HOW UNESCO'S MANDATE IN EARTH SCIENCES CONTRIBUTES TO THE IMPLEMENTATION OF THE UNITED NATIONS 2030 AGENDA

United Nations Educational, Scientific and Cultural Organization

International Geoscience Programme

UNESCO Global Geoparks

What are the Sustainable Development Goals?

As a universal call to action, in 2015 the United Nations adopted Sustainable Development Goals (SDGs) as part of the 2030 Agenda for Sustainable Development to be implemented over fifteen years (2015-2030). With 17 objectives and 169 targets, the SDGs have the overall aim to eradicate poverty and other deprivations, introduce strategies that improve health and education, reduce inequality and spur economic growth, while at the same time ensuring environmental protection. To achieve this, a great transformation of the financial, economic and political systems that govern our societies is needed and political commitment and decisive action by all stakeholders is vital.

Fully interconnected, the SDGs cover areas as diverse as education, gender equality, responsible consumption and production, and peace, justice and strong institutions.

Each SDG has targets that need to be accomplished. Progress on the implementation of these targets is monitored by the Member States through the Voluntary National Reviews and presented at the UN High-level Political Forum on Sustainable Development, the main global forum for reviewing successes, challenges and lessons learned on achieving the 2030 Agenda for Sustainable Development.

How does Earth Sciences contribute to the implementation of the SDG's?

Geoscience, or Earth Science, is the study of the Earth. This includes its surface and the processes that shape it but also its interior and the dynamics that occur beneath the crust. Through the study of the oceans, the atmosphere, rivers and lakes, ice sheets and glaciers, volcanoes and earthquakes, earth science aims to understand how these systems work today, how they operated in the past and to predict how they may behave in the future. The study of geoscience also covers how living things, including humans, interact with the Earth, for example, through the resources we use or how water and ecosystems are interconnected.

The overall aim of the SDGs is to pave the way for a sustainable world and, as it is demonstrated in this booklet, geoscience is at the core of this mission.

This discipline has the ability to grasp the complex interconnections between the atmosphere, hydrosphere, cryosphere, biosphere, and lithosphere giving a unique whole-planet perspective of the Earth system. However, it suffers from inherent limitations - incomplete data, lack of experimental control or the inability to make direct measurements - that are related to the fact that geoscience studies a 4.6 billion year old planet where most events occur at temporal scales much larger than the human lifetime. These challenges are very similar to those faced by sustainability science.

It therefore becomes evident that geoscience is paramount for the successful implementation of the Sustainable Development Goals.

The International Geoscience Programme (IGCP)

Since 1972, UNESCO, through the International Geoscience Programme (IGCP) and in partnership with the International Union of Geological Sciences (IUGS), has harnessed the intellectual capacity of a worldwide network of geoscientists to lay the foundation for our planet's future, focusing on responsible and environmental resource extraction, natural hazard resilience and preparedness, and adaptability in an era of changing climate. UNESCO, the only United Nations organization with a mandate to support research and capacity building in geology and geophysics, and its flagship programme, the International Geoscience Programme, actively contribute to society and to the implementation of the Sustainable Development Goals.

IGCP's Contribution to SDG 13

With current greenhouse gas emissions 50% higher than in 1990, the effects of climate change are evident all around the world. Global warming is causing long-lasting changes to our climate system threatening the stability of societies and human life. Near 91% of geophysical disasters are climate related, having claimed 1.3 million lives and injured 4.4 billion people between 1998 and 2017. **SDG 13 aims to mobilize 100 billion USD annually 2020 to address the needs of developing countries in adapting to climate change.** This includes investing in low-carbon sustainable development models, and integrating disaster risk reduction measures, sustainable natural resource management and human security into national development strategies.

Supporting these vulnerable regions will directly contribute not only to Goal 13 but also to the other development goals. The Earth's geological record provides information on past climates, environmental changes and extinctions that have occurred during Earth's history. By studying these extensive geological archives - ice and dust records, terrestrial and ocean sediments, and sequences of fossil plant and animal assemblages - it is possible to reconstruct ancient environments (fauna, flora and landscape features) and estimate past temperatures. For example, geologists have discovered that during the Eocene (55 to 45 million years ago) the Earth was so warm that Antarctica was free of ice, tropical flora grew at latitudes much higher than today and cold-blooded animals, like crocodiles, lived in the Arctic region. What followed was an unusually cool period – the Ice Age – that ended just 20 000 years ago.

Several of UNESCO's geoscience projects are dedicated to studying the changes in Earth's climate and its impact on life. UNESCO also supports a project (672) that explores the current state of the science on debris-covered glaciers in high mountain environments. The debris poses a risk to populations living in the vicinity due to increased climate-change related melting.

On the right: early career scientists measuring the quality of the melt water in the stream in front of Ponkar Glacier, Nepal. Credit: Neil Glasser

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