



ENVOICE

A Newsletter from the Department of Environmental Science, Vivekananda College, Thakurpukur, Kolkata

Vol. 4 No. 1

Earth Day Issue

April, 2013

FROM THE DESK OF PRINCIPAL

ENVOICE, a newsletter of the Department of Environmental Science, is going to complete its fourth year of publication. Now it emerges as a strong platform to the students and teachers of the department to express their views on environmental issues. It is high time to attract other persons interested in the field of environment in our college to contribute and enrich this publication in coming years. I am sure that ENVOICE will be successful to spread the news and views on the environment among the common people. So, to improve our living condition, ENVOICE will take the leadership in future. Environment is our wealth, so as ENVOICE is the wealth of Vivekananda College.

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Price hike or Polluter's Pay?

Rajarshi Mitra

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'The Petroleum Ministry is taking care of the Environment': sounds erratic to be a news headline? Believe me, it would have been an appropriate headline in the last week of June 2010 when the central government finally decided to leave the price of petrol on the market. The deregulation of fuel pricing may have several economic or social implications, especially in a country like India, but it is welcome when seen through the specs of an environmentalist. A trend analysis of petrol to diesel car sells during 2011-12 has shown a reversal of the ratio in demand for petrol to diesels cars in India, owing to deregulation of the petrol price while the diesel price is still under the regulatory control of the Government. The 2012-13 has also recorded a significant drop in the car sells, a portion of which may be attributed to the upward price curve of fuel.

It has happened as a rule of economics and the Polluter's pays principle of environmental management has worked, but without a proper intention of the government. The shift of car buying from petrol to diesel is not going to do better for the Environment, rather more diesel engine will worsen the condition soon. A diesel car of same engine specifications and performance emits 14 to 17% more Carbon dioxide compared to the petrol driven car. In line with the global concern of combating the global warming steps must be taken to make a cut in fossil fuel consumption. Deregulation of diesel at least for luxury consumption, therefore is the need of the day to cease draining out the money as well as the carbon credit of the country. Not, the petroleum ministry but the Ministry of Environment and Forest should take initiative to make use of the opportunity.

It has already been proved that pricing of natural resources in a higher side put a cut over the luxury consumption and play significantly well in conservation of the same. But how long it will take to be understood by our Government is a million Dollar question.

Sexual dimorphism in the evolutionary ecology of *Aedes aegypti*

Sumana Mukherjee

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The biology of *Aedes* mosquitoes is very interesting. It exemplifies how the two sexes of a species can be shaped by their ecology in very different ways. Larger females have higher reproductive success, whereas that of the males is not that much affected by body size. Probably due to this reason the two sexes have evolved very different response patterns of body size upon important environmental stresses. For example, upon intense crowding males become smaller by reducing their larval development time whereas females do not compromise on body size. Upon intense crowding, female larvae develop relatively slower and thereby manage to avoid becoming smaller. (From Bedhomme et al. 2003, J. Evol. Biol. 16: 721-730).

Put the Lights off: Let them live in Dark

Arpan Shome

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Hundreds of Olive Ridley hatchlings sacrificed their lives in Orissa coast, as they were misled by the lighter horizon of highway illumination and lost their way to the sea. Deciduous trees that are subjected to artificial light have been shown to retain their leaves in winter on the side that is lit at night. Such observations are frequenting now a days, but most of us overlook the matter, as we do not prefer a darker night. These are the results of light pollution.

Light pollution is light that is allowed to go where it is not wanted. It is often referred as “Skyglow”. A common misconception and often quoted urban myth is that the only that human have created which is visible from space is that “The Great Wall Of China”: It is in fact the light we send upwards from our planet at night! A recent satellite survey revealed that in just seven years (from 1993 to 2000) the levels of light escaping upward have increased by 17% in the UK alone. Pollution not only unbalance the ecosystem rhythm or biological clocks of the organisms, but also can be seen as loss of energy produced in expense of natural resource.

So next time you are out of your home do remember to switch off the lights.

More Gas in the air may lead more Flash in the sky

Collected & Compiled by Protusa Biswas

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Recent studies suggest that spikes in air pollution levels led to an increase in the count of lightning flashes, adding NO_x to the atmosphere and ozone levels near the ground during the thunderstorm season from April to May over Calcutta. Urban pollution is among the factors that can influence lightning and thunderstorm activities.

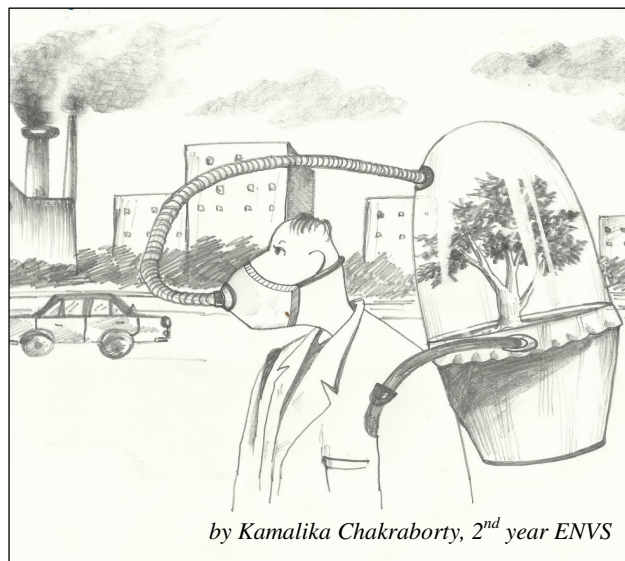
Scientists have analyzed air pollution and the lightning count these pre-monsoon months over a seven year period have seen an increase in ozone.

The scientists used Central Pollution Control Board data to measure suspended particulate matter such as soot particles and emissions along with observations from US satellite to track lightning flashes during April-May between 2004 and 2010.

It is suggested that during the of thunderstorms, updraft winds lift pollutants from near the ground and push them into the clouds. This addition of suspended particulate matter influences a process called charge separation that favours lightning. Lightning, being an intensely energetic phenomenon, dissociates compounds in the atmosphere, raising the levels of NO_x.

The level of oxides of nitrogen and ozone goes as high as 81 and 35 microgram per cubic metre respectively on days with more than 20 flashes compared to no lightning days.

Source: *The Telegraph Metro*, 6th April, 2013



by Kamalika Chakraborty, 2nd year ENVS

INVITED ARTICLE

Carbon-credit as Synergy of the Trade-Environment Face-off: A Juridical Study*Dr. Debasis Poddar**University of Study and Research in Law, Ranchi, Jharkhand*

While (degradation of) regional environ is a matter of concern since long back, life-sustaining climate on the Earth- that is global environ- is a relatively newer add-on to the same. An international climate change regime, the United Nations Framework Convention on Climate Change (UNFCCC) along with Kyoto Protocol (KP), operates as a nearly global international forum (194 state parties along with European Union) to contain global warming syndrome within affordable limit and thereby survive such existential threat to humanity in exact sense of the term. This is a juridical institution in a sense that it may and does proscribe climate sin on the part of its state parties as and whenever identified to put survival of mankind at real stake. General consensus among its state parties and consequent formulae operate as climate laws of the planet to offer check and balance for carbon economy of the world. Forthcoming paragraphs concentrate the focus on a particular formula- carbon credit.

The concept of carbon credit stems from behavioural discipline imposed upon states- industrially developed states in particular- to observe strict restraint on respective upper limits for emission of Greenhouse gases into global atmosphere. Being seasoned with its behavioural pattern, these states find the dictate inconvenient for their given agenda toward further economic development. At the same time, they cannot afford to continue climate sin at fatal cost of the Earth which includes them as well. Carbon credit is a formula introduced in course of its multilateral negotiation to attain a balance between conflicting interests of trade and environ (read climate). Carbon-economic state may thereby exchange its carbon balance in favour of carbon-extravagant counterpart in lieu of cash or other benefit(s).

Potential of this formula lies in its jurisprudential strategy to attract climate adherence on the part of developed states of the Occident on their own and thereby introduce climate discipline on them sans resistance. Thus, on one side, these states will find adherence to climate laws (if so called) of UNFCCC-KP regime less inconvenient and, on other side, Least

Developed Countries (LDCs) will find such exchange convenient to grapple with chronic fiscal and other deficits that they suffer from sans remedy. Together these two different hemispheres of the world with divergent requirements for their diverse development agenda are scheduled to resolve their respective crises between themselves. Accordingly, burden sharing process introduced by the regime is likely to be less inconvenient for both sides.

Within national legal regime, carbon credit may be introduced in two ways- individual and institutional- to ascertain carbon consumption and put restraints on climate sin. Cumulative account of these two will facilitate ascertaining carbon credit of the state. Like inter-state transaction carbon credit will be order of the day between and among individuals and institutions as well. Carbon currency- black money in rhetoric sense of the term- is thereby set to be a universal currency around the world in time ahead. Like state, individual and institution will also be subject of respective upper limits of carbon consumption besides recourse to carbon credit.

A hectore of plantation can annually absorb the carbon emitted from burning of 2000 litre Gasoline.

No model is devoid of limitation and this one seems no exception to this end. Thus, as concern is raised by the civil society movement (albeit from cynical perspective), carbon credit is set to defeat object and purpose of the

UNFCCC-KP regime since this model is bound to encourage climate sin continue through resort to carbon credit at random. Climate restraint is set to be reduced to negligibility, if not nullity, while carbon credit is meant to offer a breathing space for both hemispheres of the world. For international as well as national community, carbon credit is allegedly conceived to subvert good (climate) governance from within the system itself.

In spite of such critique from argumentative point of view, carbon credit seems order of the time ahead. After all, this tends to transparency and accountability vis-à-vis good (climate) governance. No stakeholder- be the same a state, a non-state actor (commercial entrepreneur) or an individual- may commit climate injury with impunity since sin is put on record and perpetrator remains subject of perennial vulnerability. Last but not least, this is likely to create widespread concern for climate change and duty to contain the same within affordable limit of carrying capacity of the Earth lest it is too late to lament for the posterity and pay cumulative price.

The colorful butterflies, as indicator species

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Butterfly is one of the most beautiful creations of nature. Generally we use to watch them for their mesmerizing color patches and to visualize a unique combination of beauty. But how many of us know that the butterflies are considered as one of the most valuable bio indicator of ecosystem integrity as well as ecosystem's stability? Some of us may know this but how many of us know that how a butterfly can perform the role of a bio-indicator and why butterflies are suitable as an indicator species while moths are not?

An **indicator species** is any biological species that defines a trait or characteristic of the environment. For example, a species may delineate an ecoregion or indicate an environmental condition such as a disease outbreak, pollution, species competition or climate change. Indicator species can be among the most sensitive species in a region, and sometimes act as an early warning to monitoring biologists.



There is a concept of ecosystems stability by Berryman (1987), that states structural complexity is directly responsible for supporting biotic diversity. Species diversity at all tropic levels of all ecosystem foodchains provide ultimate stability and equilibrium to the system. More the species, that an ecosystem can support through intricate and interweaving food webs, the greater its inherent stability. By contrast, simple, linear food chains involving only a few species are very unstable, and typically oscillate between population explosions and crashes that are determined by simple density dependent-Independent processes.

Now the tropic levels of all natural ecosystems are ultimately based upon the plants as producers, which are eaten by herbivores as primary consumers, which in turn are eaten by predators as second and third order consumers. A high species diversity of plants supports a high diversity of herbivores, which in turn supports similar diversity among predators. In terrestrial ecosystems, Insects function as organisms, the equivalent of zooplankton in marine systems.

Lepidoptera (butterflies and moths) are the primary defoliating herbivores in forest ecosystems, converting plant biomass into animal biomass, and making it available to higher trophic levels in the food chain.

Lepidoptera are also important in grassland systems, but share the defoliating role with grasshoppers (Orthoptera) and herbivorous mammals of the insects, Lepidoptera are primarily active in spring and early summer, while Orthoptera become dominant defoliating herbivores in mid to late summer.

Another Important point is that most Lepidoptera are highly monophagous, and feed exclusively upon single type of plant. This is, also true of many grasshopper species. Consequently, the more plant species that an ecosystem can support will be reflected by more herbivore and predator species at higher tropic levels.

So presence of different types of butterflies in a particular area means that the area has rich plant diversity. And a huge numbers of butterflies represents, herbivore rich and as well as an intricate and interweaving food webs rich ecosystem. By which an ecosystem can be considered as highly stable in condition.

Butterflies are relatively well-recorded, recognizable and appreciated by the public. Some species are sensitive and respond rapidly to environmental changes. This makes butterflies good indicators of habitat loss and fragmentation, and the impacts of climate change.

On the other hand Moths are not good organisms to use as bioindicator because they only fly at night, and cannot be visually monitored along transects through the habitat management areas. They must be collected by black-light traps. In addition, moths are very difficult to identify, and must be closely examined by a taxonomic expert. In contrast, butterflies are easy to visually monitor along transect lines during the day, There are major groups of butterflies that feed on most of the major food plant groups and these butterfly groups are easily recognized In the field by non-experts. Thus, butterflies can serve as representative bio indicators for the overall Lepidoptera community of herbivores.

Water Pricing: A way to wetter tomorrow

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Only 3% of the earth's water is fresh, non saline water. Of that non saline water, only 31% is accessible as fresh water. For every gallon of fresh surface water, there are 30 gallons that lie underground. The primary water source for urban bodies is ground water. People extract some of this water from the ground and consume it as drinking water. If the water is consumed without treatment, bacteria present in these waters, for example, *Pseudomonas*, *Flavobacterium* and *Acinetobacter*, invade our body as pathogens, which may present themselves as health risks. For our protection, municipalities use chemical agents such as chlorine or chlorine based products to kill bacteria. In addition, where unsafe levels of toxic minerals exist, they are removed by bonding them into larger molecular particles and filtering them out. These treatments, when done for the people of a country as densely populated as India, needs huge financial investment. Therefore, it is only reasonable for this water to be made public after pricing it, be it through the distribution chains of corporations and municipalities after being taxed, or be sold in packages or bottles for a price.

While pricing water, the diverse socio economic stratum has to be kept in mind. Without consideration for this aspect of the Indian society, where the margin between the rich and the poor is very high, the cost of water may become unreasonably high for some, and too low for the rest. This will result in uneven distribution of water amongst the masses, where the rich would waste and the poor would want. This would ultimately result in waste of resources, both water and life, as the rich would waste water thoughtlessly, while the poor would get so less, that their lives would become just a pursuit of water. Policies of water pricing should therefore be made necessary, keeping socio-economic inequality as minimal as possible.

DO YOU KNOW?

Loss of a drop of water a Second, amounts to loss of 31,536 litres of water a year, that is sufficient to cater the annual drinking water need of 17 people.

Fight to check Water contamination: Before it is too late

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Water is undoubtedly the most precious natural resource that exists in our planet. Although we as human recognize this fact, but disregard it by polluting river, lakes and Oceans.

Nationally 53% of the population relies on ground water as drinking water. Although, the Section 305(b) of State Water Quality Reports, 1992 indicates that overall ground water quality is good, but many local areas have significant groundwater contamination. Estimates suggest that globally around 1.5 billion people lack safe drinking water & that at least 5 million deaths per year can be attributed to water borne diseases.

There are many causes of water pollution- Because of rawsewage and oil spills most of the coastal water are now polluted & Marine Wildlife is beginning to suffer. Pollution is also caused when silt and other suspended solids are wash off by rains & settled down to the surface water. And one of the main causes of water pollution is contamination. There are two types of contaminants, *Organic* contaminants in form of petroleum hydrocarbons, Volatile Organic Compounds(VOCs) etc. and *Inorganic* contaminants like acidic or basic effluents with phenolics, cyanides from industrial units Ammonia from food processing waste etc.

High concentration of metals either of natural or of anthropogenic origin (Ca, Na, Fe, Mn, Cd, As, Hg, Cr etc.) can also have negative impacts on aquatic lives and groundwater quality finally leading to severe public health problems..

As we head into 21st century Awareness & Education will be the two most important ways to prevent water pollution. Our Government has passed laws to combat with this issue. But only government alone cannot solve twhe entire problem ,it is ultimately up to us.

So, we have to learn about various ways for disposing harmful household wastes. We have to preserve trees to prevent soil erosion and infiltration of wastewater into soil. To minimize pesticide impacts farmers may use Integral Pest Management (IPM). If these measures are not taken and water pollution continues, life on earth will suffer severely because, water pollution has the capabilities to disrupt life on our planet to a great extent.

STUDENTS FIELD RESEARCH

A Study on Digha Beach erosion and its relationship with beach profile

Students of B.Sc 1st yr., Department of Environmental Science

In continuation of the last years study on Digha beach erosion (as it was reported in Envoice, Vol.3 No. 1) in 2012-13 season the 1st year students of the department of Environmental Science tried to trace out some quantifiable causes of such erosion.

This time, the whole beach was divided into 5 zones among which the Old Digha portion does not have any sort of beach left. The students measured the inclination of the beach and the stretch of inter tidal zone (ITZ) to see whether there is any relationship between the slope and beach erosion.

The most wide beach was reported from the new Digha and Udaypur area where a very gentle slope of the beach was reported. On the other hand, at the mouth of Subarnareha river near Talsheri maximum slope was found.

Zone	Beach Height (m)	Beach Stretch (m)	Angle of inclination (°)
Old Digha	N.A.	N.A.	N.A
Old - New Digha	3.0	87.90	1.96
New Digha	3.0	131.25	1.31
Udaypur	3.37	143.54	1.34
Talsheri	2.16	60.04	2.07

The results of the study (See table) suggest that the width of beach is inversely proportionate to the angle of inclination, i.e. more slope gradient may lead to more erosion.

The First Report of Yellow Wattled Lapwing at Digha

During the field visit at Digha the students of 1st year of the department spotted a flock of Yellow Wattled Lapwing on the stabilized due beside Digha railway station on 3rd October, 2012.

Afterwards it was found to be the first report of the bird (YWL) from Digha area.

Identification of Ideal quadrat shape: A field exploration at Dooars

Students of B.Sc 2nd yr., Department of Environmental Science

Quadrat analysis is one of the most common and widely accepted procedures for biodiversity study. As a common practice in most of the cases the researchers use square quadrat, which is believed to be the best shape to work with. It is free from directional bias and having the easiest mode of area calculation. However, edge length is considered a decisive factor in choise of quadrat shape as longer edge leads to high error margin in counting of individuals. Here, circular quadrat qualifies better than a square.

During their field study at Dooars the team of second year honours students of the department designed a study for comparative assessment of workability of different shapes and sizes of quadrats in different ecosystem.

Successive efforts for two years visits revealed high variations in results from quadrats of same sizes but different shapes. For the purpose of comparison, circular, square and rectangular quadrats of 1m², 4m² and 9m² size were chosen. And the calculations were made for biodiversity indices like Shannon-Weiner index and Simpson Index of biodiversity.

The previous year’s study failed to comment on any definitive variations. But this year when variations in sizes were considered along with different shapes some trend were found.

Minimum variations in different biodiversity indices values were found among different sizes of the circular shape, while erratic variations were reported among sets of different sizes for other quadrat shapes. Even in a few instances square quadrat showed higher variations than rectangular quadrats.

Hence, it seems that the circular shape of quadrats is most acceptable, which is indeed in line with the theory. However, considering the inadequate sample size, further experiment with the same design is recommended.