

It is widely acknowledged that the future of agriculture is under threat because our soils are degrading. The FAO states that *“Although soils are essential for human well-being and the sustainability of life on the planet, they are threatened on all continents by natural erosion”*

Soil provides food for life and is home to more than a quarter of our biodiversity. A simple operation of tillage can destroy the soil cover, remove the fertile topsoil, cause erosion and degradation of diversity within a just a few days to undo the creation of the organic matter in the 15cm to 20cm topsoil that has taken thousands of years to form. Excessive dependence on synthetic agrochemicals can lead to further erosion and disruption of biodiversity and ecosystem services by soil flora and fauna. FAO states that by 2050, soil erosion may reduce crop yields up to 10 per cent, which is equivalent to removing millions of hectares of land from crop production. Overexploitation of natural resources by humans today for food, clothing, shelter, transportation, comforts and luxury not only worsens the effects of climate change today but also threatens the future.

Modern agriculture depends on fossil fuels and agrochemicals to increase productivity. It is not uncommon to see agricultural scientists justifying the imperative dependence on agrochemicals such as synthetic fertilizers and pesticides, genetically modified crops, irrigation, tillage and energy intensive practices on the pretext of meeting the current needs and gearing up for the future to feed the impending burgeoning population. It is paradoxical in many ways that we justify our dependence on fossil fuels to meet our current needs, knowing fully well that the more we use now, the more problems we create, that which may necessitate still more dependence on fossil fuels in the future only to aggravate the problems further. Beyond doubt, global commitments and determined actions by major polluting nations could lessen the damage by reducing greenhouse gas emissions and by increasing carbon sequestration through regenerative practices.

Agricultural practices are responsible for emission of more than 9.0 Giga tonnes (Gt) of CO₂ equivalent greenhouse gases (GHGs) every year. While crop lands including rice cultivation are responsible for only about 15% of the total agricultural GHG emissions, 31% of emissions are from livestock and manure and 23% emission are of nitrous oxide from nitrogenous fertilizers. The production of nitrogenous ammonia fertilizer from fossil fuels is reported to consume 1.0% of the total global energy use annually. Ironically, agricultural scientists are fully aware that legume crops can capture nitrogen from the atmosphere in quantities in far more inexpensive manner that can greatly exceed the total needs met from synthetic nitrogenous fertilizers. However, in a fast-moving world, quick fixes look more attractive than durable long-term solutions

It is also well known that regenerative agricultural practices benefit soil health. Better soil health is the bedrock of sustainable agriculture. Enriching soils with organic matter such as composts and manures not only create ideal conditions for survival and growth of soil organisms and increased availability of nutrients for plants, but also improves soil structure that is better aerated for the growth of beneficial microorganisms that antagonize harmful plant pathogens. Moreover, soils with good aeration operate as net sinks of methane due to methane utilization by methanotrophic bacteria that colonize aerobic soils. Healthy soils foster healthy vegetation that captures more carbon and promotes the growth of soil microorganisms that sequester more carbon and also greatly reduce greenhouse gas emissions. Therefore, a combination of regenerative agricultural practices plus enrichment of soils with composts and manure can contribute towards mitigation of climate change effects..

This edition of the ICAC RECORDER carries five articles that describe solutions and approaches to mitigate climate change and to rejuvenate soil health. The first three articles deal with climate-smart solutions, commitments, strategies and efforts that are underway in India and Bangladesh, while the last two articles focus on the importance of rejuvenating soil health with organic matter in the form of compost. All the five articles address the issue of enhancing carbon sequestration by enriching soils with organic matter to improve soil health and reducing GHG emissions through regenerative agricultural practices. It is clear, that with half-hearted efforts, weak Government commitments, the technical solutions available at hand will fall short in combating the humongous problem of atmospheric CO₂ that we created over the past hundred years. We may be filling small mugs with water with plans to place them in the tiny hands of our children in our preparedness to douse a huge wild forest fire. Hope the world wakes up in time before it is too late to douse the fire.

– Keshav Kranthi