The Trio - Environment, Health and Sustainable Development

SINDHU S NAIR

Associate Professor in Economics, St. Michael's College, Cherthala.

Abstract

Evidence of a strong and active relationship between human beings and environment looms large in the horizon of our knowledge. Current technology, policies and culture influence the relationship between human population dynamics and the natural environment. The steadfast economic development and population growth result in continuing environmental degradation which in turn reflects its presence on human health. Man and his activities in the course of civilization and development are indeed polluting the water we drink, the air we breathe and the soil in which plants grow. The development of environmental governance, along with technological progress, has initiated the deployment of a dialogue and the emergence of "digital activism" in many disciplines. Climate change and anthropogenic forces threaten environmental stability and with it ecosystems' capacity to provide goods and services that can be translated to economic benefit for humans. Environmental sanitation envisages promotion of health of the community by providing clean environment and breaking the cycle of disease. But while these are the proximate or immediate causes, the fundamental factors behind the crisis are deeper. What kind of solutions and alternatives are being tried out, what are the elements of hope? Economic instruments should provide the necessary incentives to all different stakeholders to act in a sustainable way.

Key words- **Population, Economic development, Pollution, Climate change, Health, Sustainable development**

I. INTRODUCTION

Evidence of a strong and active relationship between human beings and environment looms large in the horizon of our knowledge. The Indian tradition and culture has over the ages practiced its own ways of protecting trees, water bodies, wild animals etc and thus end up in protecting the environment. The concept of keeping forest reserves was first developed by the great Indian scholar, Kautilya. Sacred groves, nature worship, water conservation strategies and traditions, protection of wild life as enshrined in the Hindu religion and culture has led to the protection of environment in India since age old times[(1)] . However in recent times, humans have come to realize that their economic activities are threatening their very survival on earth. An understanding of the components and processes which take place in environment, the relationship between biotic and abiotic components and the assessment of resources with reference to need of people in a region is essential for their survival. Let us have a primary knowledge on the relationship between man and environment

II. MAN,ENVIRONMENT AND HEALTH- THE RELATIONSHIPS…

The world population has grown almost three fold times during the last seventy years. Similar is the scenario in India and our state of Kerala.

TABLE 1

POPULATION DYNAMICS

Year	World	India	Kerala
1951	2,584,034,261	361,088,090	13,549,118
2020	7,794,798,739	1,380,004,385	35,669,443

Source: www.worldometers.info

Growth of population has brought along with it positive elements: child mortality rates plummeted, life expectancy increased, and people are on average healthier and better nourished than at any time in history reflecting good news for humanity. However, during the same period negative impacts and changes in the global environment began to accelerate: pollution heightened, resource depletion continued and the threat of rising sea levels increased bringing in deprivation and misery.

In "The Environmental Implication of Population Dynamics", Lori Hunter (2000) [(2)] . Rand Corporation synthesizes current knowledge about the influence of population dynamics on environment. Hunter concludes that population dynamics have important environmental implications and also that the sheer size of population represents only one important variable in this complex relationship.

Current technology, policies and culture influence the relationship between human population dynamics and the natural environment. The distribution of people around the globe has three main implications for the environment- increased pressure on already dwindling resources, migration related pressures and finally urbanization and the resulting pollution. As global population continues to grow, limits on global resources have come into sharper focus.

Two specific areas illustrate the challenges of understanding the complex influence of population dynamics on the environment: land-use patterns and global climate change. Fulfilling the resource requirements of a growing population ultimately requires some form of land-use change with its ecological impacts. Similar is the result of growing population activities on global climate – navigating new pathways bringing in climate changes that are mostly harmful to human civilization.

The steadfast economic development and population growth result in continuing environmental degradation which in turn reflects its presence on human health. Although the exact contribution of environmental factors to the development of death and disease cannot be precisely determined, the World Health Organization (WHO) has

estimated that thirteen million deaths annually are attributable to preventable environmental causes [3] . WHO has estimated that 12.6 million deaths each year, i.e., nearly 1 in 4 of total global deaths are attributable to unhealthy environments in 2012 [4] .

Referring to recent incidences in Kerala, we can cite the examples of floods now and during the last two years, landslides in (Malappuram), Munnar etc. Similar is the sympathetic condition experienced by the people of water logged Kuttanad, Alleppey and the teeming thousands along the coastline of Kerala. Changes in land use pattern and harmful transition of the geography of the land to our convenience have resulted in serious tragedy to the inhabitants there.

Coming to the area of population, environment and its impact on health, we will have to glance through the important constituents of environment, the way it is affected and finally actions taken.

A. Constituent 1: Air Quality

Man and his activities in the course of civilization and development are indeed polluting the water we drink, the air we breathe and the soil in which plants grow. Despite being a major achievement, industrial revolutions and urbanisation are reaching unprecedented proportions leaving delirious impact on human health. Anthropogenic air pollution is one of the biggest public health hazards worldwide, given that it accounts for about 9 million deaths per year [5] .

Several studies in China point out the mortality and mobility effects of air pollution in a developing world by employing the tool of contingent valuation [6] . According to a Swedish cohort study, diabetes seems to be induced after long-term air pollution exposure [7].While the majority of studies addressed outdoor air pollution, Chau et al.[8] combine revealed and stated preference techniques to estimate the monetary benefit gains from improved indoor air quality.

In developing countries, urbanisation and industrialisation along with the alarming situation of population explosion, adds to the seriousness of the situation of air pollution [9] . Women of the household seem to carry the highest risk for disease development due to their longer duration exposure to the indoor air pollution [10] .

1) Impact of Air Pollution on Health and Environment : The effect of air pollution on health is closely related with the specific geographical position of the country, its season and time. Susceptible populations that need to be aware of health protection measures include old people, children and people with certain noted kind of diseases. Lengthy exposures to air pollutants are bound to create neurological effects in adults and children and also bring in psychological complications, autism, retinopathy, foetal growth and low birth weight [11] .

Air pollution is harming not only human health but also the environment [12] in which we live. The most important among this is listed as follows:

- Acid rain is wet or dry precipitation containing toxic amounts of nitric and sulfuric acids which acidifies water and soil environments, damage trees and plantations and even damage constructions.
- Haze is produced when fine particles are dispersed in the air and reduce the transparency of the atmosphere inducing air pollution.
- Ozone present in the stratosphere of our atmosphere protects us from ultra violet solar radiation whereas the ozone at the ground level is harmful to human health and is a pollutant. Unfortunately, stratospheric ozone is gradually damaged causing harmful effects for human life and crops [13] .

- The phenomenon of "greenhouse effect" which maintains the stability of the temperature of the Earth is destroyed by the anthropogenic activities of man. Global climate change is thus becoming an important issue that concerns mankind.

Based on the magnitude of the public health impact, it is certain that different kinds of interventions should be taken into account. Air pollution management refers to reducing to acceptable levels the presence of air pollutants and its impact on our health and the environmental ecosystem. This necessitates estimating the economic value of the benefits gained from human activities and programmes. Private and governmental entities and authorities implement actions to ensure the air quality [(14)] .

The development of environmental governance, along with technological progress, has initiated the deployment of a dialogue and the emergence of "digital activism" in many disciplines [(15)] . This activism outcome on environmental issues can be produced with the help of multiple digital technologies such as computers or mobile phones in order to pursue change in political and social affairs.

B. Constituent 2: Water Quality

Water pollution is all about quantities: how much of a polluting substance is released and how big a volume of water it is released into. Surface waters and water stored underground in aquifers known as groundwater are the two types of water resources that pollution affects. Point/ non point and transboundary pollution are the different ways in which water is polluted by single/ many sources of pollution. Virtually any human activity can have an effect on the quality of our water environment and this is one of the reasons why it is such a difficult problem to solve.

Contact with unsafe drinking or bathing water can impose serious risks to human health [(16)] . Microbe contamination of groundwater due to sewage outfalls and high concentration of nutrients in marine and coastal waters due to agricultural runoff are among the most serious threats [(17)] .

Although epidemiological studies have provided evidence of severe morbidity attributed to polluted water, the issue has received limited attention in terms of valuation studies. In the developing world, health damages from drinking water contamination are examined by Dasgupta [(18)] and Maddison et al. [(19)] The former study estimates a health production function to derive the total cost of illness related to Diarrhoeal diseases in urban India, while the latter estimates aggregate willingness to pay to avoid health risks.

About a quarter of the world population numbering to 2 billion do not have access to safe drinking water or the most basic sanitation as seen recorded in the documents of World Health Organization (2017) [(20)] . The immediate environment of individual is polluted by improper sewage disposal and this leads to water-related illnesses such as diarrhea that kills 525,000 children under five each year. As far back as in 2002, the WHO has projected that water-related diseases could kill as many as 135 million people by 2020.

1) Impact of Water Pollution on Environment and Human Health: Pathogens which are the micro organisms causing diseases among human beings are also the carriers of the impact of water pollution on health. Water borne diseases are spread in different ways and are of different types. Different diseases such as respiratory disease, cancer, diarrheal disease, neurological disorder and cardiovascular disease [(21)] are caused by water pollution. Food and vegetables that are grown in contaminated water [(22)] , fecal pollution of water sources, improper sanitation, hygiene and water supply [(23)] are all pathways leading to health risks. This is hazardous to our aquatic as well as human life and disturbs the food chain [(24)] .

Thus water pollution has emerged as a major threat to the global community. Bacterial, viral and parasitic diseases are spreading through polluted water and affecting human health. Proper disposal as well as treatment of waste is highly necessary along with conduct of educational and awareness programmes.

The mortality rate is higher in rural India as people do not have knowledge about the importance or the facilities of treated water for consumption. Untreated drinking water and fecal contamination of water is the major cause of diarrhea and cholera. Added are the diseases of hepatitis, encephalitis, gastroenteritis etc. which are spread by viruses and parasites.

While discussing about achieving a balance between economic development and sustainable natural environment, water and its quality and the succeeding topic of water pollution comes to the limelight. Water which is called as universal solvent and that which forms three quarter of the fluid in man needs to be preserved with atmost care. Though clean water is vital for the very existence of man, its availability is threatened by inefficient management, pollution and problems associated with climate change. Effective waste water management, process of reverse osmosis etc need to be looked into.

C. Constituent 3: Climate Change

Climate change is posing risks to human health and well-being and thus is emerging as a serious concern worldwide [(25)] . In 2012, climate change was estimated to be responsible for 8,46,000 deaths due to diarrhea and 2,59,000 malaria related deaths annually.

Recent years have been among the warmest on record. According to IPCC fifth Assessment Report [(26)] , Global surface temperature change for the end of the 21st century is likely to exceed 1.5°C. Warming will continue to exhibit inter annual-to-decadal variability and will not be regionally uniform.

Research suggests that temperatures have been influenced by growing concentrations of greenhouse gases, which absorb solar radiation and warm the atmosphere and are mostly humaninduced. Both - attention to demographic issues and the development of sustainable production and consumption processes - are central responses to the processes involved in global warming.

An understanding of the likely impacts of climate change on human welfare is crucial for making an informed decision about the best response strategy to the enhanced greenhouse effect. Results from multiple studies provide strong evidence that the public health benefits related to greenhouse gases mitigation strategies are substantial.

Climate change and anthropogenic forces threaten environmental stability and with it ecosystems' capacity to provide goods and services that can be translated to economic benefit for humans. Therefore economic valuation is extremely crucial to provide the correct economic indicators and signals for the design of efficient and sustainable economic policies.

There is increasing recognition that environment and health impacts require economic assessment in order to receive adequate consideration in policy [(27)] . Consequently, a huge increase in the number of valuation studies trying to quantify the environmental impacts on human health in monetary terms and elicit public preferences for health and environmental policies that reduce the risk of illness or mortality has been experienced in recent years.

Last but not least, climate change resulting from environmental pollution affects the geographical distribution of many infectious diseases, as do natural disasters. The only way to tackle this problem is through public awareness coupled with a multidisciplinary approach by scientific experts. National and international organizations must address the emergence of this threat and propose sustainable solutions. Climate changes and the effects of global planetary warming seriously affect multiple ecosystems, causing problems such as food safety issues, ice and iceberg melting, animal extinction, and damage to plants [(28)] .

Environmental sanitation envisages promotion of health of the community by providing clean environment and breaking the cycle of disease. It depends on various factors that include hygiene status of the people, types of

resources available, innovative and appropriate technologies according to the requirement of the community, socioeconomic development of the country, cultural factors related to environmental sanitation, political commitment, capacity building of the concerned sectors, social factors including behavioral pattern of the community, legislative measures adopted and others. India is still lagging far behind many countries in the field of environmental sanitation [29] . Improvement in sanitation requires newer strategies and targeted interventions with follow-up evaluation [30] . The need of the hour is to identify the existing system of environmental sanitation with respect to its structure and functioning and to prioritize the control strategies according to the need of the country.

III. WHAT SHOULD POLICY MAKERS DO?

Till now we have looked into the constituents, problems of pollution and actions taken if any, by the environment and the resulting threat it poses. The policy implications of demographic influences on the environment are complicated and can sometimes be controversial. While some view large, rapidly growing populations in developing regions as the primary culprit in environmental decline, others focus on the costly environmental effects of overconsumption among the slowly increasing populations of the developed nations. Both population size and consumption influence environmental change and are among the many factors that need to be incorporated into realistic policy debate and prescriptions.

One of the earliest attempts to describe the role of multiple factors in determining environmental degradation was the IPAT equation. It drew attention to the fact that environmental problems involved more than pollution and that they were driven by multiple factors acting together to produce a compounding effect. In order to achieve environmental sustainability, humanity's aggregate environmental impact must be lowered to sustainable level. The IPAT equation also demonstrates that there are multiple ways of reducing undesirable effects. Different nations might focus on different factors to reduce their overall impact: more affluent countries could contribute most by reducing their level of consumption (A); many poorer countries could contribute most by reducing their population (P); and the former socialist countries could make the greatest contribution by making their technologies more efficient (T).

The "global climate fest" taking place world over may well turn out to be the world's last chance to save the planet from climate change. This is a historic opportunity for India to take the lead in shaping the global sustainability agenda. The recently-unveiled federal budget accords high priority to new and renewable energy. Growing pollution levels (a 2014 WHO report ranked New Delhi as the world's worst city in terms of air pollution), water scarcity and energy crisis have been raising fetters across India. And justifiably so: after all, the country is particularly vulnerable to global ecological variations.

That India's energy costs are high. The other pertinent problem is that of accessibility of affordable energy. Transportation efficiency and fuel economy standards in India also need serious attention. Reducing the cost of wind and solar storage technologies with technical progress will be the most crucial step in India's journey towards following a low carbon strategy, claim experts.

In India, the most seriously threatened interest appears to be that of the politically weak and socially disorganised group whose resource requirements are minimal and whose survival is primarily dependent directly on the products of nature outside the market system. Environmental problems in India arise from a number of proximate or surface causes: increased need for energy, low environmental literacy, lack of environmental principles in government policies, increased stress on natural resources, non realization of growth with equity, high consumerism of upper class etc.

But while these are the proximate or immediate causes, the fundamental factors behind the crisis are deeper. What kind of solutions and alternatives are being tried out, what are the elements of hope? There are at least the following six:

1. Resistance to 'development' projects and processes that are destructive.

2. Revival of traditions that are still relevant.

3. Reconstruction synthesising traditions and modern processes/knowledge.

4. Redefinition of some key terms and paradigms of development.

5. Reorientation of attitudes towards nature and fellow humans.

6. Restitution handing back of territories, resource rights, and knowledge ownership

Economic instruments should provide the necessary incentives to all different stakeholders to act in a sustainable way. Taxes, subsidies and quotas are fiscal policy instruments that can internalize the external costs created by natural resources use and if set at the social optimal level can ensure full cost pricing of the environmental goods and services, a necessary condition for sustainability. To ensure environmental protection while enhancing economic development, economic instruments should be properly designed and implemented and in this respect information from valuation studies is crucial.

Indian leadership has made climate change planning a priority. Building institutional capacity to address climate risks will be crucial to protect livelihoods and promote sustainable development. Undeniably, greater investment is the cornerstone for sustainable growth. It is clear that for India, moving ahead with resilience will require substantial capital.

In criticising earlier conceptualisations of sustainable development, the Nobel laureate Amartya Sen argues that sustainable development should be recharacterised as encompassing 'the preservation, and (when possible) expansion, of the substantive freedoms and capabilities of people today "without compromising the capability of future generations" to have similar – or more freedom'.

IV. CONCLUSION

For highly populated UDCs like India, a critical minimum effort is required to make a marked shift from rapid growth to sustainable growth. We should have green growth without compromising the living standards of millions of poor. For development, encourage the following- green products, green buildings, sustainable environment management, environmental regulatory reforms and market based instruments, organized waste management and recycling industry, green and clean technology fund.

"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs".

Let us move forward and strive hard to achieve the same.

REFERENCES

[1] Ramakrishnan, P. S & Saxena, K. G & Chandrashekara, U. M , "Role of Sacred Groves in Conservation and Management of Biological Diversity", Paper presented at UNESCO Regional Workshop, Kerala Forest Research Institute, Peechi, India., 1997

[2] Hunter, Lori M *The Environmental Implications of Population Dynamics*, RAND Corporation, Santa Monica,2000

[3] A. Prüss-Üstün and C. Corvalán , " Preventing disease through healthy environments: Towards an estimate of the environmental burden of disease", World Health Organisation, 2006

[4] Available: https://www.who.int/news-room/detail/15-03-2016-an-estimated-12-6-million-deaths-each-year-areattributable-to-unhealthy-environments

[5] Available: http://www.who.int/airpollution/en/

[6] Wang Y, Zhang Y.S., " Air quality assessment by contingent valuation in Ji'nan,China", *Journal of Environmental Management*, vol 90(2), pp.1022-1029 ,2008

[7] Eze IC, Schaffner E, Fischer E, Schikowski T, Adam M, Imboden M, et al., "Long-term air pollution exposure and diabetes in a population-based Swiss cohort", *Environment International*, vol 70, pp. 95-105 ,2014

[8] Chau, C.K. & Hui, W.K. & Tse, M.S.,"Evaluation of health benefits for improving indoor air quality in workplace", *Environment international*, 33,pp. 186-98, 2007.

[9] Mannucci, P. M., & Franchini, M. , " Health Effects of Ambient Air Pollution in Developing Countries", *International journal of environmental research and public health*, vol 14(9), pp.1048, 2017 Available:https://doi.org/10.3390/ijerph14091048

[10] Hashim, Dana & Boffetta, Paolo. , "Occupational and Environmental Exposures and Cancers in Developing Countries", Annals of global health, vol 80,pp. 393-411, 2014

[11] Available: https://euro.who.int/_data/assets/pdf_file/0020/123086/AQG2ndEd_7_4Sulfuroxide.pdf

[12] Ashfaq A, Sharma P , "Environmental effects of air pollution and application of engineered methods to combat the problem"; *Journal of Industrial Pollution Control*, 2012 Available:https://www.frontiersin.org/articles/10.3389/fpubh.2020.00014/full

[13] Teramura A, "Effects of UV-B radiation on the growth and yield of crop plants", *Physiol Plant* ,vol 58, pp. 415–27, 2006

[14] Newlands M. , " Environmental Activism, Environmental Politics, and Representation: The Framing of the British Environmental Activist Movement", Ph.D. thesis, University of East London, United Kingdom ,2013

[15] Kaun A, Uldam J., "Digital activism: after the hype", *New Media & Society*, vol 20(6), 2018

[16] Dwight R.H, Fernandez L.M, Baker, D.B, Semenzad J.C, Olson B.H. , " Estimating the economic burden from illnesses associated with recreational coastal water pollution—a case study in Orange County, California", J. *Environ. Manage.* 2005, vol 76, pp. 95-103, 2005

[17] Le Goffe P, "The benefits of improvements in coastal water quality: a contingent approach", *International journal on Environmental research and Public health,* vol. 45, pp. 305–317, 1995

[18] Dasgupta P., " Valuing health damages from water pollution in urban Delhi, India: A health production function approach" , *Environment and Development Economics*,vol 9(1), pp. 83-106, 2004.

[19] Maddison, D., Catala-Luque, R. & Pearce, D , "Valuing the Arsenic Contamination of Groundwater in Bangladesh" , *Environ Resource Econ* , vol31, pp. 459–476 , 2005.

[20] World Health Organization (WHO): Diarrhoeal disease, Fact sheet Number 330, May 2017.

[21] Ullah S, Javed MW, Shafique M, et al., "An integrated approach for quality assessment of drinking water using GIS: A case study of Lower Dir", *Journal of Himalayan Earth Sciences* ,vol. 47(2), pp. 163-174 , 2014

[22] Corcoran E, Nellemann C, Baker E, et al.(2010). Sick water? The central role of wastewater management in sustainable development. A Rapid Response Assessment. United Nations Environment Programme.

[23] Jabeen S, Mahmood Q, Tariq S, Nawab B, & Elahi N, " Health impact caused by poor water and sanitation in district Abbottabad" *, Journal of Ayub Medical College, Abbottabad : JAMC*, vol 23(1),pp. 47–50, 2011

[24] Halder, J.N. and Islam, M.N. , "Water Pollution and Its Impact on the Human Health", *Journal of Environment and Human*, vol 2, pp. 36-46, 2015

[25] Thomas R. Karl, Jerry M. Melillo, and Thomas C. Peterson, (eds.) *Global Climate Change Impacts in the United States* , Cambridge University Press, 2009.

[26] Available: https: //www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_SPM_FINAL.pdf.

[27] Kumar S G, Jayarama S, "Issues related to sanitation failure in India and future perspective", *Indian Journal of Occupational & Environmental Medicine*, Vol 13, Issue 2 , pp : 104 , 2009

[28] Available: https://www.reuters.com/article/us-india-sanitation/no-toilets-costs-india-54-billion-annually-worldbankidUSTRE6BJ4AP20101220#:~:text=NEW%20DELHI%20(Reuters)%20%2D%20A,World%20Bank%20said%20on%20Monday.&text=%E2%80%9CThe%20report%20quantifies%20the%20economic,the%20brunt%20of%20poor%20sanitation.%E2%80%9D

[29] Haller, Laurence & Bartram, Jamie , "Global Cost-benefit Analysis of Water Supply and Sanitation Intervention", *Journal of water and health.*, vol. 5,pp. 481-502, 2008.

[30] Dhar, Biswajit & Anuradha, R.V., "Access, Benefit-Sharing and Intellectual Property Rights", *The Journal of World Intellectual Property*, vol 7, pp. 597 – 639, 2005