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Dear Friends and Colleagues,

Greetings from SANDEE and SHODH. Rucha Ghatge of SHODH continues to be our guest editor. We enjoyed creating this newsletter and hope you benefit from reading it.

In this edition’s FOCUS, Stein Hansen and Ramesh Bhatia discuss water management and poverty reduction. This summary piece identifies some key issues that need to be addressed in order to tackle poverty.

In the ‘Eco-News’ section of this newsletter, we focus on pollution. Air, water and soil/land pollution contribute to many major health problems in South Asia. SANDEE colleagues discuss some specific concerns and solutions being considered in their respective countries.

We are happy to introduce a new SANDEE supported textbook. Our former advisor, Herath Gunathilake’s book “Environmental Valuation: Theory and Applications,” provides a practical exposition of non-market valuation techniques. Students in a recent environmental economics course found it very useful.

Many of SANDEE’s research studies are now available as Working Papers and Policy Briefs. We also have numerous bibliographies. Please do visit www.sandeeonline.org to download these documents. Please also visit www.shodh-research.org for further information about SHODH and its publications. Please send your feedback and comments to newsletter@sandeeonline.org.

Take care and be well,

Rucha, Priya & everybody at SANDEE and SHODH

SANDEE....

The South Asian Network for Development and Environmental Economics is a regional network that seeks to bring together analysts from the different countries of South Asia to address environment-development problems. SANDEE’s mission is to strengthen the capacity of individuals and institutions in South Asia to undertake research on the inter-linkages among economic development, poverty, and environmental change and to disseminate practical information that can be applied to development policies.

RESEARCH NEWS

SANDEE 8th Research and Training Workshop, Waikkal, Sri Lanka, June 12-16, 2004

In response to SANDEE's 8th call for proposals, SANDEE received 90 research proposals from around the region. A rigorous review process involving SANDEE's Management and Advisory Committee and regional and international reviewers was undertaken in early 2004. The following six grants were made:

Managing recyclables for effective urban waste management: A case study in Thimphu, Bhutan
- Anjana Giri, Bhutan.

This project aims to review existing solid waste management practices in Thimphu, Bhutan. Anjana will analyze gaps, problems and economic constraints associated with recycling in particular. She will examine the recycling sector to assess the feasibility of successful public-private partnerships in waste management in Thimphu.

Pesticide Use, Human Health, and Household Productivity in a Mid-hills Watershed, Nepal
- Kishor Atreya, Nepal.

The goal of this study is to examine health disorder due to pesticide use and exposure, and the costs associated with it. The study will focus on vegetable farming, which is subject to very high doses of pesticides in Nepal. Kishor also seeks to understand the behavior of farmers and the actions they take to mitigate the effects of pesticides.

Common Property Rights, Market Access and Forest Quality: A Household Level Analysis in Nepal
- Resham B. Dangi, Nepal.

The overall objective of this study is to explore new opportunities to better manage community forests. Resham Dangi, a forester in Nepal, seeks to obtain and analyze both biophysical and economic data about the use of forests. Using a programming approach, he will examine the economic potential of community forests, and assess whether the current property rights structure allows communities to meet their needs, given forest potential.

Economic Inquiry into Collective Action and Household Behaviour in Micro Watersheds,
- D. Suresh Kumar, India.

This research focuses on the existence and extent of collective action in managing micro watersheds in Coimbatore District of Western Tamil Nadu. Suresh Kumar will try to bring out the factors responsible for the emergence and existence of collective action at community level and household level. The research result can be used by researchers and policy makers for recommending improvements for sustainable watershed management.

Economic impacts of changes in hydrological services from forest ecosystems: Studies in two agro-climatic regions of the Western Ghats of India
- Sharachchandra Lele, India.

This study aims to estimate the impact of changes in hydrological regimes on downstream communities in the Western Ghats. The study intends to analyze the influence of eco-climatic conditions and water extraction technology on agricultural production.

The Economic Implications of Natural Disasters: A Study based on Contemporary and Historical Evidence from South Asia
- Tirthankar Roy, India.

In this study, Trithankar proposes to identify the economic costs of natural disasters such as floods, earthquakes and windstorms. He will study factors that influence the rate at which communities recover from natural disasters, their coping strategies, and the role that social capital plays. The study will be based on historical records and current surveys.

Study Grants

The Analysis of Heterogeneity Effect on Peoples' Participation in Joint Management of Protected and Reserved Forests in West Bengal
- Lekha Mukhopadhyay, India.

Designing voluntary collective action programs for managing common pool resources is a difficult task in heterogeneous societies. Lekha proposes to highlight this issue in the context of forest management around the Buxa Tiger Reserve in West Bengal, India. She will examine the impact

of economic, political and ethnic heterogeneity on households and village community's decision to participate in forest management programs.

Rural poverty and forest dependence: Empirical evidences from rural areas of Sri Lanka

- Widanage Rupananda, Sri Lanka.

This study seeks to investigate non-timber forest product extraction by poor households in Sri Lanka. The focus of the project will be to study the effect of rural development policies on household use of non-timber forest products.

RESEARCH COMPLETED

This section presents abstracts from the SANDEE's working paper series. Full papers are available online at www.sandeeonline.org.

Demand for Eco-Tourism: Recreational Benefits from A National Park

- Himayatullah Khan

In developing countries, where resource crunch is one of the most important factors behind low public investment in protection and conservation of the environment, eco-tourism can play a twin role. It can ensure conservation as well as generate revenue. Himayatullah Khan's study is among the first in Pakistan to value recreational benefits of a tourist area and identify the revenue earning potential of eco-tourism.

The study uses the individual travel cost method to analyze and measure annual benefits from the Margalla Hills National Park near Islamabad. According to the study, the total annual consumer surplus or economic benefit obtained from recreation in the Park is approximately Rs. 23 million (US\$ 0.4 million). Factors that influence recreational value include: travel cost, household income, and the quality of the park. Improvements in the quality of the park are likely to increase recreational benefits by a significant 39 percent. The study recommends that a park Entrance Fee of Rs. 20 per person be introduced, which could be utilized for improving park management. This would annually generate nearly Rs. 11 million in revenues, a sizable amount of money that represents about 4 percent of the annual budget allocated to the Environment Sector in Pakistan.

Industrial Pollution Control: Choosing the Right Option

- Vinish Kathuria

Recent policy discussions recognize the limitations of formal regulations to stem pollution in developing countries. As a result, there is a growing interest in the potential of informal regulations to achieve environmental goals. This study attempts to test the hypothesis that the press can act as an informal agent of pollution control. The underlying assumption is that localized pollution problem can be influenced by discussions on pollution in the vernacular press.

Kathuria studies the impact of press reporting on polluting industries by using news data from newspapers and reports and water pollution data from four hotspots in Gujarat for the period 1996 to 2000. The results show that the press can impact polluting behavior if there is sustained interest in news about pollution. However, not all pollution agents are affected by pollution news. Press coverage appears to mainly influence industrial estates with a mix of small, medium and large industries.

The study has an important policy implication pertaining to informal policy regulations. It suggests that lobbying efforts through the media by environmental activists and NGOs may prove effective in influencing the behavior of polluting industries.

Awareness and the Demand for Environmental Quality: Drinking Water in Urban India

-Jyotsna Jalan, E. Somanathan and Saraswata Choudhuri

The demand for environmental quality clean air, potable water, sanitation, safe food is presumed to be low in developing countries due to poverty. However, individuals in developing countries often lack the necessary information to make good decisions about environmental hazards in their day-to-day lives. Even if households can afford to take private measures to improve environmental quality, very often they choose not to do so, because they are not aware of the health risks associated with inferior environmental quality. A key policy question is whether increasing awareness about the adverse health effects of environmental pollution will increase demand for a cleaner environment? In this paper, Jalan, Somanathan and Choudhuri use a household survey of urban India to

estimate the effects of awareness and wealth on household decisions to purify home water. Average costs of different home purification methods are used to get estimates on willingness to pay for better drinking water quality in Delhi. It is found that measures of awareness such as schooling and exposure to mass media have statistically significant effects on adoption of different home purification methods and therefore, on willingness to pay. The interesting result is that these effects are similar in magnitude to wealth effects – this suggests that lack of awareness may be as important as poverty in influencing demand for clean water.

RESEARCH NOTES

This section presents some unique and enlightening field experiences and lessons learnt by the SANDEE researchers in the course of their research. In this issue, Usman presents his learning experience in the field.

The Mystery of the Missing People....

-Usman Iftikhar
IUCN Pakistan

As part of our SANDEE study assessing the impact of sea intrusion on wheat productivity in deltoid Sindh, a team had been organized to carry out a Participatory Rural Appraisal before the actual questionnaire-based survey was conducted. The team was assembled keeping in mind the demography of the region, with a balanced mix of women and men to facilitate discussions with conservative, religious households. It proved to be a key element in our PRA exercise, as dialogue with women and children opened up new insights into the structure of class, caste and wealth in Keti Bunder, Sindh.

During the chart making process in one specific village, stones painted red, blue and green were used to identify the rich, middle-class and poor households on a map that had been drawn in sand using easily available props (such as twigs and colored beads and chalk) to symbolize village structures. However, based on conversations before the mapping, we were unable to account for more than 25 households. Where could these people have gone? Perhaps there were more households per house than we had expected?

Publications and Presentations by SANDEE Researchers

- ♣ Seema Purushothaman, “*Economic Analysis of Stakeholder Perceptions on Land Use Options in the Peripheries of Tropical Dry Deciduous Forests of Southern India*”, presented at the 1st World Congress of Agroforestry ‘Working Together for Sustainable Land-use Systems’ at Florida, 27 June to 2 July 2004.
- ♣ Debabrata Lahiri “*Economics of Sewerage Feed Multivarietal Fish Farming in West Bengal*” presented at the International Institute of Fisheries Economics and Trade Conference (IIFET 2004) at Tokyo, Japan, July 21-30th, 2004.
- ♣ Rucha Ghate and Deepshikha Mehra, “*Ensuring Collective Action in Participatory Forest management*”, presented at 10th biennial IASCP conference at Oaxaca, Mexico, August 9-13, 2004.
- ♣ Rucha Ghate, “*Equity in Decentralized Forest Management in India*”, presented at WOW-III at Bloomington, June 2-6 2004. A modified version was presented at the 10th biennial IASCP conference at Oaxaca, Mexico, August 9-13, 2004.

Or had we altogether missed some? We probed the group of people that had now assembled but did not receive any satisfactory answer.

Finally, the female PRA team was able to resolve the confusion: after consultation with women and children in a corner, they discovered that one segment of the village had been unaccounted for altogether! The locals had not considered recent migrants from Bangladesh, living in scattered huts at the periphery of the village. For them, the migrant community had not yet been assimilated into the social fabric of deltoid Sindh and therefore, was not a part of the village. Thus, some very important information came from the most unlikely source. We then conducted a modified PRA, incorporating the Bengali community in our study. What was an important piece of information for us was just a sore topic of conversation for the locals. What we learnt is that no matter how pro-active and helpful the local community is, and no matter how comfortable the field staff is with them, a researcher should never take anything for

granted and erroneously accept information that flows his way effortlessly. A researcher will never have the complete set of information he needs and will have to learn to adapt to new situations and new challenges. He will have to find and continue to find innovative methods of eliciting information. "After all," to quote Einstein, "if we knew what it was we were doing, it would not be called research, would it?"

TAKING RESEARCH FORWARD

Dissemination of research results forms an important part of SANDEE's policy. Researchers are encouraged to choose strategies that are best suited for disseminating their work. An example of one such effort is presented below.

Awareness Workshop on Tribal Development Schemes, Gadchiroli district, Maharashtra state, India

Researcher - Rucha Ghate
SHODH, Nagpur, India
ghates_ngp@sancharnet.in

Village Mendha in Gadchiroli district of Maharashtra State became the venue for the Workshop on January 13th, 2004. This Workshop was an outcome of a SANDEE study on three forest Institutional Structures and Sustainable Collective Action. The result of the study identified "coordination" between Forest Department officials and communities as a key element of sustainable collective action for forest management, which was found to be lacking in two out of three case studies. In the course of related fieldwork it became evident that there are government schemes to meet the rural/tribal development needs, of which the communities are not aware. On the other hand awareness among the government officials of the exact requirement of various communities is also equally poor. Thus combining the result of the study with the understanding of the need to build awareness of the communities to work for their economic upliftment, the researcher chose to use a non-conventional, yet direct way to reach out to policy-makers/implementers and the communities. A series of workshops were held to create awareness among the tribal communities regarding the existing state funded tribal development schemes. Similarly, meetings with government officials handling these schemes were also held. A final one-day

workshop was conducted to bring a direct interaction between the potential beneficiaries and the scheme-implementing officials.

The workshops proved very fruitful to tribal communities and forest officials since this was their very first effort at direct communication. It was the first time tribal representatives had a willing and patient hearing about their difficulties and needs. After some initial hesitation, tribal participants felt at ease and participated wholeheartedly in the discussions that followed. The response of the officials bodes well for future interaction and coordination between the villagers and officials. A complete report of this activity and research is available with SHODH (shodh_ngp@sancharnet.in).

FOCUS...

This piece is based on a paper by the authors entitled "Water and Poverty in a Macro-Economic Context" commissioned by the Royal Norwegian Ministry of the Environment.

Poverty Reduction and Water Resources

- **Stein Hansen** (Nordic Consulting Group A.S., Norway) & **Ramesh Bhatia** (Resources and Environment Group, India)

The World Commission on Water predicts that water use will increase by 50% over the coming 30 years, and that half the world's population will live under conditions of severe water stress in 2025. This likelihood is strengthened by political acceptance of the resilient and false myth that poor people are neither able nor willing to pay for reliable public water supplies. This myth causes politicians to avoid charging for water, and the result is that water systems cannot be sustained even where people, including the poor are willing to pay.

As many countries launch their poverty reduction strategies, it is important that they pay careful attention to the linkages between water availability, its quality and the lives of the poor. Water affects poverty reduction efforts in numerous ways. However, the four most critical mechanisms are through access to water and sanitation, irrigation and food supply, the impact of water quality on health and the vulnerability of the poor to climatic changes. Key aspects of these four mechanisms are discussed below.

Access to Clean Water and Sanitation

The Millennium Development Goal (MDG) for the water and sanitation sector state is to halve the proportion of people that go without safe, sustainable drinking water, by 2015. If translated into real world challenges, this means that the number of people served by water supply must increase by 1.5 billion i.e. service needs to be provided to an additional 100 million people per year, or 274,000 people every day. Similarly, 1.87 billion people or 125 million people per year need to be provided with sanitation facilities.

While these goals are set for all the countries of the world, lower-income countries are particularly hampered in trying to meet these goals. LDCs have limited water and sanitation (W&S) infrastructure in place, usually only covering well-established high and middle income parts of the city, while rapidly growing uncontrolled squatter areas are not covered. LDCs are also challenged by the lack of efficient institutions and management systems that can develop and sustain service delivery.

In general, in LDCs and the rest the world, new strategies are required to meet the water and sanitation related MDGs. These strategies need to be able to: a) close existing coverage and service gaps; b) increase the sustainability of existing and new services; and, c) improve the quality of service delivery. A huge challenge indeed!

Water in food production

World over, agriculture uses 69 percent of water resources, compared with 23 percent used by industry and 8 percent by households. In developing countries, the share of water for agriculture is around 90 percent. Further, 90 percent of the global increase in food production in the next 25 years is expected to come from already cultivated areas. Thus, there is a need to double the productivity of irrigated land.

The main challenge of the future is to achieve “more crop per drop” by raising water productivity and avoiding mis-management. One solution is to change the current practice of subsidizing farmers in terms of operating and maintenance costs and capital costs of irrigation infrastructure. This leads to massive water wastage and loss of agricultural output. Another solution could be for arid nations to import food

from places where food is produced cheaply. In this way water can be imported as *virtual water*.

Water Quality and Health

The poor are often forced to use polluted water, and are exposed to a variety of diseases. More than one billion people are annually affected by diarrhea and other water-borne diseases. Of these, 2.2 million die from it, of which 1.8 million are children under 5 years of age. In general, around 3.5 million children die from waterborne diseases every year. The poor are particularly vulnerable because they have no social security and being ill means loss of already bare income, and loss of ability to supply productive labor. Not only do the poor have the least reliable and accessible public water service, they also pay much more than the rich. Short of cheap public water, the poor end up captive to water vendors who charge as much as ten or twenty times the public charges for those with connections. Studies that document the willingness to pay of poor households for water indicate that unreliable but cheap water supply hinders rather than helping the poor.

Climatic variability impacts

The variability in rainfall and river flows in many developing countries affects productivity and output, most acutely in the agricultural sector. This threatens the survival of the subsistence farmer at one level; the competitiveness of agrobusiness in a globalizing world at another; and the structure and performance of national economies, at third level.

Climatic variability also manifests itself through increased vulnerability to natural disasters. Between 1991 and 2000 over 665,000 people have died in 2,557 natural disasters, of which 90 percent were water related events. Of these, 97 percent of the victims were from developing countries. Adaptation to climate change is a difficult but important challenge that poor countries need to address.

Considerations for Poverty Reduction Strategy Programs (PSRPs):

Poverty Reduction Strategy Programs are now a part and parcel of donor assistance in many developing countries. PRSPs are the right tool for addressing water and poverty linkages. In

order to rise to this challenge, PRSPs need to include:

1. Strategies that enhance proper use of water to complement and fully benefit from "hardcore" investments in storage and piping infrastructure.
2. Structural shifts away from water-intensive agriculture and industries and more emphasis on the role of *virtual water* to reduce vulnerability to water shocks.
3. Full cost pricing of water since the poor already pay high amounts to procure low quality service. Cross-subsidization from local governments may help remove the sting of this action.
4. Investments that enhance resilience to handle climatic shocks on a high priority.

SELECTED ECO-NEWS

In this section we present regional and international policy relevant news, anecdotes and analyses.

Plastic waste disposal has been a perplexing problem for policy makers for quite some time now. Right from blanket ban on plastic bags to introduction of paper and jute substitutes, nothing seems to work. Kakali and Shouvik report a possible solution worked out by the Indian Plastic Federation.

A Solution for the Plastic Waste Menace: Kolkata takes the first step

- Kakali Mukhopadhyay & Souvik Bhattacharjee

Plastics have become a major threat to environment and health in large cities due to their non-biodegradability and toxic characteristics. Their presence in the waste stream poses a serious problem particularly when there is a lack of efficient end of life management of plastic waste. In Kolkata (Calcutta) 150 metric tones of plastic wastes are generated daily with a collection efficiency of just 60-65 percent. The rest, that is simply thrown away, clogs drains, creates water logging, pollutes groundwater, surface water bodies and soil and causes environmental and health risks. A certain percentage that is burned, leads to release of carcinogenic gases like fluorins and dioxins. A major part of the plastic that is recycled, is recycled by illegal plants, which seldom follow the directives mentioned under

the Indian Plastics Handling and Recycling Rules 1999.

Considering this huge daily generation of waste plastic and the corresponding environmental hazard in the city, the Indian Plastic Federation (IPF), the apex body of plastic goods manufacturers, has come up with an ambitious plan to develop a "plastic waste management system" in the city along with the West Bengal Pollution Control Board by buying and then recycling the huge amount of plastic waste generated by the city's households.

With this objective, the IPF has recently flagged off a pilot project for the New Alipore-Chetla zone (South-Western parts of the city), with an initial target of 5,000 houses and shops. It is planned to extend the system to at least two Kolkata Municipal Corporation (KMC) wards every month. Under the project, IPF provides containers to houses and shops for collection of all kinds of plastic wastes. The garbage is then bought from the households and the shops at the rate of Rs. 4 to 6 per kg. Plastic are also to be collected from the city's streets, pavements and corporation vats.

The collected waste plastic is to be recycled and made into plastic goods and toys, strictly following the Indian Plastics Handling and Recycling Rules of the Central Pollution Control Board. The recycled plastic will however not be used for making cups or carry bags.

Keeping in mind that Kolkata has far lesser garbage bins than required, the simple act of providing these to the people can go a long way in curbing plastic litter. The fact that the garbage will be *bought* from the households, provides a powerful incentive for the people to collect their plastic waste in the bins instead of simply throwing it away. The program seems to be financially sustainable, as the revenue earned from the recycled products will be pumped back into the project itself. It is also likely to create employment for rag-pickers and slum dwellers and thus discouraging recycling by illegal plants. While all these features make this program seem infallible; its limitations and operational difficulties, if any, are likely to surface after a few years of its implementation.

More details can be had from Kakali at kakali@iimcal.ac.in.

A tragedy has occurred in Hyderabad city of Pakistan due to contamination of drinking and domestic water use. Zainab Dar in this piece tries to attract attention to the root cause of this catastrophe - pollution of one of the biggest natural fresh water reservoirs in Asia.

Water - For life or for Death: The case of Manchhar lake of Pakistan

- Zainab Dar

Hyderabad city in Sindh province of Pakistan recently encountered an outbreak of water-borne diseases including gastroenteritis, diarrhea, fever and eye infections. 41 cases of deaths and hundreds of hospitalizations have been reported so far. This crisis is one of many manifestations of the grave and often overlooked problem of water pollution.

Domestic water supply of Hyderabad comes from canals emanating from the river Indus, which recently received an unexpected and unannounced discharge of contaminated water from *Manchhar Lake*, one of the biggest natural fresh water reservoirs in Asia. The Sindh irrigation department sought to test the gates of Manchhar in anticipation of heavy monsoons and this resulted in the infusion of Manchhar water into domestic water supply. The outbreak of diseases that resulted was a direct consequence of pollution in Machar. Tests on water samples by the Sindh Environmental Protection Agency reveal enormous deviations from WHO standards in Ph levels, temperature, color, total dissolved substance, pollutants such as COD, coli forms, chloride, cadmium, copper, and ammonia and so on.

A health emergency was declared in Hyderabad, but all attention and funds remain concentrated on "treating the symptoms". The basic problem of pollution of Manchhar because of polluted runoff from agricultural fields and effluents from upstream industries has been ignored. Further, the Right Bank Outfall Drain, which drains saline water from waterlogged areas of Sindh empties its contaminated water into the Manchhar. But such issues have been pushed out of focus.

Manchhar lake supports many kinds of economic activities in adjacent areas and is an environmental asset. However, pollution is resulting in the migration of lake-dependent communities. Economic benefits from the lake are dwindling as its environmental quality

declines. Unfortunately, Manchhar is not the only lake that is in a bad shape in Pakistan. Industrial, agricultural and municipal pollution is choking almost all major wetlands and lakes. These occurrences in the presence of national level pollution regulation acts like the Canal and Drainage act and the Pakistan Environment Protection act clearly reflects insufficient attention towards implementation of laws. The remedial measures should begin with the formulation of an all-inclusive wetlands policy that makes water pollution a priority concern. The costs of pollution need to be transferred to the polluters through pollution permits for all polluting industries along the banks of the water bodies. These would not only be effective disincentives for release of untreated effluents into the water bodies but would also generate funds for the rehabilitation of the particular water body. It however might not be as simple as it sounds, as in case of Manchhar the local government itself is one of the major polluters.

For more details and references, Zainab can be contacted at zainabdar@yahoo.com

Bhutan is a country that is still at early stages of industrialization and urbanization and has a rich environmental wealth to rely upon. Thus, can it leap-frog over the many pollution problems that other South Asian countries face? This piece from Bhutan presents the air pollution scenario and possible Bhutan-specific solutions.

Pollution Control In An Environmentally Rich Nation: Case of vehicular pollution in Bhutan

- Shivaraj Bhattarai, Bhutan
& Prabhat Pankaj, India

The latest health statistics of Bhutan has come up with a startling revelation that acute respiratory infections (ARI) top the list of all common ailments in the country. ARI is found to be the cause of 14 % of deaths of children below the age of five. Prevalence of Bronchitis and Asthma has increased by about 7% points in the nineties and there is evidence of increases in other respiratory ailments as well. With this disclosure, indoor and out door pollution have emerged as major concerns.

The contribution of motor vehicles to overall urban air pollution in Bhutan is increasing. The number of vehicles in the kingdom is increasing at the rate of 15 to 20 per cent every year. About

25,000 vehicles are registered in the country so far with maximum in Thimphu (16000) and Phuntsholing (7000). One of the reasons for this growth in demand is the availability of liberal bank loans. What causes greater concern is the fact that around 60 per cent of the petrol and 96 per cent of the diesel engine vehicles do not meet the Indian emission standards. Diesel vehicles in particular are in high demand owing to the low diesel prices as compared to petrol. Diesel vehicles emit higher carbon monoxide, nitrogen oxides, hydrocarbons and particulate matters. In addition, with high sulphur and wax content in diesel and lack of high altitude compensators (without these the vehicle needs 15 minutes of pre-heating), more soot is emitted. Poor quality of road network, inadequate public transport, weak implementation of laws all seem to be worsening the scenario in addition to the above reasons. For example, the Road Safety and Transport Authority has the powers to ground vehicles that do not comply with emission standards. But implementation is weak since reconditioned diesel vehicles (purchased before a ban was placed on their import) and other old cars are still running.

In a country like Bhutan, where industrial development is at an early stage and the pollution problem has not taken alarming dimensions as yet, some concerns over air quality have been raised recently. These have been taken up seriously by policy makers as well. Due to largely undamaged environment in Bhutan, adoption of locally suitable standards, which do not compromise the social costs, are justifiable. Stricter implementation of the existing laws, public investment in improvement of public transport system and repair and construction of proper roads are few important steps that need to be taken urgently. Fiscal incentives for petrol vehicles and vehicles fitted with high altitude compensators together with statutory control on monetary incentives for purchase of diesel driven vehicles would add to the effectiveness of the whole pollution control mechanism.

Dr. Bhattarai can be contacted for more details at bhattaraisr@yahoo.com

CALL FOR PRE-PROPOSALS

Deadline: November 1, 2004

Please visit www.sandeeonline.org for the New Research Guidelines for Summer 2005 Research Competition.

Arsenic has spread and continues to swell in Bangladesh's groundwater. The Government is planning to provide piped water using surface water sources. The authors wonder if this might prove too expensive for poor.

Bane of Bangladesh: Arsenic

- Deepshikha Mehra and Zakir Khan

What started as a well-meaning policy of the government of Bangladesh in the 1970's to provide safe drinking water to its citizens, has turned into a disaster with the drilling of wells that contain geological deposits of arsenic. Consequently, some 65 million people in Bangladesh are currently estimated to be exposed to arsenic poisoning. A recent study by a team from Massachusetts Institute of Technology (MIT) estimates that long-term exposure to present arsenic levels will result in around 1.2 million cases of hyper pigmentation, 6 hundred thousand case of Keratosis, 1.2 hundred thousand cases of skin cancer and 3 thousand deaths a year from internal cancers.

Researchers in Bangladesh have now found high levels of arsenic in soil samples as well as in rice from areas irrigated from arsenic-tainted wells and aquifers. Substantiating this finding is the MIT study that finds that irrigation pumps are altering levels of arsenic in drinking wells. This is a discomfiting new discovery.

To combat the situation it is important to find alternative sources of drinking water and steps in this direction need to be taken urgently. Rainwater is one alternate source of safe drinking water; however, health specialists have ruled it out as rainwater lacks the mineral nutrients and could contribute to malnutrition in children. Another alternative is to replace highly tainted wells with deeper wells.

The national policy of Bangladesh on arsenic mitigation, however, focuses on tapping surface water, which is arsenic-free. A step in this direction is a \$55 million project entitled Bangladesh Water Supply Program Project based on a study completed jointly by the World Bank and the well-known Bangladesh NGO, BRAC. The study recommends that piped water be provided to the poorest segments in arsenic affected areas, and a service tax collected from water receivers. This tax would cover fifty percent of the initial capital cost and the

operating and maintenance cost of providing piped water (estimated to be about US\$1 per month or 3 cents per day per household). The per capita income of approximately fifty percent of the people of Bangladesh is around US\$ 1.2 per day. Thus, will the poor be willing to bear this cost? An alternative would be to subsidize the costs of clean water to the poor, but then who would bear the costs of infrastructure development and maintenances? Would this result in un-reliable water supply, forcing poor people to continue to depend on their arsenic filled wells? These are important questions that need careful discussion.

For further information, please contact Zakir at zhkhanbd@hotmail.com

Vehicular emissions contribute significantly to air pollution in Colombo, Sri Lanka. Rohitha & Anura discuss the steps that the Sri Lankan Government is taking to combat pollution.

Vehicular Pollution! Sri Lanka Is Ready With Remedies

- W.R. Rohitha and Anura Widanagamage

Air quality of the Colombo Metropolitan and other urban areas of Sri Lanka has been declining over the past decade due to rapid urbanization and motorization. Respiratory diseases among the children are reported to have gone up and lead content of samples drawn from traffic police is alarming.

Automobile emissions contain many health hazardous elements like Carbon Monoxide, Nitrogen Oxides, Lead, Sulphur Oxides, Particulate Matter (PM) etc. Eighty percent of PM is attributable to diesel vehicles alone. According to a study by Lvovsky et al. health damage from road transport diesel is about LKR 5011.2 million (\$ 51.13 million) per annum in the country.

The environmental and health cost of vehicular pollution being substantial, the Sri Lankan government is considering a consolidated vehicle emission reduction program to cope with the increasing pollution. The program consists of three components: a) fiscal policy involving raised taxes and import duties on diesel and diesel run vehicles; b) leaded gasoline to be phased out and diesel quality improved; and, c)

compulsory vehicle emission testing to be implemented.

The total capital cost of the changes proposed is estimated to be LKR 900 million, with annual recurrent expenditure being LKR. 200 million. Thus, Sri Lanka is finally taking vehicular pollution seriously. One can only hope that this large program is well implemented and the remedies actually work!

For more details contact Rohitha at rohu666@yahoo.com

PROFILE

Jadavpur University, Jadavpur

Jadavpur University is a State University under the State of West Bengal. The university has 34 departments grouped under the Faculty of Arts, Engineering & Technology and Science. In addition, there are 16 interdisciplinary schools and 21 Centers of Research. Environmental Economics is taught at the graduate and undergraduate levels. There is one graduate course each on resource economics and environmental economics. An M.Phil level course on energy economics and undergraduate courses on resources and environmental economics are also available. In addition, the School of Environmental Studies offers Doctoral and Post-Doctoral Programmes and conducts research projects in Environmental issues.

There are many reasons why students interested in environmental economics may want to join Jadavpur University – however, four reasons stand out. Recently, the University started a new research program called *“Tradition, Social Change and Sustainable Development: A Holistic Approach”*, which offers research assistantships to Ph.D., M.Phil and Master’s students in social sciences and humanities. Further, the University’s Visit-US summer internship programme provides an opportunity for students to get exposed to US work environment. In recognition of the importance of “Global Change” issues for a developing country like India, a multidisciplinary Partnership Programme for Global Change Research has also been launched. Finally, Jadavpur University was part of the World Bank

Capacity Building Programme in Environmental Economics in India and holds a very good collection of books and journals on environmental economics and provides online access to a large number of journals.

Information about research and study programs are available at www.jadavpur.edu.

SANDEE TRAINING ACTIVITIES

SANDEE organized its annual three week introductory Environmental Economics course jointly with IUCN, World Bank Institute and Institute of Policy Studies (Sri Lanka) in June 2004 in Sri Lanka. Instead of a description of the course, two participants describe below a field visit which contributed to their understanding of theoretical issues discussed in the course.

Fishing in Negombo Lagoon – A long surviving institution now faces uncertain future (Field trip at SANDEE's Introduction to Environmental Economics Course, Colombo, Sri Lanka)

- Asha Gunawardena & Santadas Ghosh

We, the participants of SANDEE-EE course, got the opportunity to substantiate our classroom studies with related field experience during the course. We got acquainted with an ancient, but still operational natural resource management institution. It was our field trip to the Grand Street Kuttudel Fisheries Society (KFS) - one of the four stake-net (locally, *Kuttu del*) Fisheries Societies operating in the beautiful Negombo Lagoon in the western province of Sri Lanka. The trip was especially appropriate as it closely followed Dr. R.B. Bhattacharya's enlightening session on institutions and their dynamics.

Stake-net fishing in Sri Lanka is an ecologically sound practice that has been perfected and sustained over centuries. These nets are fixed at convenient depths of a water channel and make use of the movement of water as the tide changes. The species captured mainly comprise of shrimps. Catch varies seasonally - peaking with the onset of the rains in April/May and October/November.

The KFSs are highly organized social institutions having well defined, understood and agreed

code of conduct that has evolved over the years with the minimal intervention from the State. Their rules and regulations have been legalized by a Government Gazette Notification. Only the members of these four KFSs have the right to undertake fishing in the channels of the Lagoon. Only one member (head of the household) of a family has the user right. This user right is passed on to the unmarried youngest son from the father (elder sons have to apply for membership). The KFS decides on new applicants based on their capabilities and employment status.

Allocation of fishing stations in the Lagoon among the members is done in an equitable way by adopting a complex rotational system. Each of the four KFSs gets fishing rights in the Lagoon in turns. Within each KFS, the rotation of fishing stations among its members is based upon random assignment of numbers at annual General Meetings. In the morning of the day a particular KFS has its turn, those members who have acquired access to the better stations, meet and bid for the precise net-fixing locations at a particular stake-net station (more than one net can be operated at each station). We were witness to such a meeting of the Grand Street KFS. The bid proceeds are utilized to provide limited pensions to widows of late members and some insurance cover to members in case of exceptionally poor harvest.

The scale of operation is controlled by historically evolved rules that ensure sustainability. The rules are, we think, among the finest examples of dynamic optimization of renewable common pool resources. The Roman Catholic Church legitimizes the enforcement of penalties and regulations. In turn, a part of the bid proceeds are allocated to the Church, which is utilized for welfare of the KFS members.

Unfortunately, the KFSs in Negombo Lagoon are now fighting a grim battle against pollution in the form of sedimentation. In our boat trip, we were witness to people wading in the Lagoon in waist-deep water. Loss of depth blocks the operation of stake-nets, rendering many previously attractive fishing stations unviable. The senior KFS members agree that catch has decreased significantly in recent years. The survival of this time-tested, ecologically harmonious fishing practice is surely at stake now. If returns fall below a threshold level, the whole structure of the KFSs can collapse. In that

eventuality, it will also be accompanied by the extinction of an exemplary social culture – and that loss may well be irreparable.

Policy Research and Proposal Writing Workshop, Nepal, 13-16th May 2004

SANDEE organized a four day “Policy Research and Proposal Writing Workshop” between the 13th and 16th of May 2004 in Kathmandu, Nepal. The main objective of this workshop was to introduce economists to key policy concerns in environmental economics and to enable the participants to develop skills required to prepare serious research proposals on these issues.

The workshop exposed participants to important environmental policy issues in Nepal and the region. Policy experts discussed strategic concerns related to biodiversity, forest, water, waste management, and air pollution. SANDEE resource people presented case studies and pilot projects and demonstrated the application of environmental economics in research and policy.

The workshop also trained participants in logical thinking, research proposal writing and presentation skills. It provided technical inputs and comments on research concepts developed by the participants. The workshop was a good platform for individuals and institutions working in the field of Environmental Economics in Nepal to interact with each other.

Dr. Mahesh Banskota, Country Representative, IUCN Nepal, Dr. Keshav Raj Kanel, Department of Forest, Dr. Toran Sharma, Nepal Environmental & Scientific Services (P) Ltd. and Mr. Ajaya Dixit, Nepal Water Conservation Foundation presented policy relevant papers on the economic aspects of biodiversity, forestry, solid waste management and water respectively. Dr. Madhav Karki from IDRC, Canada also presented a paper on issues related to poverty, economics and development.

The training faculty included Dr. Enamul Haque from North South University, Bangladesh, Dr. Joyashree Roy from Jadhavpur University and Dr. Vinish Kathuria from Madras School of Economics, India, Dr. Bishwanath Tiwari from Tribhuvan University, Nepal, Dr. Madhusudan Bhattarai from IWMI, Sri Lanka and Mr. Manik Duggar from SANDEE. The participants included young as well as mid-career

researchers. Of the seventeen participants, two were from Bangladesh, one from Sri Lanka, one from Pakistan and the rest from Nepal.

Books of Possible Interest

- Gunatilake, H. M (2003) "Environmental Valuation: Theory and Applications", 373 p, Publisher: Postgraduate Institute of Agriculture, University of Peradeniya, Sri Lanka, ISBN 955- 98121-0-6
- Toman, Michael A Chakravorty, Ujjayant Gupta, Shreekant (ed.) (2004) "India and Global Climate Change - Perspectives on Economics and Policy from a Developing Country", Oxford University Press, India
- McKinney Matthew & William Harmon (2004) "The Western Confluence: A Guide to Governing Natural Resources", Island Press
- Ellis, Richard (2004) "The Empty Ocean", Shearwater books
- O' Leary, Zina (2004) "The Essential Guide to Doing Research", Sage Publications Ltd.
- Hoel, Michael (ed.) (2004) "Recent Developments in Environmental Economics", Edward Elgar: UK.
- Lindell & Perry (2003) "Communicating Environmental Risk in Multiethnic Communities", Sage Publications Ltd
- Oates, W.E. (2004) "Environmental Policy And Fiscal Federalism: Selected Essays of Wallace E. Oates", Edward Elgar: UK.G.
- Cornelis van Kooten (2004) "Land and Forest Economics" Edward Elgar: UK

JOB OPPORTUNITIES

The Department of Economics, Sociology and Law, at the Centre for Environmental Research (UFZ), Germany, is looking for two Research Fellows/Senior Research Fellows. The positions are three-year, fixed-term, possibly renewable appointments, based in Leipzig. For more details visit UFZ's website at <http://www.ufz.de/service/ausschreibungen.html> or write to Prof. Dr. Dieter Rink, at Dieter.Rink@ufz.de or Dr. Heidi Wittmer, at Heidi.Wittmer@ufz.de.

International Maize and Wheat Improvement Center (CIMMYT) requires women candidates for the posts of **Poverty Analysis Specialist** and **Impact Assessment Specialist**. For more information about the opportunity in question,

inquiries can be directly sent to Dr. Mauricio Bellon at m.bellon@cgiar.org.

The International Food Policy Research Institute (IFPRI) seeks candidates for the post of **Research Fellow / Senior Research Fellow** for new International Service for National Agricultural Research (ISNAR) Division. Detailed information can be had from <http://www.ifpri.org/careers/program3.htm>.

Donald Bren School of Environmental science and management has invited applications for the post of Assistant Professor in Environmental Economics. Applications can be sent to eecon@bren.ucsb.edu latest by 15th November 2004. More information can be obtained from www.bren.ucsb.edu.

ACADEMIC OPPORTUNITIES

La Trobe University, Victoria, Australia invites applications for its Masters and Ph.D. courses. Students having first class degrees in economics, business, political science, environmental economics, natural resource economics or similar areas are eligible. The deadline for receiving applications is 30th September 2004. For details write to Dr. Gamini Herath at g.herath@latrobe.edu.au or visit the University's website: www.latrobe.edu.au

WEB NEWS

EPA's new Working Paper Series

EPA's National Center for Environmental Economics (NCEE) has made its complete series of working papers available over the internet at <http://yosemite.epa.gov/ee/epa/eed.nsf/Webpages/WorkingPapersByYear.html!OpenDocument&Start=1&Count=100&Expand=4>

HEI's report on air pollution impacts

The first publication of the Public Health and Air Pollution in Asia (PAPA) Program of the **Health Effects International**, on "Health Effects of Outdoor Air Pollution in Developing Countries of Asia" can be obtained from www.healtheffects.org. This special report has identified and summarized more than 135 studies of air pollution and health conducted

across Asia. In addition, it critically reviews for the first time a key subset of these studies: 28 studies of daily mortality.

Two New Bibliographies - Pesticide Use and Health Costs and Value of Statistical Life

SANDEE has two new bibliographies that may be of interest. Please visit SANDEE's website, www.sandeeonline.org for these bibliographies.

ON THE FUNNIER SIDE!!

- ♣ **The First Law of Economics:** For every economist, there exists an equal and opposite economist.
- ♣ **The Second Law of Economics:** They're both wrong.

ANNOUNCEMENTS

The International Institute of Rural Reconstruction (IIRR) is organizing a course on "Community-Based Integrated Watershed Management", to be held between November 8-26, 2004. Monette Pacia can be contacted for more details at Monette.Pacia@iirr.org or Education&Training@iirr.org.

The International Alliance of Indigenous and Tribal Peoples of Tropical Forests (IAITPTF) is organizing an Expert Meeting on Traditional Forest Related Knowledge, between 6th and 10th December 2004. The venue of the meeting will be San Jose, Costa Rica. More information can be obtained at www.international-alliance.org or by contacting Kittisak Rattanakrajangsri or Annabel Pinker at kittisak@international-alliance.org.

INSEE has invited full and completed papers for its 4th biennial conference based on "Ecology and Human Well-Being" to be held on 3-4 June 2005 at IGIDR, Mumbai. The deadline for the submission of papers is 1st February 2005. More details can be obtained from

Abstracts are invited for the 3rd biennial conference of United States Society for Ecological Economics (USSEE) to be organized in July 2005. The deadline for the submission of the abstracts is 1st November 2004. More details can be obtained from <http://www.ussee.org/conference>.

MEMBERSHIP FORM

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Name of Contact Person :
Designation :

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Brief description of objectives & activities of your organization (Max. 10 sentences)

Payment Details (Enclose Cheque/Draft)

Cheque no..... Amount (in US\$).....
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Membership Fee for the Year.....

Notes: This form is for institutional members only. The institutional membership fee is US\$25 per year for South Asian institutions and US\$250 per year for non-South Asian institutions.

Information about SANDEE and our activities are available online at www.sandeeonline.org. Our mailing address is IUCN Nepal, PO Box 8975 EPC-1056 Kathmandu, Nepal. Telephone: 977-1-552 8761; Fax 977-1-553 6786. If you have any questions about our program, please write to Manik Duggar at manikd@sandeeonline.org