



South Asian Network for Development  
and Environmental Economics

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**Dear Friends and Colleagues,**

Hope the New Year 2004 has brought many productive opportunities your way. We continue to forge ahead looking for new ways to keep SANDEE interesting. You will notice three new columns based on SANDEE supported research in this newsletter: 'Research completed' presents abstracts of working papers, 'Taking Research Forward' is meant to report on impacts, and 'Research Notes' discusses SANDEE research on 'Valuation of statistical life'.

We encourage you to provide feedback on issues raised in the newsletter. We recently heard from someone who was interested in rainwater harvesting and pollution in River Nag that we reported in two previous newsletters. We hope to hear from others among you who want to discuss solutions that have economic incentives at their core. We hope this newsletter can facilitate an exchange of ideas.

We are delighted to report on two sets of publications associated with SANDEE. Bhim Adikari's research on community forestry was published in Ecological Economics, making it one of the first internationally peer-reviewed articles from SANDEE research. We are also happy to report that an idea that emerged from SANDEE's inaugural meeting resulted in a Special Issue in February 04 of the journal 'Environment and Development Economics', which focuses entirely on South Asia.

Our friend and colleague Herath Gunathilake from Sri Lanka is leaving the region to go to the Asian Development Bank in Manila. We will miss him tremendously, but he will undoubtedly continue to be a source of inspiration and support to SANDEE.

With all best wishes,

*Rucha, Priya and all of us at the SANDEE Secretariat*

**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's 6<sup>th</sup> Set of Research Grants, November 2003: Training and research workshop, AIT, Thailand**

SANDEE recently made six research grants to researchers from South Asia. This brief description of the grants may be useful to new applicants seeking SANDEE research funding.

◆ *Groundwater Irrigation in Haryana: Institutions and Markets.* - Abhijit Banerji and J. V. Meenakshi, Delhi School of Economics, India  
This study attempts to analyse the market structure for groundwater transactions and factors that determine this structure in Haryana. It will use simulation exercises to study the effect of policy parameters on water prices and overall water use.

◆ *Towards prevention of water pollution: An analysis of willingness to pay of households and expenditures of government (Study Grant)* - Baber Nasim Khan, WWF, Pakistan  
This study investigates the effects of water contamination on human health. Linking epidemiology and economics, it seeks to assess household willingness to pay for clean water. This is particularly important given cholera and gastro-enteritis incidence in and around Lahore.

◆ *Estimating abatement costs of air pollution in Durgapur City of West Bengal* - Kakali Mukhopadhyay, IIMC, Kolkata, India.  
This study will estimate the extent of deterioration in air quality and the costs of abating emissions caused by key industries in Durgapur, West Bengal. It will suggest policies for air quality management in urban industrial areas of West Bengal.

◆ *Pesticide Use, Human Health and Farm Productivity in Jhikhu Khola Watershed, Kavrepalanchok District, Nepal.* (Study Grant) - Kishor Attreya, Kathmandu University, Nepal  
The goal of this study is to examine pesticide related health impairments and identify its effects on farm households. It seeks to understand the behavior of farmers and applicators and assess the costs they bear as a result of exposure to farm pesticides.

◆ *Hill Farming Technology in Bangladesh:*

*Assessment of Productivity, Risk and Impact on Farmer Livelihood.* - M. A. Monayem Miah, Bangladesh Agricultural Research Institute, Bangladesh.

This study is designed to measure the impact of soil erosion on crop productivity in the hill regions of Bangladesh and estimate costs and benefits of soil erosion. The study will analyze the economic implications of using specific erosion-control technologies.

◆ *Non-Market Valuation of Bhutan's Protected Mountainous Areas as International Eco-tourists Destination.* - Prabhat K. Pankaj, Sherubtse College, Kanglung, Bhutan.

The main objective of the study is to estimate tourism benefits to Bhutan using the travel cost method. This will be the first such study in Bhutan, which is much needed at the current stage of Bhutan's economic development and eco-tourism policy evolution.

◆ *Estimating WTP for fresh water and analyzing averting behavior of arsenic affected peoples of Bangladesh.* - Zakir Hossain Khan, Economic Research Group, Bangladesh.

The primary goal of this study is to assess the cost of morbidity or social loss from household's point of view as a result of drinking arsenic contaminated water. It also seeks to analyze factors that determine defensive actions taken by people in arsenic contaminated areas.

### **Publications and Presentations by SANDEE Researchers**

- ◆ Vinish Kathuria (2004), "Informal Regulation of Pollution in a Developing Country: A study of India", Madras School of Economics", Working Paper No. 2.
- ◆ Adhikari, B., S. Di Falco and J.C. Lovett (2004), "Household characteristics and forest dependency: Evidence from common property forest management in Nepal", *Ecological Economics*, Vol 48 (2).pp. 245-257.
- ◆ The 3rd Biennial Conference of the Indian Society of Ecological Economics, 2003 included presentations by researchers S. Purushotham, A. Mishra, M. Mishra, A. Shah and D. Mehra.

## ◆ RESEARCH COMPLETED ◆

*SANDEE introduced its working paper series with three papers based on SANDEE supported research. This section presents abstracts of these papers. Complete papers are available on [www.sandeeonline.org](http://www.sandeeonline.org).*

◆'Property Rights and Natural Resources: Socio-Economic Heterogeneity and Distributional Implications of Common Property Resource Management'

-Bhim Adhikari,  
SANDEE Working Paper No. 1- 03

In the last decade, far-reaching policy reforms in Nepal have resulted in a pioneering community forestry program. However, little is known about the actual distributional impacts of community-oriented forestry. How do the poor fare relative to the rich in this new management regime? Also, what contribution does forest income make to total household income? This study tries to answer these questions. The study finds that on average, wealthier households obtain three times as much forest income as poorer households. Forests income makes up approximately 14% of total income for poor households and some 22% of total income for somewhat better endowed households. The study argues that this discrepancy in impacts is a result of inherent inequalities in the ways in which the rules of management are forged. Adhikari suggests that women and the poor need greater representation on executive committees of forest user groups. Further, a system of transferable private property rights over forest produce might redress the bias against poorer households. Tradable rights would allow the poor to exchange forest products that are of low value to them for products that they are more useful.

◆"Poverty, Private Property and Common Pool Resource Management: The Case of Irrigation Tanks in South India"

-R. Balasubramanian and K. N. Selvaraj,  
SANDEE Working Paper No. 2- 03

The main goal of this study is to understand the nature of the dependence of the poor on irrigation tanks and how they fare as tank management deteriorates. The study shows that there has been a secular decline in the performance of tanks. This is at least partly due to the increase in private wells. The study finds

that poor people are relatively more dependent on tanks and hence also contribute more towards tank maintenance. The study seeks to understand various factors that contribute towards collective action to maintain tanks. It concludes that cooperative action to sustain this commons is affected by group size, the prevalence of traditional water governance institutions and wealth inequality.

◆"Ensuring 'Collective Action' in 'Participatory' Forest Management"

-Rucha Ghate  
SANDEE Working Paper No. 3- 03

This paper is based on a qualitative analysis of three forestry case studies from Central India, each belonging to one of three types of institutional structures: self-initiated, NGO-promoted, and Government-sponsored Joint Forest Management (JFM). 'Process Analysis' is used to document the genesis and evolution of collective action in these case studies. 'Self-initiated' institutional structure is seen to be most successful in facilitating collective action, but the sustainability of collective action under this institutional structure seems to be weak. The policy recommendation of the paper points towards joint management of multiple institutions and a need to conceive of more complex arrangements in which forest areas are protected for multiple objectives.



## ◆ RESEARCH NOTES ◆

*We debut this column on research being undertaken by SANDEE researchers, with a note on the Value of a Statistical Life – a number, which can provide a rational means for understanding and evaluating risks in environmental, health and industrial projects.*

### **A Note on Valuations of Statistical Life**

-S. Madheswaran and K.R. Shanmugam  
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Environmental health projects often seek to reduce risks to human life and health. In order to determine whether such projects are socially desirable, we need to compare the value of reducing risks to investment costs incurred. One way to identify the worth of risk reductions is by estimating the value of a statistical life (VSL). This can be done by assessing compensating wage differentials.

Compensating wage differentials measure what a worker would have to be paid in order to accept a small increase in his risk of dying, or, equivalently, what the worker would pay to achieve a small reduction in his risk of death. These values can be estimated from observed labor market data and converted to Value of a Statistical Life. VSL reports the value of risk reduction divided by the size of the risk reduction. This number does not give us the value of life; rather it gives us an idea about the monetary value people place on reducing risks.

While there is a huge literature on VSL in the West, very few studies exist in developing countries. In their absence, mortality risks are often valued by using the lost earnings or human capital approach, which is likely to understate people's valuation of small risk changes. Another method used is benefit-transfer, where VSL estimates are extrapolated from developed countries. However, this assumes identical attitudes toward risk, and an income elasticity of willingness-to-pay for risk reductions equal to one. Such assumptions are difficult to justify without independent developing country studies.

We set out to estimate the value of a statistical life in India by first using labour market data available in the 5<sup>th</sup> occupational wage survey conducted by the Indian Labour Bureau. Data on the average daily wage earned by workers in occupation "i" and industry "j" is available in this survey. In addition, other information such as description of work performed, number of workers employed, proportion of men, cost-of-living allowance etc. is available in the survey.

We estimated the value of a statistical life following the weighted least squares method. This involves estimating an equation with wage as a dependent variable and a number of factors such as fatal risk, non-fatal risk, workers employed, average firm size, concentration of industry within geographic regions and so on as explanatory variables. The VSL and Value of Statistical Injury (VSI) are based on the coefficients of fatal and non-fatal risk respectively. The VSL, when evaluated at the mean wage, gives an estimate of the trade off between wage and fatality rate. After making some changes to scale this estimate appropriately, we estimate the value of statistical life to be Rs. 9.8 million (US\$ 201,940). The value of statistical Injury is Rs.1.1 lakh (US\$ 2291).

To see if our estimated numbers were confirmed by data collected in specific sites, we conducted a survey of 522 blue-collar workers in manufacturing industries in Chennai district. In the case of Chennai the wage equation was estimated separately for union and non-union workers because we hypothesized that union jobs enjoy an additional premium for bearing risks. Our estimates show that the trade off between risk and wage is Rs.15.55 million and Rs.5.49 million per statistical life in the union and non-union sectors respectively. Thus, collective bargaining appears to result in higher aggregate demand for safety.

Estimates of the value of a statistical life can serve as a critical input in benefit-cost analyses of environmental and safety regulations and policies. However, willingness to pay or accept risk will differ for different individuals and will be affected by wealth. Further, actual risks may differ substantially from perceived risks. Thus, empirical studies should be used more for broad guidance rather than specific trade-offs. Despite this qualification, such studies are immensely useful for setting compensation for actual harm, in deciding whether to accept certain individual or collective risks, and in deciding whether to impose risks on others or not. Refining VSL estimations for specific characteristics of risk-affected population is a priority.



SANDEE Biannual Research  
Competition

Please visit [www.sandeeonline.org](http://www.sandeeonline.org) in April for Research Guidelines related to SANDEE research support. If interested in applying for a grant, please review research details and 'frequently asked questions.' Guidelines are also published in major newspapers and journals in several South Asian countries.



## ◆FOCUS◆

*In this section, we present a note on the immense value of a wetland in Sri Lanka based on recent work undertaken by IUCN.*

### **Counting the costs of destroying Muthurajawela Wetland**

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The South West coastline of Sri Lanka represents one of the most densely populated, urban and industrial parts of the country. There is extreme pressure on the natural environment and wetland ecosystems in particular. Land-use planning has paid little heed to the need to maintain green spaces for Sri Lanka's city-dwelling populations, and has resulted in development at the cost of the few remaining urban and peri-urban conservation zones.

Muthurajawela Wetland, to the north of Colombo, is a small island of green in the midst of the urban sprawl of Negombo, Ja-Ela and Wattala. It is a patchwork of marsh, lakes, rivers, trees and mangroves that currently covers just over 3,000 hectares. One of Sri Lanka's 21 priority wetland areas, Muthurajawela is host to rich flora and fauna. In recognition of its biodiversity and conservation status, the top half of the Muthurajawela has been declared a protected Wetland Sanctuary since 1996.

Yet the green island that is Muthurajawela, is rapidly shrinking. Today more than 300,000 people live in the Muthurajawela-Negombo area. About 5,000 houses are located in the marsh itself, 60% of which lie within the supposedly "protected" Sanctuary. The new Colombo-Katunayake Expressway cuts right through the wetland. The list goes on.

The costs of environmental degradation of these wetlands have been quantified in a research carried out by the author on the assessment of economic value of the wetlands. The Several hundred poor people fish, gather plants and trees to use for firewood, house building, and make fish traps and handicrafts. These products are worth some Rs 35 million (US\$ 1: 96 Sri Lankan rupees) a year – as food, income, and in terms of costs saved from not having to purchase manufactured alternatives. Muthurajawela is also a popular destination for tourists, school children, and for Colombo residents. Almost 20,000 people visit the

wetland each year paying more than Rs 5 million to local tour operators.

Muthurajawela acts as a giant reservoir, with a storage capacity of more than 11 million cubic meters. The most polluted rivers in the area, Kelani Ganga, Dandugam Oya, Kalu Oya and Ja Ela, drain into the wetland where their waters stay for up to 10 days before entering Negombo Lagoon to the north. At the same time a large proportion of waste from nearby industries, domestic refuse and sewage from local households, is dumped directly into the marsh. The wetland and its plants physically, chemically and biologically filter, eliminate and dilute much of this pollution. Replacing this kind of natural waste treatment service with an artificial facility would cost at least Rs 160 million a year.

Muthurajawela cleans and stores water and helps maintain local water supply and quality. As many of the local residents rely on shallow-dug wells, a clean and near-surface water table is essential. The estimated bill for this service is Rs 4 million a year. By storing and trapping water, the wetland acts as a "sponge", ensuring that high runoff and river flow during the rainy season is released only slowly into the watercourses that feed the lagoon and the sea. This reduces the intensity and frequency of flooding, averting damage worth almost half a billion rupees each year.

To sum it up, Muthurajawela's natural harvests, wastewater treatment, freshwater supplies, flood mitigation and recreational benefits are worth about Rs 700 million a year – i.e. over Rs 200,000 per hectare. Every square meter of the wetland that is reclaimed or destroyed may generate profits for somebody, but it also decreases this value for the rest of society. This translates into real cash losses, and at the same time it takes away vital goods and services such as food, clean water, income and employment – for more than 300,000 people.

Muthurajawela has recently been in the news in Sri Lanka. In August 2003, a local NGO went to Court to compel the government to improve protection of the Wetland Sanctuary and formulate a comprehensive National Wetlands Policy. The Court has recently ordered the Environment and Natural Resources Ministry to develop and present its National Wetland Policy and the government is complying. Simultaneously, the Department of Wildlife is

taking legal action against human encroachment of the Muthurajawela sanctuary.

Unfortunately, the case of Muthurajawela is by no means unique. Many of the island's remaining wild areas are being similarly degraded. These environmental resources often fill the gap between the level of basic goods and services that people require for their survival, and those that they can afford or which the government is currently able to provide. By the time we realise that we have squandered this natural wealth, it may be too late to save such goods and services or to replace these economically valuable stocks of environmental capital. And this is a cost that Sri Lanka can ill afford to bear.



#### ◆ RESEARCH IMPACTS ◆

*Disseminating research results is an important part of SANDEE's policy and researchers are encouraged to choose strategies that are best suited for their work. This section presents one such strategy.*

◆ *Policy Recommendations to West Bengal Government based on SANDEE Research*  
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A one-day SANDEE-sponsored Workshop on 'Arsenic and Radioactivity in Drinking Water: Recent Research Findings' was held on January 9<sup>th</sup>, 2004. The Workshop was organised by the Global Change Programme and School of Studies in Environmental Radiation and Archaeological Sciences, Jadavpur University. The aim of the workshop was to discuss research findings from a SANDEE study on willingness-to-pay for arsenic-free water as well as findings from other relevant studies. A key goal was to present recommendations to the West Bengal Arsenic Task Force for inclusion in its action plans.

The Chairman of the Arsenic Task Force of West Bengal Government appreciated the use of economic analysis for designing policy. He formally acknowledged the recommendations and accepted the need to include a Social Scientist on the task force to help design policies that use economic incentives. We are pleased that the West Bengal Government is willing to consider economic reasoning in its arsenic related policies as a result of SANDEE activities.

#### ◆ ECO-NEWS ◆

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

*This article highlights the plight of the Olive Ridley turtles, as a result of mechanized technology, livelihood systems and demographic pressure, and identifies emerging solutions.*

***Biodiversity (Mis-) Management in India: Plight of Olive Ridley Turtles in the State of Orissa.***

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In India, though there is a vast complex of legal provisions aimed at biodiversity conservation, its integration with social and economic processes of development is non-existent. Consequently, we have implementation failures and rising conflicts between the 'environment' and its dependent communities. A typical case is that of sea turtles in Orissa.

Bhitarkanika Wildlife Sanctuary of Orissa, a land of diverse ecological niches, contains the second largest patch of mangrove forest in the country. The Gahiramatha beach within the sanctuary is the largest sea turtle rookery in the world and home to the famed mass nesting of the Olive Ridley (*Lepidochelys olivacea*) sea turtles. Every year huge *arribadas* (mass-nesting activity by the sea turtles) takes place here when an estimated 2 to 7 hundred thousand female Olive Riddleys congregate to lay eggs on the beach, each laying between 100 to 150 eggs. The eggs hatch after an incubation period of 50 to 55 days. Premature mortality as well as mortality among the hatchlings is extremely high and only one in 1000 eggs hatch successfully.

There exists a complex environmental relationship between the mangrove ecosystem and the mass-nesting phenomenon of the Olive Ridley sea turtles. The detritus rich bottom mud of the estuary nourishes the micro aquatic organisms in the coastal waters and is constantly replenished by the litter and organic matter flowing out from the mangrove forest. The high productivity at the lower levels of the aquatic food chain contributes to the building up of a food stock and diversity that is sufficient to support the massive numbers of turtle hatchlings

and adults for a period of 7 to 8 months (the period from mass nesting to the mass emergence of hatchlings). In turn, the enormous quantity of excretory products released from the *arribada* of the Olive Ridleys probably adds to the aquatic productivity of the ecosystem.

In recent times, mortality among the Olive Ridleys has increased dramatically because of mechanized fishing in coastal waters. Illegal trawl fishing has emerged as the biggest threat. From 1995 to 2000, 75,000 dead Olive Ridleys have been counted along Orissa's beaches. Deaths are caused due to turtles getting caught in fishing nets as incidental catch. This has happened despite Olive Ridley being protected under various Acts and prohibition of mechanized fishing vessels along the entire Orissa coast. An indication of the extent of ecological imbalance came to light quite dramatically in 1997 when the mass nesting did not take place at all on the Gahiramatha beach.

Among other factors that are contributing to turtle mortality are the usual demographic pressures and pollution of river water flowing into the estuary. Bright lights of a nearby Missile Testing Range cause disorientation among the turtle hatchlings and lead them away from the seawaters to the shore. Here they perish in large numbers from predator attacks, which have increased in number due to the casuarina plantations by the Forest Department.

The state government's response to the plight of turtles has been strong on intention but weak in implementation. A recent and more meaningful initiative towards protecting aquatic biodiversity in Gahiramatha developed in the form of Operation 'Kachhapa', a collaborative effort between the state forest department and a group of NGOs led by the Wildlife Protection Society of India and the Wildlife Society of Orissa. The operation involves a three-pronged action strategy -- enforcement of the non-mechanized fishing zone, monitoring involving local communities, and awareness building. Through their combined efforts a ban has been imposed within the sanctuary on fishing trawlers and traditional fishermen in the nesting season, and, local patrolling has reportedly increased. Let us hope that these decentralized efforts towards environmental conservation continue to prevail and be both economically profitable and environmentally sustainable in the long run.



*A proposed innovative use of wild Asiatic buffalo to create a hardier domestic buffalo in a wildlife reserve in Nepal is aimed at providing livelihood alternatives to farmers. This would also reduce pressure on the Reserve's biodiversity.*

**'Community Incentives to Reduce Land Use Conflict and Conserve Biodiversity in Nepal': A Project proposed for Koshi Tappu Wildlife Reserve, Nepal'**

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In Nepal, a project has been proposed to innovatively use the wild Asiatic buffalo in the Koshi Tappu Wildlife Reserve in Eastern Nepal to produce hardier and more valuable domestic buffaloes. This is expected to augment local incomes by changing domestic livestock composition, improve relationships between local communities and Park authorities, and help sustain biodiversity conservation efforts.

The Koshi Tappu Wildlife Reserve was established in 1976 and hosts the only remnant population of about 150 globally threatened Asiatic Wild Water Buffaloes (*Bubalus bubalis*). Over 10,000 mostly very poor households live around the Reserve. Traditional practices here favour cattle and buffalo populations because of the huge demand for milk and high market value of buffaloes. Not culling cattle due to religious reasons and, purposively leaving female buffaloes inside the Reserve to crossbreed with wild buffaloes to produce hardier offspring, have lead to grazing pressure on the reserve. This is resulting in unreliable cross breeding, habitat degradation, competition with wild buffaloes for food, and increased disease transmission risks between domestic and wild animals.

On the other hand, shooting of domestic animals inside the Reserve by Park authorities is cause for much animosity between the two. This situation has lead to an innovative proposal to use semen from Wild Asiatic Buffalo to strengthen domestic animals. An insemination center will be set up which will provide artificial insemination service for domestic buffaloes, along with some basic animal health advice, medicine etc. Several other issues are being considered under this program – such as removal of invasive alien species from the Reserve to produce forage, identification of costs and benefits for purchasing forage with loans from local (existing) savings and credit groups, and developing fodder from currently unused communal lands around settlements.

By the end of the project it is expected that a self-financing artificial insemination program would be in place and used by 100 farmers. Depending on the amount of semen available, the service may be provided at slightly higher costs to people living outside the “buffer zone” around the reserve. By the end of three years from the initiation date of the project it is estimated that at least 200 households will experience increased income from sale of crossbred buffaloes and products, twenty percent of households will adopt agro-forestry, and there would be an approximately twenty five percent decline of domestic animals inside the Reserve. During the project period, fifteen percent of the total cattle population will be replaced by buffaloes.

This project is novel and would be the first example of the use of a wild animals’ genetic material as an incentive for biodiversity conservation in Nepal. Often government institutions are not geared towards maximising livelihood-based incentives for conservation. This project will help resolve a threat to conservation in Koshi Tappu and improve government capacity to identify innovative mechanisms for working with communities.



*This Eco-news on Pakistan focuses on the immediate and long-term environmental, health and economic damages of the disastrous oil spill in the Karachi Sea.*

**Environmental Impact Of Oil Spill In Pakistan**  
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Oil spills have always caught the attention of the world. This was the case with the oil spill in the Karachi Sea, when a Greek-registered tanker leaked approximately 30,000 tonnes of oil into the sea in August 2003. It affected a rich coastal environment, including large mangrove forests and habitat for marine species such as the green and olive Ridley sea turtles, dolphins, beaked whales, about 200 species of fish, and 50 species of birds. Fishing, a major source of livelihood, was significantly impacted.

The immediate damage of the spill could be seen in dead fish, crabs, shrimp, turtles etc. that were washed on to the shore. Oil percolated to over 40 centimeters into the beach sand.

Residents living in surrounding areas complained of breathing difficulty and sore throat, and, mangroves were affected with oil touching their aerial roots. Local authorities, with the help of international consultants, took several steps to check the rapidly spreading spill: aerial sprays were commissioned, medical camps were established, and so on. But many continue to have serious reservations about these actions and express misgivings over the lack of preventive measures, slow action and use of out-dated equipment.

The effects of the spill can and will be felt by the people and the economy of the region and the environment in general, for many more years to come. People around the area have developed eye problems, skin infections etc. The spilled oil will take some time to evaporate and will have harmful impacts on the marine eco-system. Mangroves that work as physical barriers against cyclones and wind erosions will take at least three to four years to recover from this disaster. The spill occurred in the seeding season and is estimated to have destroyed 95 percent of seedlings. Bird migratory patterns have also been disturbed. 75 species of water birds that arrive here in August from Central Asian Republics and Siberia have their breeding and feeding ground covered with oil and there is a possibility that very few water birds will be seen. Similar disastrous effects are predicted for other species such as the turtles feeding on vegetation covered with oil.

The presence of oil in sea is likely to adversely affect the new fish breed since the spill occurred in the breeding season. As an immediate measure the Pakistan Fisheries Department has imposed a ban on fishing in the vicinity of the disaster, which is estimated to affect the livelihood of 2 million fishermen. Careful, economic analyses would undoubtedly reveal substantial short-term and long-term costs borne by local communities.

International efforts are being made to monitor and prevent long-term damages associated with such disasters. Recently, the United Nations’ Industrial Development Organization adopted an innovative idea developed by UAE University to clean oil spills through drums that separate and collect oil that is lower in density than seawater. However, in general developing countries are not equipped to handle disasters of such magnitude. Since the long-term effects on the environment are not country-specific, deeper



involvement of international agencies with local authorities is needed to handle such catastrophes.



*Emerging water scarcity in Sri Lanka is calling for efficient use of water in agriculture where economic pricing of water is not a feasible option. This brief on Sri Lanka explores alternatives to marginal cost pricing of water.*

**Water crisis in Sri Lanka: A Multi-faceted Problem.**

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Studies based on aggregate water availability measures identify Sri Lanka as a country with moderate or little water scarcity. However, when considered from a spatial and temporal perspective, severe water scarcity problems become evident. The current drought, gripping most parts of the country and threatening major economic hardships in the coming year, is a good example of this situation.

Economic growth, accompanied by rising water demand for irrigation, domestic consumption and industry has placed a huge burden on water supply. In order to avoid a crisis situation it is necessary to limit and regulate consumption. For many economists and donors, marginal cost water pricing is the solution to this problem. But water pricing as a regulator leaves many concerns un-resolved.

In Sri Lanka agriculture, especially rice is the dominant user of the water. Rice is a major source of income for poor farmers, yet they barely breakeven despite the supply of free irrigation water. This makes pricing of irrigated water a complex socio-political issue. Production of rice with very low productivity of water (approximately Rs. 0.93/m<sup>3</sup>) is an added hurdle in pricing of water. On the other hand, pricing water below marginal cost leads to major inefficiencies, which are further complicated by the current institutional setup in irrigation.

The Sri Lankan government formulated the National Water Resource Policy to manage inland water. The objective of this policy was to manage water resources in an effective, efficient and equitable manner, consistent with the needs

of present and future generations. However, the policy is criticized on two major aspects: water entitlements and irrigation water pricing. The general public and academia find the policy 'donor-driven' and criticize it for following a top-down approach, being insensitive to historical and cultural perspectives, and for paying inadequate attention to environmental issues. Despite this, increasing water productivity in agriculture through crop diversification and the introduction of new technologies has significant potential to positively impact water-use. For instance, the International Water Management Institute is currently exploring technologies like System of Rice Intensification to improve the water productivity of rice. Theoretically, it could increase the productivity of paddy by 300% and thereby contribute significantly to water savings. The Government is also promoting crop-diversification to cash crops such as banana, which need less water particularly in elevated areas of paddy fields.

Water is scarce and has to be efficiently used. However, pricing of irrigation water will put an extra burden on poor farmers. Hence, improving agricultural productivity through other means may be more appropriate in the short-run. Making drip-irrigation and other efficient techniques affordable for poor farmers can also help increase water productivity.



◆ **SANDEE TRAINING ACTIVITIES** ◆

*Regional Course in Environment and Natural Resource Economics, AIT Center, Thailand, 30<sup>th</sup> October to 16<sup>th</sup> November 2003.*

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SANDEE organized a course on Environmental and Natural Resource Economics, co-sponsored by the United Nations Environment Program (UNEP) and the World Bank Institute. The 3-week course was designed to provide insights into theoretical and empirical issues in environmental and natural resource economics. The participants belonged to teaching and research faculties in and outside South Asia. Resource persons included Dr. Haque from North-South University, Bangladesh, Dr. Gunatilake from University of Peradeniya, Sri Lanka, Prof. Maler from the Beijer International Institute for Ecological Economics, Dr. Murty for Institute of Economic Growth, India, Dr.

Shyamsundar from SANDEE, Dr. Bhattacharya from University of Kalyani, India and Dr. Sterner from University of Gothenburg, Sweden.

The course spanned a fairly post-introductory level of material. It included topics from the economics of sustainable development coupled with national accounting, economics of renewable and non-renewable resources, CPR and institutional issues to various valuation methods like Hedonic pricing and CVM, and policy instruments for environmental management. Some minor fine-tuning like avoidance of repetitions and some more preplanning of lectures would augment the desired impact of such a course.

Group discussions on and off the classroom, on virtually every theme taught in the class, generated invigorating hours of learning and sharing. It was as if the whole of South Asia was 'economizing' on issues and ideas related to natural resources and the environment. Each of us could stretch ourselves that much more - it was fascinating to learn this way! Research presentations kept us occupied and reading till the final week. Evenings generally found us in small sub-groups in and around the beautiful AIT campus, or at Robinson's, a 20 minutes ride from the campus. It was a reiteration of the SANDEE motto, "learning with fun." For me the course turned out to be an immensely educating experience, with a significant quantum of positive externalities.



#### ◆ OTHER NEWS ◆

#### ANNOUNCEMENTS

**The Overseas Development Group (ODG),** United Kingdom is offering the following courses:

Land Degradation and Sustainable Rural Livelihoods.

Field Assessment Livelihoods Analysis for Poverty Reduction.

Indicators for Sustainable development.

For details visit: [www.uea.ac.uk/dev/ODG](http://www.uea.ac.uk/dev/ODG)

#### **2004 CSISS Summer Workshop Program**

The Center for Spatially Integrated Social Science (CSISS) is accepting applications for its

summer workshops. The application deadline is April 18, 2004. Please visit [www.CSISS.org/events/workshops](http://www.CSISS.org/events/workshops) for further details.

#### **PROFILE**

#### **The Institute of Economic Growth (IEG), Delhi, India**

The Institute of Economic Growth was founded in 1958 as an autonomous, multi-disciplinary centre for advanced research and training in economics, demography, and sociology. It is a premier national institution that pursues empirical and theoretical research related to economic and social policies. Research is focused on macroeconomics and policy, industry, globalization, social change and structure, population and human resource development and environmental and natural resource economics.

Research in environmental and natural resource economics and participatory and decentralized planning have been given special attention. Since the nineties, specialized and in depth studies are being conducted in the following areas:

- Ecological economic modeling
- Analysis of pollution abatement costs and institutional arrangements
- Common Property Resources
- Valuation and natural resource accounting
- Environment and development
- Sustainable development: indicators, operationalisation and sectoral analysis
- Population and environment interactions
- Gender issues in environment

IEG was identified as a Core institution under the World Bank Capacity Building Program in Environmental Economics in India (1998-2003) and provided training in Environmental Economics to researchers, university teachers, policy makers, and Ph.D. scholars from different universities in India. These activities continue with support from different national and international agencies. Details of the institute's activities and opportunities available are on [www.ieg.nic.in](http://www.ieg.nic.in).

## RESEARCH, TRAVEL GRANTS, FELLOWSHIPS

◆ Federal State of Bremen (Federal Republic of Germany) has announced the Bremen Partnership Award 2004 for people working on initiatives, business ventures, projects and technologies to tackle tomorrow's environmental challenges. The award includes prize money of 35,000.00 Euro. For further details visit the Website <http://www.umwelt-unternehmen.bremen.de/page.php?PageID=744>. **The application deadline is April 2004.**

◆ RFPP PhD and post-doctoral fellowships: PhD fellowships are funded for three years and post-doctoral fellowships for two years. The funded research is in the fields of agriculture, forestry or natural resource management for development; female candidates are especially invited to submit. More information is available on <http://www.zil.ethz.ch/RFPP/index.htm>

◆ The World Forest Institute (WFI) is seeking individuals working in forestry and natural resources to apply for its International Fellowship program. Information is available on website: [www.worldforestry.org/wfi](http://www.worldforestry.org/wfi)

## JOB OPPORTUNITIES

Department of Economics, Jadavpur University has announced vacancies for teaching positions of Professor, Reader and Lecturer. For details visit: <http://www.jadavpur.edu/announce/announce.htm>

## BOOKS

◆ Parekh Jyoti and Hemant Datye (eds.), 2003. "Sustainable management of Wetlands: Biodiversity and Beyond", New Delhi: Sage Publications Ltd.

◆ Kumar Pushpam, 2003. "Economics of soil Erosion: Issues and imperatives from India" New Delhi: Concept Publishing Co.

◆ Wilson Douglas Clyde, Poul Degnbol, and Jesper-Raakaer Nielsen (eds.), 2003. "The Fisheries Co-management Experience: Accomplishments, challenges and prospects." The Netherlands: Kluwer Academic Publishers.

◆ Ghate, Rucha. 2004. "Uncommons in the commons: Community-initiated forest resource management", New Delhi India: Concept Publishing Co.

### ON THE 'LIGHTER' SIDE

How many economists does it take to change a light bulb? Eight. One to screw it in and seven to hold everything else constant.

## WEB NEWS - BIBLIOGRAPHY

SANDEE has compiled one new bibliography:

"Non-Timber Forest Products (NTFP) Conservation and Management: A Brief Bibliographical Survey". Anuradha Kafle. Various aspects related to NTFP use such as economic contribution, marketing and trade, resource valuation methods and environmental issues are covered in this bibliography.

This newsletter is produced jointly by SHODH, the Institute for Research and Development, Nagpur and SANDEE, Kathmandu for SANDEE. It seeks to inform a wide audience about policy developments and research news in the area of economic development and environmental change.

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# MEMBERSHIP FORM

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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\$).....  
Drawn on (Name of Bank).....  
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](http://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](mailto:manikd@sandeeonline.org)*