**[Forests, trees as carbon offsets](https://www.dawn.com/news/1759957/forests-trees-as-carbon-offsets)**

[Aijaz A. Nizamani](https://www.dawn.com/authors/9389/aijaz-a-nizamani) Published June 16, 2023

ECOLOGISTS and environmentalists have, for many decades, advocated for sustainable forms of economic development. The world has been on an expansive yet destructive development path over the last century. While there can be no denying the benefits to humanity of this rapid development and economic expansion — particularly after 1850 and the discovery of oil — environmentalists have been rightly arguing that improving humanity’s living standards need not be at the cost of the planet.

The most glaring manifestation of unsustainable development is the carbon dioxide emissions of nearly 40 billion tonnes a year which countries and companies have been pumping into the atmosphere. These make for cumulative emissions of over 2.5 trillion tonnes from 1850 to 2021. Finally, there now seems to be some hope, as both global policymakers and business leaders are a little more prepared to respond to existential risks associated with carbon dioxide emissions.

There can be no denying that rich people in rich countries have brought the world to the brink of climate disaster. It is the poor people in poor countries who have borne the brunt of their unsustainable development. The rains in Pakistan in 2022 were attributable to climate change. Over a third of the country at one stage was under water, resulting in several hundred casualties and the displacement of millions of poor. Similarly, villagers beneath the glaciers in Pakistan’s north remain at increased risk solely due to anthropocentric reasons. We hear stories of entire villages being decimated by a moving glacier, the risk of which has increased in a warmer world.

Human civilisations have used fossil fuels for over a millennium, starting with coal. Still, the Industrial Revolution and the discovery of oil changed the scenario rapidly. The world temperature, which had been stable for hundreds of years, suddenly started rising with fossil fuel-based economic expansion, creating an existential threat to humanity. There has been a 1.28 degrees Celsius increase in average global temperatures, and scientists have warned that parts of the globe, including South Asia, will become unhabitable over the coming few decades. In Pakistan, areas like Mehar and Kachho along the right bank areas of the Indus, which were flooded last year, are already routinely above 50°C in summer.

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The good news is the world at last seems to be grappling with the challenge. Led by climate science, policymakers and businesses are responding to the emissions issue. Voters in the democratic world are pressuring their leaders for concrete action. The world is on the path of zero emissions over the next 50 years. OECD members like the US and EU have pledged to be net zero by 2050, China by 2060 and India by 2070. Similarly, businesses are strategising net-zero plans whereby their emissions would be progressively reduced to zero, corresponding to host country pledges.

Global leaders are currently grappling with the question that, even in a net-zero world, trillions of tonnes of greenhouse gases will still be in the atmosphere. There has to be a policy and business case to take these emissions back from the atmosphere and store them in trees or the geological locations where they were taken from.

The world is looking at nature-based solutions. What we learned in primary school is that trees and plants, while growing, absorb carbon dioxide and emit oxygen into the atmosphere. There is a major rush of businesses investing in raising forests which would sequester carbon dioxide and allow investing companies to offset their emissions (or trade them) against forest-based carbon offsets. This new science and economics model places a monetary value on a tree in the form of the carbon stored in it while it is alive and which can be traded as a carbon offset in the international market. The price of a carbon offset can vary — as low as $10 a tonne to over $100, considering the offset’s quality (which is basically documentation and transparency).

The Sindh government has completed one such transaction through Sindh forest department, whereby a carbon offset from a mangrove forest in the Indus delta has been sold to international buyers. This is such a novel approach that some of Pakistan’s generalist policymakers initially thought the companies would cut and remove the forest to take carbon out of it and complete the transaction! The reality is the amount raised, which runs into millions of dollars each year, will ensure more investment in raising forests and for the betterment of local communities. The transacted forest will not only continue to stand and grow but also give more carbon offset revenue for the next 60 years to the government.

Scientists and technologists have also created technology-based options for what is called ‘Direct Air Capture’ or ‘Carbon Capture and Storage. Currently, the world’s largest DAC system has a capacity of only 4,000 tonnes of carbon dioxide (imagine that against emissions of 40bn tonnes) and costs well over $1,000 per tonne. Compared to that, nature-based solutions or forest-based removal costs are just a few dollars a tonne, and it comes with immense biodiversity and community benefits. However, we should not underestimate human ingenuity: technology-based carbon removal costs will eventually come down, as we have seen in the case of computing power and the cost of solar energy.

As public policy, it should not be about technology versus nature-based solutions. The two should reinforce each other. The vast computing power we have today and technologies like satellites can be hugely helpful in afforestation, monitoring and verification mechanisms to sell carbon offsets.

Pakistan’s economy is overwhelmingly dependent on irrigation and raising deep-rooted trees like the Kikar, which removes excess water through higher evapotranspiration rates. The 2022 rains reminded farmers that agriculture cannot be sustainable without forestry in irrigation plains. This crisis has created unique international and local convergence that makes investments in forestry on private farmlands a viable proposition. New business models and an enabling policy are the need of the hour.

*The writer is a retired secretary of the forest & wildlife department and ex-chief conservator of forests.*  
[aijazniz@gmail.com](https://mailto:aijazniz@gmail.com)

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