

# Earth Science is Critical for Delivering the Ambitions of the Paris Agreement

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Earth scientists - those with knowledge of Earth systems and dynamics, and of natural resources - have a key role to play in the strengthening and implementation of nationally determined contributions (NDCs), collectively achieving the ambitions of the Paris Agreement.

Here we offer four Earth science perspectives and recommendations for their implementation:

**1. Understanding the natural environment should be at the centre of 'education for sustainable development'.** Improved public understanding of the dynamics of environmental systems can help to encourage appropriate and decisive climate action, at all levels, to deliver NDCs and hold governments to account.

**We call for Earth System Science to be a core part of mainstream primary and secondary science education to strengthen public understanding of the climate crisis.**

**2. Second, understanding the Earth science contributions required to strengthen and implement NDCs is needed to identify and bridge any training gaps.** Global commitments, through NDCs, require Earth scientists with specialised training in (for example), geothermal energy, hydrogeology, geophysics, mining geology, engineering geology, and waste management. We need to systematically understand the required contributions from Earth science (and other STEM) professionals to deliver NDCs. This will inform analysis of training gaps and the interventions required to strengthen the STEM workforce to help secure decarbonisation and pathways to adaptation.

**We call on national governments to evaluate what Earth science contributions are required to deliver their climate change strategies, and to take appropriate steps to ensure the need for this capacity is reflected in science and higher education strategies.**

**3. Valuing and protecting geodiversity is key to tackling the climate crisis.** Efforts to protect, conserve, and restore the natural environment are key parts of NDCs. Ecosystems and their biodiversity, topography and landforms are shaped (in part) by the underlying geology and geological processes on the land surface and subsurface. These complex interrelationships must be understood to achieve the ambitions of the Paris Agreement (e.g., informing reforestation and afforestation programmes), requiring increased collaboration between Earth scientists and ecologists. UNESCO Global Geoparks provide one opportunity to protect geodiversity, and explore, develop, and celebrate the links between geodiversity and ecosystems.

**We call on national governments to engage with the Earth science professional community to understand how Earth science can help strengthen the protection, conservation, and restoration of carbon sinks.**

**4. To reduce disaster risk, we need to first understand disaster risk in all its dimensions (including hazard characteristics and the environment).** Understanding Earth resources, systems, and dynamics is foundational to building resilience of the world's poorest communities, agricultural systems, infrastructure, and cities to the effects of climate change. For example, characterising groundwater resources is key to ensuring sustainable withdrawals (SDG 6.4). When this geological data is used in policy formation and implementation, it can help to build community and agricultural resilience to drought.

**We call for greater support for those institutions tasked with environmental data collection, management, integration, analysis, and access (e.g., national geological surveys, hazard monitoring agencies, ministries of water) and for the integration of such data into policy formulation and actions delivering sustainable development.**