsolete more quickly. The Sustainable Development Goals, especially SDG 12 on Responsible Consumption and Production and SDG 13 on Climate Action, are directly impacted by the growth of AI-driven industries.

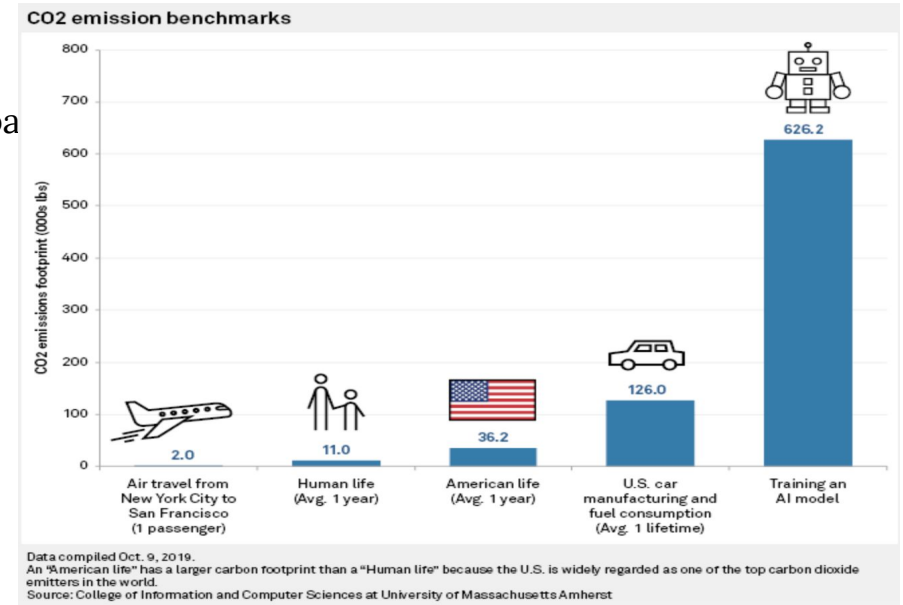
UNEP has begun addressing digital sustainability through initiatives on green computing, sustainable supply chains, and life cycle management of electronics. However, generative AI presents a new scale of urgency. Without coordinated international standards, countries may compete to build energy-intensive AI hubs that increase emissions and resource extraction, undermining globa environmental targets.

Past United Nations and UNEP Actions

UNEP has led global efforts to promote sustainable technology through programs such as the International Resource Panel, which studies the environmental impacts of material extraction and consumption, and the Global E-waste Monitor, which tracks the growing volume of discarded electronics.

The United Nations has also launched the Secretary General's Roadmap for Digital Cooperation, calling for technology to support sustainable development and human rights. Meanwhile, climate-focused UN bodies have begun exploring how AI can improve climate modeling, disaster response, and environmental monitoring.

Despite these initiatives, there is no comprehensive international framework governing the environmental impacts of generative AI. UNEP now faces the challenge of integrating AI into environmental governance before irreversible damage occurs.



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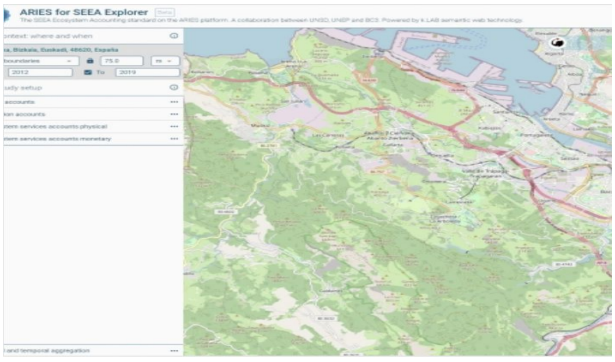
Case Study: Data Centers and Water Stress

In several regions, large AI data centers have been built in areas already experiencing water scarcity. These facilities require massive volumes of water to cool servers that run continuously. The water use associated with data center cooling systems can add pressure to local water supplies, especially in arid regions.

At the same time, these data centers often rely on electricity grids powered by fossil fuels, increasing local carbon emissions. While some companies are transitioning to renewable energy, progress remains uneven. This case highlights how AI expansion can create environmental conflicts at the local level, even as it promises global technological progress.



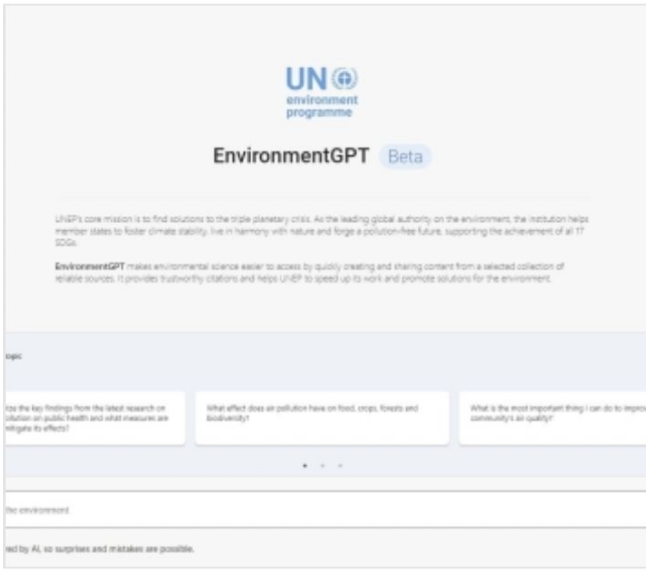
AI FOR ENVIRONMENTAL SUSTAINABILITY FOR SYSTEM ENVIRONMENTAL ECONOMIC ACCOUNTS

Case Study: AI for Conservation

Generative AI has also been used successfully in environmental protection. AI systems analyze satellite images to detect illegal deforestation, track endangered species, and predict wildfire spread. Research shows that AI tools can enhance monitoring and optimization of environmental systems, contributing to climate action and support for the Sustainable Development Goals.

In marine conservation, AI helps monitor coral reef health and identify illegal fishing vessels.

These applications demonstrate how AI can dramatically enhance UNEP's ability to protect ecosystems if deployed responsibly and equitably.



ENVIRONMENT GPT

TOPIC A: QUESTIONS TO CONSIDER

1. How can UNEP regulate or guide the environmental footprint of data centers and AI infrastructure?

2. What policies should be adopted to ensure that AI hardware is produced, used, and recycled sustainably?

3. How can generative AI be deployed to strengthen climate resilience, biodiversity protection, and pollution monitoring?

4. Should international environmental law be expanded to include digital and AI related sustainability standards?

5. How can developing countries gain access to sustainable AI technologies without bearing disproportionate environmental costs?

Challenges Facing UNEP

UNEP must balance innovation with sustainability. Key challenges include:

• Managing the carbon footprint of AI infrastructure
• Reducing the environmental impacts of mining and electronic waste
• Ensuring that AI benefits developing nations and vulnerable ecosystems
• Preventing a digital divide in access to sustainable AI tools
• Establishing international environmental standards for emerging technologies

Without coordinated action, the rapid expansion of generative AI could undermine decades of environmental progress.

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