The Environment Problem and Our Tasks

Soumitro Banerjee *

A large section of the human race lives in a very toxic environment. The air we breathe is contaminated by various gaseous substances and suspended particulate matter that harm our lungs and other organs. The water we drink is contaminated by industrial effluents and urban sewerage that find their way into rivers and groundwater. The food grains and vegetables that we eat are contaminated by chemical fertilizers, pesticides and other harmful substances.

Much of the plastic that we use is for non-essential purposes — mostly as single-use carry-bags and packaging material for junk food and online purchases. After one-time use, these non-biodegradable materials go to waste and clog our drainage systems and waterways. Above all, tiny grains of plastic, called microplastic, which are leached from plastic bottles, containers, etc., are everywhere – harming human beings as well as the flora and fauna around us.

The fossil fuels we burn to facilitate transportation and produce electricity are increasing the concentration of carbon dioxide in the atmosphere, contributing to global warming. Not only that, when coal is burnt, the sulphur contained in coal converts to sulphur dioxide. The high-temperature combustion in electric power stations and in petrol and diesel engines makes atmospheric nitrogen combine with oxygen to produce various nitrogen oxides collectively called NOx. The sulphur dioxide and NOx dissolve in raindrops and come down as acid rain.

In the 1980s, another issue came to our notice: the ozone layer in the upper atmosphere, which protects us from the harmful ultraviolet rays coming from the sun, is getting depleted. Scientific investigations revealed that the chemical substance called chlorofluorocarbon (CFC) used in air conditioners and refrigerators is responsible for ozone depletion in the atmosphere.

Due to unplanned urbanisation, groundwater is being exhausted at an alarming rate. The problem is already acute in cities like Chennai and Bengaluru. Within a few years, many more cities will have to go without a reliable potable water supply.

Global warming is already creating acute problems in the high Himalayas. The glaciers are melting at an alarming rate. When they disappear, the people of these cold, arid areas will have no water source and will become climate refugees. These glaciers also feed rivers like Ganga, Brahmaputra, Yamuna and Indus, which will run dry. Such an event will be catastrophic for much of the subcontinent. Moreover, the rising sea levels are already threatening the coastal areas. The world's largest mangrove forest, the Sunderbans, a rich biodiversity hotspot, may be inundated in a few years.

Man is using and altering nature in such a way that many species are unable to cope with habitat loss and are

*Professor Banerjee teaches Physics at the Indian Institute of Science Education & Research, Kolkata. He is the General Secretary of *Breakthrough Science Society* .

disappearing. Rampant deforestation in the name of 'development' is driving many species to extinction. Right now, the Earth is witnessing a mass extinction event. According to an estimate, up to half of presently existing plant and animal species may become extinct by 2100. In the past, the Earth has seen many mass extinction events. But what is happening now due to human activity may eventually surpass all past mass extinctions. [1]

The different species on Earth have evolved for millions of years and we are exterminating them over a few hundred years. Many of these species are undocumented, and their possible benefit for mankind is still unknown. Just imagine what would have happened if the species of mould, Penicillium rubens, had gone extinct before Alexander Fleming discovered its antibiotic properties. It is highly probable that new life-saving drugs will be discovered using some species existing in nature now, whose properties we do not know yet. If such species go extinct, we will forever be denied the use of molecules existing in their bodies, created through millions of years of evolution. We'll never even know what we lost. So, biodiversity needs to be preserved as a treasure for future generations.

The reasons behind environmental degradation

Thus, we see that the world environment is facing a grave crisis. It is due to human activity. But can the entire humankind be blamed for this?

We have indeed been burning coal since the onset of the Industrial Revolution. We have been burning petroleum products since the last century. Don't we need transportation? Don't we need electricity for a modern way of life? Don't we need energy sources to produce goods and services?

True, we need these. However, we find a big gap if we carefully analyse what we can categorise as 'necessary consumption' and compare it with the actual consumption of fossil fuels and other raw materials obtained from nature. It is because of the nature of our production system.

In the production system prevalent in most countries, those who have money buy land, set up industries, employ labour, and then produce goods using raw materials extracted from nature. With the help of science and technology, labour acts on the raw materials to produce goods. The owner sells the products in the market and from the money earned through the sales, pay the workers, buy raw materials, etc. In the productive process, labour adds value to the goods. The owner, however, pays back only a fraction of this value to labourers as wages. The remainder is extracted by them, which forms the surplus value or profit. The whole process works on one central principle: maximisation of profit.

The industrialists buy four things: land, equipment, labour power and raw materials (including energy). They earn by selling the finished products. It is obvious that profit maximisation is possible only in two ways: (a) by selling at the highest possible price and (b) by minimising expenses.

In a competitive market, one cannot arbitrarily increase the price of the products. People will obviously choose to buy from whoever sells at the lowest price. This drives the system towards monopoly: bigger companies swallow smaller ones to reach a state where they can manipulate the prices at will. They also boost sales by artificially creating demand for things that are not necessary.

On the other hand, minimising the expense can be achieved by cutting the spending on land, labour, and raw materials. That is why the capitalists try to 'grab' land in connivance with politicians at

a minimum cost. They pay the lowest salary so that the workers can barely survive and serve the production process. They also try to obtain the raw materials at the lowest possible cost by indiscriminately exploiting nature. This process not only pauperises people but also adversely affects the environment.

Why do we see unchecked deforestation when everybody agrees that a green cover is the simplest natural protection against the greenhouse gas buildup in the atmosphere? This is because wood is an industrial raw material used to produce paper, tissue, cardboard, and many other things. Since wood must be procured at the lowest cost, logging companies do not bother to spend on afforestation. Often, useful minerals lie below forest lands. From their insatiable greed to extract these resources, the corporate houses resort to the destruction of the forests without compensating afforestation.

Why do we see a proliferation of harmful and unnecessary plastic products? Simply because it is profitable. Food processing companies find it profitable to sell one rupee worth of potato chips at Rs. 10 by packaging them in attractive plastic covers. Companies producing drainage-clogging carry-bags make a profit, so they will continue to produce and market these. Mineral water and soft drinks will continue to be packaged in single-use plastic bottles because sales and profit are boosted that way.

Most rivers in our country are polluted with industrial effluents. Why do these industries release toxic chemicals into the water bodies? Don't they understand that they are harming the environment? They do. However, they also understand that installing proper treatment plants would cost money and reduce the profit margin. Greasing the palms of a few government officials turns out to be a cheaper option.

The United States has a minimal mass transport system except in big cities like New York, San Francisco and Chicago. As a result, in that country, owning a personal vehicle is as basic a necessity as food, clothing, and shelter. This situation has been created as a policy decision aimed at boosting car sales and hence maximising the profit of not only the automobile industry but also the petroleum companies and allied industries. As a result, the per-capita emission of greenhouse gases is the highest in the US. [2]

These are only a few examples. A further probe will convince anybody that the maximum profit motive in our production system is the basic cause of the loot and plunder of natural resources and destruction of the environment.

Development of environmental awareness

True environmental awareness started in the early 1970s. Before that, the prevalent idea was that man has to conquer nature. Nature has to be subjugated to improve human living conditions.

Friedrich Engels cautioned about 150 years ago, "Let us not, however, flatter ourselves overmuch on account of our human conquest over nature. For each such conquest takes its revenge on us. Each of them, it is true, has in the first place the consequences on which we counted, but in the second and third places, it has quite different, unforeseen effects which only too often cancel out the first. The people who, in Mesopotamia, Greece, Asia Minor, and elsewhere, destroyed the forests to obtain cultivable land, never dreamed that they were laying the basis for the present devastated condition of these countries, by removing along with the forests the collecting centres and reservoirs of moisture. ··· Thus, at every step, we are reminded

that we by no means rule over nature like a conqueror over a foreign people, like someone standing outside nature - but that we, with flesh, blood, and brain, belong to nature, and exist in its midst, and that all our mastery of it consists in the fact that we have the advantage over all other beings of being able to know and correctly apply its laws" [3]. However, the hazard of such lopsided 'development' did not come to general attention till the 1960s.

In the race for better and better livelihoods, we forgot the difference between need and greed and gave birth to a consumerist society. While an ever-larger fraction of people were being pauperised and were going out of money and commodity circulation, the only way to boost the market was to induce the affluent section to buy more and more. We thus created a wasteful society that extracts raw materials from nature to produce things that are not needed and are dumped into nature as waste.

Advancements in science have now made us aware of the many harmful effects of our actions on nature, but because of the maximisation of profit for the capitalist class, attacks on nature are going unabated.

The Limits to Growth

In the early 1970s, a few scientists came together and formed an activist group called the 'Club of Rome'. They published an influential book titled 'The Limits to Growth' in 1972 [4]. This book showed that there is a limit to productive activity in a society. Any productive activity requires energy, and the reserves of energy like coal, petroleum or natural gas on our planet are finite. These have accumulated in the Earth's crust over millions of years, and we have been exhausting them for more than a century. Even though the reserves might seem to be large, someday, these will be finished. So the Club of Rome team argued that we have to use them in a limited way so that they last longer. This awareness initiated the push for developing 'renewable' sources of energy like solar and wind energy. However, the mining and consumption of coal and petroleum have continued to increase because these yield rich profits.

It is more than just the conventional sources of energy that are limited. The raw materials we draw from nature are also limited. To understand the issue, consider the element manganese, which is used in many alloys, rubber, glass and ceramics. Manganese is extracted from manganese-rich minerals and is used in industries to produce these substances. When these things are used, they slowly turn into waste and are dumped. Manganese then goes back to nature in a diffuse form, from which it can never be reused. So, through the production-consumption process, manganese goes from a concentrated form to an unusable diffuse form (high entropy, in scientific language), and the amount of available manganese continuously reduces. Now, the amount of manganese ore in the accessible parts of the Earth's crust is limited. If we continue to increase the production of manganese-containing substances, someday, the store will be exhausted. This argument applies to all materials that we derive from nature. Based on this, the authors of The Limits to Growth argued that economic activity cannot expand forever. There is a limit imposed by nature.

The book also presented computer simulations of various scenarios that contained a message of hope: Humanity can create a sustainable society and live indefinitely on Earth if he imposes limits on himself and his production of material goods to achieve a state of global equilibrium with popula-

tion and production in carefully selected balance. However, such restraint can never be exercised in a market-driven economy based on maximum profit. It demands a planned economy.

The Earth Summits

The same year (1972), the United Nations convened a Summit Meeting in Stockholm, where national leaders discussed the problems faced by the planet. Many lofty discussions took place, and commitments were made. But the destruction of the environment continued unabated.

The UN organised the second Earth Summit twenty years later, in 1992, in Rio de Janeiro, Brazil. By then, the participating countries had experienced the fuel crisis of the 1970s. The depletion of the ozone layer had been discovered in 1985. The extent of global warming has been measured, and scientists have agreed that carbon dioxide and other gases released into the atmosphere through human activities are responsible for this. The Cuban leader Fidel Castro attended this meeting and delivered the famous address "Tomorrow is too late", in which he made a passionate appeal for urgent action to save the planet by subduing narrow profit motives [5]. He also pointed out that the Earth cannot be saved if imperialism keeps the Third World countries impoverished and environmentally hazardous activities are shifted to these nations.

Since then, many summit meetings and high-level conferences have taken place, the latest one being the 2023 United Nations Climate Change Conference in Dubai. A detailed account of these meetings can be found in United Nations Climate Change documents [6]. Many agreements have been reached in these conferences, but very little has been enacted. Most of these meetings saw a tug-of-war between developing countries and the First World countries, who refused to accept the responsibility for a major share of the greenhouse gas emissions. Despite various agreements, including the Kyoto Protocol (1997), Paris Accord (2015), etc., the situation remains the same: we are now only a few years away from the "tipping point", after which the Earth will experience a runaway warming, and no measures will be able to reverse the process. The only area in which some success has been achieved is in countering the ozone layer depletion.

Trends in the environment movement

Through this process, however, the problem of the environment has attracted public attention, and various resistance groups have taken shape in many countries. In Western countries, an environmentalist movement called the 'Green Movement' has taken shape. It has also entered the political arena, and 'Green Parties' exist in most West European countries like Germany, the UK, Switzerland, Denmark, Finland, and Sweden. In many places, they have won elections and ruled regions.

The Green Parties call for protecting the environment. That is a noble cause, no doubt. But do they point to the basic factor behind the environmental destruction, i.e., maximum profit motive? They don't. As a result, even though the Green Parties have succeeded in closing down nuclear power plants in some countries, in other areas, their success in protecting the environment is limited. These countries are nowadays only protecting their own forests and sourcing forest products from underdeveloped countries, resulting in deforestation around the globe.

The former US Vice President Al Gore is a known face in the environment movement. He is a globe-trotting speaker who calls

upon people to save the environment. His videos have a good fan following. Yet, does he speak about the basic cause behind the problem? No. Concern for the environment is his medium for gaining popularity.

There is another line of approach known as eco-feminism, which equates the plunder of nature with the suppression of women in a male-dominated society. Eco-feminists view the development of science and technology as a projection of Western men's values: It is controlled by men and, for the most part of history, restricted to men. Therefore, they see any destruction of the environment resulting from the use of science and technology as a reflection of male dominance in society [7]. Some eco-feminists view science as an oppressive enterprise of the European, white, dominant male and contend that science is no longer the sole method to arrive at truth.

Another position on this issue may be termed as 'ultra-environmentalism'. Proponents of this viewpoint demand the protection of the environment at all costs and, for that reason, oppose any developmental activity. They oppose the creation of roads, rail lines, industries, power plants, etc., because all these activities harm the environment in one way or another.

A scientific approach to the environmental problem

Most human activities indeed adversely affect the environment. Some worms in the soil die when we construct even a school building. For that reason, can we oppose the creation of new schools? When a railroad is laid, some ant colonies may be displaced. Should we oppose laying railway lines because of that? Even producing a pen requires us to derive the raw material from nature and consume energy. Should we stop producing pens?

Such a position cannot be a scientific one. Can we really go back to the days when men used to live in forests? No. Man has learnt about nature through relentless struggle spanning thousands of years. We should use that knowledge to improve our living conditions continuously.

It was initially thought that we have to conquer nature. Now, we understand that we have to coexist with nature. We have to improve our lives using our understanding of how nature functions. Improving our lives means being able to produce the food we need, producing the clothes we wear, constructing buildings to provide a roof over our heads, educating our children, communicating with each other, being able to move ourselves and our goods from one place to another, so on and so forth — and doing these in the most advanced and efficient way, and improving the overall quality of life. For this, we have to produce electricity, create roads and railway lines, create housing, etc. Opposing these would amount to returning to the pre-industrial era, denying ourselves the advantages of scientific advancements. That cannot be a scientific approach.

The correct approach is to use science to satisfy the needs of people while protecting the environment to the maximum extent possible. This is possible only if the objective of production is to meet people's needs rather than to derive maximum profit. Such a society would also need industries; it would need to produce electricity. So, it would also need to use raw materials derived from nature. However, it will always be kept in mind that production is being conducted in people's aggregate interest, which includes the interest of protecting the natural environment. The organisers of such production would see how raw materials, including energy sources, can be sourced and how best the wastes can be utilised or disposed of, causing the least

environmental disruption.

Such a society would produce things only to the extent necessary to meet people's needs. There would be no need to artificially boost the market for unnecessary goods through advertisements. Such a society would also need wood to produce tables and chairs, but planting trees would be integral to the logging activity. Such a society would also need electrical power plants. It would strive for an optimal mix of renewable and non-renewable energy sources. Absorbing carbon dioxide through biomass and carbon sequestration measures and utilising fly ash by producing bricks or cement would be an integral part of the power generation process. Waste treatment plants would be an integral part of any industry.

The interest of our species is intimately linked with the health of the environment we live in. Today, that environment is in peril due to the greed of a few. Unless the multitude of humanity raises a voice against this and forces the powers to take adequate measures to protect the environment, we'll leave a barren planet for future generations. If we want to leave a liveable planet for them, we have to achieve the goal of production in the interest of humanity, not for maximum profit. Any environmental movement conducted without this understanding is futile and can never succeed in saving our planet. □

References

1. John Bellamy Foster, The vulnerable planet: A short economic history of the environment. NYU Press, 1999.
2. John Bellamy Foster, Brett Clark, and Richard York. The ecological rift: Capitalism's war on the earth. NYU Press, 2011.
3. F. Engels, Dialectics of Nature. 1964 edition, Progress Publishers, Moscow
4. Donella H. Meadows, Dennis L. Meadows, Jørgen Randers, William Behrens III, "The Limits to Growth – A Report for the Club of Rome's Project on the Predicament of Mankind", Potomac Associates publishers, 1972.
5. Fidel Castro's lecture "Tomorrow is Too Late" can be found in the collection "Seminal Thoughts", published by Breakthrough Science Society, 2018.
6. https://unfccc.int
7. Mies, Maria, and Vandana Shiva. Ecofeminism. Halifax, N.S.: Fernwood Publications; 1993. 24.