



South Asian Network for Development and  
Environmental Economics

## NEWSLETTER

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Dear Friends and Colleagues,

The Tsunami clouded the arrival of 2005. We are simply grateful that many friends who were close to where the massive waves hit, were not directly affected. However, thousands of people continue to feel the impact of this huge human, economic and an environmental catastrophe. Perhaps the true environmental disaster took place long ago and continues to prevail in the clearing of mangroves, destruction of coral reefs and sand dunes. This issue of the newsletter takes up some of these concerns. We believe there is a need for economics research on the impacts of natural vegetation on coastal degradation and on other issues such as set-back limits in coastal zones. The Madras School of Economics and SANDEE recently organized a South Asia-wide workshop on the implications of coastal communities and natural disasters – do read inside for ideas for new research.

And now for some good news! We are delighted to congratulate our advisor Prof Karl-Goran Maler on receiving the European Lifetime Achievement Award in Environmental Economics. This award is given by the European Association of Environmental and Resource Economists to economists who have dedicated their lives' work to environmental economics. We are also pleased that a SANDEE research working paper by E. Somanathan and J. Jalan was a finalist among papers selected by the Global Development Network for its research awards. Details from this paper are reported in this newsletter.

The newsletter as usual contains information on research rewards and SANDEE activities, innovative research under 'Focus', news from around South Asia and grants, jobs etc. Do send us your feedback.

**Rucha, Priya and all of us 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.**

## **NEW SANDEE GRANTS**

*In response to SANDEE's 9<sup>th</sup> call for pre-proposals, SANDEE received 132 concept notes 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 seven grants were made:*

### **Heterogeneity Effects on Peoples' Participation in Joint Management of Protected and Reserved Forests in West Bengal**

*- Lekha Mukhopadhyay, India*

Designing voluntary collective action programmes 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 household and village community decisions to participate in forest management programs.

### **Social Cost-benefit Analysis of Shrimp Farming in Coastal Tracts of Tamilnadu and Union Territory of Pondicherry (Conditional grant)**

*- L. Umamaheswari, India*

The short-term financial returns from shrimp farming are high but shrimp aquaculture in coastal rice paddies has long-term welfare implications. The present study attempts to examine if it is socially desirable to go in for shrimp farming in rice fields when the effects of environmental externalities such as salinization are taken into consideration. This micro-level study will identify appropriate policy measures for the development of sustainable shrimp aquaculture in the region.

### **Estimation of Pro-Poor Tourism Potential in Indian Sundarbans**

*- Indrila Guha and Santadas Ghosh, India*

The government's latest strategy to involve large Indian business houses to lure tourists to Sundarban National Park (SNP) is a positive effort to promote tourism in this biodiversity rich mangrove area. But this can have negative

impacts on the vibrant informal economy of the local poor, who are the small service providers. In this study, the researchers propose to measure the value of recreational services provided by SNP and also understand the role of tourism in reducing local poverty. They will investigate whether the government could have generated greater revenue through an improved pricing policy while keeping the current pro-poor mode of tourism intact.

### **The Effect of Natural Resource Scarcity on Household's and Women's Time Allocation Decisions in Rural India**

*- Neetu Chopra and Supriya Singh, India*

Resource scarcity has a direct effect on women in rural communities as they are the primary collectors and users of natural resources. Neetu and Supriya propose to examine whether resource degradation causes women to spend more time in resource collection and therefore less time on other income-generating activities. An important goal of this analysis is to inform the policy debate to what extent improved natural resource management—e.g., reforestation, regeneration of grasslands, building water-conserving structures—can alleviate poverty by increasing the time that households and women spend in income-generating activities.

### **The Power Purchase Agreement in the Wind Energy Sector: A Comparative Study of Tamil Nadu and Karnataka**

*- Pushkala Ratan, India*

Wind energy is an important source of emission-free clean energy. In India, efforts are underway to encourage the private sector to finance and install new wind energy generation plants. However, the development of wind energy sector has been very slow thus far. Pushkala wants to identify whether performance of wind farms in Tamil Nadu and Karnataka can be explained through the features of existing purchasing power agreements.

### **Demand for Alternative Technologies for Reduction of Indoor Air Pollution in Rural Areas of Central Nepal**

*- Krishna Prasad Pant, Nepal*

Traditional fuels are the primary source of energy for cooking, lighting and heating in rural

households of Nepal. Most of the traditional Nepali houses do not have flues or chimneys as these are designed with few windows for ventilations (mainly to conserve heat). Therefore, concentration of indoor air pollution (IAP) is believed to be high. In this study, Pant seeks to assess households' existing demand for interventions that reduce health risks from indoor air pollution. This research is expected to provide a basis for developing pragmatic intervention to address the problems of IAP in rural households that will help alleviate rural poverty and reduce child mortality.

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**Impact of Pesticide Use in Rice Cultivation on Fresh Water Fishes in the Chalan Beel of Bangladesh** (Conditional grant)

- Md. Abdul Wadud, Bangladesh.

Rice production and fish production in the Chalan Beel have a close mutual relationship with the use of water and land resources. First, they are competitive in the use of land and water. Second, rice production discharges pesticide into water bodies causing an external cost to fish culture, which, in turn, leads to an increase in fish prices. In this project, Abdul will study the joint production of rice and fish and suggest policies for reducing the rice related externalities on fish farming.

**RESEARCH COMPLETED**

*This section presents abstracts from the SANDEE's working paper series. Full papers will be available online at [www.sandeeonline.org](http://www.sandeeonline.org)*

**Land Degradation and Migration in a Dry Land Region in India: Understanding the Dynamics**

- Amita Shah, India

Migration literature has always considered environmental constraints as one of the prime movers of populations especially, from dry regions, where water rather than land is the primary limiting factor. In this study, we seek to analyze the importance of degradation of private land as well as common pool land resources on migration decisions. We focus on three dryland districts in Gujarat and analyze data from a survey of over one thousand households. Our study finds that economic assets and natural capital have differential impacts on short-term and long-term migration decisions. The rich tend to partake in long-term, precautionary

migration. Their assets, skills and social capital allow them to migrate out perhaps permanently. The poorest rural households in dry land regions stay put i.e. they are least likely to migrate. Thus, any employment creation in rural dryland regions is likely to help the poorest. We find that degradation of common-pool resources influences short-term but not long-term migration. Better management of common-pool resources would strengthen the livelihood base of traditional herder communities and limit migration among middle-income households. Overall, in dry areas such as Gujarat, access to irrigation, rather than land ownership, is likely to deter migration.

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**Environmental and Resource Economics: Some Recent Developments**

-Partha Dasgupta & Karl-Göran Mäler

The paper surveys those recent developments in environmental and resource economics that have been prompted by a puzzling cultural phenomenon, where one group (usually natural scientists) sees in humanity's current use of Nature's services symptoms of a deep malaise, even while another group (usually economists) documents the fact that people today are on average better off in many ways than they had ever been (so why the gloom?). The developments surveyed here reconcile some of the claims and counter claims, by showing that the protagonists have frequently talked past one another. We show that some of the disagreements would be blunted if (i) use were made of a comprehensive measure of wealth to judge the performance of economies and (ii) possible irreversibilities in ecological damages were commonly acknowledged. Regional estimates of changes in wealth per capita are reported. Implications are drawn for the persistence of rural poverty in the world's poorest regions, even as they experience aggregate growth in GNP.

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**Measuring the Value of Life and Limb: Estimating Compensating Wage Differentials among Workers in Chennai and Mumbai**

- S. Madheswaran, India

Policy makers confronted with the need to introduce health and safety regulations often wonder how to value the benefits of these regulations. One way that a monetary value

could be placed on reductions in health risks, including risk of death, is through understanding how people are compensated for the different risks they take. This approach, referred to as the compensating wage differentials method, estimates the wage premium a worker would need to be paid to accept a small increase in his/her risk of dying, or, equivalently, what a worker would pay to achieve a small reduction in risk of death. Wage premiums can be estimated from observed labor market data and converted to the value of a statistical life (VSL) - a number that summarizes what a population may be willing to pay to reduce the risk of one death in a statistical sense.

While there is an extensive literature on VSL and compensating wage differentials for the developed countries, few such studies exist when it comes to developing countries. Our study is an attempt at obtaining estimates of VSL that reflects Indian risk preferences. Based on a survey of 550 workers in Chennai and 535 workers in Mumbai, we find the value of a statistical life in India to be approximately Rs. 15 million. The value of statistical injury ranges from Rs. 6000 to Rs. 9000. Policy makers interested in programs to decrease environmental and health risks could use these numbers as one benchmark against which costs can be assessed.

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**The Importance of Being Informed:  
Experimental Evidence on the Demand for  
Environmental Quality**

- Jyotsna Jalan and E. Somanathan

Details of this paper are provided under the 'Research Notes' section of this issue.

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**FOCUS**

**Do Stock Markets Penalize Environment-  
Unfriendly Behaviour? Evidence from India**

- Shreekant Gupta & Bishwanath Goldar

Several studies have established that dissemination of information about environmental performance of firms (positive or negative) affects their share prices. In particular, news about weak or negative environmental performance can adversely affect the share prices of a firm. In this context, we undertook an *event study* to examine the impact of an announcement regarding environmental

rating of firms on their capital market status. Companies in three pollution-intensive sectors, namely pulp and paper, automobile manufacturing and chlor alkali were considered. Environmental ratings of these companies by India's leading environmental NGO, Centre for Science and Environment (CSE) were used for the study.

CSE evaluates the environmental performance of various industrial sectors and announces 'green leaves' awards for the firms under its Green Rating Project. The environmental performance of firms is benchmarked against 'theoretical best practice' and not merely against current environmental norms, standards or regulations. Thus, full compliance with current environmental regulations fetches a firm a score of merely 2 on a 10-point scale. Using a life cycle analysis approach, CSE analyses the environmental performance of firms during sourcing of raw materials, the production process, product use and product disposal.

Unlike some previous studies that have examined the reaction of capital markets to a series of positive and negative environmental news about a firm, we use a standardized one-shot event, namely, the announcement of green ratings and leaf awards--on July 18, 1999 for pulp and paper firms, October 29, 2001 for automobile firms and September 2, 2002 for firms in the chlor alkali sector. These announcements are high profile events with prominent persons such as the former Indian Finance Minister (at present the Prime Minister of India) releasing the scores and distributing the 'leaf' awards. These events are accompanied by extensive media coverage. The 'event window' that is the period of observation of share prices was defined as 15 trading days following the announcement of the awards. Since there were no compelling reasons to believe that the market could have anticipated the ratings by CSE, days prior to the announcement have not been included in the event window.

CSE evaluated 17 companies in the pulp and paper sector, 15 in automobiles and 18 in chlor alkali, with the rating ranging from five leaves (best) to one leaf, or even no leaf for the worst performance/non-cooperation. In no case could a four or five-leaf rating be awarded because of reasons stated earlier. Among pulp and paper firms, 8 got a one-leaf award, 7 got two leaves and 2 got three leaves awards. 4 automobile

manufacturing firms got one leaf, 8 got two leaves and only 2 got three leaves awards. Five out of 18 chlor alkali firms got three leaves, 8 got two and 4 got one leaf. In each of the latter two sectors one firm was not awarded any leaf at all.

Our study found that the market generally penalises environmentally unfriendly behaviour since the announcement of weak environmental performance by firms led to negative *abnormal returns of up to 43 percent*. Abnormal return is defined as the difference between the *actual* rate of return on share prices and the *counterfactual* (that is, the rate of return that would have prevailed had the announcement not taken place). A positive correlation was also found between the abnormal returns to a firm's share price and the level of its environmental performance. In other words, firms with lower ratings also showed more negative abnormal returns and vice-versa. Further, comparing firms that were rated 'one leaf' with those that received two or three leaves, we found that the average cumulative abnormal return for the 'one-leaf' companies was much more negative than that for the 'two leaf' and 'three leaf' groups. Finally, whereas the average cumulative abnormal return for the 'two-leaves-or-greater' category stabilized after seven days, that for the 'one-leaf' category continued to fall.

These findings have important policy implications especially for developing countries where monitoring and enforcement capabilities are limited. Firstly, publicizing of information regarding firms' environmental performance can complement environmental regulation and can be part of the pollution abatement policy of developing countries such as India. Second, and more important, such negative market responses might prove to be effective incentives for firms to participate in voluntary environmental programs. Overall, institutionalizing the public disclosure of environmental information can create an added pressure point for firms to invest in pollution abatement.

The complete paper can be downloaded from: [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=394621](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=394621)

## PUBLICATIONS & PRESENTATIONS

Arun K.C. (2004) "Extraction of NTFPs from the Community Forest: Analysis of Benefit Distribution Pattern in the Household level", *Journal of Forest and Livelihood*, Vol.4 (1), Forest Action, Nepal.

Rucha Ghate & Deepshikha Mehra (2004) "The Land on which the Forest Stands is not ours, so what? Forest Products are ours! A Study of Three Collective Action Based Forest Regimes Operating Without Land Tenure", *Forests, Trees and Livelihoods*, Vol. 14 (2,3,4).

Vinish Kathuria (2004) "Controlling pollution from SSIs", *Economic and Political Weekly*, Vol. XXXIX, No. 26, June 25-July 2

Kishor Atreya (2004), "A Pilot Study on Pesticide Use, Acute Symptoms and Willingness to Pay for Safer Pesticides in a Commercial Area, Nepal, GDN Net Document Store.

Bhim Adhikari (2005) "Poverty, property rights and collective action: understanding the distributive aspects of common property resource management", *Environmental and Development Economics*, Vol. 10, Issue 01.

Pranab Mukhopadhyay (2005) "Now that your land is my land...does it matter? A case study in Western India", *Environmental and Development Economics*, Vol. 10, Issue 01

V.P. Ojha presented a paper entitled "Trade-Off Between Carbon Emissions, Economic Growth and Poverty Reduction in India" at the 2004 International Conference on Policy Modelling organised by EcoMod Network, held at University of Paris I Pantheon-Sorbonne.

Kakali Mukhopadhyay and Souvik Bhattacharya presented a paper entitled "Estimation of Abatement Costs of Air Pollution in Durgapur City of West Bengal" at the conference on Sustainable Energy and Environment, organized jointly by The Joint Graduate School of Sustainable Energy and Environment & Kyoto University, Kyoto, Japan, held in Hua-Hin, Thailand in December 2004

## RESEARCH NOTES

*This section highlights new tools, innovative approaches, or field experiences from SANDEE research. In this issue, E. Somathan and Jyotsna Jalan present the experimental methodology they adopted while trying to identify whether access to information about environmental quality prompts people to adopt practices to improve it.*

### **The Importance of Being Informed (SANDEE Working Paper 8-04)**

- Jyotsna Jalan and E. Somanathan

In SANDEE Working Paper 4-03 "Awareness and the demand for environmental quality: Drinking water in urban India" we used National Family Health Survey data from 1998-99 to show that schooling and exposure to news media raised the probability that a household would purify its drinking water at home in some way. We controlled for wealth and other variables in the regressions in order to ensure that schooling and news media exposure were not simply picking up income effects. Richer households are more likely to spend money on purifying their water at home. But they are also more educated. So what appears to be a relationship between schooling and purification could simply be one between purification and wealth, unless one controls for wealth. However, because wealth can never be perfectly measured, the control could be imperfect.

For this we used experimental data from Gurgaon. About half the households from our sample were randomly selected (using a random-number generator) to be given information about their water quality while the other half were not told until the experiment was over. This random selection ensured that information about water quality was not correlated with any characteristics of the households. Consequently, the effect of information on changes in purification behaviour could be estimated without any possibility that it was picking up the effect of wealth or any other characteristics. It is for this reason that the medical literature refers to randomized trials as the "gold standard" for evaluating whether a drug is an effective cure.

With quality of drinking water as a representative of environmental quality, we randomly selected about 1000 households from census lists in

Gurgaon, India. The city of Gurgaon was chosen since it is a residential urban area near Delhi and the quality of water supply was of non-uniform quality. Also the heterogeneity among the population in terms of their general awareness of sanitation and health issues made it suitable for our enquiry.

The first round was a household survey conducted for 1000 households, to gather information on household demographics, source and quality of drinking water, purification methods (if any) and general awareness of the household about health and sanitation issues. Water samples, both purified and unpurified, were collected from these households in bottles, which were sealed immediately after collection. Each bottle contained a slip of filter paper impregnated with nutrients, the major one being peptone. The bottles were kept in an incubator at body temperature for 48 hours after which, if they contained faecal bacteria, they would produce hydrogen sulphide, which would create iron sulphide, a black precipitate, otherwise remaining clear.

A month later, the second round of the survey was undertaken in which, 540 randomly selected households out of 1000 were given their test results and a handout explaining the results. The handout also contained information on different methods of purifying water, their efficiency in removing pathogens and their cost, with suggestions on safe water storing and handling practices.

The households not visited during the second round, were visited during the third round and were *first* resurveyed for changes in purification behaviour and were *then* given the test results and handouts. In the third round, the 540 households, that were informed about their water quality during the second round were also visited and re-surveyed for changes in purification behaviour. This way the 540 households were revisited 7-8 weeks after they were informed about the quality of their water, thus allowing the respondent reasonable time for acting upon or ignoring the information provided.

The results revealed that, households that were initially not purifying their water, and were told that their drinking water was contaminated, were 11 percentage points more likely to begin some form of home purification in the next 7 weeks than households that did not receive any information (the control group).

By way of comparison, an additional year of schooling of the most educated member of the household is associated with a 4.4 percentage point rise in the probability of initial purification, while a move from one wealth quartile to the next is associated with a 15 percentage point rise in this probability (using the first-round survey data). Thus the effect of information from a single test of a household's own water quality on purification behaviour was comparable in magnitude to the effect of a whole year of schooling or a large change in wealth.

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### **TAKING RESEARCH FORWARD**

*SANDEE researchers disseminate their research findings to policy makers, practitioners or in class rooms. We give details of a few here.*

Bhim Adhikari's research on forestry user groups was cited by Dr. Keshav Kanel, Deputy Director General, Community Forestry Division in discussing new challenges to community forestry in Nepal.

E. Somanathan and Jyotsna Jalan gave talks based on their two SANDEE research papers at IIM Kolkata, the World Bank, New Delhi and at the Global Development Network's 6th annual conference in Dakar, Senegal. Their work on water quality and awareness as generated considerable interest in the impact of information on household behaviour.

S. Madheswaran presented a lecture entitled "Hedonic Wage Models: A case study" at the Faculty upgradation programme in Environmental Economics sponsored by the Ministry of Environment and Forests, GOI at IEG, New Delhi on Feb. 22, 2005.

Vinish Kathuria was a resource person for the workshop on "Environmental Economics" for college lecturers, organised by Institute of Economic Growth, Delhi during February 14 to March 05, 2005. He delivered a lecture on "Informal Regulation of Pollution and Evidence".

### **SELECTED ECO-NEWS**

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

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#### **Tsunami: The Real Catastrophe that it Exposed**

- Alpana Bose and P. Indira Devi, India

India was one among the 11 Asian nations hit by the 26<sup>th</sup> December Tsunami. The worst hit was the state of Tamil Nadu on the eastern coast of India, where the death toll rose to 8000. But it is important and interesting to note that, while Nagapattinam, a coastal district of the state was lashed devastatingly by the Tsunami waves, the similarly located regions of Pichavaram and Muthupet in the same state were spared with far less damage. The one big difference was that while the mangrove forests of Pichavaram and Muthupet regions were more or less intact, Nagapattinam's mangrove forests were replaced by 200 odd shrimp farms, mostly illegal. Mangroves, the diverse, salt-tolerant forests that grow in the inter-tidal zone between land and ocean, are said to have broken the force of the Tsunami waves before they arrived the regions of Pichavaram and Muthupet, saving more than 1200 lives. While the law bars shrimp farms within 1500 ft. of the coastline, it is often ignored by commercial shrimp farmers.

While this particular example depicts mangroves as an effective defense against calamities like Tsunami, further intensive research is needed to understand other set of factors that influence the impacts of a natural disaster. If mangroves are one among them, then it would be pertinent to know the extent to which they can be relied upon as protectors.

While ecologists have always warned against the ill effects of shrimp farms and uncontrolled tourism on ecology and economy, no incident could have driven the point home in a more effective manner. Now that there seem to be some link between the mangroves and the impact of Tsunamis, regulations need to be enforced strictly. Both the activities – tourism and shrimp farming, can be carried out at safe distances from the sea and should be done so. Mass awareness building regarding environmentally responsible tourism and the environmental impacts of shrimp farming are

long term but essential activities that would ensure more sustainable and wide spread conservation efforts. Mangroves and coral reefs need to be looked at as natural defenses against natural calamities and therefore assets of national importance.

### **Some facts and figures on Tsunamis, Shrimps and Mangroves**

- ♣ India's mangrove cover has been reduced to less than a third of its original in the past three decades.
- ♣ Between 1963 and 1977, India destroyed nearly 50 per cent of its mangroves.
- ♣ In Andhra Pradesh, India, more than 50,000 people were forcibly removed and millions displaced throughout the country to make room for the aquaculture farms.
- ♣ Having grown tenfold in the last 15 years, shrimp farming is now a \$9 billion industry.
- ♣ It is estimated that shrimp consumption in North America, Japan and Western Europe has increased by 300 per cent within the last ten years.
- ♣ The life of a shrimp farm is at the most 5 years.
- ♣ As much as 38% of global mangrove destruction is linked to shrimp farm development.
- ♣ Since the 1960's, aquaculture and industrial development in Thailand resulted in a loss of over 65,000 hectares of mangroves.
- ♣ In Indonesia, Java lost 70 per cent of its mangroves, Sulawesi 49 percent and Sumatra 36 percent to shrimp farms.
- ♣ Dec 26 tsunami in 11 Asian countries alone has surpassed the economic gain that the shrimp industry claims to have harvested over the years by several times.
- ♣ Each acre of mangrove forest destroyed results in an estimated 676 pounds loss in marine harvest.

*(References can be obtained from the authors.)*

### **Post Tsunami Operations: Another Disaster?** - Shamen Vidanage, IUCN, Sri Lanka

The Indian Ocean Tsunami that hit Sri Lanka was the worst natural disaster in the living history of the nation claiming over 31,000 lives,

5,000 missing, leaving over 800,000 people displaced and destroying coastal infrastructure on a mammoth scale within the coastal area covering over 1000 km of the Sri Lankan coastline. The damage stretches from Jaffna in the north down the entire eastern and southern coast, and covers the west coast as far north of Colombo as Chilaw.

Given the size of its economy the impact of tsunami was severe. Even as detailed assessments are underway, following estimates are being widely accepted. The destruction amounted to about 100,000 housing units (75,000 of which completely destroyed), 143 schools (100 of them completely destroyed) 150,000 vehicles, 10 out of 12 major fishing harbours damaged including support facilities, about 23,000 fishing vessels of various capacities were lost or damaged (almost 60 percent of the total number of fishing vessels in the country).

After the initial wave of relief and rescue operations, the question of ensuring future safety was the next to draw attention of the government. In this regard, one of the most interesting, yet debated, decisions made by the Government of Sri Lanka is the announcement of the strict adherence to the rule of 100m "no build" zone for all new construction in the coastal areas in southern and western coastal areas and 200m in north and the eastern coast. The above decision was to discourage concentration of population near the coastal zone and therefore minimize the loss of life in a future natural disaster and to minimize the impact of human interference on sensitive coastal ecosystems, which acted as buffers against the tsunami (e.g. well-established sand dunes, mangroves and coral reefs). Earlier there was a coastal zone of 300m declared by the Coast Conservation Act (CCA), 1981 and all construction in the coastal zone was supposed to be subjected to approval under the CCA, however there were many unauthorized buildings constructed irrespective of the act. The result was apparent in the 26<sup>th</sup> December calamity.

While the new policy ensures safety of the coastal dwellers, it also creates hindrances for about 75,000 fishing households in pursuing their livelihood activities. Fishery related pressures are already immense as the tsunami impacted the 2/3<sup>rd</sup> of the country's coastline.

Another group that is opposing the decision is that of coastal tourism enterprises. Thus this well-meaning regulation is also likely to cause negative economic implications for at least two industries.

On more of a technical ground the proposed setback should have been decided individually within the 100m (200m for north and the east) 'no build zone' after considering the elevation from the coast and presence of important habitats rather than on pure distance. If strictly enforced, 'no build' zone would prevent utilizing lands which are not even vulnerable to natural disasters -due to high elevation and do not contain ecologically important habitats. This might increase the difficulties of rehabilitation especially as alternative lands are hard to find in coastal urban areas.

What is needed now is to develop rehabilitation and reconstruction policies, strategies and plans based on sound Integrated Coastal Zone Management (ICZM) principles, and their implementation through effective coordination among all the parties involved in post tsunami reconstruction and rehabilitation.

## ACHIEVEMENTS

SANDEE Adviser Prof. Karl-Göran Mäler, Director of Beijer International Institute for Ecological Economics has been awarded the European Lifetime Achievement Award in Environmental Economics. Nominations were collected from the EAERE Membership comprising over 450 members from Europe and beyond, from academic institutions, the public sector, and private industry. The Association's Council unanimously selected Prof. Karl-Göran Mäler and Prof. David Pearce for this award.

SANDEE's working paper number 8-04 by Jyotsna Jalan and E. Somanathan qualified for final round in the GDN's Research Medal Competition in the health category.

## Potential of Solar Energy in Pakistan - Shabbir Ahmad, Pakistan

Pakistan has not remained untouched from the current world energy crisis scenario. The conventional energy sources are proving insufficient to cater to the growing development

needs of the country. Pakistan however has a ready option in the form of non-conventional, renewable energy resource: solar energy. Its geography is exceptionally well suited to develop solar, wind and geothermal energy reservoirs. Its ideal location in the sun-belt makes it specially convenient to exploit this resource. Balochistan province is particularly rich in solar energy with the highest annual mean sunshine duration in the world.

The government has recognized this potential as solar energy has been listed as high priority area in the 9th Five Year Plan. A number of institutions have been set up in order to encourage solar energy use in the country. National Institute of Silicon Technology (NIST) has been formed to develop the know-how and technology to fabricate solar cells, modules, and systems. This technology is being used for stand-alone rural telephone exchanges, repeater stations, highway emergency telephones, cathodic protection, refrigeration system for vaccines and medicines in the hospitals, and so on.

Alternative Energy Development Board (AEDB) is also exploring the potential use of renewable energy resources in partnership with public and private sector organizations. It has been entrusted with the task of strengthening the institutional capacity to supplement the government's efforts to enhance available renewable energy to 10 percent of the energy mix by 2015.

The private sector has also stepped in to popularize and upgrade PV activities. A number of companies are not only involved in trading PV products and appliances and manufacturing different components of PV systems like PV modules, batteries, regulators, and invertors (small power back up during load-shedding), but also to desalinate highly saline underground water in large parts of Balochistan, Sind and southern Punjab. Public Health department in Balochistan has installed about 20 solar water pumps to supply clean drinking water to the people. A proposal of one mega watt thermal solar energy plant has already been submitted to UNESCO. Solar dryers are now being used effectively in the northern areas of Pakistan to dry fruits. Photovoltaic units with net installed capacity of 650 Kilo Watt are also working in different areas of Pakistan. Solar cookers have also been experimented with and about 3000 different sized units are being used.

Many non-governmental organizations (NGOs) are experimenting different solar energy projects with the help of communities at village level and are also trying to make them commercially viable.

The enormous growth prospects of solar energy can be tapped through creating awareness, providing resources for research and development, introducing tax holidays, exemption from duties and sponsoring renewable energy demonstration projects at community level. It is incumbent on the policy makers to pursue the course of exploiting renewable energy sources by considering these options as well as consolidating the existing ones.

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### **Biogas: The Potential Clean Fuel for Nepal**

- Kishor Atreya, Nepal

Nepal has one of the lowest per capita energy consumption in the world. It is merely 14.6 GJ per capita for domestic and 1 GJ for commercial use. In Nepal, the share of biomass in total energy consumption is a huge 86 percent while that of commercial and renewable are 13.6 and 0.4 percent respectively. Current energy consumption is still dominated by conventional sources like fuel wood, agricultural crop residue and dried cow dung. The residential sector has the highest share (89 percent) of overall energy consumption followed by transport and industry sectors. For the rural economy, heavy dependence on biomass, especially on forest resources, has contributed to deforestation, soil erosion, biodiversity loss and ultimately to desertification of land. Further, conventional energy sources like wood and cow dung, contribute to poor indoor air quality leading to adverse health implications especially for women. In view of this, biogas could prove be a viable alternative. Nepal took many initiatives since the fifth five-year plan in 1975 in non-conventional energy development. However, only the seventh-plan gave attention to biogas as an alternative for conventional domestic fuel. With the help of international organizations, NGOs, biogas companies and the government, over 92,000 biogas plants have been installed all over the country so far. But this is not nearly enough to exploit the total potential of biogas. Based on the number of cattle in the country, estimated potential for biogas production in

Nepal was around 4,356,000 cubic meters in 1999. Installation of 1 million biogas plants in Nepal is likely to save 170,000 metric tons of fuel wood, 72,000 tons of agricultural residue, 40,000 tones of dung and 4.5 million litres of kerosene. These savings would result in positive carbon dioxide balance as well as absorption.

Key components of the biogas promotion in rural Nepal are the financial subsidy and bank loans at minimal interest rate to the plant owners. Three commercial banks and some private companies such as Nepal Biogas Company are offering to finance biogas initiatives. Currently, the subsidy is limited to less than 10 cu. M. plant size. Further, the subsidy policy differs geographically. In terai (low lands) and municipalities within Kathmandu Valley it is Rs. 7,000 for 4-6 cu. M. plant and Rs. 6,000 for 8-10 cu. M. plant. For hill districts, subsidies offered are Rs 10,000 and Rs 9,000 for 4-6 and 8-10 cu. M. plant size respectively. Similarly in remote areas, these are Rs. 11,000-12,000. To sum up, while the average cost of installing a plant is nearly Rs. 23,000, the subsidy covers just about 35 percent of the cost. It has, however, played a major role in popularizing biogas in Nepal, and is still a promoting factor in the rural areas.

A lot more needs to be done to make this environment-friendly technology reach its full potential. Awareness building, creation of technical manpower, effective and regular monitoring, etc. need government attention and public investment. Although, the affordability of the technology has been achieved to some extent through subsidies and bank credits; biogas has so far been adopted chiefly by the elite and/or middle-income groups in the villages. Such inequalities need to be ironed out by promoting low-cost technology and community loan schemes for the low-income groups.

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### **SANDEE ACTIVITIES**

#### **Planning Workshops:**

#### **Coastal Communities and Natural Disasters: Priority Research Issues Chennai, India (March 02, 2005)**

The recent Tsunami disaster highlighted the extreme vulnerability of coastal and riverine communities in South Asia, particularly fishermen to such natural hazards. Given the

long history of natural resource disasters in South Asia, it is useful to consider how vulnerable coastal (and riverine) communities respond to risk and uncertainty and what public policies can help decrease the costs of disasters. SANDEE and the Madras School of Economics held a workshop in Chennai on March 2<sup>nd</sup> 2005 to discuss some of these issues and to identify questions for new research. Based on a full day of deliberations amongst researchers and policy makers from Sri Lanka, Bangladesh, India and the Maldives, the following issues were identified as being important economic questions that needed further research:

### **1. Vulnerability Lines and Set-Back Zones**

What are appropriate criteria for set-back zones or vulnerability zones? Can economic criteria be incorporated into the set of factors that determine zones? Given the presence of zones or set-back lines, what are the economic costs of decreased development in high risk zones? Who bears the costs of actions taken to reduce vulnerability to disasters in high risk zones?

### **2. Decentralization and Coastal management**

Can responsibility for coastal management be devolved to lower levels of governments? What functions can be undertaken at the village, municipal, district and state levels? What incentives do decentralized agencies have to implement current laws regarding coastal management? What financial arrangements are required in order to enable local government to implement coastal laws? What are some economic instruments (fees, permits, charges, subsidies) that can be used to regulate coastal development within different risk zones?

### **3. Community Adaptation**

What incentives and dis-incentives that communities face lead to inefficient use of coastal resources, particularly fisheries? How and to what extent do disaster relief and re-construction efforts exacerbate inefficient and sub-optimal resource extraction? What conditions lead to successful community response? What is the role of collective action and social capital in preparing for and mitigating the effects of coastal and riverine disasters?

### **4. Market Strategies**

What is the role of insurance markets in responding to natural disasters? What policy and regulatory changes are required to

strengthen insurance markets to enable them to respond to natural disasters?

### **5. Natural and Man-made barriers**

What is the role of natural barriers and the services they provide in mitigating slow and rapid-onset disasters? How can we value the services provided by natural barriers? What are some unexpected costs and consequences of man-made barriers? What incentives do communities have to develop and maintain man-made and natural barriers?

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### **Nepal Capacity Development Program in EE Curriculum and Training Needs Assessment Workshop, Kolkata, India (March 5-6, 2005)**

SANDEE organized a brainstorming workshop at the Jadavpur University, Kolkata, India for developing an environmental economics program for Nepal. Ten faculty and experts representing several Nepalese institutions (including economics, agriculture, forestry and environmental science and management) attended this workshop. The workshop resulted in the following plan of action: The participants agreed to discuss with their respective institutions for changes in curriculum and developing a semester length curricula and modules in environmental and natural resource economics, forest economics, etc. They also agreed to prepare and provide list of reading material required and a secured place in their respective institutions' libraries for the same. The participants committed that trained faculty will submit research proposals while SANDEE will help identify matching researchers for collaborative research work. The group will identify keen and qualified individuals for SANDEE training courses. SANDEE will continue to play the supportive role of a facilitator in this process.

### **SANDEE CPR Book 1<sup>st</sup> Workshop for the Contributors Goa, India (March 23-25, 2005)**

SANDEE is planning to publish an edited book on CPR Management and institutions, based on studies conducted by SANDEE grantees and SANDEE associates. In this regard, a three-day authors' workshop was organized jointly by SHODH and SANDEE at Goa, India, from 23<sup>rd</sup> to 25<sup>th</sup> March 2005. The workshop was attended

by seven proposed contributors and by Dr. E. Somanathan who acted as a referee for the book. Detailed presentation of each paper was followed by in-depth discussions that gave the authors crucial insights for improving their chapters further. Narpat Jodha, Rucha Ghate and Pranab Mukhopadhyay are editing the book jointly.

#### **TRAINING:**

##### **Training of Survey Methods on Environmental Economics Bangalore, India (1-3 November, 2004)**

- Bhoj Raj Khanal, Nepal

SANDEE organized a three-day training on Survey Methods on Environmental Economics in Bangalore, India from 1<sup>st</sup> to 3<sup>rd</sup> November 2004 in association with Institute for Social and Economic Change (ISEC), Bangalore. The objective of the training was to familiarize SANDEE researchers with survey techniques in environmental economics.

On the first day of training, survey design, elements, survey formatting and secondary data were discussed. A group exercise on survey formatting with Microsoft Excel followed the discussion. "Designing Household Survey Questionnaire for Developing Countries: Lessons from 15 years of the Living Standard Measurement Study (LSMS)" of the World Bank was also discussed on the same day.

Principles and practices in sample selection, sample size determinations were thoroughly discussed on the second day and the learning process was further strengthened by two exhaustive hands-on exercises on sample size determination.

On the final day of the training, usefulness of pre-testing and its procedures, training manual, interview techniques with data verification and validation were discussed with survey implementation. This was followed by two practical exercises on data verification and validation. The other issues like sampling techniques, sample size determination, sample size calculator, survey module, field operation and data management were oriented in the training. The training ended with a training evaluation by the participants.

Dr. Urvashi Narain from Resources for the Future, Washington D.C. USA, Dr. Shreekant Gupta from Delhi School of Economics, India and Dr. Arabinda Mishra from Center for Multi-disciplinary Development Research, India facilitated the training. 21 researchers from Bangladesh, Bhutan, India, Nepal, Pakistan and Sri Lanka, participated in the training.

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##### **Training workshop on 'MDG Needs Assessment-Resource Costing and Information Requirement' Kathmandu, Nepal (November 10-11, 2004)**

SANDEE jointly with Nepal Forum for Environmental Journalists (NEFEJ) organized a two-day technical training on "MDG Needs Assessment-Resource Costing and Information Requirement" from November 10-11, 2004 at the Godavari Village Resort in Kathmandu. The objective of the training workshop was to enhance the capacity of researchers and civil society for better understanding of MDGs and to progressively monitoring its implementation. This was a technical training program, which dealt with data needs and requirements and associated costs for the implementation of the MDGs in Nepal. Chief expert and Training Director was Dr. Sajjad Zohir, Executive Director of Economic Research Group (ERG) and Senior Research Fellow at Bangladesh Institute of Development Studies, Dhaka Bangladesh. About 28 participants from different academic, research and the NGO community attended the training workshop in Kathmandu.

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#### **BOOKS OF POSSIBLE INTEREST...**

Shiferaw, B., Freeman, H.A., and Swinton, S. (eds.) (2004) "Natural Resource Management in Agriculture: Methods for Assessing Economic and Environmental Impacts", CABI Publishing ISBN: 0851998293

Joy E. Hecht (2005) "National Environmental Accounting Bridging the Gap Between Ecology and Economy", RFF Press ISBN 1-891853-94-5

Gordon Tullock (2005) "Public Goods, Redistribution and Rent-Seeking", Edward Elgar Publishing 1-84376-637-X

Paavola, J. and Lowe, I., eds. (2005)  
"Environmental Values in the Globalising World:  
Nature, Justice and Governance", Routledge:  
London

Jordan, A. and D. Liefferink (eds.) (2004)  
Environmental Policy in Europe: The  
Europeanization of National Environmental  
Policy. Routledge: London

P. Caratti, H. Dalkmann, R. Jiliberto (eds.) 2004  
Analysing Strategic Environmental Assessment:  
Towards Better Decision-Making Series on  
"Economics and the Environment" published by  
Edward Elgar Publishing.

Mohan Munasinghe & Rob Swart (2005) "Primer  
on Climate Change and Sustainable  
Development", Cambridge University Press, UK.

### **JOB OPPORTUNITIES**

The Public Policy Institute of California (PPIC)  
has an opportunity available for a Visiting  
Fellow. Candidates should bring a record of  
experience in public policy research along with  
an interest in applying empirical research and  
analysis to policy issues that focus on balancing  
economic growth and environmental priorities.  
A Ph.D. in economics, environmental studies,  
political science, public policy, regional planning,  
resource economics, sociology, or a closely  
related discipline is required. To apply, e-mail an  
application letter and a CV to  
[resumes@ppic.org](mailto:resumes@ppic.org), using "Visiting Fellow  
Search" in subject heading.

### **ACADEMIC OPPORTUNITIES**

The Institute for Social and Economic Change  
(ISEC), Bangalore, India, invites applications for  
doctoral fellowships in Agricultural Economics /  
Rural Development, Environmental Economics,  
Demographic Studies and Gender studies. More  
information and application forms can be  
downloaded from [www.isec.ac.in](http://www.isec.ac.in). The last date  
for receiving completed applications is 10<sup>th</sup> May  
2005.

The Indian Institute of Forest Management  
(IIFM), Bhopal, India, invites applications for its  
12<sup>th</sup> batch of Post Masters Course in Natural  
Resource Management. Application forms can  
be downloaded from [www.iifm.ac.in](http://www.iifm.ac.in).

### **WEB NEWS**

A new information base on Pakistan's  
Environmental laws has been made available on  
the Internet. [www.law.iucnp.org](http://www.law.iucnp.org) is intended to  
serve as a reference resource for law scholars,  
teachers, administrators, environmentalists and  
everybody else who are interested in the  
subject.

### **A New Bibliography on Economics of Solid Waste Management**

SANDEE has a new bibliography that may be of  
interest. Please visit SANDEE's website,  
[www.sandeeonline.org](http://www.sandeeonline.org) for bibliography.

### **ANNOUNCEMENTS**

#### **INSEE Conference**

Fourth Biennial Conference of the Indian Society  
for Ecological Economics (INSEE) will be held in  
Mumbai, at the Indira Gandhi Institute of  
Development Research, during 3-4 June 2005.  
The main theme of the Conference will be  
"Ecology and Human Well Being". For more  
information, please write to: [insee@ieg.ernet.in](mailto:insee@ieg.ernet.in).

#### **3<sup>rd</sup> World Congress of Environment and Resource Economists**

The Third World Congress of Environmental and  
Resource Economists is going to be held from  
July 3-7, 2006 at the Kyoto International  
Conference Hall - Kyoto, Japan. More  
information can be obtained at  
<http://www.worldcongress3.org>.

## MEMBERSHIP FORM

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

#### Payment Details (Enclose Cheque/Draft)

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Notes: This form is for institutional members only. The institutional membership fee is US\$50 per year for South Asian institutions and US\$250 per year for non-South Asian institutions. **Please do not send cash.**

*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)*