

POSSIBLE ENVIRONMENTAL AND HEALTH PERILS ASSOCIATED WITH ENHANCED ROCK WEATHERING

PINAK DUTTA¹ AND MITA DUTTA^{*2}

¹Bejoy Narayan Mahavidyalaya, Itachuna, Hooghly 712 147, West Bengal, India

²Sreegopal Banerjee College, Bagati, Magra, Hooghly 712148, West Bengal, India

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ABSTRACT

Research for developing negative emission technology for carbon capture in order to arrest global warming is a globe wide craze. Enhanced crop weathering in crop fields is a promising technique but comes with a package of negativities specially for developing countries in the form of crop quality and human health degradation, possibility of biodiversity loss in both land and marine ecosystem and pollution caused by usage of non green energy for crushing, transporting and spreading the rock dust. Much introspection is needed to take care of these pitfalls before implementing the process on a large scale.

KEY WORDS : ERW, Over mining, Crop quality decline, Biodiversity loss, Health hazard, SDG.

INTRODUCTION

Climate change triggered by human activities is a matter of global concern. Excessive green house gases emission has been identified as a major cause for global temperature rise. Innovations to create Negative Emission Technologies (NETs) for CO₂ removal (CRD) from atmosphere are most sought topics of research after the 2015 Paris agreement on climate change recognized the need of arresting future temperature increase. All large scale NETs proposed have poor acceptability as they donot consider the pitfalls of its application (Smith *et al.*, 2016 and Williamson *et al.*, 2016).

Lately potential for CO₂ removal in large scale by enhanced rock weathering (ERW) with croplands has raised hope among the scientific community (Beerling *et al.*, 2018 and Beerling *et al.*, 2020).

This involves physical addition of crushed rocks (fast reacting silicates) to croplands which generates base cations making the soil alkaline which is instrumental in turning atmospheric CO₂ to dissolved inorganic carbon (HCO₃⁻) which is removed from the soil through drainage waters. In spite of claims of this process also having potential

benefits for soil fertility improvement and runoff water reducing ocean acidification (Hartmann *et al.*, 2013, Cripps *et al.*, 2013 and Albright *et al.*, 2016), in our opinion this proposed NET will have a huge negative impact on ecosystem and biodiversity.

Possible negative impacts of large scale implementation of ERW as a carbon capture technique:

- Yield of crops which is claimed to gain momentum with ERW may be a reality, but at the cost of crop quality decline. Carbon capture is more effectively done by olivine rocks, which have high nickel and chromium content. Bio accumulation of these toxic metals by crops and hence food chain has to be considered as screening of these rocks before application is a remote possibility in developing countries taking in account the cost involved.
- We also have to consider the CO₂ emission that is associated with mining, grinding, transporting and spreading of rock dust. This decreases the efficiency of CO₂ removal (Moosdorf *et al.*, 2014), unless the entire process uses green energy source, which is also a remote possibility in developing countries.