Turning the CO2 tide to protect our species

Much to the dismay of Anote Tong, former president of the Republic of Kiribati, his island home in the central Pacific Ocean is facing the heat of climate change. "In my lifetime over the years, villages, communities, have had to leave ... because it is no longer viable," he laments.

The reason?

Excessive carbon emissions, trapping of heat within the earth's atmosphere, melting ice caps and rising sea waters which submerge low lying islands like Kiribati! Every year, the billions of metric tons of carbon dioxide (CO2) that we release into the atmosphere increases the threat of climate change and irrevocable damage to vulnerable geographies.

For the 100,000 people living in these isolated Kiribati islands, every day is a challenge for survival. They know they must leave their homes forever someday soon - unless there is a miracle!

Unequal burden

One of the most unpalatable things about climate change is that fact that the perpetrators aren't the ones who always pay the price. In Malawi, where 300 people lost their lives in the recent flood, the average Malawian emits a mere 80kgs of CO2 every year. The average US citizen on the other hand, spews almost 17.5 metric tonnes. While the big four CO2 emitting countries like China, USA, India and Russia chug away towards a perceived development, the more vulnerable societies pay a heavy price.

Polluted air, polluted waters and a toxic environment have been the immediate fallouts of global warming and climate change. World Health Organization estimates that around 93 % of children below the age of 15 breathe air that is so toxic that it puts their health and development at risk. In 2016, 600,000 children died from respiratory infections caused by polluted air. While it is true that development cannot take a backseat, it is imperative that governments must take requisite measures to address the threat of climate change.

With concentrations of CO_2 at its highest in the last 400,000 years, the world needs to cut emissions and remove greenhouse gases from the atmosphere.

Climate warriors

The good news is that more and more people are becoming aware of climate change and the devastation it brings in its wake. And, they are trying, in big and small ways, to impact change in the behaviour of common people, corporates and countries.

Take for example the 16-year-old climate activist Greta Thunberg, who protests outside the Swedish Parliament every Friday. The Nobel nominee hopes to urge leaders to implement policies to fight climate change. In India, students walked out of schools across multiple cities, demanding that the government act. Everywhere, youth are driving people to stop and take notice of the reality of Climate Change.

Trees and Technology

Trees have been protecting human life, since millions of years. The process of photosynthesis turns sunlight, carbon dioxide and water from the atmosphere into sugars to feed plants. But deforestation and the massive presence of CO_2 in the atmosphere have made our green cover inadequate to deal with the gargantuan challenge. Most of them turn less than 1% of the solar energy they receive into useful energy-rich compounds. This is where science and technology must pitch in.

The IPCC maps out four pathways to achieve 1.5C, with different combinations of land use and technological change.

1. Reforestation, electric transport systems and greater adoption of carbon capture technology.
2. Carbon pollution to be cut by 45% by 2030
3. Carbon prices must be set three to four times higher than the 2C target
4. Climate injustice - must stay below 2 degrees Celsius of global warming. At the present 4 degrees, we are facing an existential threat

Climate change is without doubt the greatest threat to human rights in the 21st century. It is a big challenge and need assistance in terms of technology, finance, systems and support. Governments around the world have pledged huge support. This is a great responsibility and it requires complete solidarity to ensure we reach zero carbon emission by 2050.

From toxic waste to a sustainable, profitable business

Scientists and entrepreneurs must build technologies that can take over from nature and make recycling carbon dioxide a profitable industry. Only then will it be adopted by industry bodies.

Until recently, the dialogue has been focused on carbon capture and storage (CCS). Emissions were forced into underground rocks at great cost and no economic benefit. The tide is slowly turning of late. Today, there is a ready global market for CO_2 as a chemical raw material. It is

sourced from industries such as brewing where CO2 is cheap and easy to capture. One plant at the industrial port of Tuticorin is capturing CO2 from its own coal-powered boiler and using it to prepare baking soda. Elsewhere, scientists and chemical makers are working on making plastics and fuels from waste CO2 and inventing technologies to convert captured CO2 into new products.

This brings us to recycling all the wasted CO2, to turn it into something that is less environmentally damaging and more useful to mankind. If we could capture excess CO2 from the atmosphere and from all of India's CO2 emitting factories and convert it into fuels, it would be a huge achievement. CO2 could then become a carrier of energy rather than just a toxic waste or emission.

However, capturing CO2 from the world's smokestacks is not an easy task. Technology to capture CO2 from the atmosphere and store it underground is at a very nascent stage. Called "carbon sequestration", it is not yet certain that it can be done to scale in the next few decades.

The future for captured CO2

Consulting firm McKinsey & Company estimates the 2030 market for carbon dioxide-based products alone will be between $800 billion and $1 trillion. StartUps are converting greenhouse gases into clothes, animal food, toothpaste, jet fuel, vehicles, concrete, plastics, shoes and other useful consumer products. Instead treating CO2 as waste, innovators have been finding opportunities. At present, 49 companies are working on commercial uses for carbon. Captured CO2 is converted into chemicals, building materials, and even shoes.

Carbon use is feasible. With current process, capturing carbon is more expensive than allowing it to escape into the atmosphere. On the other hand, using carbon to manufacture products is a viable way to create markets for CO2 emissions, giving carbon capture facilities a revenue model to encourage competition with other power generators. With the right kind of encouragement from the government, policy makers and venture capitalists, India, the world's StartUp hub can play a steering role in this new market.

India and climate change

Researchers from University of California San Diego in the US found that India is among the top three counties that stand to lose from climate change. The other two are USA and Saudi Arabia. The country-level Social Cost of Carbon (SCC) for India alone is estimated to be about US$ 86 per tonne of CO2. This means that at current emission levels, the Indian economy loses US$ 210 billion annually. What's more, India's emissions are on an upward trajectory, making it the third largest GHG emitter in the world.

India's domestic Climate Policy is hazy. It is a mix of a variety of uncoordinated environmental topics such as pollution, water, energy, transport, waste management, agriculture, mining, forests, environmental clearance, finances, etc. Policy integration, institutional design for effective implementation, and climate justice must play a central role in India's domestic climate policy. India needs inputs from policymakers, natural and social scientists, the

academic community, civil society and communities from across the country to participate in the policy making process.

India, along with the rest of the world, is facing multiple crises on the environmental front. Some of the world's most polluted cities are in India. Water pollution which is caused by untreated sewage and unregulated industrial effluents is a huge concern. Climate action therefore should include the current and future physical effects of unchecked climate change and the impact it will have on societal functioning.

In the words of **Wangaari Maathai**, a Kenyan environmental political activist and Nobel laureate: "In the course of history there comes a time when humanity is called upon to shift to a new level of consciousness, to reach a higher moral ground."