

CLIMATE CHANGE

Ever-Green Revolution: A Sustainable Pathway beyond Green Revolution

Climate change is one of the most pressing global challenges of the 21st century. Rising temperatures, extreme weather events, melting glaciers, and rising sea levels are clear indicators that urgent action is needed. While policy reforms and behavioural changes are essential, technology has emerged as one of the most powerful tools in combating climate change. From renewable energy to artificial intelligence-driven climate modelling, technological innovation offers practical solutions to reduce greenhouse gas emissions and build a more sustainable future.

One of the most significant contributions of technology in addressing climate change is the rapid growth of renewable energy. Solar, wind, and hydropower technologies are transforming the global energy landscape. Advances in solar panel efficiency, battery storage systems, and wind turbine design have made renewable energy more affordable and accessible than ever before. Many countries are now transitioning from fossil fuels to clean energy sources, reducing carbon emissions and promoting energy security.

Energy storage technology is another critical area of innovation. Renewable energy sources like solar and wind are intermittent by nature, meaning they do not produce energy continuously. Modern battery systems, including lithium-ion and emerging solid-state batteries, allow excess energy to be stored and used when needed. These technologies help stabilize power grids and enable wider adoption of renewable energy solutions. In addition to energy production, technology is also transforming how industries operate. Smart manufacturing, automation, and energy-efficient machinery are helping industries reduce their carbon footprint. Digital monitoring systems can track energy use and emissions in real time, allowing companies to identify inefficiencies and implement improvements quickly. Green technologies such as carbon capture and storage (CCS) are also being developed to capture carbon dioxide emissions before they reach the atmosphere.

Agriculture, a sector heavily affected by climate change, is also benefiting from technological innovations. Precision agriculture uses satellite imagery, sensors, and data analytics to optimize water use, fertilizers, and crop management. This reduces waste, improves productivity, and lowers the environmental impact of farming. Climate-resilient crop varieties developed through scientific research are helping farmers adapt to changing weather patterns and ensure food security. Artificial intelligence (AI) and big data are playing an increasingly important role in climate action. Advanced algorithms can analyse vast amounts of environmental data to predict climate patterns, monitor deforestation, and track changes in ocean temperatures. AI-powered systems can also optimize energy consumption in buildings and transportation networks, making cities more sustainable. Transportation is another area where technology is driving climate solutions. Electric vehicles (EVs), hydrogen-powered transport, and improved public transit systems are reducing dependence on fossil fuels. As battery technology improves and charging infrastructure expands, EVs are becoming a viable and eco-friendly alternative to traditional vehicles. However, technology alone cannot solve the climate crisis. The successful implementation of climate technologies requires strong political commitment, international cooperation, and supportive policies. Governments must invest in research and development, provide incentives for green innovation, and create regulatory frameworks that encourage sustainable practices. At the same time, businesses and individuals must adopt these technologies responsibly and integrate them into everyday life.

■ DR. BANARSI LAL

India has seen various advancements in food production. One such advancement was green revolution. The production of food within India was insufficient in the years from 1947 to 1960 as there was growing population. There was a severe shortage of food crops as well as commercial crops. At the same time, Dr. Norman Borlaug, an agronomist contributed to the green revolution significantly. He provided new seeds for cultivation which were stocky, disease-resistant, fast-growing and highly responsive to fertilizers. In India, the green revolution was launched under the guidance of geneticist, Dr. M. S. Swaminathan. It was started in 1960s and helped in increasing food production in the country. The green revolution made India self-sufficient in foodgrains production and ended precarious dependence on food aid and grain imports. The concept of ever-green revolution is, indeed, a sequel to the green revolution. Green revolution was triggered by the use of high-yielding crops varieties which required good amount of water, fertilisers and plant protection chemicals. It caused some distortions in the cropping pattern and led to some unwarranted ecological ramifications in terms of degradation of natural resources such as soil, water and emergence of new insect-pests, diseases and weeds in different crops.

Presently there is dire need of an everlasting or evergreen revolution. The major objective of transforming the green revolution into an evergreen revolution is to expand it to all crops and in all regions of the nation with minimum adverse effects. This kind of an environment-friendly and natural resources-compatible evergreen revolution, covering all gamuts of agriculture and its allied fields and spanning all across the country is the need of

the hour. Although there is spectacular advancement in the Indian agriculture but the overall productivity of the Indian agriculture still remains low compared to that of many other advanced countries. Still the Indian agriculture relies on the monsoon and this sector is badly affected by the extreme weather conditions. The scope for increasing the area under crops has also reduced. The size of land holding is getting smaller and fragmented. Agricultural marketing is suffering from some formidable disabilities and farmers are neither getting adequate nor efficient reasonable returns for their farm produce. Agriculture labour is turning scarce and costly.

The term 'Green Revolution' was coined by William Gaud of the United States in 1968. With Green Revolution the production and productivity of crops increased but it had some negative effects on the society and environment. With the increase in population, per capita land and water availability is declining. There is dire need to increase the food and other agricultural technologies by adopting some frontier agricultural technologies.

There is need of Ever-Green Revolution that can increase the food grain production per unit of land and water for the increasing population and increase the income and employment among the farmers. A paradigm shift is needed in our agricultural research, extension and development strategies to mitigate the food grain problem. Evergreen Revolution can help to produce more crops from the available land, water and labour resources without effecting the ecological system and society. There is need to adopt the cropping or farming system approach to increase the income and employment.

The research should not focus only on a single commodity but to the entire crops production sys-

tem. The transition from the fatigue Green Revolution to an Evergreen Revolution needs a shift from crop-centered approach to the integrated farming based approach. In order to enhance the Indian farmers' income agricultural scientists have the open opportunities to design the different farming systems. There is need to promote the ecofriendly-technologies and traditional knowledge of the farmers should be blended with the frontier agricultural and allied sectors technologies. Industrial countries are responsible to increase the temperature, sea level, precipitation and ultraviolet radiation.

In developing countries most of the jobs are provided by the agricultural sector. In India about 70 per cent of the livelihoods are provided by the agricultural industries. Smaller the farm, greater the efforts are needed to increase the income of the farmers. Employment is affected by the import of different agricultural commodities. There is need to put more attention on the post-harvesting technologies. There is a need to develop an approach not only to develop ecologically sound technologies for different areas but also to facilitate their utilization at gross root level.

The green revolution gave a sudden boost to the production and productivity of major cereals. Yet, there are several challenges and downstream consequences being faced by the Indian farmers.

The impact of Green Revolution remained confined to the assured irrigated areas. The agricultural research has success to selected crops. There is a great difference between the actual and potential yields. Deterioration of soil health, ground water depletion, gap between rich and poor, regional imbalance, environmental pollution etc. are the consequences of intensive agriculture

following Green Revolution. There is need to rectify the regional disparities, technological empowerment, food insecurity, fatigued green revolution, malnutrition etc. Many efforts have been made for rural upliftment. We have certain noteworthy achievements in the last 6 decades. We launched green revolution, yellow revolution, white revolution and also blue revolution in our country. But these uni-coloured and uni-dimensional revolutions are not sufficient. We need the techno-colour or multi-colour revolutions. Our ex-President Dr. A.P.J. Abdul Kalam initiated a scheme Providing Urban Facilities in Rural Areas (PURA) through four connectivities viz., physical, economic, electronic and spiritual to be brought in a cost-effective way. Now many experts are thinking for second green revolution. Our country needs to move towards ever-green revolution from green revolution. While working scientifically now the aspects of ecology and environment are kept in mind. In agriculture, we need to minimize the indiscriminate use of chemical fertilizers and chemical pesticides.

Technology choice have a critical impact on many aspects of agricultural development, especially the way we choose it, the way we innovate and design them and the way we deliver them to masses. Technology must be carefully chosen to enable local people to acquire and imbibe knowledge according to their needs and environment.

The technologies should be made in such a way that they upgrade their traditional skills and capabilities, minimize fatigue, reduce drudgery, be innovative, assured added value to existing methods of operation, generate employment, use local resources in both men and materials, need low capital investment, low cost, be capable of replication and adoption, blend harmo-

nously with existing eco-systems leading to tangible improvements in the living conditions and self-sustained development of the farmers. It is necessary to develop and introduce appropriate technologies coupled with sound delivery systems which ensure economic and ecological sustainability and optimum use of local resources emphasizing on capacity building and technological empowerment, particularly small and marginal farmers.

New agricultural technologies are of limited value if they are not adopted by the farmers due to their unsuitability to particular socio-economic and agro-climatic conditions. Many of improved agricultural technologies are partially adopted by the farmers or totally rejected by them. Main reasons of low adoption of technologies are: economically not viable, unavailability, not matching with the farmers needs and not compatible with their farming system. Many of the agricultural technologies are not appropriate for small and marginal farmers. In conventional researches, there was negligible involvement of the farmers. These factors compel the extension personnel and researchers to shift to more farmer-oriented, holistic and interdisciplinary approach for technology development and its dissemination. There is need to involve the farmers for assessment and refinement of technology.

The success of the efforts to transform the green revolution into an evergreen revolution would depend largely on how well the mooted programmes and schemes are implemented. Organic ways of farming can be adopted for sustainable agriculture. The practices of natural farming can be followed to increase the quality of farm produce and reduce the cost of cultivation.

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Tobacco: The Enemy of Health

Consumer Rights: A Shield Against Fraud

■ BAIKAWAL CHAWALGAMI

Tobacco is one of the most dangerous substances ever introduced into human society. For centuries it has been consumed in various forms-smoking cigarettes, cigars, pipes, and chewing tobacco-often under the false belief that it provides relaxation, pleasure, or social acceptance. However, modern medical science has conclusively proven that tobacco is a silent destroyer of human health. It slowly damages the body, weakens the mind, and shortens life expectancy. The simple yet powerful message "Say No to Tobacco" is therefore not merely a slogan; it is a call for survival, dignity, and a healthier future for humanity. One of the most alarming facts about tobacco is that it contains thousands of chemicals, many of which are highly toxic and carcinogenic. Among these substances are nicotine, tar, carbon monoxide, arsenic, and formaldehyde. Nicotine is particularly dangerous because it creates addiction, making it extremely difficult for users to quit once they begin. This addictive nature traps millions of people in a cycle of dependence, forcing them to consume tobacco repeatedly even when they are fully aware of its harmful consequences. What begins as curiosity or peer pressure often develops into a lifelong habit that gradually deteriorates physical health. The health consequences of tobacco consumption are devastating. Tobacco is a leading cause of various life-threatening diseases, including lung cancer, throat cancer, heart disease, stroke, and chronic respiratory disorders. Smoking damages the lungs by filling them with harmful toxins that reduce their ability to function properly. Over time, the delicate tissues of the respiratory system become inflamed and weakened, leading to breathing difficulties and chronic illnesses such as bronchitis and emphysema. The heart is also severely affected, as tobacco increases blood pressure, damages blood vessels, and raises the



risk of heart attacks. The body, which is designed to function with remarkable precision, slowly deteriorates under the persistent assault of toxic substances found in tobacco.

Equally disturbing is the impact of tobacco on non-smokers through passive smoking, commonly known as second-hand smoke. When a person smokes, the surrounding environment becomes contaminated with harmful fumes that can be inhaled by others nearby. Children, pregnant women, and elderly individuals are particularly vulnerable to the dangers of passive smoking. Scientific studies have shown that second-hand smoke can cause respiratory infections, asthma, and even cancer in individuals who have never touched tobacco themselves. Thus, tobacco does not merely harm the user; it endangers innocent lives in homes, workplaces, and public spaces. Beyond its devastating health effects, tobacco also creates a heavy economic burden on individuals and society. Many people spend a significant portion of their income on cigarettes or other tobacco products, often neglecting essential needs such as nutritious food, healthcare, and education. For families living with limited financial resources, tobacco consumption can deepen poverty and hardship. Governments, too, face enormous healthcare costs in treating tobacco-related illnesses. Hospitals are filled with patients suffering from diseases caused by smoking, placing immense pressure on healthcare systems that could otherwise focus on improving overall public health.

Another tragic aspect of

tobacco addiction is its impact on youth. Many young people are lured into smoking through advertising, peer influence, or the misguided perception that tobacco symbolizes maturity or sophistication. Unfortunately, the younger a person begins using tobacco, the more difficult it becomes to quit later in life. Adolescents are particularly vulnerable because their brains are still developing, making them more susceptible to nicotine addiction. As a result, millions of young individuals unknowingly place their future health at risk before they fully understand the consequences of their choices. The environmental impact of tobacco is another concern that often goes unnoticed. The cultivation of tobacco requires vast amounts of land, water, and chemical fertilizers. Forests are frequently cleared to create space for tobacco plantations, contributing to deforestation and ecological imbalance. Cigarette butts, which are among the most common forms of litter worldwide, contain plastic filters that take years to decompose. These discarded filters pollute soil and water bodies, harming wildlife and degrading the natural environment. Thus, tobacco not only damages human health but also threatens the planet we inhabit. Despite these grave dangers, there is hope. Across the world, governments, health organizations, and communities are working tirelessly to reduce tobacco consumption. Public awareness campaigns, strict regulations on tobacco advertising, health warnings on cigarette packages, and increased taxation on tobacco products have proven effective in discour-

aging smoking. Educational programs in schools are helping young people understand the risks associated with tobacco and empowering them to make healthier decisions. These collective efforts demonstrate that society has the ability to confront the tobacco epidemic and protect future generations.

Quitting tobacco is undoubtedly challenging, but it is entirely possible with determination and support. Millions of former smokers have successfully overcome addiction and transformed their lives. Within weeks of quitting, the body begins to repair itself. Lung function improves, blood circulation becomes healthier, and the risk of heart disease gradually decreases. Over time, individuals who abandon tobacco experience greater physical stamina, improved mental clarity, and a renewed sense of well-being. Most importantly, they regain control over their lives instead of being controlled by addiction. The message "Say No to Tobacco" is therefore a message of empowerment. It encourages individuals to prioritize their health, respect their bodies, and safeguard the well-being of their families and communities. Choosing to reject tobacco is not merely a personal decision; it is a responsible act that contributes to a healthier society and a cleaner environment. Every person who refuses tobacco sets an example for others, creating a ripple effect that can inspire widespread change. In the final analysis, tobacco offers nothing but temporary illusion and lasting harm. It steals health, drains financial resources, and damages both society and nature. The wisest and most courageous choice is to reject it completely. By embracing a tobacco-free lifestyle, humanity can move toward a future defined by vitality, longevity, and genuine well-being. The message is clear, urgent, and timeless: say no to tobacco, and say yes to life.

■ YOGESH KUMAR GOYAL

Today's consumer is far more active and aware than before. However, the changing structure of markets and the rapid expansion of consumerist culture have also created new challenges. Problems such as hoarding, black marketing, adulteration, irregularities in weights and measures, arbitrary pricing, sale of substandard products, misleading advertisements, online fraud, and denial of service despite guarantees or warranties continue to trouble consumers. In such circumstances, consumer rights act as a strong shield that protects consumers from exploitation and deception. To raise awareness about these rights and empower consumers, World Consumer Rights Day is observed every year on 15 March. This year, the day is being celebrated with the theme "Safe Products, Confident Consumers," highlighting the importance of consumer safety, product quality, and effective regulatory mechanisms.

World Consumer Rights Day is not merely a symbolic observance; it is an important occasion to remind consumers of their power and rights. The foundation of the consumer movement was laid on 15 March 1962, when the then President of the United States, John F. Kennedy, delivered a historic speech in the US Congress recognizing four fundamental consumer rights. This initiative later became the basis of the global consumer movement. In India too, the consumer movement developed gradually. It began in the 1960s, and in 1966 initial efforts were made in Mumbai to promote consumer protection. Later, the establishment of 'Grahak Panchayat' in Pune in 1974 gave new direction to the movement. Over time, numerous organizations and institutions related to consumer welfare were formed in various states, playing a significant role in spreading awareness about consumer rights. These efforts eventually led to the development of laws and institutional mechanisms for consumer protection.

In reality, exploitation of consumers in market systems is not a new phenomenon. Throughout history, consumers have faced various forms of fraud and unfair trade practices. In modern times, the expansion of markets, globalization of trade, and the growing influence of digital platforms have made consumer protection challenges more complex. Therefore, the need for effective laws and a quick justice system was strongly felt to safeguard consumers. To address this, the Consumer Protection Act was implemented in India, providing consumers with a pathway to obtain justice quickly and at a relatively low cost. To further strengthen consumer rights, the Government of India implemented the



Consumer Protection Act, 2019 on 20 July 2020, replacing the nearly three-and-a-half-decade-old Consumer Protection Act, 1986. The new law provides broader rights to consumers and includes several important provisions such as regulation of misleading advertisements, accountability of e-commerce platforms, product liability, and online redressal of consumer complaints. Under this Act, the Central Consumer Protection Authority (CCPA) has also been established to take action in cases involving violation of consumer rights.

According to India's consumer protection laws, any person who purchases goods or services by paying money, or promises to pay for them, is considered a consumer. If there is any defect in the product or deficiency in service, or if the consumer suffers any loss due to it, the consumer has the right to seek justice and demand compensation. These rights protect consumers from exploitation in the marketplace. The system of consumer courts has proved extremely important in this regard. Through these courts, consumers can obtain relatively simple and speedy justice. In many cases, consumers have successfully defended their rights with the help of consumer forums. For instance, a consumer once purchased an electric fan from a shop with a one-year warranty. After some time, the fan stopped working, but the shopkeeper refused to repair or replace it. Ultimately, the consumer approached the consumer court. The court not only ordered the replacement of the fan but also directed the shopkeeper to pay compensation for mental distress and inconvenience. Such examples clearly demonstrate the important role consumer courts play in protecting consumer rights.

However, it is also true that at some point in life almost everyone faces minor or major consumer problems, yet most people hesitate to raise their voices for their rights. One major reason is that a large section of the population still lacks adequate knowledge about their rights and the legal procedures involved. Surprisingly, even educated individuals often remain indifferent toward consumer rights and

ignore small instances of fraud. If consumers become more alert and aware, many problems in the marketplace can automatically be controlled. One of the most important steps is to always obtain a receipt while purchasing any product or service. A receipt is the most crucial document that provides a legal basis for protecting consumer rights. Without proof of purchase, it becomes difficult to present a complaint effectively in consumer courts.

In today's digital age, the importance of consumer rights has increased even further. Online shopping, digital payments, and the expansion of e-commerce platforms have certainly increased convenience for consumers, but they have also introduced new risks such as cyber fraud, fake websites, and misleading online advertisements. Therefore, consumers must not only be aware of their rights but also exercise caution and vigilance. One of the biggest advantages of consumer courts is that they do not require consumers to go through long and complex legal procedures. Consumers can file complaints themselves, and generally there is no mandatory requirement to hire a lawyer. Moreover, the process of resolving cases is comparatively simple and inexpensive. This is why consumer courts have become an accessible means of justice for ordinary citizens.

A strong and aware consumer forms the foundation of a healthy market system. When consumers remain vigilant about their rights and raise their voices against injustice, transparency, quality, and accountability in the marketplace are ensured. World Consumer Rights Day conveys the message that we are not merely consumers of goods and services but also citizens endowed with rights. Today, there is a need for consumers to be aware not only of their rights but also of their responsibilities. Through awareness, vigilance, and legal knowledge, consumers can protect their interests. If every consumer becomes alert and exercises their rights, not only can fraud and exploitation be controlled, but the marketplace can also become more just, transparent, and trustworthy.

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