PREVENTION AND CURE OF HEALTH HAZARDS CAUSED BY ENVIRONMENTAL POLLUTION

Proceedings of the Workshop

Sponsored by
The Department of Science and Technology, Government of West Bengal

Organised by
Siliguri B.Ed. College (West Bengal)
&
BangiyoBhugol Mancha(Jalpaiguri Branch, West Bengal)

20 and 21 January 2012
Siliguri B.Ed. College, P.O. Kadamtala, Dist. Darjeeling ,Pin:734011

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Front cover: Photographs of the Coordinators

Back cover: Photographs of the participants and audience

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PREFACE

Environmental pollution means a change in the environment that is harmful for human existence. The human being lives in the environment. It is also true that human being is a part of the environment. The relation between human being and environment is very complex and nonlinear. Experts from almost all the disciplines are trying hard to gain a basic knowledge about the nature of the relationship and to have control over the problem of environmental pollution.

A greater problem has been how to make people oriented and active for taking positive steps against environmental pollution and the health hazards caused by it. There is much confusion. But, nobody disagrees with the age old wisdom, *prevention is better than cure.*

With this view point we thought that if the teaching community at school level of the region of North Bengal could be oriented and empowered through brain storming in a workshop then the same could be percolated to the students of the different corners of the same region. And we acted accordingly with the help of experts from different corners.

We take this opportunity to acknowledge the cooperation that has been extended by the Department of Science and Technology, Govt. of West Bengal, in the form of financial assistance. We are grateful to Siliguri B.Ed. College for offering the venue, allowing all the infrastructural facilities available with the college and bearing the contingency expenses. We must mention the trouble taken by the BangiyoBhugol Mancha, West Bengal, in making contact with the resource persons and contributing to meet the expenditure for their travel.

Dr. Nita Mitra(Chanda)

Reader,SiliguriB.Ed.College, and Coordinator of the programme

and

Sri JatiswarBharati,

Asst. Secretary,BangiyoBhugol Mancha, W.B., Secretary, BangiyoBhugol Mancha, Jalpaiguri andCoordinator of the programme

INDEX

Programme details at a glance

The programme was divided into two parts.

The first part of the programme started with the inaugural song presented by the trainees of Siliguri B.Ed. College. Sri JatishwarBharati, Assistant General Secretary of the BangiyoBhugolMancha,and Secretary of BangiyoBhugol Mancha(Jalpaiguri Branch) informed the participants and the guests about the objectives of the workshop. The Principal of the college, Dr.Pranab Krishna Chanda, presented the welcome address.The Chief Guest of Honour,Dr.YunahBhutia, Regional Director, IGNOU, Siliguri Region gave his observations in a very lucid manner and stressed upon pollution control at local level.Sri Prabir Kumar Sarkar, General Secretary of BangiyoBhugol Mancha, delivered his brief observations about Pollution Control.Dr. Nita Mitra(Chanda), Coordinator of the Seminar and a Reader in Geography of Siliguri B.Ed. College, talked about the psychological aspects of the Environment.Sri JatishwarBharati, Assistant General Secretary of the BangiyoBhugol Mancha, Secretary of the Jalpaiguri branch of the BangiyoBhugol Mancha and another coordinator talked about Environmental education. In his inaugural address Dr.SoumenduChatterjee, Reader, Department of Environmental Science, Vidyasagar University, talked in detail about Medical Geography in the perspective of Environmental management. Dr.JayantaBhattachrya, a dedicated doctor and an independent Research Scholar, discussed about some theoretical questions that he expected to be crucial to locate the genesis and historicity of the issue that was raised in the workshop. This part of the programme was anchored by Smt. Paromita Das, Assistant Professor, Sliguri B.Ed. College. In the audience there were teaching and nonteaching staff and students from different colleges including the host institution and teachers from different schools of the Jalpaiguri district and Siliguri Sub-division.

The second part of the workshop comprised of group activities. The representatives from the Department of Geography and Applied Geography were Dr. I. Lepcha(nee)Lama, Associate Professor andSriSnehasishSaha, Assistant Professor. Among others who helped in coordinating the group activities are Dr. Nita Mitra(Chanda),Sri JatshwarBharati, Smt. Paromita Das and Dr.BimalChanda of Tarai High School. The participants in the group activities were teachers from different schools and treainees of Sliguri B.Ed. College.

Photographs of the resource persons, guests

Dr. Yunah Bhutia,
Regional Director, IGNOU
Siliguri Region
Chief Guest

Dr. Soumendu Chatterjee
Reader, Department of
Environmental Science,
Vidyasagar University
Inaugurator and Resource Person

Dr. Jayanta Bhattacharya
MBBS, Ph. D., Independent Scholar
Resource Person

Photographs of the resource persons, guests

Sri Prabir Kumar Sarkar
General Secretary
Bangiyo Bhugol Mancha
West Bengal
Special Guest

Dr. I. Lepcha (nee) Lama
Associate Professor,
Department of Geography
and Applied Geography
University of North Bengal
Resource Person

Sri. Snehasish Saha
Assistant Professor
Department of Geography
and Applied Geography
University of North Bengal
Resource Person

Photographs of participants in group activities

Group A

Group B

Photographs of participants in group activities

Group - c

Other Participants

Lectures / Comments

Pollution Control at Local Level

Dr.Yunah Bhutia*

One can expect that the Government controls Environmental Pollution centrally.

It is also true that the Governments are taking big steps round the globe.

We are aware of international conferences which are taking resolutions for the control of the Environmental Pollution and ensure a green earth for our future generations. However, such efforts are having only limited successes.

And this is inevitable too.

It is rightly said that *think globally and act locally.*

Global resolutions can never be successful unless we ourselves act locally.

We want to keep our home clean. We forget to realise that the most effective way to keep our home clean is to ensure the cleanliness of our immediate environment.

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*Regional Director,IGNOU, Siliguri Region and the Chief Guest of Honour of the Workshop

Health: Its Geographical Perspectives

Dr.Soumendu Chatterjee*

Since early days of Modern Geography, geographers are trying to analyze and understand health in terms of characteristics of places and people such that the spatial variation in health can be discerned. The basic objective underlying this perspective is to develop effective strategies for reducing health disadvantages of the people who are marginalized in the social power structure. 'Health' has been variously defined as- malfunctioning of body as a machine, a balance, a degree of control the individual has over his or her health, functional disability to carry out key roles, resilience against threats of disease and so on. But in social terms, health refers to the access to healthcare and a reasonable standard of living. In its early stage of development, geographical thinking of health was primarily concerned with application of geographical perspectives and methods to the study of health, disease and healthcare. It included two major components- firstly, spatial variation in health i.e. death/mortality and disease/morbidity and the environmental and social conditions which may be related to health; and secondly, formal and informal activities or services concerned with care, cure, treatment of ill health with disease prevention. This line of thinking led to the development of a systematic branch in geographical academics, called 'Medical Geography'. Quantitative measurements of deaths and diseases and health; and analysis of environmental and habitation factors in the study of health were the major issues dealt in Medical Geography. Demographic factors like- male-female ratio, young-old ratio, ethnic minority, age-at-marriage, married-single etc. and socio-economic factors like- income, occupation, social deprivation, quality of life, sufferings of multiple social problems etc. along with the environmental factors related to- household (crowding, indoor pollution, separate kitchen, safe toilet, sanitation, access to safe drinking water and all that); neighbourhood (settlement pattern, land use, access to healthcare and so on); and workplace (accident probability, pollution, workload, nature of job and so forth) have been considered as the primary health determinants. In the second phase, medical geographers put emphasis on the spatial patterning of health provisions and inequality in accessing healthcare facilities. Because it was then thought that health is a state's responsibility. Researches in this line contributed largely in finding the social causes of health inequality. At the beginning of the present century, the discipline has taken a humanistic turn. An ethnographic approach began to be adopted in analyzing individual health and health related behaviour.

Issues like- patient's level of satisfaction; doctor's behaviour; awareness regarding immunization family planning, pre- and post-natal care etc. have gained importance in contemporary medical geography. Exploration of the roles of socio-economic processes involved in creating health inequality has now become the primary objective of the subject. It is now being felt that, the idea of 'care' has to be extended to 'welfare'. Endeavours are not supposed to be restricted only for 'healing' but for 'health promotion'. Interplay between human life and health in a particular place has to take central position in health studies. In Medical Geography, it is resolved that individual's role and responsibility in accessing health should be evaluated in the context of power and knowledge.

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*Reader, Department of Environmental Science, Vidyasagar University, Inaugurator, and Resource Person

Nature or Environment or vis-à-vis? – Health, Disease and A Few Fundamental Queries

Jayanta Bhattacharya, Independent Scholar, MBBS, PhD

Email: drjayanta@gmail.com

In Defence of the Theme

To state at the outset, I have dealt with some theoretical questions which are not apparently directly related to the topic under discussion. But, to me, these theoretical questions, especially, the way we live now, have their bearings and impact on the whole issue. To locate the genesis and historicity of the issue under question we may benefit from taking these issues into our consideration.

Environmental Pollution and Health Hazards: Some Basic Facts

Arguably, there are some basic differences in the perceptualization of nature between Europe (post- Renaissance, post-industrial revolution) and India. While even in the 20th-century India nature seems to form a part of human existence (remembering "Chipko" movement and so many other movements), nature gets severed off from the Western way of existence. Here, particularly after the industrial revolution found its all-powerful success and expression. Nature becomes a thing, an object which can be mastered, constituted and made to serve human purposes at their will. When the force of omnipresent, omnipotent and omniscient market gets intertwined with this concept both nature and human being become just a spectacle of all these interplays. They lose their agency and identity. All these factors should be taken into consideration while dealing with issues of environmental pollution and health hazards. Furthermore, we can take an example from the use of the word "science" in specific colonial context. In India, at the early colonial moment, the British grouped indigenous medicine with literature and the arts considering it to be a part of local tradition distinct from universal science. It is consistent with the evolution of the concept and meaning of science in Europe. Science came into English in C14. "**Science** may now appear to be a very simple word, even if we remember that before C19 it had other meanings. Yet, precisely in its separation from these meanings, there is a significant and still active social history ... But from mC17 certain change became evident. In particular there was the distinction from *art*. Then in 1725: 'the word science is usually applied to a whole body of regular or methodical

observations or propositions ... concerning any subject of speculation'. This can be read, loosely, as a modern definition, but it concerns propositions as well as observations and relates to 'any subject' ... to mean either theoretical or, commonly, a demonstrative proof in an argument. " (Raymond Williams, *Keywords: A vocabulary of culture and society*, New York: Oxford University Press, 1983, pp. 276-277.)

Seventeenth century stalwarts of medicine, like Sydenham and Boerhaave, depended more on clinical history than on technology. Boerhaave instructed, "Everything pertaining to the case must be listed; nor that least thing neglected which a critical Reader might rightly seek to understand the malady...there must be arrangement according to the surging change of events, and each event must be recorded in its proper place." (Vincent J. Derbes and Robert Edgar Mitchell, Jr., "Hermann Boerhaave's (1) Atrocis, nec Descripti Prius, Alorbi Historia (2): The First Translation of the Classic Case Report of Rupture of the Esophagus, with Annotations", *Bulletin of the Medical Library Association* 1955, 43(2): 217–240.)

As late as 1829, the Lancet, expressed concern that the stethoscope could also lead to eavesdropping.

Auscultation Extraordinary.

Quoth Rodrick I'll a place contrive

So dark and safe, no man alive

Shall to our private meetings grope

Egad, cries Johnny, that won't do,

If there's no crack to listen through

They'll make reports by stethoscope.

(Quoted in C. Peter W. Warren, "The history of diagnostic technology for diseases of the lungs," *Canadian Medical Association Journal 1999, 161(9), pp. 1161-1163.)*

Technology is not only constitutive of the models of health and disease. It provides also for their metaphors. Furthermore, with the application of artificial organs such as pacemakers, cochlear implants and advanced limb prosthesis, technology becomes a part of humanity's physical existence, that is, there is a fusion of human being and technology. (Bjorn Hofmann, "The technological inventions of disease", *Journal of Medical Ethics: Medical Humanities* 2001, 27(1), pp. 10-19.) Before eighteenth century, medicine was based on the patient's narrative of the symptoms. In addition to this subjective portrait of the illness, the physician observed the patient's appearance and behaviour as well as any signs of disease. During the eighteenth and nineteenth centuries medical instrumentation enabled and extended the physical examination of patients which made the physician less dependent on subjective narration.

Contrarily, if, rather than as a technological object, society and science view medicine or art of healing in an all- encompassing way, the problems, and, more importantly, the solutions will be understood following this line of thinking. The rise of anatomical knowledge and, subsequently, surgical practice and technological innovations in Europe led to epistemological exclusion of mind and person from the purview of medicine. In the era of Bedside medicine, cosmological analogies emphasized an image of the body "as a microcosm, a reality *sui generis* subject to its own peculiar laws of growth and decay, comparable to the macrocosm of the physical universe." (N. D. Jewson, "The disappearance of the sick-man from medical cosmology", 1770-1870," *Sociology* 1976, 10(2), pp. 225-244. Reprinted in *International Journal of Epidemiology* 2000, 38(3), pp. 622-633.)

In the 18th century, when doctors turned to mathematics to produce a Newtonian map of the body, the metaphor of hydraulic pumps was used to express human digestion and blood circulation. Archibald Pitcairne, an 18th-century British physician, is exemplary in this regard. In his close attention to Newton's method, ideas of causality, and theory of matter Pitcairne showed himself more closely acquainted with Newton's thought than many, or most, of his contemporaries. "In his published work he used Newtonian ideas and arguments, if not wholly Newtonian accounts, to explain such functions as secretion." (Anita Guerrini, "Archibald Pitcairne and Newtonian Medicine", *Medical History* 1987, 31(1), pp. 82-83.)

The above mentioned discussion very briefly shows how Western medicine has evolved and technology, not nature, has come play an increasingly powerful role. The "mind-body" dichotomy, as viewed by Descartes, finds its full expression. This mechanical view of the body as a set of parts that can be manipulated, analyzed, and enhanced has reached the ultimate in genetics in which the very object manipulated, assessed, turned into a product, and enhanced, is the DNA itself. "In particular, the science of genetics focuses on the smallest units of the body, studied in isolation." (Lori Andrews and Dorothy Nelkin, "Whose body is it anyway? Disputes over body tissue in a biotechnology age," *Lancet* 1998, 351 (9095): 53-57.) Steven Rose argues, "The core issue is reducibility, which ... comes not as second but as first nature to natural scientists" (Steven Rose, "The rise of neurogenetic determinism", Nature 1996, 373: 380-382.) While addressing the core question of Western medicine, Kleinman observes, "The entailements of monotheism foster a single-minded approach to illness and care" that has the "decided advantages of pushing medical ideas to their logical conclusion" and, consequently, "establishing criteria against which orthodoxy and orthopraxy can be certified." (Arthur Kleinman, "What is specific to Western medicine?", *Companion Encyclopedia of the History of Medicine*, Vol. I, eds., W. F. Bynum and Roy Porter, London, New York: Routledge, 1993, p. 17.)

Biomedicine differs from Chinese, Indian or most other systems of medicine by its extreme insistence on materialism as the grounds of knowledge, and by its discomfort with the dialectical mode of thoughts.

The 5th Rock Edict of King Asoka lets us know, "Beloved-of-the-Gods, King Piyadasi (Ashoka), speaks thus: Animals were declared to be protected – parrots, mainas, aruna, geese, wild ducks, nandimukhas, gelatas, bats, queen ants, terrapins, boneless fish, vedareyaka, gangapuputaka, sankiya fish, tortoises, porcupines, squirrels, deer, bulls, okapinda, wild asses, wild pigeons, domestic pigeons and all four-footed creatures that are neither useful nor edible. Also protected were nanny goats, ewes and sows which are with young or giving milk to their young, and so are young ones less than six months old. Cocks are not to be caponised, husks hiding living beings are not to be burnt, and forests are not to be burnt either without reason or to kill creatures. One animal is not to be fed to another. Our king killed very few animals." One must note here that the world of animals and plants are in unison and live in harmony with the world of man.

We shall find similar picture in Ayurveda too. The question of ethics (and morality) is ingrained within the cosmos and philosophy of Ayurveda. "Good, evil, happy and unhappy is Life. That (knowledge) in which are declared its nature, and measure, and what is beneficial to it and what injurious, is called the Science of Life." (Caraka-Sa?hita, Sutrasthana, 1.41) Though, to note, Wujastyk cautions us against the "unwaveringly male gaze" of Ayurveda. In fact, Ayurveda is not a system of medicine but a dynamic philosophy of life by which one can attain healthy individual and social life so as to perform the functions efficiently and fulfill the social obligations fully, at the end to attain a perfect bliss of liberation. (P. V. Sharma, Essentials of Ayurved, Delhi, Motilal Banarsidass, 1998). For a brilliant discussion on this issue also see, Rahul P. Das, *The Origin of the Life of a Human Being* (Delhi, Motilal Banarsidass, 2004); Dominik Wujastyk, *The Roots of Ayurveda;* G Jan Meulenbeld, "The Characteristics of a Do?a", *Journal of European Ayurvedic Society*, 1992, 2, pp. 1-5.) Because Ayurveda constitutes a blend of Vedic metaphysics and traditional pre-modern science "it has earned its high place among the learned and intellectually unique accomplishments of Indian civilization." (Horacio Fabrega Jr., *History of Mental Illness in India: A Cultural Psychiatry Retrospective* (Delhi, Motilal Banarsidass, 2009, p. 336.)

However, after about 2000 years since the origin of Ayurveda, the entire scenario related to nature, human being and health began to change relentlessly with the arrival of the British. Those people who were so far living in forests in harmony with nature and natural world began to be evicted and they were branded as dangerous "criminal tribe", only because of the fact that they did not wish to relinquish their traditional way of living and preserving forests against the severe onslaught on trees for commercial greed of the colonizers. It reminds us of the now famous letter of the Chief Seattle. Chief of the Suquamish Indians allegedly wrote this letter to the President of the then US in the 1800s,

The President in Washington sends word that he wishes to buy our land. But how can you buy or sell the sky? the land? The idea is strange to us. If we do not own the freshness of the air and the sparkle of the water, how can you buy them?

Every part of the earth is sacred to my people. Every shining pine needle, every sandy shore, every mist in the dark woods, every meadow, every humming insect. All are holy in the memory and experience of my people.

We know the sap which courses through the trees as we know the blood that courses through our veins. We are part of the earth and it is part of us. The perfumed flowers are our sisters. The bear, the deer, the great eagle, these are our brothers. The rocky crests, the dew in the meadow, the body heat of the pony, and man all belong to the same family.

The shining water that moves in the streams and rivers is not just water, but the blood of our ancestors. If we sell you our land, you must remember that it is sacred. Each glossy reflection in the clear waters of the lakes tells of events and memories in the life of my people. The water's murmur is the voice of my father's father.

The rivers are our brothers. They quench our thirst. They carry our canoes and feed our children. So you must give the rivers the kindness that you would give any brother.

If we sell you our land, remember that the air is precious to us, that the air shares its spirit with all the life that it supports. The wind that gave our grandfather his first breath also received his last sigh. The wind also gives our children the spirit of life. So if we sell our land, you must keep it apart and sacred, as a place where man can go to taste the wind that is sweetened by the meadow flowers.

Will you teach your children what we have taught our children? That the earth is our mother? What befalls the earth befalls all the sons of the earth.

This we know: the earth does not belong to man, man belongs to the earth. All things are connected like the blood that unites us all. Man did not weave the web of life, he is merely a strand in it. Whatever he does to the web, he does to himself.

One thing we know: our God is also your God. The earth is precious to him and to harm the earth is to heap contempt on its creator.

Your destiny is a mystery to us. What will happen when the buffalo are all slaughtered? The wild horses tamed? What will happen when the secret corners of the forest are heavy with the scent of many men and the view of the ripe hills is blotted with talking wires? Where will the thicket be? Gone! Where will the eagle be? Gone! And what is to say goodbye to the swift pony and then hunt? The end of living and the beginning of survival.

When the last red man has vanished with this wilderness, and his memory is only the shadow of a cloud moving across the prairie, will these shores and forests still be here? Will there be any of the spirit of my people left?

We love this earth as a newborn loves its mother's heartbeat. So, if we sell you our land, love it as we have loved it. Care for it, as we have cared for it. Hold in your mind the memory of the land as it is when you receive it. Preserve the land for all children, and love it, as God loves us.

As we are part of the land, you too are part of the land. This earth is precious to us. It is also precious to you.

One thing we know - there is only one God. No man, be he Red man or White man, can be apart. We ARE all brothers after all.

Against this perspective, the unique situation of "environmental pollution and health hazards" at the turn of the 21st century may be understood. In the late 19th century (to be precise, 1860), the first water act (a kind of environmental act) in colonial India following Indian Penal Code was enacted. With this act, Indian people could be tried and convicted. They became losers in their own land. In 1905, the Bengal smoke Nuisance Act and, in 1912, the Bombay Smoke Nuisance Act were enacted. By the time, new industries were founded flouting all protests, suggestions and resistance of Indian people. Nature was mercilessly and heavily ravaged to suit the end of commercial profit of the British government.

In independent India, after the Bhopal gas disaster in 1984, Indian government introduced the Environmental Protection Act (of 1986). Inn recent times, one of the headlines of a news of the New York Times (26 November 2013) was – "The Air That Kills India". Two researchers of the University of Delhi published a paper in *Research Journal of Economics, Business and ICT* (Vol. 5, 2012) – an international refereed journal. Their observation was, "the problem of indoor air pollution is largely confined to rural and poor population and it is caused due to burning of solid biomass burning which happens in a most inefficient manner. Note also that the problem of indoor air pollution is, unlike outdoor pollution, not a problem of externality, but it is the problem of poverty. Due to poverty and nonavailability of clean fuels, these people use solid biomass for meeting their cooking needs." Manas Ranjan Ray and Twisha Lahiri of Chittaranjan National Cancer Institute have published their study in 2009.

Regarding air pollution, their study shows – **Critical [PM10 > 90 µg/m3]** - Guwahati, Patna, Raipur, Delhi, Faridabad, Dhanbad, Nagpur, Bhopal, Indore, Jalandhar, Ludhiana, Jaipur, Howrah, Kolkata. **High [PM10 61 - 90 µg/m3]** - Hyderabad, Chandigarh, Ahmedabad, Panjim, Shimla, Bangalore, Mumbai, Pune, Bhubanshwar. **Moderate [PM10 31 - 60 µg/m3]** - Kochi, Shillong, Chennai. **Low [PM10 up to 30 µg/m3]** – Aizal. They even suggested link between increased DNA damage and air pollution due to excess comet formation.

As is obvious, in the case of environmental pollution, the air is not the only concern. Entities like water, deforestation, indiscriminate use of insecticides and pesticides and a lot more. With the refrain from previous discussion, by the 18-19th century, when man established the master-slave relationship with nature, environmental pollution took a different shape than from its hitherto existing forms.

Regarding water pollution, *the India Information Report* (2011) lets us know, "It was observed that there was a gradual decrease in the BOD (biochemical oxygen demand) levels and in 2009, 17 per cent had BOD value > 6 mg/1. The worrying aspect of this trend is the high percentage (19 per cent) of sampling stations exhibiting unacceptable levels of BOD, which might either mean that the discharge sources are not complying with the standards or even after their compliance their high quantum of discharge contributes to elevated levels of contaminants ... smaller towns and cities have very little wastewater treatment capacity. Meanwhile, only 3.15 per cent of the rural population has access to sanitation services and 115 million homes have no access to toilets of any type." (pp. 286-287)

The effects of exposure to organophosphrus (OP) compounds have been studied in India by Mohd. Fareed et al. Their report exposes that overall respiratory morbidity observed among exposed subjects was 36.75%. Symptoms for respiratory illness like dry cough, productive cough, wheezing, irritation of throat and blood stained sputum were found to be significantly more (p,0.05) among pesticide sprayers than controls. Lung function parameters viz. PEFR, FEV1, %PEFR predicted, %FEV1 predicted and FEV1/FVC were found to be significantly decreased (p,0.05) among pesticide sprayers as compared to controls. Exposure wise distribution of respiratory illness and lung functions among pesticide sprayers show that the exposure duration significantly elevates (p,0.05) the respiratory problems and significantly decreases (p,0.001) lung functions among pesticide sprayers. Activities of acetylcholinesterase and butyrylcholinesterase were found to be significantly depleted (p,0.001) among pesticide sprayers as compared to controls which show the exposure of OP pesticides among them. The hematological profile viz. RBC, WBC, monocytes, neutrophils, MCV, MCH, MCHC and platelet count were significantly altered (p,0.001) in pesticide sprayers than controls. ("Adverse Respiratory Health and Hematological Alterations among Agricultural Workers Occupationally Exposed to Organophosphate Pesticides: A Cross- Sectional Study in North India", *PLoS One*, 25 July, 2013)

In their observation, "The exposure of OP pesticides among them caused various respiratory problems, altered lung functions and hematological abnormalities. Due to unawareness of the hazardous health effects of pesticides among agricultural workers, they followed incorrect work practices without taking any safe and precautionary measures of handling and spraying pesticides, which eventually resulted in exposure of pesticides among them. It is very necessary to monitor health risks associated with pesticide exposure regularly among agricultural workers and make awareness programme with implementation of proper legislations for safe methods of spraying pesticides, so that the adverse health effects among agricultural workers could be minimized."

The question arises who is going to bell the cat – the state or medical professionals or medical educational system or the big pharmaceutical companies? To find out the answer we can take a venture to chart out some different ways which may not always be comfortable to digest and accept as facts.

Elaborating the Theme

Let me now take up two words – "development" in Englsih and "উন্নয়ন" in Bengali. During the last 3 or 4 decades, development has attained a very high tenor and frequent usage in our daily vocabulary. In some way, it depicts a magic imagery in our visualization of the present. In this project of development is included everything like nature, environment, human being and its habitation, GDP and so on and so forth. For India's development project related to nuclear power and its sequel one may see Itty Abrahan's *The Making of the Indian Atomic Bomb*. Abraham argues, "For the Indian citizen to become truly modern, s/he would need to internalize the norms of science." (p. 20)

When this colorful project of development becomes a burden to the world community and, in particular, decision-making bodies the world, the word begins to be substituted by a new word "sustainable development". What we have learned as development has been transliterated as উন্নয়ন in Bengali. But, intriguingly, there remain some nuances. In the two most celebrated Bengali dictionaries – Haricharan Bandopadhyaya's Bangiya Shabdakosh (2 Vols) and Subal Chandra Mitra's *Saral Bangla Abhidhan* – we do not find any entry of the word before 1960. It can be extrapolated that the particular word উন্নয়ন has come into use in Bengali after the 1960s. It denotes "to look upwards" or "to look forward". The problem with meaning that it does not include any laterals or collaterals in its gambit. In English too, it seems to have acquired the same connotation gradually-that is why the need of the new term "sustainable development". To remeber, in 1756, development meant "an unfolding". Of property, with the sense "bringing out the latent possibilities," from 1885 (Pickering's glossary of Americanisms, 1816, has betterments "The improvements made on new lands, by cultivation, and the erection of buildings, &c."). Meaning "state of economic advancement" is from 1902. Meaning "advancement through progressive stages" is 1836.

Additionally, sustainable development is part of a second wave of modern environmentalism and heralds a new approach to tackling environmental problems a shift from protest to consensus and negotiation. Neocolonialism operates on the assumptions that market forces with its internalized techno-scientific armamentarium should predominate everywhere, both between and within countries of all per capita income levels, and should not be regulated by governments to protect the disadvantaged. Lack of incentives for investment and productivity – rather than historically unfair relationships between the rich and the poor – are viewed as the main obstacles to economic growth, which will automatically improve living standards for everyone. This view either assumes there is fair opportunity for everyone to compete in the marketplace, or does not perceive such fairness purpose but to reinforce current patterns of global domination.

Coming to colonial India, the dislocations of Indian terms began to occur during the 18th-19th centuries. One good example is "jaṇgala". "In Sanskrit texts, the term stood for "arid, sterile, desert". (Monier-William's *Sanskrit English Dictionary*, 2005, p. 408-09) It was counterweighted by the word "an.pa" which meant "marshy land". There remained a polarity between the two words which were very meticulously used in Ayurveda for ascertaining the nature of disease, food, medications and many more. During the 19th century "j..gala" lost its original meaning and usage. "The change in Anglo-Indian use may be compared to that in the historical meaning of the word forest in its passage from a waste or or unenclosed tract to one covered with wild wood. In the transferred sense of the jungle there is apparently a tendency to associate it with tangle." (Francis Zimmermann, The Jungle and the Aroma of Meats, p. 15) Zimmermann notes, "The Hindi name tarai ("marshy lands") – the exact semantic equivalent of the Sanskrit anupa – now becomes the aberrant synonym of jungle."

Interestingly, with this new meaning, jungle becomes a place of wilderness as as a place infested with ferocious animals. For the first connotation, we have Keats with his too famous poem "To one who has been long in city pent'-

To one who has been long in city pent,
'Tis very sweet to look into the fair
And open face of heaven, - to breathe a prayer
Full in the smile of the blue firmament.
Who is more happy, when, with hearts content,
Fatigued he sinks into some pleasant lair
Of wavy grass, and reads a debonair
And gentle tale of love and languishment?

For the second one, man will exert fully its mastery and reshape it as he wishes. *Nature* does not remain any more nature as it was understood so far. It becomes *environment*. We are now concerned with this new one. But the dissocia-

tion and transposition of nature and environment bring forth an altogether new chapter.

The Knowledge of Medicine – the Gift of Market – the Position of the Patient

Evidently, in contradistinction to common people's concern regarding health, it was not of much concern for the statesmen of the big and powerful countries around 1945 during the formation of the United Nations. It was a "forgotten" issue in the first draft of the United Nations' Charter. However, at the last moment, on an ad hoc basis at the United Nations Conference (San Fransisco, 1945), health was finally incorporated as an agendum of discussion. (See, *Park's Preventive and Social Medicine*, 2011, p.12) The "forgotten" issue of health is shaped by various vectors like international finance capital, commodity production and profits accruing from it, health as a commodity, governance and biopolitics of the modern period and so many other factors which may not be always understood quite well.

I shall now like to focus on the present trend of medical education. It is quite explicitly depicted in the *New England Journal of Medicine*, presently the most celebrated journal of medicine, - "Are we in a bubble market in medical education? In medicine, students buy their education from medical schools and residency programs (which pay wages that are lower than the value of the work that residents provide in return). *This education is transformed into skills and credentials that are then sold to patients in the form of services.* So long as it is believed that patients, or whoever purchases health care on their behalf, will keep paying more and more for physicians' services, students and trainees should be willing to pay more and more for the education that enables them to sell those services." (*New England Journal of Medicine*, November 21, 2013, pp. 1973-1975. Emphasis added) The journal warns its readers about the future of medical education in this way – "That bubble will burst when potential students recognize that the costs of training aren't matched by later returns. Then the optometry bubble may burst, followed by the pharmacy and dentistry bubbles. At the extreme, we will march down the debt-to-income ratio ladder, through psychiatrists to cardiologists to orthopedists ... until no one is left but the MBAs." (*Ibid*, p. 1975.)

In her paper, Barbara J. McNeil raised a few important isues related to medical education and medical practice.In her view, "Uncertainty can be interpreted not only as lack of convincing evidence but also as impaired access to convincing evidence...*Uncertainty* influences virtually all of medical decision making ... The lack of data persists despite enormous efforts to improve clinical decision making ... The well-reported underrepresentation of *women* in clinical trials similarly limits informed decision making...the results of clinical studies suggest that *varying* perceptions of the same data can lead to *different* clinical *decisions*." (SHATTUCK LECTURE – Hidden Barriers to Improvement in the Quality of Care", *New England Journal of Medicine*, Novenmebr 29, 2001, pp. 1612-1620)

Susan Block and Andrew Billing observe, "Occasionally, we became uneasy about the way in which we were caring for these patients. What was the effect on us, as persons and as physicians, of the model of detachment that we saw around us in dealing with this profound human event?" They emphasize, "Unfortunately, the "hidden curriculum" of contemporary medicine – especially the hurried, disease-centered, impersonal, high-throughput clinical years — still tends to undermine the best intentions of students and faculty members and the best interests of patients and families." ("Learning from the Dying", *New England Journal of Medicine*, September 29, 2005, pp. 1313-1315)

Renee C. Fox asks, "But at what stage in the training of medical students could such "cosmopolitan education" take place? Is there any space for it in the rapidly paced, biomedically crammed course of learning they undergo?" ("Cultural Competence and the Culture of Medicine", *New England Journal of Medicine*, September 29, 2005, pp. 1316-1319)

When education takes such a turn, it is very unlikely to conceive that trained pupil coming out of this *education-commodity-profit* machinery will become much concerned with the patient as a person or placing him against his natural perspective. The reality of the patient and the reality of the environs (usually, which is a hospital) in which s/he is situated gets severely dissociated – "The hospital is an intimidating environment for most individuals. Hospitalized patients find themselves surrounded by air jets, button, and glaring lights; invaded by tubes and wires; and beset by the numerous members of the health care team – nurses, nurses' aides, physicians' assistants, social workers, technologists, physical therapists, medical students, house officers, attending and consulting physicians, and many others ... they may be left unattended for periods of time; they may be obliged to share a room with other patients, who have their own health problems. *It is little wonder that patients may lose their sense of reality.*" *(Harrison's Principles of Internal Medicine*, 18th edn., Vol. I, p. 6. Emphasis added)

The situation becomes grimmer when the process of dehumanization of medicine costs an uninsured US person $10,000 (his entire life savings) for his "examination, laboratory tests, and CT scan". (Michael Stillman and Monalisa Tailor, "Dead Man Walking", New England Journal of Medicine, November 14, 2013, pp. 1880-81) The authors express their uncanny feelings, "Shocked" wouldn't be accurate, since we were accustomed to our uninsured patients' receiving inadequate medical care. "Saddened" wasn't right, either, only pecking at the edge of our response. And "disheartened" just smacked of victimhood. After hearing this story, we were neither shocked nor saddened nor disheartened. We were simply appalled." *(Ibid*, p. 1880) Further, "We find it terribly and tragically inhumane that Mr. Davis (the patient) and tens of thousands of other citizens of this wealthy country will die this year for lack of insurance." (*Ibid*, p. 1881)

Unfortunately, in such a rueful milieu, medicine is bonded in vicious nexus with market forces, pharmaceutical industry's profit-making enterprise and a technology-driven area. Alastair Matheson has dealt with this issue at some length in a journal published by the London School of Economics – "Corporate Science and the Husbandry of Scientific and Medical Knowledge by the Pharmaceutical Industry" (*BioSocieties*, December 2008, pp. 355-382) This article analyses the role of the pharmaceutical and medical device industries ("pharma") in the construction of scientific and medical knowledge. As drug development proceeds, research and marketing activities coalesce around "product canons" that integrate scientific truth-claims and commercial positioning, generating knowledge with implicit commercial functionality. From this platform, pharma stamps consensus-building 'narratives' into medical-scientific discourse, in which 'problems' arise and are 'solved' by drugs.

Margaret Talbot, a veteran journalist of the *New York Times*, tellingly describes how a neologism "shyness syndrome" insinuates into medical vocabulary in her insightful article "The Way We Live Now: The Shyness Syndrome". (*New York Times*, 24 June, 2001) This very disease terminology invented by a pharmaceutical house which was running loses for some time. Then the drug was marketed under the name Praxil. Talbot reports, "A set of traits and behaviors, at least some of which were once regarded as neutral or even desirable, re-emerged as a pathology – a function of brain chemistry, amenable to and indeed demanding pharmacological manipulation." She is afraid that terminologies like meek and mild may be lost forever – "Maybe in another generation or so, we'll find ourselves sorely missing the meek and the mild, the stoic and the taciturn among us. Is somebody out there inventing the drug to treat excessive perkiness?"

More analyses can be had from Ray Moynihan, Iona Heath and David Harvey's "Selling sickness: the pharmaceutical industry and disease mongering" (*British Medical Journal*, 13 April, 2002), and Peter C. Gotzsche, "Commentary: medicalization of risk factors" (*British Medical Journal*, 13 April, 2002). Erika Check, a veteran journalist of the journal *Nature*, comments "Obscure scourges have been quietly maiming or killing people in Asia, Africa, and Latin America since Biblical times. According to the World Health Organization (WHO), millions in the developing world suffer from neglected diseases, which include hookworm, lymphatic filariasis, and Guinea worm. They kill more than 530,000 people every year, resulting in a loss of 56.6 million years of healthy life. Another 460 million people are affected by the slightly less ignored "Big Three" -- HIV, tuberculosis, and malaria -- which claim 5.6 million lives each year. Every 30 seconds, it is said, malaria takes a child's life." (*Foreign Policy*, June 12, 2006) She notes in her article while 1,556 drugs have been discovered during the period 1975-2004, only 1% of these drugs are meant for neglected diseases like malaria, TB etc. Contrarily, millions of dollars are expended for AIDS.

Ray Moynihan was alarmed to find, "The first step in promoting a blockbuster drug is to build the market by raising public awareness about the condition of the is designed to target." Further, "The corporate sponsored creation of a disease is not a new phenomenon, but the making of female sexual dysfunction is the freshest, clearest example we have ... To build similar markets for drugs among women, companies first require a clearly defined medical diagnosis with measurable characteristics to facilitate credible clinical trails. Over the past six years the pharmaceutical industry has funded, and its representatives have in some cases attended, a series of meetings to come up with just such a definition." The potential risk, in a process so heavily sponsored by drug companies, is that the *complex* social, personal, and physical causes *of sexual difficulties* and the range of solutions to them will be swept away in the rush to diagnose, label, and prescribe. Perhaps the greatest concern comes from the flip side of inflated estimates of disease prevalence the ever-narrowing definitions of 'normal' which help turn the complaints of the *healthy* into the conditions of the sick. ("The marketing of a disease: female sexual dysfunction", *British Medical* Journal, 22 January, 2005, pp.192-194)

Such maneuvers erase the dichotomy between the normal and the pathological, the healthy and the sick. Medical professionals become the most important component of this enterprise of profit-driven medical industry.

McNeil noted, "Between 1940 and 1990, medical technology was estimated to account for about half the growth in real per capita health care expenditure." ("Hidden Barriers to the Improvement of Quality of Care")

In a similar tone The Tavistoc Group's "A Shared Statement of Ethical Principles for Those Who Shape and Give Health Care: a Working Draft" states, "Over the past 150 years, health care delivery has expanded from what was largely a social service provided by individual practitioners, often in the home, to include a complex system of services provided by teams of professionals, usually within institutions and using sophisticated technology." (*American College of Physicians*, 1999)

Here comes the question how to perceive the nature of our future course of action. How to resolve the conundrum? If one sees the problem from technology-oriented mode of solution, answers comes in the shape constituted in the as we have so far seen. If one sees the problem from *human being-society-nature-social assistance* paradigm answers take a different shape. We have to decide which way to choose, which way to face environmental issues and health hazards related to it. Moreover, as Ashish Nandy makes us aware, "In this environment it does not matter whether the technology is innovative or replicative, moral or immoral, obsolete or new." (Ashis Nandy, ed., *Science, Hegemony and Violence: A Requiem for Modernity*, Delhi, Oxford University Press, 1998, p. 8)

Cross-sectional study of 3,902 participants (1,366 rural, 2,536 urban) in the Indian Migration Study. Associations between mode and duration of active travel

and cardiovascular risk factors were assessed using random- effect logistic regression models adjusting for age, sex, caste, standard of living, occupation, factory location, leisure time physical activity, daily fat intake, smoking status, and alcohol use. Rural dwellers were significantly more likely to bicycle (68.3% versus 15.9%; p,0.001) to work than urban dwellers. The prevalence of overweight or obesity was 50.0%, 37.6%, 24.2%, 24.9%; hypertension was 17.7%, 11.8%, 6.5%, 9.8%; and diabetes was 10.8%, 7.4%, 3.8%, 7.3% in participants who travelled to work by private transport, public transport, bicycling, and walking, respectively. In the adjusted analysis, those walking (adjusted risk ratio [ARR] 0.72; 95% CI 0.58–0.88) or bicycling to work (ARR 0.66; 95% CI 0.55–0.77) were significantly less likely to be overweight or obese than those travelling by private transport. Those bicycling to work were significantly less likely to have hypertension (ARR 0.51; 95% CI 0.36–0.71) or diabetes (ARR 0.65; 95% CI 0.44–0.95). There was evidence of a dose-response relationship between duration of bicycling to work and being overweight, having hypertension or diabetes. The main limitation of the study is the cross- sectional design, which limits causal inference for the associations found. Walking and bicycling to work was associated with reduced cardiovascular risk in the Indian po pulation. Efforts to increase active travel in urban areas and halt declines in rural areas should be integral to strategies to maintain healthy weight and prevent NCDs in India. (Christopher Millett et al, "Associations between Active Travel to Work and Overweight, Hypertension, and Diabetes in India: A Cross-Sectional Study", *PLoS Medicine*, June 2013, Vol. 10, Issue 6)

Indigenous knowledge is the local knowledge that is unique to a culture or society. Other names for it include: "local knowledge", "folk knowledge", "people's knowledge", "traditional wisdom" or "traditional science". This knowledge is passed from generation to generation, usually by word of mouth and cultural rituals, and has been the basis for agriculture, food preparation, health care, education, conservation and the wide range of other activities that sustain societies in many parts of the world. Indigenous people have a broad knowledge of how to live sustainably. However, formal education systems have disrupted the practical everyday life aspects of indigenous knowledge and ways of learning how to live with nature, replacing them with abstract knowledge and academic ways of learning. Today, there is a grave risk that much indigenous knowledge is being lost and, along with it, valuable knowledge about ways of living sustainably. An empathetic approach towards local knowledge illustrates ways that indigenous knowledge may be integrated into education and, thereby, brings the benefits of helping to "sustain" indigenous knowledge and societies to all. It also encourages teachers and students to gain enhanced respect for local culture, its wisdom.

Objectives for this purpose may be set thus: (a) To appreciate indigenous perspectives on ways of living; (b) To appreciate the role of indigenous knowledge and sustainability of a community; (c) To understand the role of 'modern' education in undermining teaching and learning; and (d) To identify opportunities for integrat-

ing relevant aspects teaching and learning into the school curriculum.

Such recognition of a different knowledge system and the different mode of perceptualization of nature and man (maybe ensconced in it) helps us to conceptualize medicine, man and nature and their interrelationship in a way not assimilated into the dominating and hegemonic knowledge system in which we are perpetually embedded.

Vandana Shiva warns us about the tragedy "when the largest commons, nature, is mindlessly pillaged and life- support systems irreversibly ruined by those who are confident that they will not suffer the consequences of their action. Such a situation (which is no longer hypothetical but has become a harsh fact of life) is created by big business, multinational or national, which has perfect mobility of capital(from one sector to another and from one country to another)." ("Reductionist Science as Epistemological Violence", *in Science, Hegemony and Violence*, p. 241)

The mandate of Article 8(i) of the Convention on Biological Diversity (CBD) is the touchstone on which some arguments can be based. This provision mandates that contracting parties shall: (a) *respect, preserve and maintain* knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity; (b) to promote their wider application with the *approval* and *involvement* of the holders of such knowledge, innovations and practices; (c) to encourage the *equitable* sharing of the *benefits* arising from the utilization of such knowledge, innovations and practices. (Italics supplied).

Final Words

Taking our cue from Frits Staal, modern society arising out of Greek knowledge about metropolis has seen Greek civilization as a "civilization of political speech." Contrarily, Indian world is civilization of narrative per se in historiographic sense. Greek – *logos*, India – *speech*. "Man" in Sanskrit has two meanings, can be understood in two ways > *purusa* > *manusya*. Purusa has connotation with *pasu* – domestic animal, different from mriga – wild animals. Father, man and animal, demons - all live together *relationally*, not in *hierarchy*. So, this animal man has therefore his place among the village species as well as among the forest species. It is a natural equilibrium – harmony of nature and man ingrained within the concept. Nature is not wilderness as starting from late the 19th century victorious accounts of Man over Nature being, consequently, turned into environment – a much heated topic or **in-thing** in the present day's academic world.

I shall stress that at the heart of ecological thinking is situated the natural ecosystem. By analogy, concepts from natural systems are used to help understand human systems and environments. The use of metaphors occurs when people seek to explain phenomena in unfamiliar contexts by evoking images from familiar contexts.

Even in the sacrificial ritual of the so-called "grotesque" practices of indigenous healing practitioners there are some traces of legacy of old mainstream Sanskritik terminologies. These have been imbibed by indigenous people in their cultures over millennia. An example is the word **da**. It means "give" and as man you must be givers to each other – a reciprocity of gifts sacrificially formalized, which is the basis of a community without equivalent in any other classes of beings. They look for what distinguishes them from (other) animals and plants, yet supplementary and complementary to each other. As a consequence, despite the fact that there is gross inadequacy and counter-productivity in their medical art of healing they perform two things – possibly unknowingly – (a) no breach of harmony between nature and man, so they procure their herbal medicines from around their habitations (we can remember about pharmacopoeia of India where no plant is useless and has, on the other hand, some sort of medicinal values); and (b) they provide solace and healing touch to the souls of the ailing persons which is almost completely missing from Modern Medicine (for the remedial of which courses like Narrative Medicine, Medical Humanities or Faith healing are being introduced in 1st World medical curricula).

One end of the spectrum shows how market reforms and investment in billions of dollars pharmaceutical houses on drug prescriptions through doctors affect prescribing trends and creates bias in favor of unnecessary, often of unproven safety and sometimes even harmful drugs. "The potential for bias in industry-prepared information becomes especially precarious when such information is accompanied by a gift or free service." (Susan L. Coyle, "Physician- Industry Relations, Part 1. Individual Physician", *Annals of Internal Medicine*, March 5, 2002, pp. 396-402)

The other end of the spectrum shows concerns of some acutely sensitive researchers on cultural specificities, politics of technology and construction of disease, and its role on doctors' changing perception of illness patterns. How globalization and introduction of new technologies, and, in tandem, lifestyle and existential change reconstitute our world of disease understanding must be addressed by physicians to serve the ailing humanity in a better and meaningful way. In another analysis "Children's behaviour is influenced by child rearing philosophies and cultural socialisation processes. Globalisation is imposing Western culture and views of mental health around the world with the assumption that they are superior to those in non-Western cultures... a hallmark of Western market economies is that it promotes individualism while weakening social relationships. Globalisation is helping export this economic and moral value system worldwide." (Sami Timimi, "Effect of globalisation on children's mental health", *Briitsh Medical Journal*, 2 uly, 2005, pp. 37-39)

Man's creative freedom consists precisely in his ability to devise cultural perspectives and meaning systems in form and content that cannot be wholly and significantly understood in terms of any objective logic of adaptation. Do we really suc-

ceed for any meaningful talk about indigenization vis-à-vis globalization once we fail to initiate a sort of dialogue between epistemologies of modern/global and indigenous/ local? Though to emphasize, there can no longer be any pristine knowledge out there ready to be adapted by us. Rather, it is experiential knowledge of people versed in the knowledge about nature through generations that we can try to learn. In this process both epistemology and ontology of learning have to be reviewed again and again.

Moreover, about the use metaphors (as used in everyday life) it is doubtless to say that it is potentially problematic in science, because the more complex the phenomena being observed, the greater is scientists' dependency on the use of metaphoric language to describe it. Something like this, I think, has happened in the case of 'health', as a result of the declining vitality of religious metaphors in Western, or at least European, public discourse. Metaphorical ideals such as "healthy behaviour" and "mental health", propounded by doctors and others who are perceived to be "objective" and to have no ideological axe to grind, have expanded to fill the vacuum as it were. The absence of any metaphors more convincing than therapeutic ones, thus may help to explain why applying even such a label as "Munchausen's syndrome" seems to many people the best hope of understanding that morally ambiguous condition. (Kenneth Boyd, "Disease, illness, sickness, health, healing and wholeness: exploring some elusive concepts", *Medical Humanities*, June 2006, Vol 26, Issue 1, pp. 9-17)

These were scientific, therapeutic and progress-related metaphors that are substituting the core of inter- subjective, community-dependent network of common people. We should be aware of it. Health, in this context, becomes a negative connotation – the absence of disease and "risk factors" (courtesy to pharmaceutical MNCs). It is not swasthya (health) in itself. Etymologically swasthya means "to revert to one's self" – swa+stha+ya. Thinking in this paradigmatically different way environment or, better to say, nature gradually emerges as a part of our existence – hence, not to pollute it. If we are sincere enough to clinch the point of ***sustainable*** development – when development as a term in itself turns out to be not-so-effective, inadequate or sometimes detrimental to the core meaning of DEEVLOP, we might be humbled, without falling into the trap of Hindutvabadi politics, by the "closed" system of logic and philosophical or ideological mindset behind these indigenous practices. It can perhaps make us more *humane* and sensitive to the needs of the people for which sustainable development is actually meant for.

To address the theme "environmental pollution and health hazards", I believe, all these issues, though sometimes disparate, should be thought of and taken into account for a better tomorrow.

Prevention and cure of health hazard –environmental pollution

Sri Prabir Kumar Sarkar*

Over the course of the twentieth century, growing recognition of the environmental and public health impacts associated with anthropogenic activities has prompted the development and application of methods and technologies to reduce the effects of pollution. In this context, governments have adopted regularity and other policy measures to minimize negative effects and ensure that environmental quality standards are achieved. The basic principles followed for eliminating negative impacts on the quality of water, air or land will be introduced; the shifting emphasis from control to prevention will be considered; and the limitations of building solutions for individual environmental media will be examined.It is not enough, for example, to protect air by removing trace metals from a flue gas only to transfer these contaminations to land through improper solid waste management practices. Integrated multimedia solutions are required. The environmental consequences of rapid industrialization have resulted in countless incidents of land, air and water resources sites being contaminated with toxic materials and other pollutants, threatening humans and ecosystems with serious health risks. More extensive and intensive use of materials and energy has created cumulative pressures on the quality of local, regional and global ecosystems. Before there was a concerted effort to restrict the impact of pollution, environmental management extended beyond laissez-faire tolerance, tempered by disposal of wastes to avoid disruptive local nuisance conceived of in a short-term perspective. The need for remediation was recognized, by exception, in instances where damage was determined to be unacceptable. As the pace of industrial activity intensified and the understanding of cumulative effects grew, a pollution controlparadigm became the dominant approach to environmen6al management. Two specific concepts served as the basis for the control approach: the assimilative capacity concept, which asserts the existence of a specified level of emissions into the environment which does not lead to unacceptable environmental or human health effects;the principle of control concept, which assumes that the environmental damage can be avoided by controlling the manner, time and rate at which pollutants enter the environment. Under the pollution control approach, attempt to protect the environment have specially relied on isolating contaminants from the environment and using end-of-pipe filters and scrubbers. These solutions have tended to focus on media-specific environmental quality objectives or emission limits, and have been primarily directed

at point source discharges into specific environmental media (air,water,soil). Application of pollution control method has demonstrated considerable effectiveness in controlling pollution problems-particularly those of a local character. Application of appropriate technologies on a systematic analysis of the source and nature of the emission or discharge in question, of its interaction with the eco-system and the ambient pollution problem to be addressed, and the development of appropriate technologies to mitigate and monitor pollution impacts.

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COGNITION OF ENVIRONMENT AND CURRICULUM DEVELOPMENT

Dr. Nita Mitra*

Prevention and Cure of Health Hazards caused by Environmental Pollution is important. However, this requires an objective oriented spontaneous behaviour which is a function of external and internal environment with respect to one's own perception.

It can be stated that the functional dependence can be best visualized with the help of an important area of the newly emerged discipline of COGNITION, namely the concept of 'cognition of environment'.

In this context one may quote the observation stated in the National Policy of Education (1986) which states:

> *There is a paramount need to create a consciousness of the environment; it must permeate all ages and all sections of society, beginning with child. Environmental consciousness should be developed through teaching in schools and colleges. This aspect will be integrated in the entire educational policy.*

It should be kept in mind that the above opinion is not meant only for urban dwellers. They are relevant for rural children as well. India is dominated by villages that depend upon mostly on agriculture.On the other hand, through Satellite connections urban outlook is being constantly poured in the rural areas. Thus the rural cognition also needs to be constantly nourished through the interaction with the environment.

Keeping this point in view one can propose the way in which emphasis may be placed upon a particular aspect of the school curriculum.

We should give higher importance to the cognition of environment at the time of introducing Environmental Education at lower classes (up to class VIII). At this stage there may not be any complain of a deviation from the existing curriculum. Because here the students are not required to appear in any examination that is important from the point of view of career formation.The teacher can be flexible and she/he can try her/his best to bring the Environment within the cognitive zone of the children. This can be done by allowing the child to play with the Immediate Environment through direct interaction and to swim through Distant Environments through Print and Electronic media. The target should be to nourish the friendship between the child and the environment that exists already in a Natural way.

However, the environmental aspects should come automatically in the basic school subjects so that those do not appear to be separate entities. Truly speaking, from the Psychological point of view this should be the general approach for the development of curriculum, especially in the lower classes.

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MOTIVATION IN CLASSROOM FOR PRESERVATION OF ENVIRONMENTAL BALANCE

JatishwarBharati*

The Preservation of Environmental Balance in order to avoid long and short-term natural disasters and health hazards is a very important subject for the teachers of secondary and higher secondary level teachers. The endless use of fossil fuel, pollution of environment, and uneven development are interrelated to each other.

The students are the target agents of next days to bring change in the habit of exploiting the nature, which is important to save the human civilization. To develop the target agent teachers must make them to ingest the fact of degeneration of environment and the allied facts, which are causing threat to the life on Earth. For this rationale, the teachers must make themselves convinced about what and how they will convey to the students to make them believe and understand rather treat the curriculum a mere step for passing the school examination.

In this light, we intend to set in motion the teachers to motivate the students through various activities to incorporate some realistic approach to promote the idea of sustainable development and preserve the environmental balance to prevent the life threat.

For the people in the world, securing access to reliable, sustainable and affordable energy services remains a key challenge. Exploitation of the natural resources is necessary to stimulate production, income generation and social development, but it should be in a way which do not alter or disrupt the natural process of protecting life as well as to reduce the serious health problems caused by the use of fossil fuel, chemicals, pesticides and various ingredients of civilization. Increased energy efficiency, renewable energies and low-carbon technologies, bio farming, recycling resources have a central role to play in meeting the demand of civilization in a sustainable way. School education should take a lead in their development and deployment. Environmentalists argue broadly in favor of sustainable development. By this, they mean a pattern of living that favors the preservation of habitat, the conservation of nonrenewable resources, and the increased use of renewable energy sources so that Earth's ecosystems are not harmed beyond repair.

Are our children aware of their stake in making a difference in our environment? Do they know how to move from awareness to action so that they can contribute to the future of our planet? Education in the classroom bridges this gap. The classroom is the perfect place to begin bringing forth awareness as to how wecan make a difference in preserving our planet's natural resources and create a healthy atmosphere for continuation of life on Earth.

The curriculum of school education contains environment education as a compulsory subject but it demands proper attention and creative efforts to draw practical results for which it is embedded in curriculum. This is the reason which motivates us to intensive discussion and efforts to formulate ways to implant practical practices in everyday life in the next generation.

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Report Submitted by the different groups

REPORT 1:Health hazards and the Environmental Pollutions which may be responsible for the hazards.

(Not always One to One correspondence is maintained)

Health Hazards	Responsible environmental pollution	Identified by GrA/ GrB/ GrC
1. Malaria,Diarrhoea, Malnutrition, Other water borne diseases, Skin diseases, Dysentery	1a. Contamination of ground water 1b.Exposure of rock minerals due to excessive mining 1c. Aluminium mixing with water 1d.Rapid use of insecticides in tea gardens 1e. High rate of settlement growth 1f.Plastic bag disposal 1g.Gases exhausted by automobiles and industries 1h.Lack of sanitation facility	GrC
2. Arsenicosis (black- foot disease prevalent in Raiganj region)	2. Arsenic contamination in ground water	GrA

Health Hazards	Responsible environmental pollution	Identified by GrA/ GrB/ GrC
3. Knock knee syndrome (prevalent in tea gardens of the Dooars region)	3. Fluoride pollution	GrA
4. Thyroid problem (prevalent in the region of North Bengal)	4. Lack of Iodine in the soil and water of North Bengal	GrA
5. Dysentery, Malaria, Typhoid	5. Polymer pollution	GrA
6. Headache, Drowsiness	6. CO(Carbon monoxide) pollution	GrA
7.Cough,asthma,burning of nose, bronchitis	7. Pollution due to different oxides of sulphur	GrA
8. Environmental temperature rise	8. Pollution due to carbon dioxide	GrA
9. Skin disease, T.B., Cardiac problems (especially for gold workers)	9. Gold workers use Nitric Acid, Sulphuric Acid, Borax, Sodium hydroxide, zinc, Copper, Lead etc. which pollute water and air. The pollution is much more intense because of the fact that the workers are confined in a small room for a long period of time.	GrA

Health Hazards	Responsible environmental pollution	Identified by GrA/ GrB/ GrC
10. Repulsion to work, Mental depression, Reduction of work efficiency, Irritable temperament, Memory loss, Sleeplessness, Nerve excitement	10. Sound pollution (e.g. due to Horn from vehicles, Whistle from train, Sound cracker, Loud speaker, T.V., Radio, Mixer machine, Cutter and planer machine for marble stone, Cutter and planer machine used by the carpenters etc.)	GrA
11. Headache, Feeling of dizzy, Depression, Fear of being senseless, Vomiting tendency, Heart attack	11. Carbon monoxide Pollution	GrB
12. Lung irritation, Bronchitis, Pneumonia, Lung Cancer.	12. Nitrogen Di Oxide Pollution	GrB
13. Breathing problem, burning sensation in the nose/throat/eye, severe cough, Emphysema, Bronchitis etc.	13. Sulpher Di Oxide	GrB

Health Hazards	Responsible environmental pollution	Identified by GrA/ GrB/ GrC
14. Poisoning in the body, breathing problem	14. Floating elements in the air	GrB
15. Vomiting tendency, Headache	15. Pollution due to hydrogen sulphide	GrB
16. Fluorosis	16. Pollution due to hydrogen fluoride	GrB
17. Conjunctivitis	17. Pollution due to chlorine and hydrogen chloride	GrB
18. Disease of nerve, Mina Mata etc.	18. Pollution due to Mercury	GrB
19. Anaemia, brain failure.	19. Pollution due to Lead	GrB
20. Constipation, piles, acidity etc.	20. Pollution due to Iron	GrB
21. Black foot disease, Melanises, Skin Disease, Anaemia	21. Pollution due to Arsenic	GrB
22 Bone Disease	22. Pollution due to Cadmium	GrB
23. Skin disease, Cancer	23. Pollution due to Chromium	GrB
24. Allergy, paralysis	24. Pollution due to Fluorine.	GrB

Health Hazards	Responsible environmental pollution	Identified by GrA/ GrB/ GrC
23. Mental depression, headache, deafness	23. Sound pollution from vehicles.	GrB
24. Skin cancer, nervous breakdown, disability	24. Radiations	GrB
25. Absent-mindedness, Mental disease	25a. Socio-economic degradation 25b. Abnormal tendency of the parents to maintain social status 25c. Frequent use of mobile phones.	GrC
26. Vomiting tendency, headache	26. Plastic wastes that are burnt at the end of a fair may evolve gases leading to the problems.	Gr.A
27. High pressure, breathing trouble	27. Uncontrolled urbanisation which leads to poor air circulation in the flats	Gr.A
28. Absent mindedness, acute lack of concentration, Mental fluctuation, anxiety for unknown reasons, frustration, inability to cope up with the situation.	28a. Psychological imbalance of guardians 28b. Excess and unlimited involvement in video games 28c. Undue involvement of all kind of electronic gadgets (mobile phone, internet, television etc.) 28d. Unhealthy competition ,and unsatisfied ambitions of guardians	Gr.B

REPORT 2: Measures that can be taken at indigenous level

(Not always One to One correspondence is maintained)

	Measures	Identified by GrA/ GrB/ GrC
1.	Plantation of Herbal and Medicinal plants	Gr C
2.	Use of boiled and decanted water	Gr A
3.	Burning of waste material	Gr B
4.	Recycling of waste material	Gr B
5.	Use of organic fertiliser	Gr B
6.	Afforestation and social forestation	Gr B
7.	Use of olive/neem oil in case of skin disease	Gr C
8.	Parthenium plants are uprooted	Gr A

REPORT 3: Measures that are being taken at Govt. /NGO level

(Not always One to One correspondence is maintained)

Measures that are being taken at Govt./NGO level	Identified by Gr A/ Gr B/ GrC
1. Government has increased the wage rate of the labourers	Gr C
2. NGOs are getting involved in spreading literacy and awareness. They are providing medical facilities as well.	Gr C
3. Government has given mandate for the sale of iodised salt.	Gr A
4. Municipalities are collecting waste materials, separating the plastic/polymer products and recycling them.	Gr A, Gr B
5. Use of lead free petrol (for the vehicles) has been made mandatory.	Gr A
6. Use of silencer has been made mandatory by the vehicles.	Gr A
7. Government of India has issued several Acts in order to control pollution. For example,(i) the 1981 Act stated that no one can throw harmful gases beyond the permissible limit, (ii) the 1986 act stated that every industrialisation must get approval from the State Government and the Central Government, (iii) the 1894,1952 and 1988 acts take care of conservation and development of forest areas, (iv) according to 1905 act no furnace/chimney can be constructed without the permission of authority all these permissions are renewable at regular interval.	Gr A

Measures that are being taken at Govt./NGO level	Identified by Gr A/ Gr B/ GrC
8. 'The Water Pollution Prevention and Control Act' of 1974 and water cess Act of 1977 are noteworthy. In 1985 the Ganga Action plan has been formulated based upon which actions are being taken at Banaras, Hardwar, and Hrishikesh etc. for keeping water pollution free.	Gr A
9. Govt. has taken steps against Eutrophication (growth of plants which are not useful due to use of chemical fertilisers).	Gr A
10. Govt. has taken steps so that oil carrying ships do not throw oil into sea water.	Gr A
11. The Indian Govt. is a signatory of the International Environment conference by the UNO at Stockholm of Sweden on 5 June 1972	Gr A
12. The United Nations Conference on Environment and Development, UNCAD, also known as First Earth Summit or Rio Summit, was organised in June, 1992 in Rio De Janerio city of Brazil. After a number of conferences finally in the year of 1998 in Kyoto city of Japan the Kyoto Agreement was signed. It was decided that 5.2 per cent cut in the emission of carbon dioxide by the deveioping countries will be implemented.	Gr A
13. The Govt. has initiated efforts through corporations, municipalities, and panchayats to keep the drains clean, to remove and recycle the sewage system properly and to construct sanitary toilets in village areas with the help of Govt. subsidies.	Gr A, Gr B

Measures that are being taken at Govt./NGO level	Identified by Gr A/ Gr B/ GrC
14. The Govt. has put restrictions on the use of chemical fertilisers and has put emphasis upon the use of organic fertilisers.	Gr B
15. Govt. has put directions for the use of lead free fuel	Gr B
16. Govt. has developed the science and technology wing of the total workforce of the country so as to make all kind of motors and engines pollution free.	Gr B
17. Govt. has encouraged and itself has taken part in the process of general afforestation and social afforestation.	Gr B
18. International restriction on oil pollution has been introduced.	Gr B
19. Formation of Central pollution Control Board(1981) has taken place	Gr B
20. Formation of Act related to Pollution Control due to motor vehicles(1988) has taken place	Gr B

Measures that are being taken at Govt./NGO level	Identified by Gr A/ Gr B/ GrC
21. Enforcement of the use of catalytic converter in motor vehicles has taken place so as to minimise pollution.	Gr B
22. Factories with chimney provision have been instructed to use precipitator.	Gr B
23. The Govt. has participated in different treaties e.g. against nuclear weapons testing in 1963 and further development of nuclear weapons	Gr B
24. NGOs take part in awareness programme about ill effect of pollution.	Gr C
25. Govt. sponsored institution named 'Mrittika' work in socially backward areas	GrC
26. There are campaigns against Drug addiction at Govt./ NGO level	Gr C
27. Govt. is formulating regulations so that radiation level from mobile towers do not cross the risk factor.	Gr A

Measures that are being taken at Govt./NGO level	Identified by Gr A/ Gr B/ GrC
28. Govt. has removed mobile towers in many areas like hospitals and declared them as silent zones.	Gr A
29. Most of the municipalities and Panchayets have developed systems for collection of household waste materials and their re use.	Gr A
30. SulabhSouchagar introduced in populated areas.	Gr A
31. Cars that are 15 years old are being cancelled.	Gr A
32. Checking of pollution level of cars is mandatory.	Gr A
33. Govt. has given instruction to the factories to recycle the waste materials before putting into rivers/ lakes.	Gr A
34. Govt. has encouraged the use of non- conventional energy and has globalised the expenditure in this regard.	Gr A

REPORT 4: Proposal of new steps that may be taken so as to prevent pollution and possible health hazards.

(Not always one to one correspondence is maintained)

Proposal of new steps that may be taken so as to prevent pollution and possible health hazards.	Identified by Gr A/ Gr B/ Gr C
1. Awareness building at grass root level- both about the mal utilisation of environment and the govt. effort to improve the situation.	Gr A
2. Govt should ban the use of mobile phone by teen agers i.ebelow 18 years.	Gr C
3. Govt. should improve its administration and science and technology so as to recycle the huge amount of waste materials that are collected at different location.	Gr C
4. Teen agers should be provided with better source for entertainment e.g good quality cartoon books, indoor games, yoga etc. They should be pulled back from T.V, Computer games and mobile	Gr B
5. In order to reduce the use of mobile phones the land line connections are to be expanded more efficiently and less expensive way.	Gr B
6. The govt. of India has correctly introduced the prize of 'Nirmal Gram' in order to introduce the concept of pollution free environment. The govt. should introduce similar prize for the wards of municipal area.	Gr B
7. Social afforestation should be rigorously implemented in city areas so as to combat sound pollution	Gr B
8. Introduction of domestic tourism should be encouraged.	Gr C

Proposal of new steps that may be taken so as to prevent pollution and possible health hazards.	Identified by Gr A/ Gr B/ Gr C
9. Medical tourism market should be encouraged.	Gr C
10. The culture of touching the feet at the time of showing respect should be abandoned.	Gr B
11. Use of fossil based fuel should be reduced and the use of induction cooker, solar cooker etc. should be increased.	Gr B
12. Use of processed food should be reduced.	Gr B
13. Kitchen gardening should be encouraged.	Gr B

Epilogue

The outcome of the seminar is a combination of success and failure. The success offered confidence whereas the failure offered a determined planning for a better programme in future.

It was expected that each disease (previously identified /not identified at least in the form of felt physical problem) would be associated with some environmental mal utilisation (previously identified /not identified).

After the execution of the workshop it was found that not in all situations one to one correspondence has been made. Rather, the participants had taken the matter seriously and listed out the health problems and environmental mal utilisation with remarkable details.

In order to honour the achievement of the participants, though incomplete to some extent, the reports have been presented in a tabular form which have been further checked by experts. The experts did not have any attempt to modify the comments of the participants. The observations with all the merits and limitations are genuinely those of the participants themselves. However, any shortcoming that might have been left behind should be treated as the failure of us who represent the organising committee. And for those limitations we beg pardon from everybody concerned in anticipation.

The hope may not be unjustified that the ultimate outcome of this seminar is the achievement of a structure that has the potentiality to spell out how the control of the mal utilisation of the of environment can ensure prevention of health hazards including psychological hazards and establish once again that *prevention is better than cure.*

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and

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WORKSHOP ON