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E-QUALNEWS

A BI-MONTHLY NEWSLETTER OF THE EU-INDIA PROJECT E-QUAL

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ENVIRONMENT: SYSTEMS OF ENQUIRY

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Contents

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Guest Editorial

Are We Moving Towards a Sustainable Future?

Professor Sugata Hazra

Recently, I participated in a conversation with celebrated author Amitav Ghosh at Jadavpur University, on the occasion of the publication of his latest book, *The Great Derangement: Climate Change and the Unthinkable*. The discussion (moderated by my colleague in Project E-QUAL, Samantak Das) was lively and relevant. During the course of our discussion, one issue which emerged was how failure to address climate change is caused by an abject failure of rational perception. Perhaps it is partly because of the fact that climate change as a phenomenon can change its pace and scale rapidly. It can be initially a slow change and then a very rapid one. Since we do not usually sense the impact of climate change in our surrounding environment immediately, the phenomenon itself appears invisible to us. Our lack of rational perception of the day-to-day effects of climate change is thus complimented by our lack of cultural imagination in addressing climate change. This blindness is addressed by Ghosh in generational terms, setting this narrative onto the broader scheme of history. However, there is another factor that contributes towards the perpetuation of this attitude: an often unexamined nexus between culture and desire. Our desire for an ideal modern life is constantly dictated to and modified by our cultural spheres and it is precisely this desire that drives the carbon economy. More cars, travel by air instead of train, air conditioners in every room, and so on and so forth, these are all desires of modern life. If we multiply this cultural demand by the number of aspirants to modern living we end up with the two great unresolved questions of modern times, namely, *sustainability* and *climate change*.

Discussion about population growth is considered so trivial, that often it is not even present amidst the current discourses on climate change. The premise itself is not complex: the earth has a certain carrying capacity in every sphere, and when there is a significant gap between population growth and carrying capacity, problems of natural resource degradation and climate change are bound to occur. Discussions about population control measures are often culture specific and generally avoided because of religio-political considerations. If we can have a lower emission target, say by 2030, why can't we set a target for lower population growth in the world? This again is a function of the failure of our perception in the contemporary scenario and a failure of our imagination in the longer scheme of things. This is reflected in our understanding of the concept of sustainability itself. When we use terms like "sustainable environment" or "a sustainable world", do we really visualize a future filled with genetically modified (GM) seeds and nuclear power plants? How much change can we inflict on nature to make it sustainable to our future demands?

What I have been keenly observing for a long time is how any discussion about climate change and sustainability revolves around policy measures of various kinds and, particularly, the much-hyped global summits of politicians and business barons. However, I would propose that before bringing about change in public policy, we need to adhere to an overarching philosophy about the need for a sustainable world. I am not suggesting that technological change or interventionist policy ideals aren't important but these must be guided by a philosophical ideal. Such a philosophical quest may lead to a better understanding of environment, energy and economy linkages: key to achieving sustainability through adaptation to climate change. The creation of knowledge hubs with clear educational frameworks is more important than the hosting of climate summits in attractive global mega cities, precisely because these only address top down policy approaches, either with ideals which nobody practice or through keeping material benefits for a small group in mind. These summits tend to neglect equally important concerns regarding subsistence, ancestry,

custodianship, labour or even spiritual ways of understanding the environment in the age of the Anthropogenic. In ancient civilizations, places of worship which also functioned as knowledge hubs played pioneering roles even though they existed in an environment of materialism. At the same time we must be aware that sustainability did not follow a linear model of progress through ages. The ancient models of sustainability were predicated on the availability of ample amounts of natural resources which clearly is not the case in our fractured present, dominated by fears of scarcity, deprivation, starvation and extinction.

At this point in time, the various eco-centric approaches at the base level may not lead to a sustainable planet. The problem with this accumulative approach is that very often in spite of being successful at the local level; they do not bring about any change in the broader sphere. Hence there is a need to adopt a dispersive model of sustainable growth, one in which the sources of inspiration and motivation are always already there and subsequently radiated to every realm. This is why we need to see the big picture by creating a broader structure of philosophical goals to which step-by-step changes will lead. This has the potential to bring about a transformative change in our ways of understanding the planet, not the other way around, in which accumulative steps only bring incremental change. That, clearly, is not enough. Therefore, before looking for utopian resolutions in "solving" sustainability issues we must start with asking the right questions.

The sense of interconnectedness, and in a way, interdisciplinarity, is probably the most important to achieve sustainability and mitigate anthropogenic climate change. It is important to combine technology with environmental ethics, business with climate justice and literature with critical thinking. It is important to understand the interrelationship between emissions from tanks and fighter jets and the early flowering of plants or the death of planktons in the oceans. Why can't we imagine stopping all wars to achieve a sustainable world and combat climate change?

In this Project E-QUAL, we have tried to put greater emphasis on the idea of interdisciplinary in producing knowledge. In the four different strands (Cultural Studies, Natural Resource Management and Sustainable Technology, Human Ecology, and Critical Thinking) of the project our faculty members and research scholars are involved with different systems of enquiry to understand the environment and its interrelationship with modern living. The E-QUAL project believes in a university without walls, therefore we have used digital technology and online learning to enhance knowledge production. This Journal, too, is part of the same effort and I invite you to join us in taking it forward.

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Transcription: Somak Mukherjee, Sritama Chatterjee, Project E-QUAL, Jadavpur University

Book Review

Ecosystem Management: Towards Merging Theory and Practice

Dr. Nilanjana Deb

Kolkata-based ecologist Dhrubajyoti Ghosh was awarded the Luc Hoffmann Award for his work on the East Kolkata Wetlands in 2016. The award is given by the International Union for Conservation of Nature and Natural Resources to global environmental leaders in conservation and ecosystem management. Dr. Ghosh's work on the East Kolkata Wetlands began with identifying the uniqueness of the ecosystem. He mapped the wetlands, calculated the economic value it was adding to the economy of Kolkata, and had the area declared a Ramsar Site in 2002, fighting to keep the area from being swallowed up by the fast-growing metropolis. Dr. Ghosh has been an Ashoka Fellow and has served on the board of trustees of the World Wide Fund for Nature - India for eight years. For those desiring to know more about the ideas of Dr. Ghosh on the subject of human ecology, there can be no better place to start than his 2014 book, Ecosystem Management: Towards Merging Theory and Practice. Dr. Ghosh has developed a people-centric pedagogy that creates allows human ecology to incorporate the voices and knowledge of common people who are not usually seen as 'experts' but have evolved their own ways of successfully managing ecosystems.

In his preface to the book, Dr. Ghosh explains, "Historically, my student life was witness to a period of global turmoil. Students were protesting against the establishment in many places – France, Pakistan, Sri Lanka and in my own country, India. They were trying to make a point. Like many others, this had an impact on my ethical anchor. I wanted to enquire into the complex maze of interrelationships that lay hidden below the erratic expressions of the social. The result of the first few years of this inquiry was my doctoral dissertation in ecology." The emphasis on ethics in the study of human ecology is visible in *Ecosystem Management: Towards Merging Theory and Practice* as well; the last chapter probes the ethics of the discipline, and lays down guidelines for research and field work that are important for any student or researcher of the subject.

However, the book deliberately avoids an excessively academic approach. It is thorough in providing examples of how academics can actually create distorted ideas about ecosystem management if their research and thinking remains confined within the ivory tower of academia and ignores communities and the 'enlightened' common man. Dr. Ghosh speaks of how the dominance of the 'culture of experts' has led to a decreased emphasis on the voices of those who are ecologists by virtue of their lifelong negotiation of their particular ecosystems rather than by formal disciplinary training. Dr. Ghosh believes in learning from the latter, and his writing includes both learned references to major writers on ecology as well as lively anecdotes that teach us about the intuitive problem-solving skills and knowledge of a wide range of ordinary people who have demonstrated extraordinary ability in ecosystem management. He reminds us that peasant and tribal communities are not inarticulate; they have their own ways of transmitting knowledge through story-telling, conversation and other forms of expression. It is the failure of the academic who cannot understand what is being expressed unless it is in vocabulary that is part of his intellectual training.

Though Dr. Ghosh refers to many important theorists in his book, he is careful to avoid jargon. The people-centric approach shapes his style as well, and the general reader will find this book eminently readable. He maintains a personal, conversational tone through much of the book. There are real-life stories culled from his field-work over decades, as well as parables and humorous tales. This does not mean that the author steers clear of political analysis; he can be quite pugnacious when he so desires. He calls certain kinds of American environmentalism 'genocidal' in wishing to prioritise the protection of wilderness in the

global 'South' at the cost of human needs, 'even when this involves allowing people to starve'. There are many instances when he points out the blindness of so-called 'experts' and major governmental and international aid organizations when it comes to the ground realities of ecosystem management. He cites the example of the Marichjhapi massacre, as well as other instances from the Sunderbans where governmental rigidity with regard to 'forest conservation norms' led to the deaths of innocent people. He goes on to show, through examples from Laos and other locations (most notably, the East Kolkata Wetlands) that 'ordinary' people around the world can evolve their own strategies for harmonizing their economic needs with the protection of the ecosystem and biodiversity. Rather than imposing top-down policies on them, governments, organizations and 'experts' should try and learn from them.

Like the farmers and fishermen whose traditional knowledge and patient teaching he acknowledges, he adopts a pragmatic approach to the study of the environment that has little patience with utopianism and naivete. There are no visions of Gaia embedded in his writing; instead, he says, "This world will continue to remain carefully divided, tersely competitive and increasingly hierarchical. There will be diminishing camaraderie and expanding military might. Babies will continue to die of malnutrition. Concern for the ecological well-being of the world must above all be practical in accepting certain realities. Naïveté cannot be a strength in any ecological interpretation." His is a new generation ecology that is grimly realistic in its vision, though never cynical.

He rejects the 'development' doctrine built upon universalisation, and emphasizes that an intimate understanding of local dynamics is required, one that does not divide the world into 'developed' areas and 'underdeveloped' ones based on a normative model of 'progress'. His analysis of the way in which agriculture is becoming the site of acute contestation between the older forms of traditional and localized wisdom about the land and new market-driven know-how deserves close reading. He shows how in the case of environmental refugees, and those who are 'ecologically handicapped' such as communities in the Sunderbans, the straitjacket of governmental definitions and norms and the general ignorance about slow-onset climate change related disasters can cause hardship and devastation. The 'one size fits all' approach cannot work in the new human ecology.

Dr. Ghosh attempts to develop pedagogy of the new human ecology, one that examines grassroots strategies and local interventions, and engages with the fact of improvisation on ecosystem management. This pedagogy demands that much academic learning be discarded as the researcher learns from local folk. As Dr. Ghosh says, "Most of my lessons in ecology have been from the natural ecologists of the East Kolkata Wetlands and most of the learning has been a kind of unlearning the … conventional texts in ecology." Apart from a greater attention to ethics, Dr. Ghosh stresses the need for collaborative work. There needs to be collaboration between the learner-researcher and the local ecosystem manager (whom he refers to as the "enlightened ordinary"). There also needs to be greater interdisciplinarity; Dr. Ghosh's book is notable for its call for a study of the cognitive and epistemological aspects of ecosystem management - "the story of (the) mind of the ecosystem residents is not in the forefront of perceived understanding of ecosystem research." He feels that inputs from the life sciences, physics, hydrology, geology, psychology, sociology, politics and geography are necessary for a more rigorous study of human ecology, and ecologists of the future ought of receive some training in all these core areas. He tries to show how the researcher needs to re-think the process of writing descriptions when engaging in fieldwork. This process of writing itself can render voiceless or invisible certain parts of the population, or create a lopsided and partial view of how the ecosystem actually incorporates human presence and intervention. He proposes a symbiotic relationship between the grassroots stewards of ecosystems and the scholars of various disciplines, so as to ensure avoidance of theoretical dogmatism as well as empiricism born out of bits and pieces of experiential knowledge in a particular time and place."

Many will begin reading this book expecting a narrative that is focused primarily on Dr. Ghosh's work in the East Kolkata Wetlands; they will be enriched by the breadth of his reading (one might mention here that the comprehensive bibliography he provides at the end is a valuable resource for students of human ecology) and depth of his thinking about the future of common people everywhere. Of course, the reader will also gain insight into Dr. Ghosh's pioneering work on the East Kolkata Wetlands. His book is an important contribution to bringing ecosystem management into mainstream discussion ('conversation') from its erstwhile positioning at the end of university syllabi on ecology in elite institutions. It reminds ecologists, planners, bureaucrats and 'experts' of various kinds that close and long-term engagement with an ecosystem and the people who manage it is required for ethical and productive work to be done. Above all, it ensures respect for the 'enlightened ordinary' who have much to teach university-educated scholars about the praxis of ecosystem management.

Dr. Dhrubajyoti Ghosh, Ecosystem Management: Towards Merging Theory and Practice (New Delhi: Nimby Books, 2014).

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Indian Bengal Delta: Climate Change, Awareness and Responsibilities

Sukanya Banerjee, Farha Naaz and A.K. Ghosh

1.0 Introduction

World's largest mangrove forests called "Sundarbans" (named after a species of mangrove Sundari = *Hereteria*) is a part of delta of Ganga-Brahmaputra-Meghna (GBM) basin called Indian Bengal Delta (IBD). It is spread over 9,630 sq. km. forming smaller, western part of Sundarbans. Historically, it is estimated to be 2,500 to 5,000 years old, formed by silt carried by the mighty Riverine system. Dominated by tidal activities, it forms the lower deltaic part (Danda et. al 2011.). The IBD is connected with the mainland on one side but it has also a chain of 110 islands, 54 of which are officially recognized as human habitats, rest being dedicated to nature and wildlife and act as the only swamp habitat of the Royal Bengal Tiger. In Indian Sundarbans Delta is recognized as the world heritage site by UNESCO and in Bangladesh it is been recognized as a Ramsar site by UN Ramsar Bureau. Additionally, India has declared a Sundarbans bio-sphere reserve and set up one of the tiger reserve within the geographical limit. Two of these inhabited islands have undergone different stages of submergence during last three decades, one called Lohachura now being totally submerged and abandoned while the other called Ghoramara is facing critical problem of erosion and submergence with only 20% of the total population still trying to live on the elevated part of the island. Incidentally, this 'Climate Induced Refugees' were initially supported by the local self-government, to resettle in the nearby largest island of the delta, called Sagar Island, but as the number of migrants increased, state support gradually declined and stopped.

The people of IBD, estimated to be more than 3.5 million, are now facing perhaps the most uncertain future living in one of the most vulnerable deltas in the world. The same fate is shared by the people in Bangladesh Sundarbans. The low lying islands of IBD are protected by 3,500 km of earthen embankments – the lifeline for millions of people living in the island of 'The Hungry Tide' as novelist Amitabh Ghosh (2004) has described in his memorable book with the same title. The IBD has 100 years of records of cyclone and storm surges but with the current phenomenon of Climate Change, the intensity of such events is becoming increasingly fierce with devastating consequences. One can recall that on 25th May, 2009, the cyclone Aila hitting IBD at 125 km/hr; within 6 hours it affected more than 1 million people washed away innumerable domesticated and wild animals, killed nearly 100 people but left a scarring mark so deep that it is taking years to heal. The government of India provided grant of Rs. 5000 crores to rebuild 1300 km of earthen embankments. But after 5 years, 80% remain as they were. The tidal waves, 30-40 feet high, receded but left a deep imprint with salinization of farmland making the farmers desperate to find a solution for survival. It is sad to see that neither the International Organisations nor the Central Government or State Administration came to the rescue of the farmers; a Kolkata based NGO, "ENDEV – A Society for Environment and Development", traced five different types of Salt Tolerant Farmers' Varieties of Rice which has become very rare (Ghosh, 2014a). On the basis of very small quantity of such rice seeds, collected from different sources over a period of one year, five Community Based Organizations (CBOs) took up the challenge in 8 affected blocks of Sundarbans and increased the seed varieties to a total of 2000 kgs; each of these CBOs have also set up a Community Seed Bank providing seeds to the willing farmers on the condition of returning double the amount of seeds taken after harvesting their own crops. This effort of ENDEV for Adapting to Climate Change for Food Security has found place in the five part documentary called "Food for Nine Billion" (http://cironline.org/reports/struggling-farmers-in-india-find-promise-4736 last accessed on 15.09.2016) in 2012 and received the Judges' Award on the global

competition of success stories for adapting to Climate Change, launched by Washington US based think tank "The Nature Conservancy and Solutions Search", out of 90 proposals received from 37 countries. (http://solutionsearch.org/contest/adapting-changing-environment last accessed on 15.09.2016) Subsequently, it shared the 5th Earth Care Award with the partner organisation Lutherian World Organization Trust in 2014 from JSW-TOI-CEF Foundation. (http://articles.economictimes.indiatimes.com/2014-04 22/news/49318827_1_earth-care-awards-climate-change-mitigation last accessed on 15.09.2016)

Post Aila scenario has put up the biggest challenge not only for ensuring future Food Security but also reconstructing the embankment and rebuilding the damaged houses.

Public awareness about the phenomenon of Climate Change slowly became evident. Worst affected people, especially able bodied male members in the family, had to migrate in search of livelihood. Sample survey studies showed 70% of them have migrated to as many as 11 states of India, to work as unskilled labour in Real Estate Sector. Girl trafficking increased so did the debt burden of thousands of families. (Ghosh, 2014b)

2.0 Public Awareness

The people in IBD, over generations, have learnt to live with Natural Disasters but with the phenomenon of Climate Change, largely ascribed to Human activities elsewhere, emitting Green House Gases (GHGs) is now threatening their very survival. Mangrove forests are well known to absorb such GHGs as Carbon dioxide, so the forest act as a sink area, besides protecting the islands, its wildlife and people, from natural calamities as the first line of defence. Mangrove afforestation over the years has become participatory, thanks to the initiative of Joint Forest Management (JFM) System and the functioning of Forest Protection Committee (FPC) and Eco Development Committee (EDC), under JFM initiative.

People in India have become aware of the phenomenon of Climate Change and its impact of increasing vulnerability. Shockingly, island people are yet to be exposed on the issue of effective way to combat such disaster, they still lack the benefits of Early Warning System, training to evacuate and above all Multipurpose Cyclone Shelters (MPCS). A recent World Bank Report (2014) has clearly indicated the need to invest urgently in Early Warning System and building up MPCS. Declaring existing school buildings as MPCS will not do. Quick investment in such areas besides rebuilding damaged 1000 km embankment, lying unattended, since 2009 should be of top priority, as also offering other modes of adaptation such as using "Salt Tolerant Farmers' Variety" of paddy. (Ghosh, 2014)

The public awareness can be increased by the print and the visual media who can very well highlight on the problems of the area and the commitment of the system of governance which remain unfulfilled. The civil society organizations, as well as local, state and National can play a vital role in not only disseminating the critical situation of IBD but also raising voices of protest regarding unfulfilled commitment of the government. So far, no visual media has focused on the issue and even though the local level CBOs have raised concern, they remain unheard in the corridors of power.

3.0 Need for Good Governance

The United Nations High Commissioner for Refugees (UNHCR), an agency, which was established by the United Nations General Assembly is "mandated to lead and co-ordinate international action to protect refugees and resolve refugee problems worldwide". It was built in order to protect the "rights and well-being of refugees". It also "strives to ensure that everyone can exercise the right to seek asylum and find

safe refuge in another State, with the option to return home voluntarily, integrate locally or to resettle in a third country".

(http://www.unhcr.org.in/index.php?option=com_content&view=article&id=7&Itemid=129

last accessed on 15.09.2016) However, the UNHCR is yet to recognize "Climate Change Induced Refugees" under its purview. The Convention relating to the Status of Refugees which focuses on the rights of "Political Refugees" does not mention the term "Climate Change Induced Refugees" or "Environmental Refugees" and hence, these vulnerable people remain bereft of their human rights even at the global level. It is imperative to bestow a legal status to "Environmental Refugees" in the era of devastating global Climate Change.

The United Nations Framework Convention on Climate Change's (UNFCCC) principle of "Common but differentiated responsibilities and respective capabilities" needs to be looked at with keen eyes. Carbon emissions made by the present day developing countries are high but the developed countries that have already made their share of extravagant carbon emissions should not escape their bigger responsibilities. It should be kept in mind that Industrial Revolution took place in these countries and thus they have largely contributed to Climate Change and Global Warming, especially when the life of Carbon dioxide can extend up to 150 years in the upper atmosphere. Now, the Conference of the Parties (COP) 21 to the UNFCCC has made references to Intended Nationally Determined Contributions (INDCs) when it came to curbing carbon emissions for each country. But that should not mean the countries can evade their responsibilities in the absence of mandates. In times of a global crisis such as Climate Change, the developed countries should not hesitate to mobilise the promised $ 100 billion International Adaptation Fund before 2020 and offer free transfer of technology to the developing countries, where vast coastal vulnerable low lying areas are located.

The Government of India has announced the National Climate Change Action Plan in 2008 with eight National Missions, later extending it to twelve missions in 2014. Of all the National Missions, the Indian Government seems to be heavily focussing on shifting over to Renewable Energy from carbon emitting Thermal Power. "Mitigation" became the focal point while current crisis in the IBD calls for investment in "Adaptation". India has so far received funding support only for two projects from International Adaptation Fund; India, however, has set up its own Adaptation Fund of 350 crores. But none of it has arrived at the shores of Indian Bengal Delta.

Who bears the responsibility of Good Governance? Obviously, the elected representatives of the majority party, who forms the Ministry. India has extended the name of erstwhile Ministry of Environment and Forests adding Climate Change as suffix – so MoEF has become MoEFCC. One may say is if only the Federal Government to bear all the responsibilities. Rightly so. The State Government of West Bengal, as has been done by all other Indian States, has drawn up West Bengal State Action Plan on Climate Change (WBSAPCC) in 2012 with an ambitious budget. Thoughtfully, the State Authorities made separate Action Plan for Indian Sundarbans – (here referred as Indian Bengal Delta or IBD). It had an estimated budget of more than Rs. 3000/- crores, with a target year of completion of projects in 2022. First five years (2012-2016) are now coming to an end but till date no information is available in public domain on the progress of WBSAPCC. The responsibilities to protect the World's largest Mangrove Forest, its rich biodiversity and above all millions of people living in the Tide Country, one can say, lie with the State and the Nation. The Delta Vision document of WWF-I (2011) predicted migration of 1.2-1.4 million people from eight most vulnerable blocks of Indian Bengal Delta. Who will empower them with additional skills? Skills which are in demand and may help earn better income in the receiving area of future Climate Change Induced Refugees

from the Worlds' Largest Delta. The Ministry of Skill Development and Entrepreneurship has drawn up a scheme to train manpower for Renewable Energy sector as a part of 'Mitigation' programme.

No one knows who will take responsibility to train the future Climate Change Induced Migrants to enable them to adapt to secure a better livelihood through required skill development.

It may further be added that past experience of Climate Induced Migrants from Ghoramara and Lohachura to the nearby Sagar Island has been analysed in view of Human Rights (Ghosh, 2015 a, Ghosh, 2015b). The extent of deprivation is well documented.

The question is loud and clear. But we are still seeking answers from the International, National and State system of Governance.

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Of Lynx and Men: New Trends in European Environmental Governance and Policy

Tina Schivatcheva

People or nature, environment or economy? The analytical discussion centers on the ways in which Europe is trying to reconcile these important modern challenges. The European megalopolises are growing, leaving ever smaller areas of land for wildlife habitats, while at the same time the land, rivers and oceans are becoming more polluted. Today in Europe ambitious policies at an unprecedented continental, Pan-European scale try to reconcile the challenges of sustainable development, population growth, urban sprawl and shrinking habitats. These policies aim to help some of the most vulnerable European wildlife species, without the conservation measures negatively impacting the poor rural communities. The present analysis introduces some emerging European biodiversity conservation governance trends, focusing on the governance policy of Natura 2000 (N2000), the major European conservation network, established by the European Commission (EC) (EC, 2016a).

The increasingly urbanizing and growing in affluence India seems poised to soon face challenges, similar to the ones being experienced by Europe. Thus, the essay will also include a brief discussion of the ways in which the European achievements could be of value to India.

Analytical Context

Fenced off nature reserves – this was formerly the dominant biodiversity conservation approach. The so-called 'fortress conservation' considered people and nature as two separate entities, inherently inimical to each other. But the era of cordoned off reserves and heavy top-down environmental governance has now come to an end andin Europe new governance approaches view the dilemma: 'people or nature',as animperative: 'people and nature'. The new governance paradigm strives to achieve a lasting transformation of the human-environment relations and it has already celebrated some important successes.

Howeverin poor areas, suffering from economic stresses, the environment alone is not seen as the highest priority. A persistent social dilemma 'environment or economy 'has often considered development and biodiversity conservation as two mutually incompatible objectives. Even though the sustainable development paradigm has offered a conceptual way forward, much work still remains to be done in practically reconciling the two social goals.

Cognizant of the magnitude and complexity of the European conservation challenges, the EC has set up the Natura 2000 network of protected areas. Recently, the EC has also set up the N2000 award (EC, 2016b). The award recognizes excellence in finding concrete, workable and empirically verifiable solutions to the urgent and complicated conservation and sustainable development tasks by highlighting some particularly valuable conservation achievements in six categories (EC, 2016b). Here two of these categories will be discussed in more detail. The first one concerns the rescue of the Iberyan Lynx in Spain (EC, 2016c); the second –Payment for Ecosystem Schemes in Bulgaria, supporting farmers, living in the poorest region of the European Union (EU) (EC, 2016d). Both initiatives are recent winners (2016) of the N2000 award. These European achievements highlight conservation successes, particularly relevant for some of the

conservation challenges in India, such as the conservation of the Bengal Tiger and the ecologically sustainable development of poor rural Indian communities.

The exposition will now proceed by providing a brief discussion to the most important characteristics of N2000; which will then be followed by a discussion, which engages in greater detail with each of the two award-winning projects.

Natura 2000 – the center-piece of European conservation

Today Natura 2000 (N2000) is the major conservation initiative of the European Union (EU) recognized as 'the center-piece of EU nature and biodiversity policy' (IUCN 2014). N2000 is an environmental protection regime designed by the EU as a network of protected areas. Stretching over 18% of the EU's land area, N2000 is the largest coordinated network of protected areas in the world. The aim of the network is to ensure the long-term survival of Europe's most valuable and threatened species and habitats, listed under EU's Birds Directive and Habitats Directive, the two pillars of EU nature legislation (EC, 2016a).

Europe is home to more than 500 wild bird species, yet the conservation status of at least 32% of the EU's bird species is currently unsatisfactory. The Birds Directive aims to protect all of the 500 wild bird species naturally occurring in the EU (Bird Directive, 2009). The Habitats Directive (Council Directive 92/43/EEC of 21 May 1992) ensures the conservation of a wide range of rare, threatened or endemic animal and plant species (Habitat Directive**,** 1992). The Directive on the conservation of natural habitats and of wild fauna and flora aims to promote the maintenance of biodiversity, taking account of economic, social, cultural and regional requirements.

N2000 is not a system of strict nature reserves, excluding all human activities. Furthermore, while it includes strictly protected nature reserves, most of the land remains privately owned. N2000 strives to reconcile the potentially conflicting demands of the different stakeholders, by striving to promote a new type of inclusive and participatory natural resource governance model, whereby people are invited to actively partake and co-govern the natural resources. Of course a governance challenge of such scope and complexity is not easy to achieve. The Directorate General (DG) for the Environment of the European Commission makes every effort to acknowledge and encourage the good successes and to inform the whole European public about the best ways forward, towards a better and more sustainable human-environment interactions. One of the most notable examples of this Pan-European recognition of and learning from conservation excellence examples are the European N2000 awards.

Spain: Rescuing the Iberian Lynx

The Iberian lynx (Lynx pardinus), the most endangered wild cat species in the world, now lives mainly in a few isolated enclaves of the Iberian Peninsula in Spain. Tufted ears, long legs, short tail, and a ruff of fur that resembles a "beard" characterize the outward appearance of this elegant cat. The females weigh 9 kg and the males 12 kg. Several different threats endanger the survival of the sharped-clawed hunter: habitat loss, due to urban and resort development, and a recent sharp decline of the wild hare populations, the favourite food of the graceful feline. Yet, in spite of this troubling outlook, a major Spanish conservation effort helped the lynx population recover from as few as 52 mature individuals (2002) to 327 (2014). The

IUCN lowered the threat category for the species from 'critically endangered' to 'endangered' and the European public voted in favour of recognizing the project by the 2016 European Citizens' Award as part of the 2016 N2000 awards (EC, 2016c).

The rescue of the Iberian lynx highlights some important trends in contemporary European conservation governance. First of all, the project owes its success to a pattern of collaboration between public and private bodies, which included multiple and often specific forms of collaborative arrangements. The participation of landowners and managers of private hunting estates was particularly essential for the success of the lynx rescue. Stewardship agreements and voluntary contracts with 132 private owners, managers and hunting clubs in six Natura 2000 sites reduced the hunting pressure on the rabbits and secured lynx-friendly land management. Furthermore, the rescue programme was coordinated and applied simultaneously across six conservation sites in Spain. Thus, timely exchange and learning took place across different locations within the country and involving different stakeholders, consequently enabling learning and best-practices exchange across the conservation locations. The EC particularly recognized that the collaborative framework, established as a result of the effort to save the lynx, was a very important and significant outcome of the project's efforts.

Bulgaria: Lifting farmers out of poverty

The 2016 N2000 socio-economic award was granted to a coalition of Bulgarian environmental NGOs for their work with farmers, micro enterprises and small enterprises that rely heavily on the rich natural resources of six Natura 2000 sites in the Balkan mountain region of Bulgaria (EC, 2016d). The project was undertaken in the poorest region of the EU, an area suffering from chronic unemployment, leading to depopulation and abandonment of traditional farming. The lack of income has caused the area's inhabitants to overexploit the natural resources - forests, herbs; in turn this has led to habitat deterioration and subsequent further impoverishment. The NGO coalition set up innovative schemes to pay directly the farmers and small enterprises for the environmental benefits they help maintain, establishing Payment for Ecosystem Services schemes. The project aided in the creation of four such schemes, while also attracting financing from 16 companies for the restoration of High Nature Value (HNV) grasslands and water ecosystems. Moreover, the initiative also sought to address the situation by establishing direct lasting links between environmentally conscious

producers and consumers. This was achieved by creating farmers' markets for sustainably-produced farmer's products and via a campaign educating both the producers and consumers about the real ecological costs of sustainable farming.
Once again, in a way similar to the Spanish case, although the NGOs led the process, it was a public-private partnership that was able to achieve the desired results. In this case the collaboration was even international in nature, as it involved four Swiss and seven Bulgarian partners. The project participants acknowledged a previously-existing 15-year-old Swiss-Bulgaria partnership in the sphere of sustainable natural resources management, as the key to the effort's success. Thus, the project was particularly successful in being able to build on the already-existing collaboration and finding new and very important ways in which to successfully extend into a new sphere of activity.

The award winners explicitly recognized the achievement as an inspirational example and a model to be followed in other regions in Bulgaria. Most positively, rather than an end in itself, the socio-environmental learning, which has taken place as a result of the project, is finding new applications, beyond the narrow regional scope. The achievement has demonstrated that beneficial economic activities, such as High Nature Value farming, protects nature and aids people in remote and poverty-stricken areas. The subsequent policy work is now helping broaden the results at a national scale have already been included in the Bulgarian Rural Development Programme.

The project made also made a particularly important contribution towards re-defining the relations between the business and nature, demonstrating in practice that Natura 2000 should not be perceived as an obstacle to business, nor as a set of complex rules, but it is rather a real opportunity to offer products and services of high quality and environmental value. Consequently, this positive effort showed to both the investors and the public that regions of high natural value can attract investments of the type "2 in 1" ensuring sustainable development and nature conservation. The success of the project demonstrates how effective can be the guiding principle of N2000 – that conservation initiatives can be managed sustainably not only ecologically, but also economically.

Conclusions

Both award-winning N2000 initiatives, introduced by this brief discussion, owed their success to the open invitation, extended to the civil society, to be an active participant in the governance process, rather than a passive observer. An explicitly recognized goal of the two projects has been the expectation that they would act as a catalyst of similar civil society initiatives. Thus, the key to effective, long-term and sustainable use of successful conservation is mobilizing the civil society, while also seeking to offer fair and comprehensible compensation for the ecological benefits to the whole society, which many of the poor rural communities already provide.

Another important conclusion, which the European experience highlights, is that successful policies do not result from dismissing the tensions, attendant to the biodiversity conservation policies' development and their implementation, but on the recognition of their potential for public discussion, participation, and collaboration. EU's current complex and dynamic governance system presents a challenge, so the successful

implementation of the environmental conservation policies entails an institutional imperative to be reflexive, learn and transform. Only by adopting such stance will the EU be able to face the challenge of inspiring people around the world and across generations to reconnect with nature, 'by demonstrating that genuine sustainable development is possible' (IUCN2014).

The European experiences would hopefully be of value to the Indian conservation community as well as to the general public. The biodiversity richness of India is much higher than that of Europe, and thus the conservation challenges are much greater. The EU is a contracting party to the Emerald Network initiative, which is a valuable institutional arrangement in enabling the sharing of the conservation principles, experiences and acquired N2000 know-how-to other states (CoE, 2016). Although set up by the Council of Europe (and thus having its initial focus mainly on Europe), the Emerald Network now involves not only all EU member-states, but also some non-Community states and a number of African states. India is not currently participating in this initiative, but maybe it is time to call for closer collaboration of the Indian conservation community with both the DG Environment and with the Emerald Network, thus hopefully helping to pre-empt many of the problems that Europe now has to face as well as address the already existing Indian conservation challenges.

Acknowledgements

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Our Planet, Their Planet: A Tale of Deprivation

Deepnanda Ray

I don't boast of being an animal lover or an ardent admirer of the tiny winged creatures who form an integral part of our surroundings. I am an observer. Amid the very hectic life during the time I was living in Bangalore, to the relatively relaxed life of my current job in my hometown Kolkata, I have always managed to find time to observe the stray dogs, the cows, the common birds, and their lifestyle. Nowadays I have some more time to devote to them. Some of the strays in my locality have become my pet. I'm not an environmental activist, nor an expert in this area. I shall only attempt to tell the stories of these rather hapless beings and the impact of ecological turmoil on their lives, on their behalf.

Let us consider an extremely unfortunate news cited in the Times of India on September 02, 2016 that mentions how nearly 100 kg of plastic waste was found from the stomach of a pregnant cow. I don't know how many of us will sympathise with her plight, when our own lives are so full of regular troubles. But in some way we are responsible for this outcome. Particularly in Bangalore, I have seen cows bending into waste bins, having no access to grassland. Actually cows in Kolkata are luckier, even amid the ongoing constructions; I do happen to find green stretches where they happily graze.

Courtesy: Ravikant Jaiswal - flickr.com

It is a different story that we don't do much for the animals. The bigger fact is that they don't ask for much. And then, what do we do even for our own selves? What are the corrective actions we have taken despite knowing that smoking pollutes the environment…why, some parents are not even ready to quit smoking in presence of their own babies, let alone other infants. Even doctors, who are probably better aware of the hazards of smoking than a lay man, continue to smoke throughout their entire lives. So it seems meaningless that animals would seek compassion from us. Last Diwali, a familiar street dog in the locality almost embraced me out of fear, and sought my intervention. He didn't have an idea about how powerless we humans are apparently; so many pet owners shut their windows and live with the palpable distress of their pets…because for the common inconsiderate human, the celebrations come before someone's wellbeing. So probably, animals are as well ignored as a sick senior citizen, who'd be troubled with the noise of crackers, and would find it difficult to breathe because of the ensuing fumes. We don't even regret the fact that every year animals have to lick up the toxic paints smeared on them playfully during Holi, even though it is not their festival. I always feel that if some stray is alive, it is entirely a miracle, given the odds and the negligence they face from us, the self-proclaimed superior race, every single day of their lives.

Courtesy: dogwithblog.in

I have found birds to be equally intelligent, if not more, than the animals. It is a custom at our home to feed the strays in the morning. We also keep a pot of water for them to drink water from. I have often seen birds steal the share from more powerful dogs and cats and fly away. Often, if the biscuit they have stolen is large and they can't manage to eat it, they would dip it in the water and peck on it afterwards - the four legged creature from which it was stolen initially, would have lost interest in the wet biscuit by then. This very same intelligence is manifested in their struggle for existence. The story of the sparrow and its adaptation is my favourite. Sparrows, like other common birds, can be termed as an important bio indicator. Yet most of us have failed to notice the sharp decline in their population over the last few decades. The predicament of the house sparrow probably dates back from the early 20th century when petroleum driven automobiles started replacing horse driven carriages, and a major source of their food in the form of grain spillage was lost. Electromagnetic radiation from mobile phones and the proliferation of mobile towers have caused the species to get endangered further. But despite these odds, the tiny sparrows have shown tremendous adaptability. In Delhi, it was observed few years back that they are making fresh efforts for survival and finding new nesting sites for breeding. Even in my own locality I can find sparrows plentifully, resting on the window sill or perched under the sunshade, protecting them from the rain. The Delhi Government declared the sparrow as its state bird. Subsequently India Post released a commemorative stamp to give wings to the save-sparrow campaign. Such gestures inspire me to dream that even now, if we can take some well-timed mitigating actions, probably all will not be lost for us. In fact, I am amazed to see the variety of birds that live around my home which is adjacent to a major Kolkata metro construction site. Let alone crows, sparrows and mynah, I have seen doves, storks, pigeons, even an owl and a couple of vultures. I am not an environmentalist, but logical thinking compels me to believe that this is solely because of the ample greenery and the abundance of water bodies in our locality. As a result, the food chain and the ecological balance are in place. But it is not easy to preserve even this. The imminent threat of natural calamities is not sufficient to stop the human race from being greedy. The one man struggle of Dr.Dhrubojyoti Ghosh to save the east Kolkata wetlands from the clutches of real estate sharks leave us thoughtful. If we let money and materialism win over the importance of such an ecological paradise, then what would we leave for our future generations? Forget the future world, the current situation won't spare our dead even. The Parsi tradition of leaving the dead in the tower of silence is threatened by the decrease in India's vulture population. Our age old traditions are at stake here. These creatures might be insignificant constituents in nature, but still, their existential crisis has such unthinkably far-reaching impact.

Yes, I know that the points I make might be circumstantial in most cases. I just happen to notice the rather minor components of nature that many of us tend to overlook, like the stale roadside trees with yellowed leaves. We forget the fact that they help us breathe in oxygen and remain alive, we saw them down anyways and make way for more "concrete" development. Who, in the modern days, would care to walk through a cosy shaded boulevard, when we can boast of air-conditioned fast transports? Time is of essence. Yet, we don't have time enough to contemplate the comfort to the eye imparted by flora and fauna, acknowledge the relief a dog's lick provides at the end of a long tiring day, or the avenue to realize our ambition that opens up through the visual of a flock of birds taking flight high into the sky. Research suggests that some pesticides damage the learning capacity of bees. These and other climatic influences are leading to the honey bee population getting dangerously dwindled, a phenomenon that might directly impact food security. We organize for conferences to preserve mother earth, and sustain our own clan, the seemingly deserving candidates to rule upon her. Whether it is part of our duty to create a sustainable environment for the other, so-called less important species as well, is entirely for us to decide. The usual scepticism apart, all I can comprehend with my limited knowledge is that, if they don't live, we won't either…courtesy Albert Einstein, who famously said that "if the bee disappeared off the surface of the globe, man would have only four years to live".

Courtesy: commonfloor.com

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A Small Step Towards Green Energy

Subhajit Ghosh

The agreement at COP21 mandates a transition to a lower carbon future. The Energy Trilemma (equitable provision of secure, sustainable and affordable energy) remains a particular challenge for urban and rural India, which has one of the world's most carbon intense energy systems, yet with over 20% of its population having no access to electricity supply. Sundarbans in India is among the many rural areas rapid expansion of indigenous and foreign tourism is expanding the built environment to urban scale, but without the necessary transport and energy infrastructure. To help promote green growth and achieve a more sustainable future, renewable energy needs to displace centrally generated and distributed or off-grid high-carbon supplies.

The term 'wet renewables' is commonly used to refer to offshore wind energy developments as well as tidal barrages/fences, tidal stream and wave energy schemes. For countries with significant areas of coastal waters the utilization of offshore and coastal energy resources is attractive. Wet renewables are becoming increasingly economic and it is expected that offshore energy resources will become a significant source of renewable energy in the near future.

River current turbines, some akin to smaller tidal turbines, are being developed for deployment in rivers around Europe and the USA. The Sundarban Delta has a relatively high variation of water levels and flow speeds due to tidal action and there are many sites that may be suitable for in-flow generation of electricity from submerged tidal turbines. These opportunities would reduce transmission losses and displace fossil fuel generation.

The Delta has areas like the Gosaba, Satjelia Island and Rangabelia in the Canning subdivision of the South 24 Parganas district. They have increasingly developed into conurbations with a population between 2-300,000 thousand people and over 500,000 tourist visitors annually. There are many off-grid communities relying on sparse PV and diesel generation. Local electricity supply is poor and cannot be relied on for economic activity, growth or the provision of urban services (such as air-conditioning, refrigeration, lighting and potable water).

The total energy demand in the Sundarbans is met by biomass (73 percent), followed by kerosene (14 percent), electricity (4 percent), and diesel (4 percent). Of 1,064 villages, 589 have less than 10 percent of households using electricity and are, therefore, considered unelectrified villages, as per the new definition of village electrification by the Ministry of Power. There are at least 16 revenue villages in the Sundarbans that are yet to be electrified, seven in Gosaba Block, five in Patharpratima Block and four in Namkhana Block. At best, households without access to grid electricity, located in remote areas, are connected to micro and mini renewable energy plants (consisting of 16 solar photovoltaic systems, two wind turbine systems, and two biomass gasifier systems), which provide four to six hours of daily power supply. About 20,000 solar home lighting systems have been distributed to households through government schemes or by NGOs. Over 110 small-scale diesel generator sets (less than 30 kVA) are operated by independent power producers to meet the needs of small markets and selected commercial users (World Bank, 2014). Demonstration of tidal technologies may be important stepping stone toward wider deployment in estuarine communities with strong tidal currents and as part of run-of-river generation schemes. Deployment of tidal turbines in the Sundarbans would ultimately contribute to green growth of all of these provisions and the area itself.

Based on recent research activity carried out by School of Oceanographic Studies Jadavpur University partnering with the University of Edinburg, UK, in two energy hot spot sites at Satjelia and durgaduani, the average site electrical output power , using 3 Diameter turbine at sites over the assessment period (FEB-MARCH ,2016) is substantial enough to venture Tidal energy as an alternative option in future .With these available data a computer simulation indicated several high energy spots which are different from the measurement locations. Two clear high energy sites for Satjelia have been identified by the model and the predicted current velocities during the pring tide produced more than threshold velocities to produce adequate amount of electricity for the island. The influence of depth: velocity profile and water depth on available diameter has a major influence on energy yield and peak power at both (or any) sites. At 3-meter diameter the average site electrical power is low, but the peak power is rather higher. This is most useful when peak demand for electricity coincides with times of peak flow but this is perhaps only for a few days each month. Electrical or thermal energy storage can be used to re-match release of stored energy with demand for electricity or hot water. Combined development of solar PV capacity would also diversify the availability of electricity to meet times of peak demand. This suggests that hybrid systems with storage will augment the utility and economic viability of tidal power at sites such as those above.

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Towards Environmental Humanities: Relevance, Approaches and Agenda within the Indian Context

Jenia Mukherjee and Purbita Chowdhury


Introduction

The Age of 'Anthropocene' is upon us and humanity is rapidly transgressing a set of planetary boundaries including climate change, atmospheric aerosol loading, stratospheric ozone depletion, loss of biodiversity, etc. (Magdoff and Foster). [1] We are encountering multiscalar crises of geopolitical instability, resource scarcity, and economic collapse at both local and global levels (Sorlin 788). Scholars, from the domains of both natural or social sciences are no longer convinced that only science and economics, and incentive-driven public management solutions can address and tackle the deep-rooted environmental crisis. The growing awareness of the 'great derangement' (Ghosh) has provoked scholars and activists to engage with environmental issues from an integrated, multidisciplinary perspective. Moreover, the transformative context has compelled us to rethink many of the concepts and ideals that have been central to our understandings and aspirations (Chakrabarty). At this critical juncture of humanity and the unstable earth system, the emerging arena of Environmental Humanities seems to inculcate rays of hope through the frameworks of critical theory and action-oriented research.

Environmental Humanities: The Concept and Recent Advances

Environmental Humanities is situated at the intersection of natural and social sciences and across the various branches within humanities and social sciences. Drawing on humanities and social science disciplines that have brought qualitative analysis to bear on environmental issues, the subject of environmental humanities engages with fundamental questions of meaning, value, responsibility and purpose in a time of rapid and escalating change. It indicates a renewed emphasis on bringing various approaches to environmental scholarship into conversation with each other in numerous and diverse ways (Rose et al 1-2). While environmental scientists, engineers and technocrats have focused on the non-human species, and non-human world has been the thrust of ecology and ecological research for a long time, humanities and social sciences have focused on 'the human' in a way that has often excluded, overlooked or undermined the non-human world. Environmental Humanities ensures the enrichment of environmental research with a more extensive conceptual vocabulary, whilst at the same time vitalizing the humanities by rethinking the ontological exceptionality of the human (Rose et al 2).

The field or arena of Environmental Humanities is growing rapidly, both in research and in teaching. Within a very short span of time, several research centres, and undergraduate and postgraduate programs have emerged at universities all around the world, in particular the USA, the UK, Australia, Scandinavia, etc. Recently established research centres such as the Centre for Culture, History, and Environment at University of Wisconsin-Madison, the Rachel Carson Centre in Munich, the KTH Environmental Humanities Laboratory in Stockholm, and the Eco-Humanities Hub at Mid Sweden University are bringing scholars from the associated fields together. Networks such as Humanities for the Environment, the Transatlantic Environmental Research Network in Environmental Humanities, the Australian Environmental Humanities Hub, the Nordic Network for Interdisciplinary Environmental Studies (NIES), and the European Environmental Humanities Alliance also help to connect researchers in environmental humanities regionally across institutions and disciplines. One new journal, *Environmental Humanities*, based at the University of New South Wales in Australia, began publishing in November 2012; another titled

Resilience: A Journal of the Environmental Humanities, from University of Nebraska Press, published its first issue in January 2014.

The South Asian (Indian) Context: Relevance, Approaches and Agenda

Similar to the journey of some of the established fields within environmental social sciences, especially Environmental History and Environmental Sociology in the earlier decades, Environmental Humanities also seems to be emerging and making waves in the West. Though the discipline is carving out a niche in the non-Western context as well (for example Taiwan), yet its progress still remains very much restricted and confined. The current scenario provides the opportunity to argue for the inclusion of non-Western/oriental (South Asian, or more specifically Indian) context within the ambit of Environmental Humanities. The interpolation of the South Asian (Indian) context is significant from two major dimensions:

- The context is divergent from the west; apart from global environmental problems, it encounters 'additional' vulnerability connected to the long historical past of colonial intervention and subjugation, and its continued legacy in the post-independence years, especially against profound and prominent functioning of trans-national aid agencies.

- It offers rich historical traditions of ecological and humanistic knowledge and wisdom that were deliberately not provided agency or accorded importance strictly due to political reasons like enforcing a cultural hegemony and economic manoeuvrings.

These aspects have been important variables and parameters in shaping the trajectory of South Asian environmental social sciences, most importantly South Asian Environmental History, as distinct disciplines with well-crafted methods, methodologies, approaches and agenda. While Indian Environmental Sociology in the early decades between 1970s and 1990s, being greatly influenced by western discussions/speculation on population explosion and 'limits to growth', focused on acute rather than chronic problems, thus building upon prescriptions rather than interpretation, Environmental History on the other hand tried to locate contemporary externally-funded development projects as part of a wider, more gradual, historical process of change (Baviskar). One of the major contributions of the field has been to delineate the 'varieties of environmentalism', demarcating between the West (post-material societies) and the non-West/South Asia that had dictated and influenced the divergent trajectories of the discipline across dissimilar contexts, as elucidated in the debate of 'ecology of affluence' vs. 'environmentalism of the poor' (Guha and Alier). Though the great divide has blurred to an extent in our recent times within the 'global' dimension of the environmental scenario and there are prominent manifestations of environmental justice in disciplines across cartographic (and political) boundaries, yet the Guha-Alier paradigm was a path-breaking contribution that brought the political ecology framework to the forefront as the critical lens of enquiry to understand third world contexts.

Using an explicit political ecology perspective, Indian Environmental Sociology has also made significant advances in the recent years. Moreover, it has also been able to include the 'urban' within the realm of environmental analysis, an area where Indian Environmental History however is yet to contribute. The rate, scale and shifting geography of urbanization, with a relocation of the fulcrum of urban growth to Asia and particularly South Asia, have opened up complex avenues of investigation, such as how a particular urban environment is produced, and who within that environment stands to gain or lose due to certain paradigms of power that influence changes therein. An exploration into the Indian variety of urban environmentalism has gained prominence mostly among sociologists and anthropologists in the current decade as the ecological traditions of local self-sufficiency offer few solutions for city-dwellers and political action is

unlikely to be found in an idealized, colonial and rural past. In her 2003 article, on the making of metropolitan Delhi, Baviskar irrevocably brings out the encounter between urban environment that includes capital-intensive beautification schemes and other projects securing resources for capitalist restructuring within the neoliberal regime and for the poor inhabitants of the 'illegal' *jhuggis* (squatters) (89-98). Applying the Baviskarian paradigm of 'bourgeois environmentalism', Bose describes the restructuring of Kolkata through development of new skyscrapers, malls, flyovers, highways, movie theaters, conference complexes, gated communities, etc. over the past two decades (Bose). Recently, researchers have gone beyond the Baviskarian paradigm, not to get confined within a single dominant variety of urban environmentalism, but to engage into nuanced readings of varieties of environmentalisms involving multiple stakeholders with their plural interests operating within an urban-ecological space (Rademacher and Sivaramakrishnan; Mukherjee).

Apart of these two major fields (Environmental History and Environmental Sociology), Indian Environmental Philosophy and critical literary tradition, though still limited within eco-critical and deep ecology paradigms, has immense potential to mature in convergence with these related fields. [5] The oriental context which was ecologically tuned with the parallel evolution of scientific, technological practices and humanistic knowledge and wisdom since days of antiquity with rich histories of socio-economic-ecological embeddedness, much before the glorious and victorious journey of the West, would provide fresh insights towards the nurturing of socio-natural metabolism. [6]

Discussion and Conclusion

The write-up should end with a note of caution, followed by clarification of the purpose here. The advocacy for the interpolation of the non-western (South Asian) context might lead to the danger of eulogization and romanticization of the separate and distinct non-western tradition, making space for the west/non-west binary and divergence that erroneously generalize (pre-colonial, pre-modern) non-west as environmentally benign and (modern) west as environmentally disruptive. [7]

Environmental Humanities is not a discipline, but an arena where disciplines from different social and also natural sciences converge to craft its emergence and evolution as an all-encompassing umbrella. The interpolation of the South Asian (Indian) context is the political necessity that would enrich the arena and add another layer of enquiry towards transcending theories into action.

Endnotes

1. The Stockholm Resilience Centre provides detailed information on the nine planetary boundaries and also estimates of how the different control variables have changed from 1950 to the present times. *The Nine Planetary Boundaries*. 14 September 2016. <http://www.stockholmresilience.org/research/planetary-boundaries/planetary-boundaries/about-the-research/the-nine-planetary-boundaries.html>.

2. South Asia is used synonymously with India in Indian Environmental History. Though this is problematic and needs further inquiry, however, one of the possible reasons might be the colonial context as the major centre of analysis across undivided India (including present Pakistan and Bangladesh).

3. It is to be noted that here that Jadavpur University is organizing a GIAN International Workshop on "Environmental Humanities: Ecology, Culture and Intervention" from 14 to 30 November, 2016, which also brings in the Indian perspective and case studies.

4. Guha and Alier provide the Stanislaus/Narmada or the Dudois/Patkar comparison to the "diversity of ideologies" and "forms of actions" between these two varieties. Both Mark Dubois and Medha Patkar intended to offer their lives to stop dam construction in the Stanislaus River in California and the Narmada River respectively. Dubois chained himself to a boulder, and Medha Patkar decided to drown herself in the

river. Though the strategy of protest was similar, but the goal was not absolutely the same. Mark Dubois's protest was to save the Stanislaus canyon as the last remaining example and icon of virgin and untouched American wilderness. Medha Patkar was massively fighting for the cause not only to save the Narmada River but also the huge number of inhabitants of the area who would be displaced with the construction of the dam with the completion of the Sardar Sarovar Project.

5. Two of the most recent and comprehensive volumes on this subject include J. Baird Callicott and James McRae edited *Environmental Philosophy in Asian Traditions of Thought* and Meera Baindur's *Nature in Indian Philosophy and Cultural Traditions*.

6. 'Socio-ecological metabolism' is the central idea within Ecological Marxism (Foster). The concept of 'socionature' has been popularized by Erik Swyngedouw to illustrate the inseparability of society and nature in contradiction to Durkheimian and Parsonian sociology (Swyngedouw).

7. This finds strong manifestation in numerous works on Indian forest and water history. Though the colonial period should be considered watershed in transforming the socio-ecological metabolism in India, yet new studies and micro-researches are coming up to critically encounter and interrogate these generalizations.

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India's Climate Commitment: Policy and Perspective

Nandini Das and Kuheli Mukhopadhyay

Background

Climate change is one of the key economic and developmental challenges that the world is facing today. Increased concentration of greenhouse gases (GHGs) has been caused by economic activities in sectors like energy, industry, transport and changes in land use pattern over time (IPCC), (Stern). To address the problem of climate change, lowering the scale of emission of these GHGs is required and this is not possible to achieve through climate policy only. Integration of climate and development strategies across multiple sectors is needed for both less emission of GHGs as well as to ensure sustainable development. Countries have realized that in order to achieve climate goals and development targets, transition towards a new paradigm that supports lower emission and climate resilient development is necessary. Climate change is gradually becoming an integral part of developmental challenges and is directly correlated with the issue of sustainability. To address the adaptation and mitigation challenges, Government of India has taken some serious policy decisions based on the vision of sustainable development. Under the agreed convention of parties (COP), United Nations Framework Convention on Climate Change (UNFCCC) has put all the responsibility on the developed countries (Annex II) to provide adequate financial support to stall climate change as they are historically the main source of emission and cause of climate change. India being a developing country is categorized as a Non Annex I country which means that currently India is not required to take up any legally binding commitment for mitigating climate change. However, India has voluntarily committed to reducing its emissions intensity by 20-25% of its 2005 levels by 2020 (Government of India). The Emission Gap Report (2014) of United Nations Environment Programme (UNEP) has recognized Indias a country that has been able to achieve its voluntary goal.

The climate policy in India is primarily a top down approach. In June 2008, the Prime Minister's Council on Climate Change had announced the adoption of the National Action Plan on Climate Change (NAPCC). The NAPCC is the umbrella of climate policies under which various measures are being developed. This plan has identified eight core "national missions" namely, 1) national solar mission 2) national mission for enhanced energy efficiency 3) national mission for sustainable habitat 4) national water mission 5) national mission for sustaining Himalayan ecosystem 6) national mission for a "green India" 7) national mission for a sustainable agriculture 8) national mission on strategic knowledge for climate change (NAPCC). Now the state actions plans are also being developed and some of them are in action also. Various urban centres are also adopting measures to become more climate resilient and to create less environmental burden while growing up. According to NAPCC interim report, India needs $84.65 billion to fund these eight national missions (Mandal and Shivapradha). It is expected that current and next five year plan (12th & 13th 2012-17 and 2018-2022) will have some provisions to implement these missions keeping in mind that in 12th five year plan low carbon inclusive growth is a key pillar (UNDP). Although some of the national missions like National Solar Mission are characterised by clear and ambitious targets along with elaborate and exhaustive policies, yet other missions like National Mission on Sustainable Habitat are yet to develop clear action plans that are required for effective implementation. There is a necessity for adequate financing and a proper coordination between various implementing agencies at state and national levels so as to achieve the desired targets and goals.

Where does India Stand?

Issues of climate change in India come under the purview of Ministry of Environment and Finance (MoEF) but all the decisions are finalized by the Ministry of Economic Affairs (MoEA). Planning Commission of India plays the role of advisory which prepares all the road maps for development. Historically India is always championing the principle of "Common but Differentiated Responsibilities" in all the international negotiations. Now that climate change is a global common problem has been acknowledged, policies to deal with it have to be taken at an international level. However, as we live in a fragmented world, implementation of policies must be done nationally or locally. In accordance with this policy, developed countries have to recognize their responsibilities for environmental degradation and have to provide developing countries financial and technological resources to deal with it.

Among all policy issues, long term sustainable finance is most important in India. To address this issue, India is always vocal to prepare a proper blueprint so as to achieve this goal. To identify new and additional sources of finance so as to meet the target of 100billion a year up to 2020, UN secretary general appointed a High-level Advisory Group on Climate Financing (AGF). AGF has identified five important sources of finance like carbon market auction revenues, tax on aviation and shipping, carbon taxation, multilateral funds and international financial transaction tax (UNFCCC). But India is apprehensive about aviation or shipping tax as this kind of innovative taxation should not fall on part of the developing countries. But India is supporting the issue of scaling up and mobilizing finance to reach the goal of $100 billion by 2020.

India's Commitments

In October 2015 India submitted its Intended Nationally Determined Contribution (INDC) to UNFCCC (INDC). It clearly reflects India's desire for economic growth in parity with reduced climate risk. INDC projects its ambition towards a low carbon future and as it is built on a trend which is already happening, the goals mentioned here are not unachievable (Heller). It could be analysed as a source of several financing policy components towards sustainability transition of energy sector in India. India has promised to reduce the emissions intensity of its GDP by 33-35 per cent from 2005 levels by 2030. Although clean energy and energy efficient industrial sector is one of the major concerns of India, yet at the same time INDC mentions that coal will continue to dominate power generation in future.

Coal is by far the most dominant source in energy supply sectors in India. In INDC, several policy framework and mitigation initiatives have given thrust to power sector, it being the highest polluting one. India's demand for electricity is expected to rise by more than two folds from its 2012 level to 2499 TWh by 2030. One of the major reasons of this rise is rapid urbanization. Growing population with rising income level is yet another contributor of this increasing demand for electricity. This implies that in order to cater to the demand of this growing population, growth of power sector should not been neglected. So government has given special importance to energy mix mainly through solar, wind and super critical technology in coal based power plants. Technology and finance is going to play an important role in achieving these targets. There is an urgent need for finance to undertake activities like early warning systems, disaster risk reduction, loss and damage and capacity building at all levels in India.

Challenges and Way Forward

In spite of India's commitment to reduce GHGs emission and serious policy measures to deal with adverse impacts of climate change and extreme events, there exist some barriers which are pulling back India in delivering the desired outcome. Universal energy access and energy security is one of the major development objectives of India as more than 300 million Indian populations are still living without

electricity. Achieving this with a lower environmental impact is a major challenge. India is committed to produce 40% of its power from non-fossil based source by 2030. This overall energy mix will not only contribute towards addressing the present and future power supply deficits but also it will enhance the energy access in remote areas. However, in spite of large potential, the high cost and the lack for storage systems are some of the major barriers for the large-scale diffusion of renewable energy technologies. So far, wind has the highest share in renewable energy sector and solar is showing a tremendous progress. However, for both these sources, land is a big issue. Traditionally land acquisition has been a major challenge in India and the land issue faced by project developers has to be resolved by creating better policy framework regarding land across India.

Reduced energy intensity of GDP is another important opportunity in combating climate change. In order to move towards an energy efficient pathway, the NAPCC has put forward the National Mission for Enhanced Energy Efficiency (NMEEE) with the objective of promoting innovative policy and regulatory regimes, financing mechanisms, and business models. Being a developing nation, transition towards energy efficient infrastructure requires both technological development and transfer which inturn need international cooperation. The approach should be more tailored as different local and sub-national entities have their unique needs. By linking climate friendly technology transfer and development projects to other national development strategies and goals such as energy security, poverty alleviation, rural income generation, and regional cooperation activities, India can find multiple benefits.

Like all other factors for sustainability and growth, finance is a key factor here also. Estimates reveal that at least 2.5 trillion (at 2014-2015 prices) will be needed for meeting India's climate commitments (INDC). This will be financed partially from domestic sources and the rest is expected to be supported by the developed countries. Furthermore, India will need around USD 206 billion (at 2014-15 prices) between 2015 and 2030 for implementing adaptation actions in vulnerable sectors like agriculture, forestry, fisheries infrastructure, water resources and ecosystems. However, it is needless to say that to meet these huge numbers, both public and private collaboration is the need of the hour. Proper and well defined domestic policies are also needed to be formulated to gear up investments from the private sector as well. In a country like India where the climate finance scenario is "highly fragmented" with the central government, state governments, private sectors and civil society bodies playing pivotal roles in combating climate change, there is a necessity to develop sound and rational strategies for climate finance. The strategies should meet the already on-going efforts on mitigation and adaptation coupled with various domestic and international financial arrangements.

The architecture of climate change mitigation and adaptation is multilateral. An effective and efficient institutional framework is required to be developed to keep the balance between policy and goals. Mainstreaming of climate change is hence necessary and this implies integration of climate change issues into policy-making, budgeting, implementation and monitoring processes at various national, sectoral and sub national levels (Bouwer and Aerts). It entails working with a range of government and non-governmental actors, and other actors in the development field. Understanding the linkages between climate change and national development priorities, as well as understanding the role of both governmental and nongovernmental institutions in this context is also of utmost importance.

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Over fishing of Hilsa (*Tenualosa ilisha*) and its sustainable management plan in the coastal regions of West Bengal

Sandip Giri and Isha Das


Tenualosa ilisha (Hamilton) or commonly Illish in Bangla is one of the most commercially important fish in India specially in the West Bengal. The fish not only connect the transboundary ecosystem of India and Bangladesh but also the life and culture of these two neighbouring countries. Hilsa contribute the major portion of the fisheries in the Hooghly estuary accounting about 15-20% of the total fish landing. However, in the recent years the annual catch is decreasing due to amplified fishing pressure in both the upstream and downstream of the Hooghly estuarine region. The indiscriminate fishing method and unwise exploitation of Hilsa, is leading to the decrease in natural stock as well as the catch per unit effort. With this decreasing natural stock, fishermen are trying to augment their fishing effort with whatever the size of fish is available to support their livelihood. The adult fishes swarm at the lower estuaries and the gravid adults that migrate to the river for spawning are often get entangled in the fishing net before spawning and it has been tremendously affecting the recruitment pattern of the population. Apart from that the fries and the fingerlings that grow in the river also get entangled in the *'Behundijal' (zero mesh net)*, having very small mess size, mainly operated to catch the seeds of the shrimp.

Increased number of fishing crafts (boats as well as trawlers), often unregistered, add up to the fishing pressure. The Maximum Sustainable Yield (MSY) calculated for the time period 2002 to 2012 reveals that the Hilsa population in the West Bengal coastal water are at risk of unsustainable over-exploitation as the present effort (number of boats operating in the coastal area around 8,510) is much higher than the desired range (2,500 to 3,252) to maintain the maximum sustainable yield (MSY, 18,143 to 27,498 tonnes).In the year 2010 Hilsa catch (54,265 tonnes) significantly exceeded the MSY and since 2010 there is a critical reduction in the annual Hilsa catch.

In order to conserve Hilsa and maintain a sustainable ecosystem, fishing regulation in terms of mesh size specification during different seasons in accordance with the growth stage of the fish, enactment on fishing effort guideline, fishing ban period implication and declaration of marine protected areas are required. Apart from them the Government should consider alternate livelihood for short term or the subsidy for the fishermen during the fishing ban period so that they can abstain from fishing temporarily.

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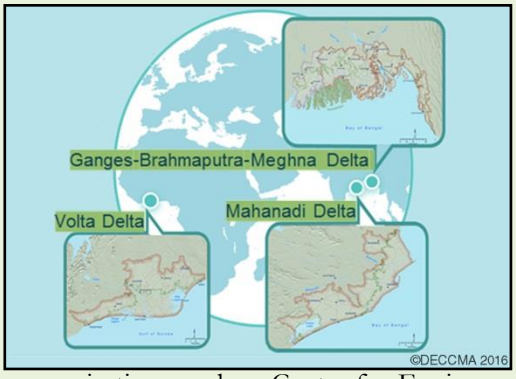
Climate Change, Communication, and Co-Production of Knowledge: Learning from DECCMA

Sumana Banerjee

A global debate on whether climate change is real or a hoax has recently gained currency. I am neither a scientist who can calculate expected sea-level rise and predict the wrath of climate change nor do I possess the skill to investigate such predictions and call it a hoax. But working for a climate change project has introduced me to populations whose existence is determined by how well they can fight a changing climate and other environmental forces. I have learnt that while I ponder over whether to shop online or visit the nearby store, there are people residing some 100 odd kilometres away from me who have to choose between migrating from their homes and striving to adapt to a changing environment. I consider myself lucky to be part of a project like DECCMA where each day unfurls a new lesson for me.

Deltas, vulnerability and Climate Change: Migration and Adaptation (DECCMA) is a research project studying the impacts of climate change and other environmental drivers across contrasting deltas of Africa and Asia. Effectiveness of adaptation options in the deltas and if migration can be a form of adaptation is to be assessed to finally deliver policy support for creating conditions for sustainable gender-sensitive adaptation. Volta Delta, Ghana is the African delta being studied. From Asia, we have the Ganges-Brahmaputra-Meghna Delta which is being studied by Bangladesh and India, where the Indian part of the delta is called the Indian Bengal Delta (IBD). The Mahanadi Delta, Odisha is also being studied. The DECCMA-Indian team led by School of Oceanographic Studies, Jadavpur University, with partner organisations such as Centre for Environment and Development based in Kolkata, Chilika Development Authority and Sansristi based in Bhubaneswar, and National Remote Sensing Centre based in Hyderabad, are responsible for research in the IBD and Mahanadi Deltas.



Project members are spread across five continents and several time zones. Needless to say, communication is the gear oil for such multi-country multidisciplinary project. Technology has been instrumental in keeping communication between project members alive. Also, we meet every six months to discuss our progress and plan for the next six months. Apart from getting work done, these face-to-face meetings also give us a chance to learn about each other's culture. Communication is thus not just aimed to make a project work but also help build relations.

Communication also plays a pivotal role in DECCMA's stakeholder driven research approach. The project's stakeholders are government officials, representatives from non-governmental organisations, community based organisations, self-help groups, academicians, and the community. We interact with our stakeholders by organising stakeholder workshops, focus group discussions, bilateral meetings, and also surveys. Communication, as we all know, is a two way process where exchanges are made.The initial stages of communication involved introducing DECCMA to stakeholders and then seeking their feedback and

opinions pertaining to our research questions. With progress in the research, communication involved sharing initial findings and getting those validated by the stakeholders. In every step of the project we have reached out to stakeholders and they have co-produced knowledge. This co-production of knowledge has been possible because of sustained engagement through specific communication processes.

To generate comparable results across the deltas of Africa and Asia, common methodologies are designed for the entire project. While it is important to follow a common methodology, it is equally important to factor in the unique delta-specific conditions. That is where having a delta-specific strategy becomes important. Understanding the social, cultural, and political conditions of each study area is critical. Working in two deltas have made us realise that having a same strategy for both as they are based in the same country is also not always helpful. But working in two areas have helped us in transferring lessons learnt from one and implementing in the other, after tweaking some elements suiting to the deltaic conditions. Strategising is a dynamic process and this will have to evolve along with the purpose of communication with the gradual advancement of the project. Following a consistent methodology and a protocol gives us the guidance to complete the tasks in a well-structured format. By blindly following the protocols we run the risk of ignoring the nuances which can shed light on the uniqueness of the deltas. A slight room for improvisation is likely to aid in the generation of optimum results.

DECCMA has its own methodology for carrying out the various engagement activities. The methodology stresses that ethical considerations are of utmost importance for any communication but for most of Indian institutions ethical considerations pertain to medical research. This prompted the team to design a form which states that the project strives to meet the highest ethical standards and the stakeholders' views will remain anonymous in any resulting publications, unless they give explicit permission for their names to be used. At any engagement event, after a round of introduction, we inform the stakeholders of our research objectives, purpose of the interaction, and also approximately how much time we expect to take. It also falls within the purview of ethics to assure them that participation is voluntary and that the project will protect confidentiality. After this, we seek evidence of informed consent by the participants by using a written consent form. The consent form outlines how DECCMA strives to maintain ethical standards. These forms are written in English and for mixed groups it gets difficult to ascertain who would be comfortable to use a form in English and who will be comfortable using one in the local language, Bangla or Odia. So, on behalf of the project we verbally communicate our ethical procedures and then invite from the stakeholders to share with all what is written in the form. This ensures a fairly transparent process where one of their own explains the content of the form and they naturally feel relaxed signing it. Many a times our stakeholders from the community cannot sign and we encourage them to give a thumbprint instead. Designing a form, inviting a stakeholder to share the written content of the form or asking for a thumbprint were not explicitly mentioned in the methodology but these are the little strategic interventions from the team which helped in ensuring that research is benefited without affecting any delta-specific condition or taking advantage of stakeholders.

Another such instance of a successful strategic intervention was when we divided our stakeholders into male-female groups during a district level stakeholder workshop at Mahanadi Delta. Our methodology suggested having mixed groups for stakeholder workshops and having separate male-female groups for focus group discussions. A state level workshop with mixed male-female groups rendered desirable results but when we try having mixed groups at the district level where there is more representation from community, women feel inhibited to speak in mixed groups and the project runs the risk of not getting a chance to listen to the women's experiences. Awareness of this reality helped

us in trying a new strategy by separating the male-female groups. This rendered good results as the women freely discussed the issues amongst themselves which helped us in gaining new insights which could have been lost in mixed groups. While the first step in ensuring incorporation of gender in our research was to enhance participation from women, the immediate step that followed was to strategise in making the engagement effective. Similar to this, during the group activity for our 2nd Round State Level Stakeholder workshop in Mahanadi Delta, we encouraged exclusive groups with respect to their organisational background. So when the government representatives sat together they discussed the issues themselves and so did the NGOs/CBOs and academics. By doing this, we got to see the different perspectives of a same situation and also gained some new insights which could come forth because the groups were exclusive.

Among the finer things that worked well so far for us, knowing the language of the respondents is a crucial one. The DECCMA-India team has efficiently dealt with Bangla and Odia speakers to extract desirable results. A continuous working experience in two of the deltas has helped the team in enjoying the support from the ground level NGOs and CBOs. This has aided in our engagement processes where the community extends their trust for DECCMA based on their trust in the local NGOs and CBOs. The respondents felt comfortable upon seeing that the familiar faces from their areas trust the research team. Another important guideline that we follow is to have male moderators for male groups and female moderators for female groups. For our stakeholder workshops and focus groups, this has been followed with the support from the research team. For carrying out survey in 1500 households, we needed 15 male and 15 female enumerators who were to interact with male and female respondents respectively. This was ensured by orienting the survey company with our methodology and then training the enumerators. This is a very useful method for carrying our interactions, especially with the community, as during communications with the community in mixed groups, women's voices tend to go unheard or lost in the dominance of male voices. Our research is geared to assess vulnerability of deltaic populations and communicating with those vulnerable populations makes the research organic. These interactions bring the data sheets and academic papers to life.

As a research team, we have learnt all along these processes. The first learning has been to let the respondents speak and not bombard them with a series of questions just because they agreed to give us their time. When we value this fact that they have given us their time, we learn to appreciate their efforts by making them feel important as a co-producer of findings besides being the end-user of research results. It immensely helps to opt for a conversational mode instead of a question and answer session as it not relaxes the respondent but helps in building a relation. While it is important to guide the respondents towards our research concerns, it is even more important to not pile our own understanding on them. Hailing from a research realm where hotspots, risks, integrated models, scenarios, and assessment reports rule, it is extremely vital to bear in mind that for most of the respondents, these mean nothing. Their reality of their daily lives does not give them a chance to assess their current plight nor examine whether they are dwelling in risk zones under multiple scenarios. So, it is best to avoid jargon when communicating. Interestingly, we have also experienced the community talking in climate change jargon. As a novice, I was initially impressed that our respondents are so well-versed in issues relating to climate change. But it was sometime later that I realised that they were giving a generic feedback. Thanks to a number of such projects where the involvement of community is encouraged, the people have been trained to speak in climate change jargons. In such cases, it is helpful to ask for examples from their daily lives or prompt with questions which will help them share details. Their responses can elucidate if the jargons they have used are merely terms which they think we want to hear or are really happening to them.

As an individual who is into project management and not directly participating in research, my most significant learning from these communication procedures has been to remain patient and flexible. I learnt that when we try listening patiently, we automatically try to understand and then carry forward the

conversation. When we listen patiently and understand, it helps us to see a perspective which may or may not be different from ours. If it matches ours, it is easy to carry forward the communication. When it does not match our perspective, we might get tempted to refute but we ought to be flexible to view this new perspective which is different from our sense of reality. Data analyses can tell me the statistics for female literacy and female work force in a certain area but judging by those I cannot expect that just because a woman is literate or working, she will not bear any patriarchal values which are prevalent in her immediate society. I may feel tempted to contest such patriarchal views which I hear during the communications but here lies the importance of listening closely to understand the area-specific social, cultural, and political nuances. This learning about patience and flexibility is not just applicable for communication with stakeholders but also within our research team. Management does not only mean tasks and deadlines. It also means team members behind the emails and the people from the lengthy citations of academic papers. It is my personal belief that for any teamwork to flourish, patience and flexibility are important. To conclude, I would like to say that this has been a very significant learning that I shall always carry with me as a gift from DECCMA.

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Ecosystem Services

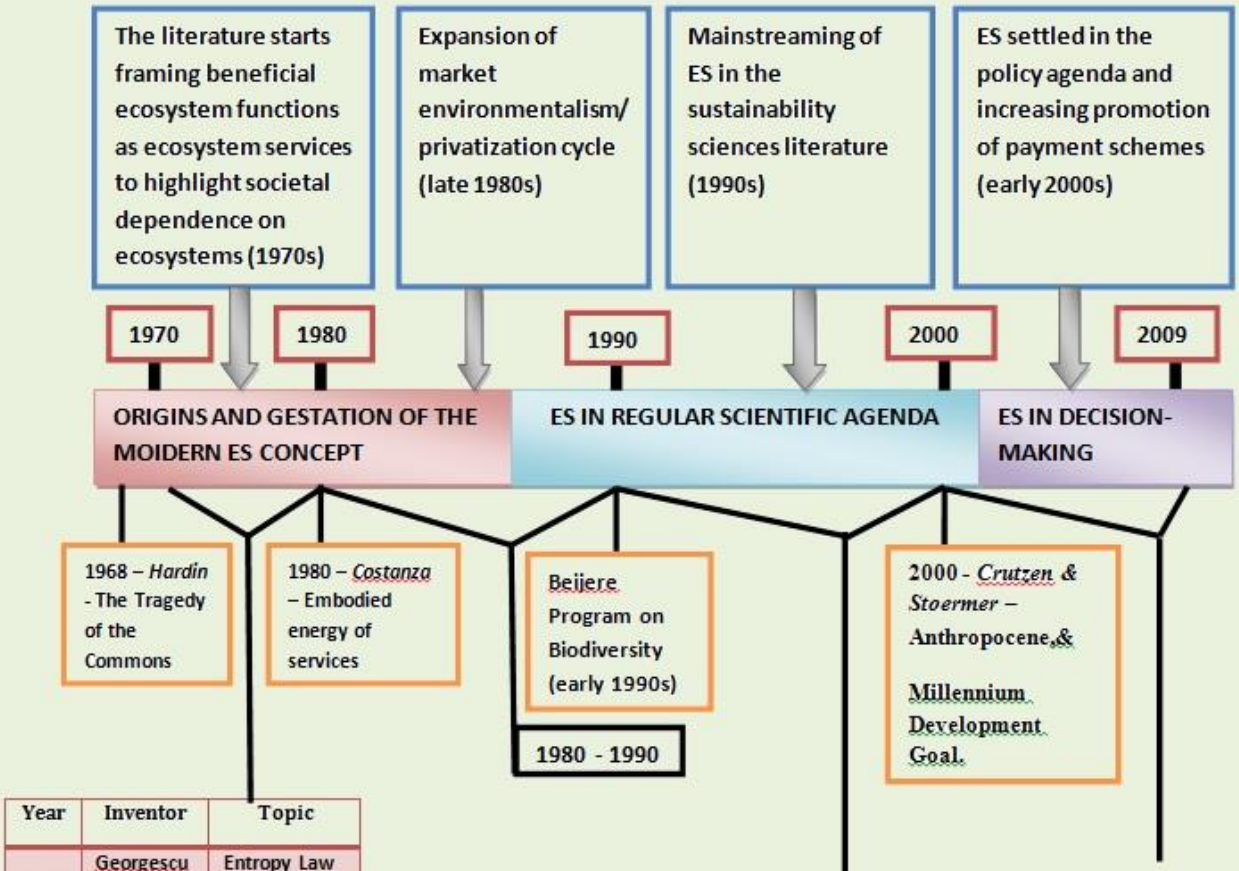
Masuma Begum, Moutrisha Ganguly & Anirban Mukhopadhyay

Introduction

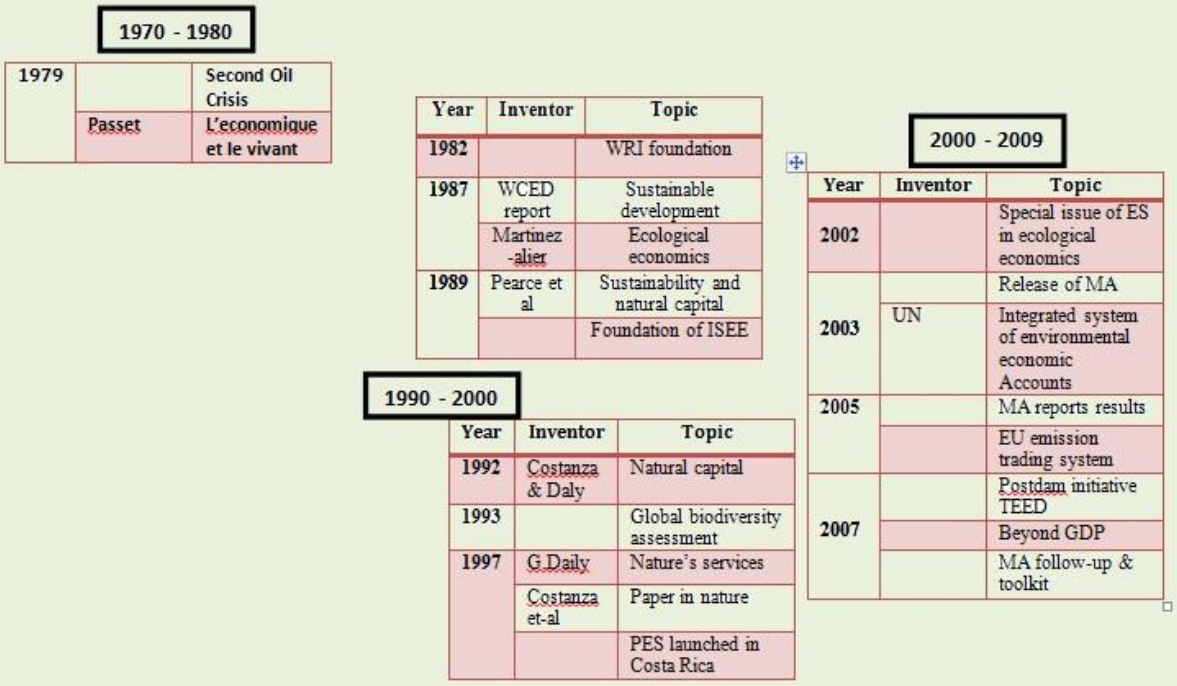
Ecosystem means the togetherness of the living community of plants and animals with the non-living components of the environment such as soil, air and water. An 'ecosystem' is a region with a specific landscape just like a forest, grassland, desert, wetland and coastal area. The nature of ecosystem is based on its geographical features like hills, mountain, plain, rivers, lakes, islands or coastal areas. It is also related by climate –the amount of sunlight, temperature and rainfall in the region. The benefits, people obtain from ecosystem is called Ecosystem Services. The definition is still being discussed with additional view points and arguments from ecology and economics. Ecosystem services are involved to clean drinking water and the decomposition of wastes. Human being is totally dependent on ecosystem. The major species gain energy directly from the sun for their metabolism. Plants obtain most of their nutrients from the soil or water. The term Ecosystem Services contain both the 'work done component' as well as the 'product component.' Nature gives us food, water, oxygen and it controls floods, drought and land degradation. Always we are ready to take the gift of nature but can we give the return gift to nature?

Ecosystem services are the benefits which people obtain from ecosystem. These include a provisioning services such as food and water, regulating services such as soil information, nutrients cycling and cultural services such as recreational, spiritual, religious benefits.

Representation of Ecosystem Services from *past to present* is shown in following chart (Figure 1).



Year	Inventor	Topic
1971	Georgescu - Roegen	Entropy Law & Economic Process
	H.T. Odum	Environment, Power & Society
1972		Stockolm Conference
	Meadows	Limits to growth Report
1973		Oil Crisis
1974	I. Sachs	Suggest eco-development concept
1977	Daly	Steady state economics



1970 - 1980

1979		Second Oil Crisis
	Passet	L'economique et le vivant

Year	Inventor	Topic
1982		WRI foundation
1987	WCED report	Sustainable development
	Martinez -alier	Ecological economics
1989	Pearce et al	Sustainability and natural capital
		Foundation of ISEE

1990 - 2000

Year	Inventor	Topic
1992	Costanza & Daly	Natural capital
1993		Global biodiversity assessment
1997	G Daily	Nature's services
	Costanza et-al	Paper in nature
		PES launched in Costa Rica

2000 - 2009

Year	Inventor	Topic
2002		Special issue of ES in ecological economics
2003		Release of MA
	UN	Integrated system of environmental economic Accounts
2005		MA reports results
		EU emission trading system
2007		Postdam initiative TEED
		Beyond GDP
		MA follow-up & toolkit

Figure 1: The history of ecosystem services: From Past to Present.

Importance of Ecosystem Services

The concept of Ecosystem Services is thinking about nature-society relationship. It is a contribution of biotic nature to human being. Human is an integral part of ecosystems. Ecosystems provide a range of services which are of fundamental importance to human well-being for health, livelihoods and survival. Ecosystems share biological, climate and social factors categorically. There is a great similarity in climate conditions, geographical conditions, surface cover, species composition and resource management system. The concept of ecosystem provides a valuable part for analysing and acting on the linkages between people and their environment. The human population is expected to reach 9 billion by 2050 and the demand of the natural sources will be increased. The Convention on Biological Diversity (CBD) defines the ecosystem as a strategy of integrated management of land, water and living resources. The application of the ecosystem approach will help to reach a balance of conservation, sustainable use. Many countries have passed laws to protect endangered species.

According to the CBD, the term ecosystem can refer functioning unit at any scale which requires adaptive management to deal with complex and dynamic nature of ecosystem. As described in the CBD, there is no other way to implement the ecosystem approach because it depends on local, provincial, national, regional and global conditions.

Classification of Ecosystem Services

People get so many benefits from Ecosystem. The **Millennium Ecosystem Assessment published in 2005**, divided the Ecosystem Services into four categories. They are –

(a) Provisioning Services,

(b) Regulating Services,

(c) Cultural Services and

(d) Supporting Services.

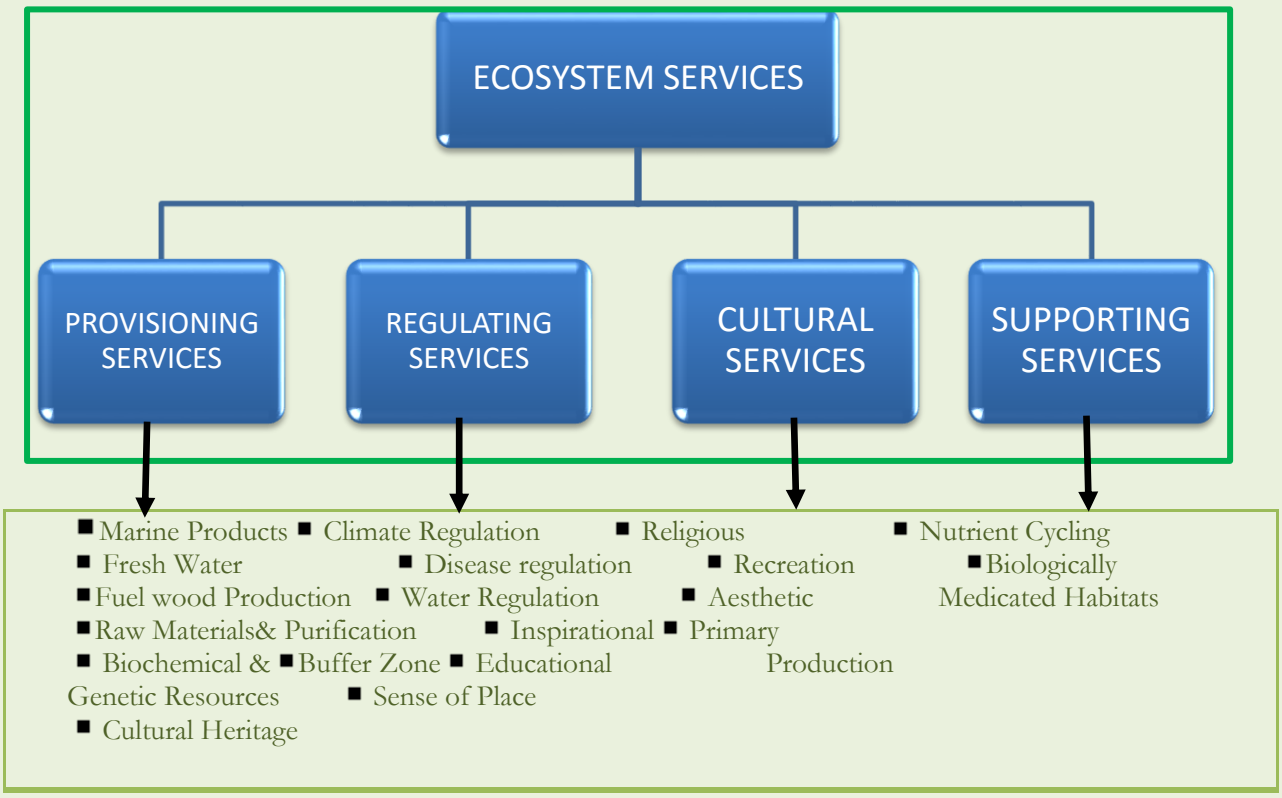


Figure: 2. Classification of Ecosystem Services

(A) Provisioning Services: We get the benefits obtains from regulation of ecosystem. It regulates the carbon sequestration and climate regulation, waste decomposition, purification of air and water. It also controls pests and diseases. By contributing and extracting chemicals, it purifies the air. Ecosystems influence climate both locally and globally. At a local scale both temperature and precipitation can be affected by changes of land cover. Vegetative cover plays an important role in prevention of landslides. Ecosystem is a source of impurities in fresh water but also can help to filter out and decompose organic wastes of island water, coastal water and marine ecosystem.

i) **Marine products -** Human being consume a large number of sea products like fish, shell fish and sea weeds etc. These are the elements of local cultural diet of costal people.

ii) **Fresh Water -** Water bodies which are not highly concentrated in salts are called fresh water. We found this kind of water not only in lakes, rivers, streams but also in the frozen state as soil moisture or buried deep underground. It is essential for all the existing species of animals and plants.

iii) **Fuel wood Production –** Wood, dung and other biological materials are the source of energy.

iv) **Raw materials -** Marine creatures provides us the raw materials which is used for manufacturing clothing and building materials. Coral reef extract is used as ornaments and

personal use items. The skin of marine mammals is used for clothing. Raw marine materials are utilized for non-essential goods. Oceans and seas are used for oil and gas installation sites.

v) **Bio-Chemical and Genetic Resources-** Bio Chemical resources are used in medicines pharmaceuticals, cosmetics and other biological products. Genetic resources are used for the breeding of animal and plant. It is also used in biological field for technological advances.

(B) Regulating Services- The benefits obtained from the regulations of ecosystem process is called Regulating. This service includes climate regulation, waste treatment and disease control and natural hazard regulation.

i) **Climate Regulation**: Both biotic and abiotic play a role in a climate regulation. They act as sponges at the time of coming gases in the atmosphere, retaining large levels of carbon dioxide and other greenhouse gases. Marine plants use carbon dioxide for photosynthesis and it helps to reduce carbon dioxide level in atmosphere. The oceans and seas absorb the heat from the atmosphere and redistribute it through water currents, atmospheric processes just like evaporation and the reflection of light to cool and warm the overlying atmosphere**.**

ii) **Waste Treatment and Disease Regulation**: Marine Ecosystem offer treatment of wastes. It helps to regulate the diseases. Wastes can be diluted and detoxified through transport across marine ecosystem. Pollutants are removed from the environment and stored, buried or recycled in marine ecosystem. The waste is diluted with large volumes of water and moves with water currents for leading the regulation of diseases and the reduction of toxin in seafood

iii) **Buffer Zone**: Coastal and estuarine ecosystem act as buffer zones against natural hazards and environmental disturbances just like floods, cyclones, tidal surges and storms. Wetland and vegetation retain large amount of surface water, snowmelt, rain and ground water and releases back slowly. Mangrove forests protect coastal shoreline from tidal erosion.

(C) Cultural Services: It is not providing direct material benefits but it is contributing needs and desires of society. Ecosystem influences the spiritual and religious values. It also creates diversity in cultures. It provides a rich source of inspiration for art, national symbols, folks and architecture. People find beauty or aesthetic value in various aspects of Ecosystem. They choose a landscape for spending this leisure time which has its scenic beauty.

- **Inspirational:** Marine environments have been used by their art, music, architecture and traditions. Water environment has a spiritual importance for rejuvenation. The result of this type of living, near water bodies, is water activities. It becomes a ritual and culture in the lives of people.

(D) Supporting Services: Ecosystem services include the services such as nutrient recycling, primary production and soil information. These services make it possible for ecosystem to provide services such as food supply, flood regulation and water purification.

i. **Nutrients Cycling:** This cycling refers to the storage, cycling and maintenance of nutrients by organisms. The ocean is a vast storage pool for carbon, nitrogen and phosphorus. The nutrients are absorbed by the basic organisms of the marine food web and it is transferred from one organism to the other and one eco system to other.

ii. **Biologically mediated habitats:** This habitat allows the interactions between different species, aiding the provisioning of marine goods and services.

iii. **Primary production:** It refers to the production of organic matter which is produced by the primary producers and generates oxygen for life.

The Millennium Ecosystem Assessment uses five dimensions to assess relationship between Ecosystem and Human being. These are basic material for a good life, freedom, choice, health and good social relation.

I. **Basic material for a good life:** It is a category to measure household incomes, assets and fulfilment of basic needs. There is a discrepancy between business economic valuation and political economy. Though there is a trend of increasing wealth now a day but also there is an imparity between "poor" and "rich".
II. **Freedom and choice:** These are measured by political organization and education.
III. **Health:** It is a dimension with relatively good data. Ecosystem is easily related to health issues.
IV. **Good social relations:** People have good family relation. They help each other and build up social capital and express cultural and spiritual values.
V. **Security:** People are in a state of security if they don't suffer abrupt, threads to their well-being caused by violence, natural calamity or disaster or economics.

Economic valuation of Ecosystem Services

Nature provides a wide array of marketing and non-marketing benefits to the society, including the moderation of extreme events, climate change mitigation, provisioning of food and water, recreation and over a dozen other services. Our entire economy is dependent on these natural goods and services for everything we produce and consume. ***Ecosystem service valuation*** is a process that quantifies these economic benefits for inclusion in decision-making at scales from local to global. Contribution of ecosystem services to economic systems is difficult to quantify in monetary terms. Thus economic valuation is a tool used for valuing ecosystems and their services in monetary terms. It quantifies the benefits provided by ecosystems and the impact of ecosystem changes on the wellbeing of people. Economic values are essential to consider when making economic choices or at the time of decision making.

There are two ways to measure how much something can be valuable: instrumentally or intrinsically. *Instrumental* (or utilitarian) means that something has value because it is useful to something else while *Intrinsic* means that something has value in and of itself, not because something else considers it valuable. Ecosystems and their services are valuable if they serve and satisfy human beings. From point of view economic valuation of ecosystem services comes.

Loss of ecosystem services is difficult to quantify. But, from economic point of view, - the loss of ecosystem services is stated as negative externalities, while the provision of ecosystem services (that led by the natural ecosystem) is not necessarily specified as positive externality, except the owner of the ecosystem forgoes its use.

Economists divide economic valuation of ecosystem services into two main categories: use and non-use (Figure 3). Use values are derived from physical involvement with some aspect of an ecosystem while non-use values do not involve physical interaction. According to GIZ the commonly used tool for assessing the overall economic value of an ecosystem service is the Total Economic Value (TEV) framework. It is a framework for consolidating different types of value that people might associate with an ecosystem service. Use values are further broken into direct use, indirect use whereas non-use values typically refer to existence, bequest value and option values. Direct use is further divided into consumptive (logging, fishing) and non-consumptive (recreation, tourism) values.

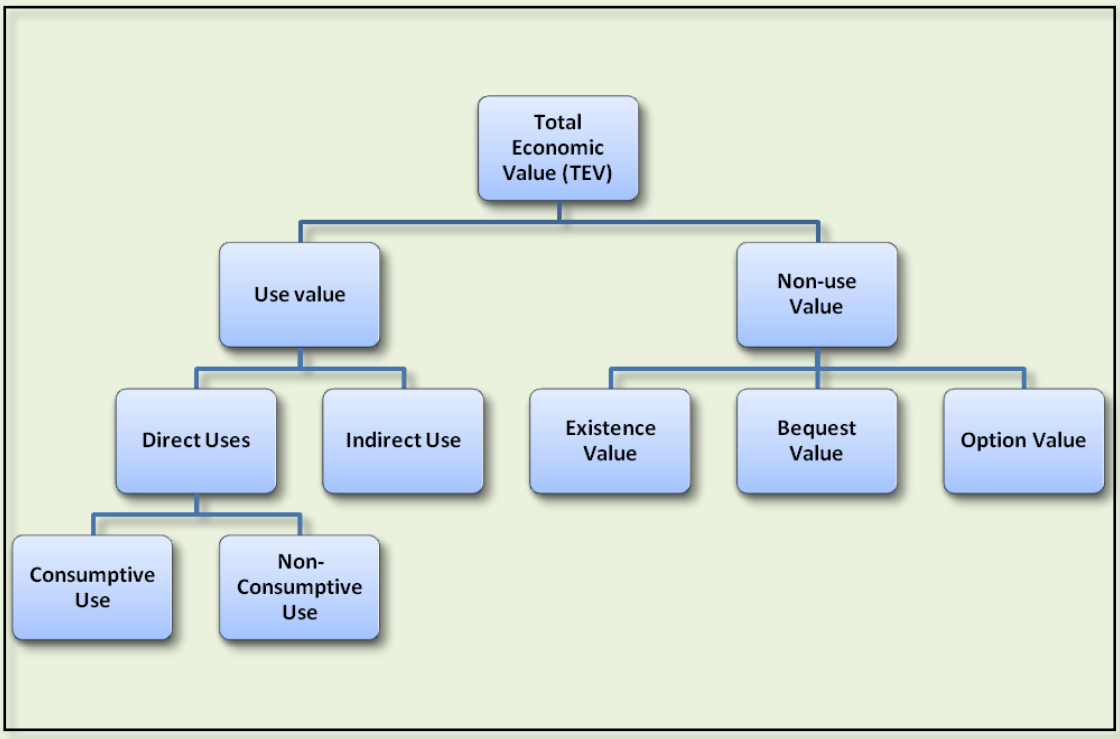


Figure 3: Types of values (adapted from Edwards and Abivardi 1998)

Direct use: These values include ecosystem services that are directly used for consumption or production; tangible (e.g., wood, fish) and intangible (e.g., recreation, research).

Indirect use: These values include the benefits derived from functional services that support current production and consumption, such as water filtration and shoreline protection by mangroves.

Existence value: It arises from the satisfaction of merely knowing that ecosystems and their services continue to exist, even if the person will never use it.

Bequest value: It is associated with the knowledge that the natural environment will be passed on to future generations.

Option values: This estimate the price that people are willing to pay for an un-utilized asset, simply to avoid the risk of not having it available in the future.

The choice of valuation method generally depends on the type of service, availability of resources, time and data for the study as well as its purpose. Some of the commonly used valuation methods to quantify or estimate the different value components of the TEV are shown in the above, figure 1. Direct use values tend to be the easiest to account for, because they are often part of formal markets. Non-use values are particularly challenging; they are the most difficult to quantitatively measure, and have the greatest uncertainty attached to them.

There are several methods to quantify the valuation of ecosystem services from economic perspective.

Under **Dollar-Based Ecosystem Valuation Methods** we show how variety of economic approaches is applied to quantify the valuation of ecosystem services through Table 1.

Table 1: Different Approaches under Dollar-Based Ecosystem Valuation Methods

Approach	Method	Application
Market Prices(marketed goods) - (Revealed Willingness to Pay -(uses market based information to infer a non-marketed value)	**1. Market Price Method**	Money paid for ecosystem goods and services that are treated in commercial markets
	2. Productivity Method	Value is inferred by considering the changes in quality and/or quantity of a marketed good that result from an ecosystem change
	3. Hedonic Pricing Method	Value of environmental amenities (air quality, scenic beauty, cultural benefits, etc.) that affect prices of marketed goods (e.g., the higher market value of waterfront property, or houses next to green spaces)
	4. Travel Cost Method	It assumes that the value of a site is reflected in how much people are willing to pay to travel to visit the site. Costs considered are travel expenditures, entrance fees, and the value of time.
Circumstantial Evidence – Imputed Willingness to Pay	**1. Damage Cost Avoided**	Value is based on the costs of actions taken to avoid damages if a specific ecosystem service did not exist
	2. Replacement / Substitute Cost	Value is based on the cost of replacing the ecosystem service (function) or providing substitutes
	3. Costs of human capital	Health costs (morbidity and mortality) due to changes in ecosystem services (e.g., air or water pollution)
Stated preference – Expressed willingness to pay (Questionnaire surveys; these methods can be used to estimate non-use values)	**1. Contingent valuation Method**	Involves directly asking people how much they would be willing to pay to prevent loss of, or enhance an ecosystem service (e.g., willingness to pay to keep a local forest intact)
	2. Contingent Choice Method	People chose from a 'menu' of options with differing levels of ecosystem services and differing costs, (e.g., policy decisions where a set of possible actions might result in different impacts on ecosystems).
Transfer of values	**Benefits transfer (not evaluation method in itself)**	Transferring a value from studies already completed in another location and/or context

The most common use of ecosystem valuation for decision-making process is in benefit-cost analysis. Benefit-cost analysis compares benefits and costs of the ecosystem services to society for the policies,

programs, or actions to protect or restore the ecosystems. Benefit-cost analysis measures the net gain or loss to society from a policy perspective for the ecosystem services. In case of the ecosystem services the objective of benefit-cost analysis is to determine whether society, as a whole, will be better off if the policy or action is implemented for that.

Among many possible ways Benefit-cost analysis is only one method to make public decisions about the natural environment effective. Benefit-cost analysis determines the economically efficient option as it focuses only on economic benefits and costs. This may or may not be the same as the most socially acceptable option, or the most environmentally beneficial option due to the fact that different ecosystem service has difference benefit-cost value. We know that economic values are based on peoples' preferences, which may not coincide with what is best, ecologically, for a particular ecosystem. Moreover, public decisions must consider public preferences, and thus benefit-cost analysis based on ecosystem valuation is one way to do so.

Benefit-cost analysis is conducted in four steps, viz. –

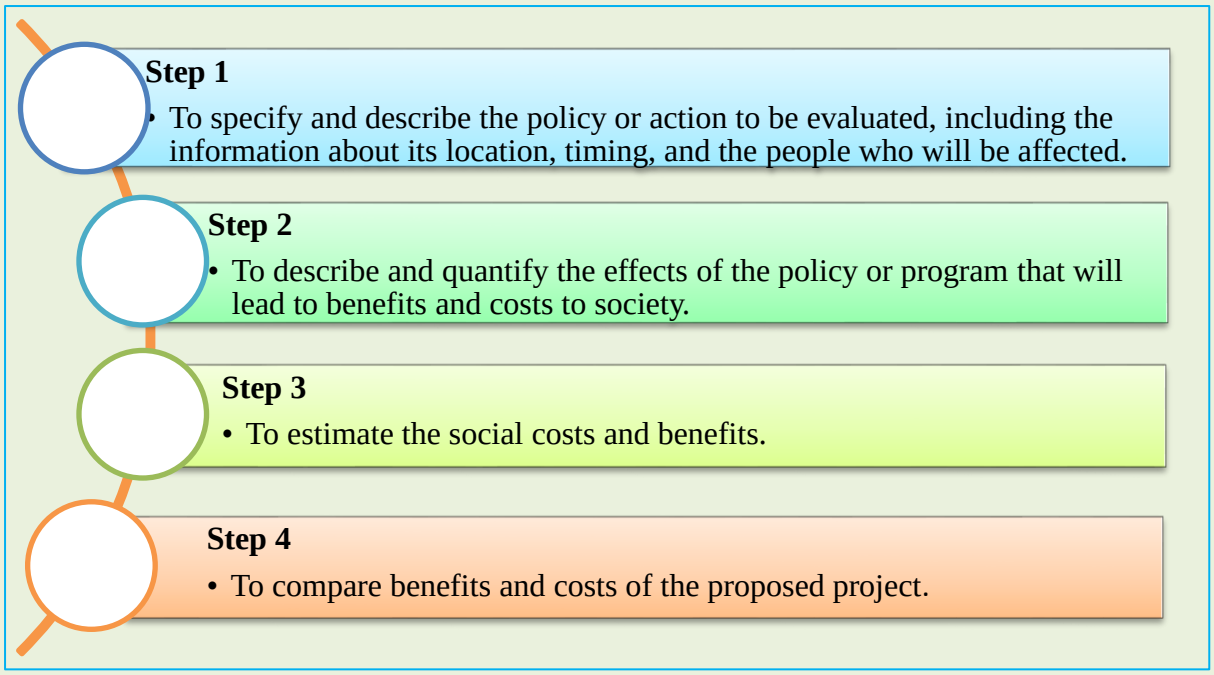


Figure 4: Steps for Benefit-Cost Analysis

Conclusion

The relationship between Ecosystems and human being is not all positive. Pests and diseases carry the negative part of ecosystem. Rain brings both life giving water but also life threatening flood. Human history is a history of constant struggle to adopt nature from the primitive time. Ecosystem services valuations are best seen as complimentary to conventional decision making frame works in which positive and negatives externalities of the use or loss of many environmental goods.

The contribution of ecosystem is both possible and worth living. Ecosystem serves us material benefits such as food and water, regulation of flood, soil erosion, diseases outbreak etc. We get non-material benefits from ecosystem such as recreational and spiritual benefits in natural areas. The tangible and intangible benefits are separated sometimes into "goods" and "services".

Some ecosystem services involve the direct provision of material and nonmaterial goods to people depending on the particular species of plants and animals. Other ecosystem services arise directly or indirectly from the function of ecosystem process. The service of formation of soil and soil fertility depends on the ecosystem processes of decomposition and nutrient.

It should be kept in mind that many individual ecosystem services do not function in isolation. The vegetation plays an important role by taking up carbon dioxide and producing oxygen at the time of regulation of atmospheric composition. It influences ground water levels and the movement of water and wind across the landscape.

Most of the ecosystem services remain free of charge for using but we have to pay for some ecosystem services like organic foods and ecotourism industry as well as the direct trade with carbon emission reduction and sequestration services.

Since Ecosystem Services are defined in terms of their benefits to human being, it should be recognized that ecosystem services are dependent on some features of ecosystem which is considered as an ecosystem services by one group of people.

Ecosystems provide enormous support to human being for leading a quality life. Though many services overlap and are interdependent, it is useful to make an attempt to classify them. Human value each ecosystem service in various ways, including direct and indirect use, and non-use values. By using economic methods, such as direct market pricing, travel cost evaluations, or contingent valuation, surveys the services and values can be quantified.

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Changing Ideas on Environment

Ritaja Mukherjee and Debkanya Banerjee

"There is only one corner of

The universe you can be certain

Of improving and that's your own

Self. "- Aldous Huxley

When you sit back with a steaming cup of coffee, to think about your true position under sun, you will realize a series of facts. By the time you are done discovering how you are in a room of a house in a city of a certain country situated on a particular continent on a planet revolving around a star among thousands in a galaxy, and there are innumerable galaxies in the whole universe and there are debates on how many universes there are in total, literally you will find yourself with cold coffee devoid of ice cream. We occupy such an insignificant amount of space. Yet, the race of Homo sapiens have gone to the extreme heights of superiority complex, where they have declared themselves to be the most refined creation of the supernatural being. However, the nature never fails to make this proud race realize it can easily outwit them with its phenomena. For the last refuge of the shelter less insomniac is a sense of superiority to the sleeping world.

Surely we have to regard intelligence as man's main characteristic and we agree that there is no superiority which intelligence cannot confer on us. Hence man's efforts to prevent pollution in his environment are worth applause. But is it perfect for a race of such high intellectual capacity to be certain of his ways of handling the process of preserving the biosphere? A question is bound to arise and deserves due attention, that is, "Is it possible for human race to bring massive destruction and change on planet earth through pollution? "For a major volcanic eruption can generate more climate alternating gas than that is produced by humans in their entire history. The certainty we claim over particular facts too often end up in failures. For example, the declared extinct volcanoes all over the world have erupted to devastating consequences. Assumed extinct volcano Mt. Vesuvius erupted in AD 79 to result in complete destruction of the sites. Pompeii and Herculaneum. Soufriere Hills volcano on the island of Montserrat resumed activity in 1995. Seismic activity under Stars Volcano, Columbia prompted INGEOMINAS to raise the alert level to eruption warning; even an extinct volcano in Rome is reported to be rumbling to life in 2014.

Debate on nature caused CO2 emission is way more than the bucket full of human generation of this gas has been making its way around the rumour mill for years. According to the U.S Geological Survey (USGS) the world's volcanoes generate more CO2 than humans do. Ian Plimer concludes after his studies on global warming saying, “Human addition to CO2 on atmosphere must be taken into perspective. Over the past 250yrs, humans have added just one part of CO2 in 10,000 in the atmosphere. One volcanic cough can do this in a day. "

0.8degrees Celsius increase in temperature since 1850 may not be due to global warming because the Little Ice Age ended after 1850 and it's absolutely no surprise that temperature increases after long cold period. Since then there is rise and fall in temperature and rate of increase has been same for 3 periods. Hence what part of this warming range was natural? Certainly not the first two was caused due to industrial effect. Hence why wouldn't 1976 - 1998 be a natural process? For Antarctica may be melting equally from below due to the volcanoes under just as warming air temperatures from human induced emissions erode them from above? Is it a change we are going through and instead of adapting to it we take it in the negative light?

Yet, as opposed to our above discussion there are facts that prove, that human activities have contributed a lot to global warming, pollution and other such environment hazarding causes. Questions can be raised that how can we demean the major hazards caused by human faults like the Bhopal Gas tragedy. The initial effects of exposure were coughing, severe eye irritation and a feeling of suffocation, burning in the respiratory tract, breathlessness, stomach pains and vomiting. A total of 36 wards were marked by the authorities as being "gas affected," affecting a population of 520,000. Of these, 200,000 were below 15 years of age, and 3,000 were pregnant women. The official immediate death toll was 2,259 and in 1991, 3,928 deaths had been officially certified. Ingrid Eckerman estimated 8,000 died within two weeks. The

government of Madhya Pradesh confirmed a total of 3,787 deaths related to the gas release. These were the immediate effects but the deformity still continues; it was a massacre in one Word.

AO's Global Information and Early Warning System (GIEWS) classifies a country as facing a food emergency when a disaster-induced shortfall in its aggregate food supply relative to its consumption requirements in a given year cannot be fully covered by the country's own resources and, therefore, it needs external food assistance. As of July 2003, some 36 countries around the world were affected by food emergencies, including 23 in Africa (64 percent), 7 in Asia (19.4 percent), 4 in Latin America (11.1 percent) and 2 in Europe (5.5 percent). In Africa, the dominant cause is civil war which affects 14 of the 23 countries or 61 percent, followed by drought (11 countries or 48 percent). In Asia, the main cause is drought, especially in Central Asia where the impact of the 2000 severe drought is still being felt and food assistance continues to be required. In Central America, the collapse of international coffee prices has left thousands of families without an income, as workers on coffee plantations have been laid off en masse. In Europe, many internally displaced families and refugees in Chechnya (Russian Federation) and in Serbia and Montenegro need food assistance to survive, following recent or ongoing civil wars. This chunk of information talks about food crisis due to emergency situations, and if we notice carefully then flood is the only natural cause for food crisis while all others are manmade. If barbaric quest for political and economic power is the cause for such crisis them why blame the nature? An underwater nuclear explosion leaves no trace at the surface but hot, radioactive water rising from below. This is always the case with explosions deeper than about 2,000 ft (610 m). Such scientific experimentations too are the cause of severe natural outbursts that devours millions of lives.

Though we have enough information to oppose our goal of this paper but we do have enough to support us too. Digging trenches caused trampling of grassland, crushing of plants and animals, and churning of soil. Erosion resulted from forest logging to expand the network of trenches. Soil structures were altered severely, and if the war was never fought, in all likelihood the landscape would have looked very differently today.

Another damaging impact was the application of poison gas. Gases were spread throughout the trenches to kill soldiers of the opposite front. Examples of gases applied during WWI are tear gas (aerosols causing eye irritation), mustard gas (cell toxic gas causing blistering and bleeding), and carbonyl chloride (carcinogenic gas). The gases caused a total of 100,000 deaths, most caused by carbonyl chloride (phosgene). Battlefields were polluted, and most of the gas evaporates into the atmosphere. After the war, unexploded ammunition caused major problems in former battle areas. Environmental legislation prohibits detonation or dumping chemical weapons at sea; therefore, the clean-up was and still remains a costly operation. In 1925, most

WWI participants signed a treaty banning the application of gaseous chemical weapons. Chemical disarmament plants are planned in France and Belgium. These were the effects of World War 1, which inversely made the super powers first world countries of today, making the colonised nations under developed or developing. These countries then, have developed at the cost of us and at the cost of environment (nature), and are now hindering us on our way to progress. If the 19th – 20th century was the era of our nation colonisation then the 21st century is of ideological colonisation where the first world countries are barring us with the excuse of environment, which they have exploited when they required it to reach the power summit. We are not however justifying deforestation. May learning to accept the changes that are coming in our way instead of confining our attention to only the aspect of pollution in the subject environmental studies right from school level could help us in future.

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News from Partners

Climate Change: Present, Past and Future

Professor Sugata Hazra and Dr. Samantak Das in conversation with Author Amitav Ghosh

Reporting by Sritama Chatterjee

The release of Amitav Ghosh's book *The Great Derangement: Climate Change and the Unthinkable* has renewed conversations about climate change, anthropocene and the need to establish a dialogue between the sciences and the humanities, in order to formulate an understanding of climate change that is holistic in nature and not exclusively the domain of sciences. It is precisely with this objective that Jadavpur University hosted author Amitav Ghosh on 2nd August, 2016 at Vivekananda Hall, amidst an audience which was enthusiastic and keen on sharing views, perspectives and opinions with Ghosh himself. The discussion which was moderated by Professor Sugata Hazra, Director of Oceanographic Studies, Dean of Interdisciplinary Studies and Dr. Samantak Das, Associate Professor, Department of Comparative Literature went beyond the issues raised by the book and engaged in exploring the intersections between art, modernity and climate change, in general to reflect on the nature of politics surrounding it. The discussion was simultaneously profound, nuanced and yet accessible to the audience. Although Ghosh had quipped in the beginning that if one wants to change the topic at hand in a discussion, one should start talking about climate change, expectedly the conversation was sharp and focused. However even in this humorous statement, one cannot fail to notice his irony, sarcasm and concern about how we tend to ignore climate change because it does not affect us immediately. This was in response to a question by Professor Hazra whether twentieth century uniformitarianism ("Present is the key to the past") is indispensable in order to understand science and history and if it can be used to discuss the inequalities that exist between the Anglosphere and Asia. Further Ghosh stated that the word "humanities" itself completely excludes other forms of beings from its corpus, an idea which is no longer relevant in the age of anthropocene because it merges human history with geological history. He also expressed his concern about the fact that the increasing concentration of Carbon Dioxide in the air has raised the temperature by 6 to 7 degrees. Professor Hazra corroborated with him and also added an insightful remark that even if the Carbon Dioxide concentration in the air is reduced, the temperature will still remain the same because oceans cannot absorb so much heat.

In the course of the conversation, Ghosh also pointed out how any discussion of climate change within literature is almost always in the domain of science-fiction or non-fiction (Amitav Ghosh's book is also a non-fiction) and how realism or serious fiction has never engaged seriously with it. He states, "Our conception of seriousness is such that we cannot accommodate the uncanny, unusual and the improbable within the scope of serious fiction. The possibility of fictional discourse becomes improbable. We are entering into a new normal." Besides it is not just a failure of the arts or sciences, but also the way in which institutes of learning are created that need to be more climate-sensitive. What he was trying to propose is a kind of environment-based pedagogy inspired by Rabindranath Tagore's model practiced in Shantiniketan. At this juncture, both Professor Hazra and Dr. Das pointed out how there is a thread that connects the novels he had written so far, including *The Hungry Tide* (in its incorporation of the non-human Tiger and the Sunderbans). On being asked by Dr. Samantak Das whether he considered his writings of the yesteryears to be inadequate and if he thinks that his writing is changing, Ghosh suggested that it is not necessarily the case because every novel that he had written needs to be understood in its context and not outside it, as is often the case with any piece of art.

From a reflection over his own piece of writing, the conversation gradually took a paradigmatic shift when Professor Hazra asked Ghosh how the concept of modern ideal life has failed, particularly in Asia and how culture dictates desire that drives carbon economy, in relation to climate justice and spaces outside the Anglosphere. Dr. Das also took this opportunity to ask him how the notion of collective is absent both at the level of praxis and also in politics and said that the most depressing part of the book was probably the section on politics wherein he talked about how he found a new hope in religious groups talking about climate change in spite of knowing how religious groups are used to divide people- Hindus for climate change, Muslims for climate change, Buddhists for climate change. To this Ghosh remarked that he considers Pope's document to be "…the single-most important document and a remarkably open document that addresses very complex ideas in a remarkable way [because] it shows concern for justice and for the poor. In other words, it is just the opposite of what the Paris Accord stands for. He is a religious figure who is borrowing on a pre-modern form of discourse in order to show how modernity, particularly liberal modernity has failed." In order to substantiate his argument, he referred to the Indian or the Asian Civilization where the first duty of the state is to provide water because we are a hydrological civilization. So in China, Cambodia or in India, when the monarchs came to power, they first thing they did was to build tanks, reservoirs, irrigation systems and during famine, the poor were taken care of. However, this starts disappearing during the colonial period when Lord Lytton refused to intervene in the distribution of rice because that would intervene in the free-market economy and he deeply expresses his disappointment because this is precisely what is happening now under a neo-liberal economy. Further he stressed that in Eastern India, it is not understood so much because we are not a water- stressed region. In Bundelkhand, 700000 people were immigrating to Delhi, Nagpur and all these cities every week and Ghosh pointed how no one talks about it and not a single newspaper covers it. Further he predicted that there will be very serious long-term consequences of this because the Syrian uprising originated in a drought because it is only after that they started migrating to cities. In a shift of focus from Syria to India, he regrets that only eighty M.P.s turned up for a session on this issue, enough to throw light on the Indian political class and their indifference about it. He notes, "The first duty of the state has to been provide water but they clearly seem to have forgotten that. Very few civilizations have been able to survive this. The last was probably the Japanese civilization. There was a timber shortage and they had imposed heavy rationizing. So, there is no easy way out of it. Whoever is going to power is not a benign, helpful or friendly person."

In the last question of the day, Professor Hazra asked him why any discourse on anti-war strategies are not tied up with issues of climate change, especially considering the carbon cost of war that ranged from 560 million metric tons of Carbon Dioxide particles in Hiroshima and Nagasaki to 2003 Iraq War that released 540 million metric tons of carbon in the air equivalent to carbon budget of USA for a year. Ghosh replied that this can be attributed to the neoliberalisation of climate change and the irony lies in the fact that the Paris Climate Summit was also sponsored by one of these honchos while the environmentalists were put under house-arrest. This was followed by a stimulating interaction with the audience where questions included role of alternative modernities in climate change and if we are too afraid to accept the reality. It is hoped that such conversations will open up a space for further deliberations on ethics and philosophy within the issue of climate change.

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