

Baker Hughes

Healing Soil, Cooling the Planet

When a farmer watches his soil lose its strength year after year, it is more than just declining yield. It is a sign of a deeper imbalance between nature and human activity.

At IIT Bombay, a team of researchers is working to restore that balance by turning ordinary farmland into a powerful tool for removing carbon dioxide from the atmosphere.

Using the principles of enhanced rock weathering, the team has developed an approach that harnesses the natural properties of Deccan basalt to accelerate the removal of atmospheric carbon dioxide.



From Natural Process to Scalable Solution

Once applied to agricultural fields, this basalt dust begins a quiet transformation. It reacts with carbon dioxide present in the air and soil, converting it into stable carbonate minerals that remain locked within the ground.

Rainfall plays a key role in strengthening this process, as dissolved carbon dioxide containing water interacts with the basalt, accelerating the formation of these permanent carbonates.

All bicarbonate and remaining carbonate ions in the solution continue to be in the water stream and eventually mix with the larger water bodies such as rivers and oceans.

Instead of relying on new mining, the solution **repurposes fine basalt powder from construction-materials mining**, an underutilised by-product, bringing a circular and sustainable dimension to climate action.

Early trials in Maharashtra's Washim district, where soils are naturally derived from basalt but suffer from nutrient depletion, have shown promising results.

Beyond removing atmospheric carbon, the basalt acts as a slow-release soil booster, replenishing essential micronutrients like iron, improving soil pH, and gradually enhancing overall soil health.

Encouraged by these findings, the research demonstrates both immediate and long-term impact: accelerated carbon removal in the initial phase, followed by sustained sequestration as the rock continues to weather over time.

The added novelty lies in the use of patented biomimetic catalysts that accelerate the rate of reactions. This dual benefit positions the solution as both a climate intervention and an agricultural revival strategy.



What makes this innovation truly powerful is its simplicity and scalability. By combining natural processes with existing resources, it offers a practical pathway to remove carbon while strengthening the very soil that sustains livelihoods.

It is this blend of scientific ingenuity and environmental stewardship that defines IIT Bombay's spirit of innovation—where solutions to global challenges are designed not just to work, but to endure.