

## CARBON SEQUESTRATION WON'T SOLVE CLIMATE CHANGE

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**A**s a matter of fact the atmospheric concentration of carbon dioxide (CO<sub>2</sub>) touched 400 ppm (NOAA, 2019) *i.e.* a total of 3124 giga tonnes of CO<sub>2</sub> is present in the atmosphere. However, there is increasing interest in controlling this growth in order to minimize the impacts on the global climate. Although major emphasis is focused on decreasing the rate of CO<sub>2</sub> emissions from fossil-fuel use, there is also increasing recognition that the hazard can be mitigated by transferring CO<sub>2</sub> from the atmosphere to the terrestrial biosphere (plant and soil system) as CO<sub>2</sub> is absorbed by plants through photosynthesis and stored as carbon in biomass in tree trunks, branches, foliage and roots. This phenomenon has been termed as carbon sequestration, which is nothing but long-term storage of carbon in the biotic system to reduce the carbon dioxide concentration in the atmosphere.

It is evident that, tree plantation is very effective way to fight against global climate change (global warming). According to a recent report from a Swiss university, planting 1.2 trillion trees could suck up about 750 billion tonnes of CO<sub>2</sub> from atmosphere (Bastin *et al.*, 2019). This amount of CO<sub>2</sub> has been discharged during the past 25 years of anthropogenic activity. Though it seems very lucrative for obtaining a tangible (rather say readymade) solution of the climate change, it is never easy or sustainable. Obviously planting tree is beneficial for environment. However, unplanned forestation can harbor unwanted species of flora and fauna which may disturb the balance of the existing ecosystem. Whereas, aggressive plant species may spread the land very fast and may cause shift in biological diversity, dry up water bodies and make areas more prone to wild-fires. Nevertheless, it would be very much appreciating to stop the denudation of existing tree cover (mainly forest) from earth surfaces. Massive reforestation only works if the world's current forest cover is maintained and increasing; for example the clearing of the Amazon rain forest is in very alarming situation. However, there is no intension of discouraging the tree plantation programme, but when it would be conducted on a vast scale there are utmost chance of underestimating the local and regional ecological issues. Countries like Ireland and Japan are already witnessing the consequences of poorly planned tree plantation activities. Planting of just few tree species to replant in those countries has led to ecological disturbances.

On the other hand, agriculture has enormous role to play in improving the carbon dynamics of atmosphere not only by reducing green house gas emissions through adopting improved management practices, but also by enhancing the carbon stock of the soil. It is

estimated through several predicting models that soil organic carbon pool can be increased by soil restoration and the adoption of recommended agricultural practices. Carbon sequestration in agricultural system in particular has several ancillary beneficial roles, which includes reduced plant water stress due to enhanced available water in the soil, increased nutrient retention, enrichment of species diversity of soil biota, reduction in surface runoff and improve use efficiency of inputs. The ability of agriculture lands to store or sequester carbon depends on several factors, such as climate, type of soil, type of crop or vegetation cover and management practices adopted (Sundaram *et al.*, 2012). Agriculture can positively influence the carbon sequestration by adoption of conservation agriculture, cover crops, perennial cropping systems and agro-forestry, restoration of degraded lands, rotational grazing, crop improvement and efficient management of manure and nutrient, water. However, the capacity of the soil to sequester and retain carbon is also finite as it reaches a steady state after sometime and the retention time is shorter in tropics than under temperate climates.

It must be understood that carbon sequestration through tree plantation and adopting sustainable agricultural practices is very much necessary but is short term way to fight against the climate change. Mature forests can store a lot of carbon, but this capacity is only reached after hundreds of years, not a couple of decades of new tree plantation. Also, there is great uncertainty regarding the size of the potential carbon sink of soil especially the agricultural soils. Carbon sequestration only buys us time during which alternatives to fossil fuel are to be developed and implemented. If anthropogenic CO<sub>2</sub> emission is not controlled through combustion of fossil fuels, it will be very difficult to mitigate climate change. Moreover, it is the overall awareness of people to nature and natural systems can mitigate the potential hazards of climate change.

### Reference

- Bastin, J-F., Finegold, Y., Garcia, C., Mollicone, D., Rezende, M., Routh, D., Zohner, C. M. and Crowther, T. W. (2019). The global tree restoration potential. *Science*, 365:76-79.
- NOAA. (2019). Trends in Atmospheric Carbon Dioxide. National Oceanic and Atmospheric Administration. Earth System Research Laboratory. Global Monitoring Division. <https://www.esrl.noaa.gov/gmd/ccgg/trends>
- Sundaram, S. M., Sivakumar, T., Sankaran, V. M., Rajkumar, J. S. I. and Nishanth, B. (2012). Distribution of soil organic carbon in agricultural lands by farming forage crops for mitigating climate change. *International Journal of Environmental Biology*, 2(3): 165-168.