ENVOICE

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

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FROM THE DESK OF PRINCIPAL

I am indeed delighted to learn that the Department of Environmental Science of our college is bringing out a Newsletter to observe the 40th anniversary of Earth Day on 22nd April, 2010. The major challenge in our country today is to maintain balance between environment and development in tune with demands of society. I am sure this newsletter will obviously shed some light in the minds of our younger generation to meet this challenge. I wish all success and prosperity of this noble endeavour. I also take this opportunity to put on record my sincere appreciation of the efforts of our staff members and students of Environmental Science department for enriching the awareness of others.

Dr. Tapan Kumar Poddar,
Principal
Vivekananda College, Thakurpukur

ABOUT US

The Environmental Science department of Vivekananda College is the first ever and the only Environmental Science (Hons.) department under the University of Calcutta, established in 2008.
In addition to regular academic activities, it pursues:

- **Seminar lectures** on Environmental issues.
- **Daily Weather reporting** at 12'o clock.
- **Students Research** activities.
- Field studies
- This biannual **newsletter** has been launched on the occasion of Earth day, 2010
- Celebration of **Earth day** and **World Environment day** through students activities.

IN THIS ISSUE

FUTURE ENVIRONMENTALISTS SPEAK

Dr. Rajarshi Mitra
Head, Dept. of Environmental. Science, VC

Little Mimi of 3rd standard knows the value of a tree. Mr.Chatterjee at his early 80s shares his experience with warming weather and relates it to greenhouse effect frequently. Mrs. Sen is proud of her new AC as it saves energy and is tagged eco-friendly. Can you relate them? They all are well aware of environment and consequences of environmental degradation – it's good, indeed a very positive sign. But, ironically, it becomes equally threatening when they think environmental science is what they all are talking about or it is everyman's business.
Today with the media exposure and awareness campaigns, a good number of people have become pro-active on environmental issues and started talking on the same. In most of the cases, however they overlook the science behind and do not pay hid to the subject as a scientific discipline, frequently leading to confusion and dilution of the issue.

The need felt in early 90s. In response to a PIL filed by M.C.Mehta, the Hon'ble Supreme Court of India had given its judgement for introduction of the subject in formal education system. Following the order, step by step it has been made compulsory in school and under graduate level academic curriculum throughout. But the lucidity remains.
We are not sure, 'whose fault is it'. We are not sure, 'what is to be done'. We are not yet even confident what we are actually doing with it! We are only hauling little more loudly. We feel something needs to be done, and we are still to start with a scratch.

A scratch – 'ENVOICE', a newsletter from, the first ever, undergraduate department of Environmental Science (Hons.) under the University of Calcutta.
Don't know whether it will be soon in you waste paper bin or really will put a mark in your mind. But for sure, it will carry the glimpses of the future environmentalist with depth of knowledge on the subject. It's the voice of those who has risked their career to grow with a subject at its infancy.
Hopefully, you'll love the taste and the bin will wait for a while to get the next item thrown in it.

Abstract of Theme Lecture of Earth Day celebration

RELEVANCE OF CELEBRATION OF EARTH DAY IN INDIAN CONTEXT

Professor S.C. Santra,
Department of Environmental Science, University of Kalyani

On April 22, 1970 much of the US citizens enthusiastically celebrate the first "Earth Day". In many ways this was a time of idealism. Even as people finally acknowledged the existence of environmental problems, they assumed that the problems could be solved. In latter stage, rising public activism and litigation led to the passing of a number of federal laws that still form the basis of environmental protection in the United States. However at the latter part of 1970s, public concern about the environment had declined. But once again since 1990s, environmental issues were coming to centre stage. Earth Day 1990 received more attention than any Earth Day celebration in the past.

Since then Earth Day celebration, draws attention of the global partners more effectively. India became concerned on environmental issues since early 1970s. A number of legislative measures are taken up over past four decades to protect our environment and also to maintain better healthy lifestyle.

In the 40th year of Earth Day celebration the focus was made on waste recycling. In truest sense there is no waste, if you can make proper use of waste gas, waste water, solid waste and then pollution could be minimized. Wealth can be generated out of waste. Enormous technological progress is made over the years on waste recycling processes. Appropriate use of resources, waste recycling, energy conservation and population stabilization are key issues of today's environmental protection in any country of the globe. India is not an exception from the same. Celebration of any special day, is nothing but the stock taking of activities done in the past. What could be our future goal and action plan? All these issues needs to be assessed at the time of day's celebration.

SECOND GENERATION BIOFUEL: A NEW CONCEPT TO TACKLE CLIMATE CHANGE

Sumana Mukherjee, Lecturer, Dept. of Environmental Science

Converting the rubbish that fills the world's landfills into biofuel may be the answer to both the growing energy crisis and to tackling carbon emissions and to tackling climate change. New research reveals how replacing gasoline with biofuel from processed waste could cut global carbon emissions by 80%.
Biofuels produced from crops is often controversial because they require an increase in crop production which has its own severe environmental costs. However, second-generation biofuels, such as cellulosic ethanol derived from processed urban waste, may offer dramatic emissions savings without the environmental catch.

Research suggests that fuel from processed waste biomass, such as paper and cardboard, is a promising clean energy solution. Environmentalists said that if developed fully this biofuel could simultaneously meet part of the world's energy needs, while also combating carbon emissions and fossil fuel dependency.

It is estimated that about 82.93 billion litres of cellulosic ethanol could be produced from the world's landfill waste and that by substituting gasoline with the resulting biofuel, global carbon emissions could be cut by figures ranging from 29.2% to 86.1% for every unit of energy produced.

Scientists have developed a groundbreaking way to produce ethanol even from waste products such as orange peels and newspapers. The approach is greener and less expensive than the current methods available to run vehicles on cleaner fuel. This breakthrough can also be applied to several non-food products including sugarcane and straw. There's also an abundance of waste products that could be used without reducing the world's food supply or driving up food prices. In Florida alone, discarded orange peels could create about 200 million gallons of ethanol each year.

Thus we can hope that this Second generation biofuel could become an important component of our renewable energy future. This could be a turning point where vehicles could use this fuel as the norm for protecting our air and environment for future generations.

INVITED ARTICLE

THE PEOPLE AND THE SNAKES

Anurag Basu, 1st yr. Environmental Science (Hons.)

A faint track on the sand – may not tell us anything, but for an *Irula* person it indicates that a small Cobra has passed that place barely 10 minutes ago. He may even follow the tract to find a rat hole in a scrub forest hundred meters away. In most of the cases, a cobra will be available in the hole. In the urban communities most of the people are scared of snakes and hate the serpent a lot, but quite a good number of people live on the reptile for their livelihood and protect them traditionally for their ecological importance.

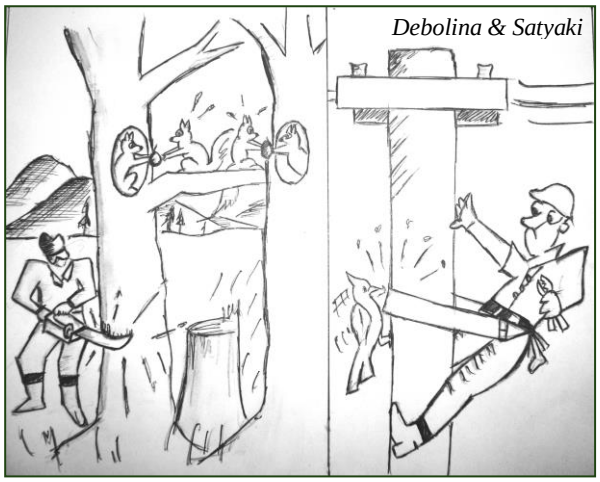
Irulas – a local tribe of Tamil Nadu are famous for their snake tracking and catching capacity, as they used to supply a huge amount of snake venom to different institutes of the country and abroad predominantly for medical research. They have indeed formed a society called Irula Snake Catchers Cooperative Society, where snakes are brought and kept in cool mud pots to be sent to different institutes. Their activities, however, does not kill the snakes but a lust for money through snake skin trade by many other kinds of hunters pose massive threats the snake community.

Irulas are not the only snake catcher tribe. There are many others who thrive on the reptile like *Das* snake

charmers of Patia region of Orissa who are specialized in catching the Cobras from nearby mangrove forest areas. But, the most common snake charmers, whom we used to see in the urban roads with flutes in hand and a snake in a basket are not those traditional people and do harm to the animal by several ways those lead then to death within a month or two. *Mahrs* of Maharastra, *Chakmas* and *Poliyars* tribes of North Eastern India are some of other tribes which are closely related with the snakes. However, while Mahras are only snake catcher, the North Eastern tribes feed on them.

Snakes are worshipped in many countries of the world. In India People have mythological believes about snake. Lord Shiva and Vishnu have their own snakes like Cobra and Ananta Naga respectively and they enjoy regular offerings from them. In Battis Shirala of Maharastra, during the harvest festival – Nag Panchami, freshly caught Cobars are worshipped with flowers, ghees and money. Such believes and rituals are also found abroad. In Burma an expert snake catcher goes into the forest and brings back a huge King cobra. On the auspicious day, the snake is taken to a open field and people surround it. As the basket of the snake is opened the Cobra rises to its full height and spreads the hood and then the expert dancers and wrestlers lean on it kissing its head.

Snakes have ecological values and importance in the society. Now a days the lust of human society for the snake skins, venom and other parts have made some of the species endangered and the list is being elongated every day. Considering their relationships with the traditional people and values in maintenance of ecological integrity conservation efforts are on through scientific researches and awareness building.



BECOME E-GREN TO BE GREEN

Debolina Naskar, 1st yr. Environmental Science (Hons.)

We have proud our poisons into the world as though it is a bottomless pit, and we go on gobbling them up. Its hard to imagine how the world would survive another century of this abuse, if nothing is done right now. Electronics have become an integrated part of our everyday life. Technologies are advancing at a lightning speed and the today's gadgets becoming outdated tomorrow to be thrown as waste – the *e-waste*. Here question arises whether they are been disposed off safely or not?

The unfortunate truth is that e-waste has become a huge problem for the environment. It is contaminating water supplies and adding to the CO_2 concentration of atmosphere. E-waste is all too often not properly being disposed off and the US is one of the largest polluters.

Unlike plastics, which have ended up in the oceans harming wildlife at an alarming rate, e-wastes are being shipped off to far away continents. Unfortunately, we hardly pay attention to what happens to the toxic effects of those waste materials. Indeed you may find those waste materials in slums of Mumbai and many other low income clusters of the developing countries. The poor generally reuse and recycle the materials or destroys those to make something else. While the former option is comparatively safe but the later one leads to maximum threats to both the human health and environment.

It is not only a policy decision or some advanced technological option can solve the menace, but we can also learn to be e-green. We must take each and every one of our electronic purchase seriously. We should stop buying every new gadget that last long and can be upgraded without discarding the article. We need also to be vigilant on disposing off any of the gadgets we are using. Remember, use of a laptop saves nearly 90% power compared to a desktop and LCD monitor saves upto 30% energy. Cartridge recycling and regular maintenance to avoid replacement and waste generation too should be encouraged.

However, of let a few corporate responsibilities for electronic gadget recycling are being noticed even in our country. Although those activities like recycling or cell phones and/ or computers sometime cut our personal profitability to some extent, we should encourage those to be e-green.

OCEAN ACIDIFICATION DISTURBS ANIMAL COMMUNICATION

Tanushree Gayen, 1st yr. Environmental Science (Hons.)

We all know that Carbon dioxide is a minor but important constituent of the atmosphere. All though natural presence of the gas at a concentration of nearly 388 ppm is necessary for our environment but the present rising trend due to rapid urbanisation and industrial development has alarmed a concern. Being a greenhouse gas the increasing concentration of atmospheric carbon dioxide warms up the earth – atmosphere system leading to Global warming. But, some other important consequences are being overlooked frequently. One of such consequence is the acidification of ocean water.

When carbon dioxide comes in contact of the ocean water it gets dissolved in it and forms carbonic acid, lowering the pH of the water. It has been found that presently the seawater pH has declined by about 0.1 compared to the pre-industrial level, which is corresponding to nearly 25% increase in acidity. A recent study reported in *Oceanography* journal by Brewer and Hester in 2009 has found that such lowering of oceanwater pH has severe impact on ocean acaustic that may disturb the underwater communication of marine animals.

Low frequency sound absorption depends on the concentration of dissolved chemicals such as boric acid, which in turn depends on seawater pH. Hence with the changing concentration of boric acid due to pH fluctuation affects the underwater sound propagation. However the process of sound propagation is much more complex. It depends on spatial distribution of sound sources and environmental parameters, making some areas noisier than other. With the lower pH the rate of sound propagation increases and therefore the areas with high noise intensive activities like shipping operations, use of sonar system etc. may become acaustic hotspots. Such enhance noise levels are expected to interfere with the underwater animal communication system affecting their community interactions.

The study seems to be an eye-opener for the commons, about the integrity of environmental systems, and how disturbance to one particular component can disturb the others. Next time when you think of your energy consumption in expense of fossil fuels not only think of your future with global warming but also try to feel the agony of those marine animals which used to rest in peace.

WHY THERE IS A NEED FOR SUSTAINABLE DEVELOPMENT

Aritra Misra, 1st yr Zoology (Hons.)

In this modern human civilization the whole world, particularly the developing countries face near crisis situation in terms of both economic and environmental condition. Governmental bodies find it difficult to formulate programmes that would work under the present situation of escalating population on one hand and diminishing resources on the other. This ultimately results in environmental decadence that inevitably weaken the economy leading to social disintegration. In spite of knowing the fact that the link between environment and socioeconomic degradation cannot be overlooked, even today very few efforts are being made to break this vicious cycle.

In the post-independence period in our country political and social attitude have been dominated by developmental growth without a culture of pollution control. As a result, presently we are facing the problems in pollution stabilization, integrated landuse planning, conservation of biodiversity, development of non-polluting renewable energy resources, waste recycling and at most in propagation of environmental education and awareness.

The environmental protection is an ethical as well as economic issue and sustainability is necessary. However, none of these as an issue is sufficient condition for sustainable development. Sustainable development as defined by World Commission on Sustainable Development (WCSD) in 1987 is ‘a kind of development that meets the necessity of present generation without compromising the interest of the future generation’, set a fundamental target of ensuring an uninterrupted development. In this context, public institutions have responsibility to plan and act so that there is no undersupply of the public goods and resource. In fact, the goal of sustainable development may be focused in line of enhancing the coping capacity of the society as Prof. Amartya Sen, 1985, suggested “Goods and commodities are important for enriching human lives, but their effectiveness in welfare enhancement depends on the trait of society and its institution. So the focus changes to the fulfillment of human capabilities to cope up with any change”.

Numbers of national and international agencies are working on the problem along with increasing number of social and environmental movements. It

is a good sign for the sake of environment and economy if they go hand in hand but, will fail to achieve the actual essence of sustainable development, if conflicts flicker at every point. Hence, we need to be cautious and indulge a development which is indeed sustainable one.

NATURE NEEDS OUR SYMPATHY

Tilak Chatterjee, 2nd yr. Environmental Science (Hons.)

Environment means integrity of flora and fauna in a way to help each other for a long peaceful existence. With the advancement of the civilization, the lives of several creatures have been at a stake. A few news headlines as follows indicates the need of the present.

- IUCN has reported 21% mammals, 30% of amphibians, 12% of Birds, 28% reptiles, 37% invertebrates has been lost so far, and many others are at a stake.
- 25 species of Primates has also been reported to be endangered. The Gibbons of India is also included in this list. However, regarding the this a perfect study has not yet been completed.
- Degradation of marshes in the Europe, especially Romania has faced fast degradation leading to habitat loss of more than 5500 species of plants and animals.
- Besides extinction or threats to the wild plants and animals, the Climate change issue has become a burning topic of today. But most unfortunately the integrated effort to combat the same at UN Framework Convention of Climate Change has cropped no positive way out till date. In spite of introducing several measures for mutual understanding in form of carbon credit, clean development mechanism etc. the ultimate cut in the Carbon emission to the environment could not be achieved.

Although the clippings seems to be stray information to us, but all of them is indicative of the fact that we should be little more vigilant to our activities and attitude to the nature and natural resources. Otherwise, a day will come when nature will take revenge in its own way.

BIOREMEDIATION

Debolina Misra, 1st yr. Environmental Science (Hons.)

Earlier, till 1960s little was known about the toxic effects of chemicals on hydrosphere and the concept of bioaccumulation and bio-magnification. Since, 1960s after the land mark 'Silent spring' was published thousands of scientific research works have come out with in that direction. However, in recent years along with the advancement in the field of Biotechnology a new line of research is getting increasing importance, which helps in degrading the pollutants biologically to retain the environment in its original condition. The process is called *Bioremediation*.

The process may be employed in order to attack specific contaminants such as chlorinated pesticides, crude oil spills, which can be degraded by bacteria in general. However, the technique is sometimes employed at the site of contamination or in laboratory conditions, respectively known as in-situ and ex-situ treatment.

In 1979 a pipeline carrying crude oil burst and contaminated the underground aquifer in the Minnasota. Fortunately the natural bacteria rapidly degraded the toxic chemical leaching out of the oil. But as the rate of contamination exceeded the capacity of the microbial population the ill fate of contamination came in action, and there lies the importance of the biotechnological intervention.

In another instance at Cape Cod, Massachusetts accurate laboratory measurement of the natural microbial efficiency was done to treat the disposed off sewage effluent protecting the shallow aquifer contamination.

Other than these, bioremediation has proved its importance in treating contamination of water and soil through pesticides, agricultural chemicals, gasoline, creosote etc. However, it should also be noted that not always bioremediation is a solution to any contamination. Till date commercial scale application for treating heavy metals contaminations like Lead, Cadmium etc. could not be achieved.

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