SANDEE
South Asian Network for Development and Environmental Economics

NEWSLETTER

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IN THIS ISSUE

Dear Friends:

As we roll out this newsletter, our minds are on the terrible disaster that has struck Kashmir. The images of children struggling to comprehend the tragedy that they will have to live with for years are stark. We have friends in Pakistan who are helping the earthquake victims by raising resources for them. The Sustainable Development Policy Institute is a think tank that works on environmental issues and is now working on earthquake relief. Please consider contributing to this effort. Further information is available on their website at www.sdpi.org

Our region is reeling from one natural disaster to the next. In this issue, Prof. Nirmal Sengupta, discusses the need for and implications of flood management in South Asia, under Focus. We think that careful research can contribute to disaster management by identifying strategies to mitigate the effects of disasters. Our new research guidelines solicit proposals on coastal disaster management, vulnerability and adaptation. We hope to receive an excellent set of concept notes, for this will allow us to continue to solicit research in this area.

As always, please send us feedback on this newsletter or any other SANDEE-related issue.

Be well and take care,

Guest editor Rucha Ghate, Priya Shyamsundar 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.

RESEARCH NEWS

SANDEE's 10th Research and Training Workshop, Bangalore, India, July 22nd – 26th, 2005.

NEW SANDEE GRANTS

In response to SANDEE's 10th call for pre-proposals, SANDEE received 105 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 2005. The following nine grants were made:

- *An Economic Evaluation of the Effects of Effluent Water Discharged from Raw Natural Rubber (NR) Manufacturing Industries on Human Health in Sri Lanka - Jagath Edirisinghe, Sri Lanka*

Natural rubber manufacturing industries often discharge the effluents generated during rubber production into natural waterways without treating them, posing, as a consequence, a threat to human health. Jagath, in this study, will identify and evaluate the impact of these effluents on the health of the population. In addition, he will estimate the costs of abating effluents in order to identify suitable policy options. Jagath's research is part of the Rubber Research Institute's efforts to develop and promote abatement technologies for effluent discharge.

- *Economic Valuation of Health and Agricultural Impacts of Households: Case of Cement Air Pollution in Puttalam District of Sri Lanka* - C. Bogahawatte and H.M.S.J.H. Bandara, Sri Lanka

Even though the problem of air pollution is often associated with metropolitan areas, certain natural resource based industries operating in suburbs or rural areas also cause air pollution. In his study, they will investigate the impact of rural air pollution caused by a large cement factory in the Puttalam district of Sri Lanka. This research seeks to estimate the magnitude of the impact of pollution on the health and agricultural productivity of households in the proximity of the cement factory. They will also demonstrate how changes in pollution standards can contribute to better health and improved agricultural production.

- *Institutional Support and Solid Waste Management (SWM) in Sri Lanka - Sunil Chandrasiri, Sri Lanka*

Solid waste has become a major environmental hazard in urban as well as semi-urban areas of Sri Lanka. Crude dumping practices of solid waste can disrupt sensitive ecosystems, leading to deterioration of water and air quality. As a consequence, lack of solid waste management practices results in negative externalities to agriculture, industry, trade and tourism as well as impacting adversely the health of the human population. Sunil, in this study, will carry out a select number of case studies of the solid waste management sector in Sri Lanka with special focus on understanding institutional support systems.

- *Poverty, Environment and Micro-credit: An Assessment of the Micro-credit based Social Forestry of Proshika in Bangladesh - M. Jahangir Alam Chowdhury, Bangladesh*

Long-term sustainability of micro-credit based social forestry programs will depend on their capacity to alleviate poverty. The poor are likely to lose interest in participating in such programs if they do not generate adequate income. In this study, Jahangir seeks to examine the impact of 'Proshika,' a micro-credit program that aims to reduce poverty and improve the environment through social forestry. The study will be based on a careful use of quantitative program evaluation tools.

- *The Productivity of Pesticide in Cole Crops Production: A Case Study of Vegetable Production Pockets of Bhaktapur Districts of Nepal - Ratna Kumar Jha and Adhrit Regmi, Nepal*

Several studies have claimed that the use of pesticide for pest control in production system is unsustainable. In this study, the researchers will examine the contribution of pesticide to crop yields and identify the determinants of pesticide use in Cole crop production. The study also

seeks to find out how farmers perceive pests and assess their beliefs and practices in relation to crop protection problems. This study will directly contribute to Nepal's pesticide policies, as one of the principal investigators is a member of the Plant Protection Directorate of the Ministry of Agriculture.

- *Cost Benefit of Indoor Air Pollution Control Initiatives in Nepal: A Case Study at Rashuwa District - Min Bikram Malla Thakuri, Nepal*

The smoke caused by the burning of biomass as fuel in households is one of the four leading causes of death and disease in the world's poorest countries. A number of measures have been developed and disseminated that aim to reduce exposure to indoor air pollution. While the physical impacts of adopting interventions, like reduced emissions or improved fuel efficiency can be observed directly, their value in terms of monetary benefits is less evident. This study aims to generate empirical evidence on the costs and benefits of specific indoor air pollution control initiatives in rural Nepal that have provided households with different types of stoves and chimneys.

- *Community Forestry and Poverty Reduction in Nepal -Ridhish Pokharel, Nepal*

Nepal's Community Forestry program was originally initiated to achieve the national goal of poverty reduction. But despite two decades of successful implementation, the program's contribution to poverty alleviation is far from satisfactory. In this study, Ridhish seeks to examine how community forestry funds, established through the collection of fees, fine and donations, actually contribute to poverty reduction. This study will carefully scrutinize investments made from these funds in order to analyse their impact on poverty alleviation.

- *Economic Valuation of Storm Protection Function: A Case Study of Mangrove Forests of Orissa - Soudamini Das, India*

The role of mangrove forests in providing protection to the lives and properties of coastal communities during natural calamities such as cyclones is well known. However, there has been no systematic attempt to value this crucial protective service. In this study, Soudamini aims to evaluate the storm protection function of mangrove forests and to compare it with the storm protection value of Casurina forests that are planted by the government as cyclone buffers. She also seeks to compare the relative costs of different anti-cyclone measures.

- *Vulnerability of Indian Agricultural Farmers to Climatic Changes and to Globalization - K. S. Kavi Kumar, India*

This proposal brings together two important issues that concern Indian agriculture in the future – global climate change and globalization. The study seeks to examine different strategies that might effectively reduce the vulnerability of Indian farmers to these combined forces. Kavi Kumar proposes to use an agent based social simulation model (ABSSM) to analyze the effectiveness of existing mechanisms to reduce farmer vulnerability. The ABSSM will be based on secondary and primary data from two specific locations, Anantapur district in Andhra Pradesh and Chitradurga district in Karnataka, in South India.

RESEARCH COMPLETED

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

- *Using Traditional Knowledge for Commercial Innovations: Incentives, Bargaining and Community Profits*

  - K. Aparna Bhagirathy,
  SANDEE Working Paper No. 11-05

The recent interest in traditional knowledge systems within health care and biodiversity sectors is directly related to the profitable innovations that traditional knowledge can generate. This paper seeks to examine the nature of economic incentives required for protecting and sustainably using traditional knowledge. The two key questions the paper addresses are: (a) under what conditions do communities and pharmaceutical companies

enter into contracts to develop traditional knowledge-based innovations and, (b) what factors influence the benefit-shares of the two parties from the commercial use of traditional knowledge.

Bhagirathy's research shows that the actual sharing of the revenues depends on a number of issues including the relative bargaining strengths of the two parties. Factors that affect profits and relative bargaining strengths include the contributions of the parties in developing the innovation, the availability of alternative sources and options, differences in expectations over future revenues and costs and the involvement of a third party in the negotiations. Such factors need to be taken into account in designing incentive schemes that can help communities benefit from the use of their traditional knowledge.

- *The Trade-Off among Carbon Emissions, Economic Growth and Poverty Reduction in India*

  - V.P.Ojha
  SANDEE Working Paper 12-05

This study examines the consequences of a) a domestic carbon tax policy, and b) participation in a global tradable emission permits regime on carbon emissions, taking into account the Gross Domestic Product (GDP), and the poverty in India. The results, based on a CGE model of the Indian economy, show that a carbon tax policy that simply recycles carbon tax revenues to households imposes heavy costs in terms of lower economic growth and higher poverty. However, the fall in GDP and rise in poverty can be minimized or even prevented if the emission restriction target is a very mild one and tax revenues are transferred to the poor.

A soft emission reduction target is all that India needs to set for itself, given that even a ten percent annual reduction in aggregate emissions will bring down its per capita emissions to a level far below global per capita emissions. On the other hand, participation in the tradable emission permits regime opens up an opportunity for India to sell surplus permits. India would then be able to use the revenues from permits to speed up the GDP growth and also reduce poverty as well as keep its per capita emission below the 1990 per capita global emissions level.

- *Land-use Strategies, Economic Options and Stakeholder Preferences: A Study of Tribal Communities in Forest Peripheries*

  - Seema Purushothaman
  SANDEE Working Paper 13-05

In the Anaikatty region of the South-western Ghats in India land-use in forest peripheries is characterized by low productivity and extended fallows. Land alienation, soil degradation, drought, wild animal attacks, and declining access to forests have debilitated the livelihood base of a tribal community known as *Irulas*. This study seeks to identify alternate land-use and management strategies to strengthen and diversify the livelihood options that confront these extremely poor, marginal farmers.

Benefit cost analyses in combination with stakeholder discussions reveal that alternative land-use strategies such as millet-based dry farming, the adoption of soil conservation or the growth of perennials on field bunds are economically efficient compared to current dry farming and also enjoy the acceptance of farmers. Adoption of such systems would result in a nearly 300 percent increase in annual income from their land. Some other economically superior alternate land-uses are not acceptable to farmers, indicating the care with which tribal development policies need to be made. The tribals in this region are caught in an almost in-surmountable poverty and environment trap. This study offers some suggestions that may enable them to move out of the current grim reality facing them.

TAKING RESEARCH FORWARD

SANDEE researchers disseminate their research findings to policy makers, practitioners through lectures, publications and paper presentations. We give details of a few here.

S. Madheswaran presented his research on the value of statistical life and trade-offs between wages and risk in the labour market to

government officials and faculty members of the V.V. Giri National Labour Institute on August 5th, 2005. He used the results of his hedonic labour market study to discuss the importance of market based risk information. Madheswaran urged this policy-making body of the Indian government to use the value of statistical life and similar numbers in programs that affect occupational safety and environmental health programme. Dr. Madeshwaran also delivered two lectures on Hedonic pricing and Application of Econometrics in Environmental Economics, at one UGC-Refresher Course in Ecological Economics, at ISEC last year.

Bhim Adhikari's work in forest user groups in Nepal found its way into the most recent World Resouces book on the Wealth of the Poor. World Resources is a flagship publication by the World Resources Institute, World Bank, United Nations Development Program and United Nations Environment Program.

FOCUS……

Urban Flood Mitigation

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The severity of the recent Mumbai floods has shocked everybody. The deluge claimed about 450 lives and damaged property worth about Rs. 4000 crores (40,000 million). The water refused to recede for three full days. Since Mumbai cannot exactly be called flood-prone, many questions followed the disaster. While floods are expected and indeed inevitable in many parts of India, Mumbai is located in an area that rapidly descends from uplands and hills. The question confronting any researcher is that in a landscape that encourages water to drain out fast, why did water not recede in Mumbai for three days? The answer basically lies in human interference with nature's course. Two factors that have come up prominently as responsible for the floods are firstly, the enormous number of plastic bags that had clogged up the drains making it virtually impossible for them to deal with such huge quantities of water. Secondly, the natural drainage system of the city has collapsed over time owing to indiscriminate construction that has either closed down or diverted the natural rivers and rivulets. Mithi, one such rivulet, was diverted to make way for the Santa Cruz airport. The construction near the airport was followed by a spate of encroachments. The result was that the river failed to drain out the huge volume of water after the heavy downpour and the whole Santa Cruz area, including the airport remained under water for several days.

In South Asia floods are frequent natural disasters and 55 percent of the total loss of lives due to natural disasters are attributed to floods alone. Out of the total lives lost in floods, 90 percent were in Asia, and within Asia, South Asia tops the chart. The total value of flood damage in Asia in the last two decades is about US$ 200 billion. Until the recent devastations in the US this was about 90 per cent of flood damages throughout the world. In Bangladesh, loss due to flood is so substantial that in some years it is expressed as a percentage of GDP. But what is more interesting is that in course of the last three decades, annual flood events in Asia have increased by three times. The increase is even more rapid for South Asia. The estimated loss of property due to floods has increased by about 25 times in the last five decades. The urban areas, where both population increase and development levels are higher, bear the major part of property loss.

Haphazard urbanization and concretization of the land has in fact helped export floods to non-flood prone areas that has created a Mumbai like situation in many cities. By 2025 half of the population of South Asia will live in urban areas. While damage potential of floods is on the increase, it is also realized that complete prevention of flood is a distant dream. In recent years, another set of strategies has been added to the conventional flood prevention efforts in order to reduce the loss of lives and property. This is called flood mitigation. In many parts of South Asia, particularly in the low delta areas, flood control may never be possible. Flood mitigation, therefore, is the most important tool for coping with increasing flood havoc.

The primary instrument of urban area flood mitigation is appropriate land use planning,

structural measures and forecasting. In brief, micro-units of land in flood prone areas are mapped according to the intensities of possible floods. This is followed by a master plan of permissible structures in each micro-area. Disaster preparedness and flood warning systems are parts of this mitigation strategy. The land use plans however, have made very slow progress. The benefits of investing in lands that might be affected by floods seem to outweigh the costs until a flood really occurs. Also, siltation makes flood control projects ineffective as they age.

At present there are more studies on flood prevention than on mitigation. There are some studies of disaster preparedness which may help us to develop methods for studying flood mitigation. In addition, the lessons of the Mumbai floods need to be integrated into the flood mitigation methods. One important aspect that needs to be highlighted is to see flood creation as another consequence of pollution. Considerations like flood creation potential of certain solid wastes like plastics may need reviews of our Environmental Impact Analyses methods.

ECO-NEWS

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

- **Human Elephant Conflicts: Future of the Giant in Sri Lanka**

  - Janaranjana Herath, Sri Lanka
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The number of Elephants in Sri Lanka has decreased from 36,000 at the beginning of the century to 2500-3000 at present. National goals of poverty alleviation and increasing domestic food production have resulted in large tracts of forestland being brought under cultivation. This has affected the survival of elephants, especially in the dry zones of the country. Inefficient policies and inadequate collaboration among departments related to forests and other natural resources has made the condition worse. Reduction in the number and area of feeding habitats and prevailing drought conditions has resulted in elephants intruding into nearby villages in search of food and water. This has resulted in human-elephant conflicts especially around national parks such as Lahugala, Udawalawe, Wasgomuwa, Gal-Oya and Maduru-Oya.

With subsistence farmers encroaching on park buffer zones, elephants in Sri Lanka face an unprecedented threat. While some elephants are shot or trapped by local residents, others have starved to death. The communities living in the vicinity of the elephant habitat happen to be among the most marginalized in the country. They lose their crops and lives in these conflicts leading to a situation that is jeopardizing both the giant and the poor.

Though the government is evidently concerned about the issue and has declared 12 per cent of the entire land of the country as national wild life parks, there are few effective policies that curtail the growing encounters between elephants and humans. Short-term solutions such as physically driving away the elephants to certain national parks or scaring them away by using fire bullets or crackers have actually exaggerated the problem by making the elephants more aggressive and dangerous. The creation of buffer zones is also not a sustainable solution as such areas are encroached on by locals.

Long-term solutions are required to stop further dwindling of the elephant population and to ensure the safety and livelihood of the poor. New approaches such as habitat enrichment, resettlement of villages, and translocation of elephants are potential ideas. Collaborative efforts with NGOs, researchers and environmentalists may help identify other solutions. Information provided by victims also needs to be given attention. Are there enough resources for humans and elephants to live in harmony? Perhaps, but only if misallocation and misuse of the resources is avoided.

- **Virtual Water Trade: A Researchable Issue**

- P.S.Srikantha Murthy, India
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'Virtual water' is the total volume of water from all sources used to produce a crop, including the water embodied in the crop. Hemdan, an Egyptian geographer and Tony Allan of King's College London, first introduced and defined this concept in the nineties. Any country exporting water-intensive agricultural product to another country exports water in the virtual form. Thus, the importing country saves that amount of water. From the resource conservation point of view, it makes sense for a water-scarce country to import water-intensive agricultural products from water-rich countries and thereby relieve the pressure on the nation's water resources. Thus, the transfer of virtual water can be instrumental in improving global water use efficiency and water security in water-scarce regions. Increase in rational virtual water trade can provide significant benefits by reducing the negative environmental consequence of distorted agricultural policies.

A recent study on virtual water[1] concluded that access to arable land rather than its water endowment determines the country's virtual water trade. Accordingly, virtual water trade increased with the increase in gross cropped area. There was no correlation between relative water availability and virtual water trade. Virtual water flowed out of water-poor, land-rich countries to land-poor, water-rich countries. India, Afghanistan, Malawi, Thailand, Denmark and a few other countries as those closer to the water-stress threshold but are still the biggest virtual water exporters. While the proponents of virtual water relate food self-sufficiency to "total water sufficiency" (equal to the volume of water to produce crops for consumption), the results of this study showed that "total water sufficiency" alone does not guarantee food self-sufficiency -- access to arable land is crucial.

Many water rich regions in India are importers of food from naturally water scarce, semi-arid regions. The water-rich state of Bihar has been traditionally importing food grains. Bihar's small per capita landholding of 0.092 hectares, limits the scope of utilizing the abundant water resources available in the region. Therefore to optimize the productivity of water, it can be transported to regions that have sufficient land to optimally use the water. Through this the focus shifts from water use efficiency to land use efficiency. Water can be physically transferred to water scarce, land rich regions for agriculture. The food grains produced can then be exported back to water-rich and land-poor regions that will buy back their water virtually. Valuing virtual water in trading agricultural commodities is important for rational allocation of water resources. We have a long way to go to figure out how to do this.

[1] www.iwmi.cgiar.org/library/Files/PDFS/IWMIPUBS052005.pdf

- **Ibex: an Agent of Economic Change The Case of Karambar Valley, Ghizer Pakistan**

- Marriyum Aurangzeb, Pakistan
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Hunting of wild animals is usually seen as an unsustainable practice for both environmental conservation and human well-being. The Karambar valley of Pakistan has however taken up hunting as a sustainable practice from the view of environmental conservation and livelihood generation for the local communities. The Karambar valley covers an area of 640 square kilometres in the Ghizar District of Pakistan's Northern Areas and is one of the poorest areas in the world. The people are farmers and herders and the majority of the valley's population lives below the poverty line. It has lately been realized that farming could never generate income enough to achieve the desired social, economic and environmental goals.

In such circumstances, the residents of the valley introduced the concept of trophy hunting of the Himalayan ibex in the valley. The Himalayan ibex is a species of wild goat, found abundantly in these mountain ranges. This experiment was first conducted in the neighbouring Bar valley, in 1989 with partnership among community organizations, NGOs and the Government. The WWF-Pakistan

had also played a leading role. The First licenses to hunt ibex in the Bar Valley were issued in October 1996 and Rs. 244,000 (about US $ 4500) got generated through the exercise.

Inspired by this, 14 villages of the Karambar Valley got together to create the Karambar Social Welfare and Conservation Organization (KSWCDO) to start the process of legal Trophy Hunting of the Himalayan ibex in their own valley. In addition, a Conservation Fund and Permanent Endowment Fund were established dedicated to future earnings. During the period from 1998-2004 a total of 10 trophy hunting permits were issued by the Government to the Karambar valley community.

The community consequently earned Rs. 388,400 by using 90 per cent of the permits. The money generated from trophy hunting was pooled into a fixed account and the interest earned from this conservation endowment fund was subsequently transferred into a revolving account. The income generated was spent on conservation, development and administrative cost in the ratio 55%, 30% and 15% respectively. In this way, the income of the trophy-hunting programme was utilized for conservation of the Himalyan ibex along with other faunal species. Therefore, there is a trade-off between conservation and development that has laid the foundation of sustainable development in terms of development as a reward of conservation.

With the funds generated, the Karambar Valley community has been able to promote traditional "patti" by installing looms for local artisans and by establishing a resource center where local artisans prepare handicrafts and embroidery products. Through developing effective linkages with the government this resource center has been able to attract a fund of Rs. 576,000 from the government for food processing units. People are employed by the center to prepare and process various kinds of jams, jelly, vinegar and dry fruits in summers and almost the same products are produced from sea buck in winter which also have a high medicinal and food value. Thus this center provides the Karambar Valley community with a sound "all season" source of income generation.

The whole process has instilled a sense of ownership for the natural resource in the community. The Valley community is now conservation practitioner and custodian of wildlife and natural resources instead of the exploiter that it used to be previously.

- **Pest Management Program in Nepal: The Quest for Agro Biodiversity Conservation and Sustainable Agriculture**

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While pest infestation affecting agricultural production is a common occurrence, the increased use of pesticides has led to an increase in the virulence of many species of crop pests due to the destruction of non-target species like natural parasitoids, parasites and predators of pests. The World Resource Institute notes that more than 500 insect and mites species are immune to one or more insecticides. Pesticide resistance by pests and weeds is ranked as one of the top four environmental problems in the world. In this regard, Integrated Pest Management (IPM) is the global quest to protect agro-biodiversity through an ecosystem based production and pest management approach.

This eco friendly approach have been adopted in Nepal since 1997 after facing the massive outbreak of Brown Plant Hopper (Nilaparvata *lugens*) in rice throughout the Terai belt of Nepal. More recently, a NORAD funded project is being implemented with technical assistance from Food and Agriculture Organization, to develop a cadre of IPM facilitators to educate farmers in field schools. It also promotes cooperation for IPM among government, NGOs, research institutions, development agencies, extension services and farmers. In the last nine years, more than a thousand farmer field schools (FFSs) have been organized to educate farmers in rice and vegetable based agro ecosystems. FFS empowers farmers to create a safer working environment for themselves and their families by becoming aware of the negative health impacts of pesticide applications. Through phytosanitary standards, pesticide residues and environmentally and socially unacceptable cultivation practices are increasingly used as barriers to international

trade. Consumers in importing countries are rejecting questionable products. IPM is considered as the best approach by policy makers to address these problems at the source. The IPM technique not only helps in producing healthy crops in an environmentally friendly, economically viable and socially acceptable manner, but in the process also secures an uninterrupted access to local and foreign markets for agricultural products of Nepal.

- **Reduction in Groundwater Level in Dhaka City**

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Dhaka, the capital city of Bangladesh covers an area of about 360 sq. kilometres and houses a population of about 10 million. The densely populated city needs 2000 MLD of water each day and this requirement is steadily increasing, as the population of the city is growing at the rate of 5.5 percent. Almost all the water required for the city comes from groundwater sources. The previous few years have seen a drastic increase in the number of wells and currently there are 1300 boreholes that tap the aquifer in urban and suburban parts of the city. This is in spite of the fact that the city is surrounded by four rivers: Buriganga in the south, Balu and Shitalakhya in the east and Turag in the West. These surface water sources have been rendered unfit for use by the indiscriminate dumping of organic, inorganic and biodegradable matters, priority pollutants, nutrients, toxic matters and many other pollutants.

This makes Dhaka the world's largest groundwater dependent city. This dependence is likely to cost Dhaka a heavy price as the groundwater levels are falling fast in and around the city. The productivity of the boreholes as measured by specific capacity is found to have declined significantly. According to a recent estimate by WASA, Dhaka will run out of groundwater by the year 2015. It is high time that serious attention is paid to the problem. State efforts are required in cleaning up of surface water sources, and developing them as alternatives for the groundwater that is fast running out. This switch over might also prove to be a partial solution to the spreading problem of arsenic poisoning in the country. Therefore, the benefits of tapping the surface water sources are sure to outweigh the costs of cleaning-up of these sources, making this option worth pursuing.

PUBLICATIONS & PRESENTATIONS

1. Atreya, K. (2005), 'Health costs of pesticide use in a vegetable growing area, central mid-hills, Nepal', Himalayan Journal of Sciences 3(5): 83-86.
2. Mukhopadhyay, K. (2005), 'Sustainable Industrial Development in Urban areas of West Bengal: A case study of Durgapur', International Journal of Sustainable Development 2(1): 123-139.
3. Mukhopadhyay, K. (2005), 'An Output Distance Function Approach to Estimation of Air Pollution Abatement Cost of an Industrial Complex in India: A Case Study of Durgapur', paper presented at the 41st Annual Conference of 'The Indian Econometric Society', Jadavpur University, 20 -22.
4. Kathuria, V. (forthcoming), 'Managing pollution from SSIs - Designing for a sustainable institution', Environment, Development and Sustainability.
5. Kathuria, V. (forthcoming), 'Controlling Water Pollution in Developing and Transition Countries: Lessons from three successful cases', Journal of Environmental Management.
6. Adhikari, B. & J.C. Lovett (Forthcoming), 'Transaction Costs and Community-based natural Resource Management in Nepal' Journal of Environmental Management.

PROFILE

Tamil Nadu Agricultural University

The Tamil Nadu Agricultural University (TNAU) came into being on June 1, 1971. Its genesis however dates back to 1868 when an Agricultural School at Saidapet, Chennai, was established. This was later relocated to Coimbatore and in 1920 the University received affiliation to Madras University. TNAU assumed full responsibilities of Agricultural Education and Research and supported the State Agricultural Department by delivering research products. The University offers nine undergraduate programs and twenty-nine postgraduate programs in 10 colleges distributed in seven campuses all over Tamil Nadu. Besides, the University has 32 research stations for agro technology development.

A full-fledged Department of Agricultural Economics was established in 1961. Since its inception, the department has been offering courses of relative importance in agricultural economics to under-graduate students. The curriculum for M.Sc. (Ag) in agricultural economics is well designed and balanced. The courses include history of economic thought, micro economics, macro economics, production economics and farm management, development policy, research methodology, natural resource and environmental economics and so on. At the doctoral level, in addition to regular courses in advanced micro and macro economics, advanced production economics, applied econometrics and other specialized courses such as resource and environmental management are also offered. To obtain further information about TNAU and to apply to study there please visit www.tnau.ac.in.

SANDEE Activities

WORKSHOPS:

Policy Research and Proposal Writing Workshop, Islamabad, Pakistan, 16th – 19th May, 2005.

10th Biannual Research and Training Workshop at Bangalore from 22nd - 26th July 2005.

Consultative Research and Training Workshop at Delhi, October 3-4, 2005.

Consultative Research and Training Workshop at Dhaka, October 7-8, 2005.

CPR book workshop was organised at Bangalore on July 19–20. Six proposed contributors attended the workshop. Professor Dasgupta and Dr. Priya Shyamsundar commented on the papers. Editors of the proposed CPR book met again in Delhi on October 3-4, 2005.

TRAINING:

An introductory course in Environmental and Natural Resource Economics, held during July 1st to 20th July, at Bangalore, India.

- Suresh Kumar
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The Environmental Economics course organized by the SANDEE provided participants across South Asia with stimulating inputs. The three-week course was designed to cover both the theoretical and empirical aspects of Natural Resources Economics, Environmental Economics and Policy Analysis. As far as the course curriculum was concerned, we had excellent course materials (three volumes), reference materials, handouts and computer based assignments on most afternoons. The resource persons were of international repute. As part of the course programme we were taken to the field to study the problems and issues in Common Property Resources (CPR) and also to the wastewater recycling plant. These were eye-openers orienting us to real life issues. The course also provided a good opportunity for us to work on new policy oriented research proposals. It was useful to get feedback and to apply our newly learnt skills to research problems.

Other News

BOOKS OF POSSIBLE INTEREST…

Patel, Sheelwant (2005), *Indian Forests: Soil, water and bio-environment conservation,* Pointer Publishers, Jaipur (Rajasthan, India)

India Core (2005) has brought out the revised edition of 'Overview of Power Sector in India'. It is the industry's annual reference source offering a holistic view of the developments taking place in the Indian power sector. For ordering and other information visit www.bharatbook.com

World Resources (2005), "The Wealth of the Poor: Managing Ecosystems to Fight Poverty" ISBN: 1-56973-582-4 jointly by United Nations Development Programme, United Nations Environment Programme, The World Bank, and World Resources Institute

JOB OPPORTUNITIES

The Centre for Interdisciplinary Studies in Environment and Development (CISED) seeks to recruit Core Faculty in the thrust areas of (a) water resources and (b) energy & pollution. Deadline for receiving applications is November 15, 2005. Contact Dr. Sharachchandra Lele slele@isec.ac.in. Visit www.cised.org for more information.

The Asia Pacific School of Economics and Government (APSEG), Australia's premier policy school focused on economics and government in Australia, Asia and the Pacific, invites applications from economists for a joint appointment in the Environmental Management and Development and International and Development Economics Programs at APSEG. The successful applicant will be expected to teach and undertake research in environmental and resource economics and applied econometrics. The application deadline is December 16, 2005. For full details visit http://info.anu.edu.au/hr/Jobs/Academic_Positions/_APSEG3069.asp

ACADEMIC OPPORTUNITIES

Gender and Poverty Electronic Learning Course

The Poverty and Growth Program (PGP) of the World Bank Institute is launching a Gender, Economic Development, and Poverty Reduction E-Learning Course to be delivered October 31-November 25th, 2005. To register, visit the PGP learning catalogue at: http://web.worldbank.org/WBSITE/EXTERNAL/WBI/WBIPROGRAMS/PGLP/0,,menuPK:461264~pagePK:64157898~piPK:64156199~theSitePK:461246,00.html

WEB-NEWS

New Beijer Discussion Papers Available online at http://www.beijer.kva.se/publications

New Policy Briefs entitled "Valuing Life and Limb: Understanding the Risk-return Trade-off" and "Danger Dirty Water! An Assessment of the Importance of Information in Improving Water Use Hygiene" on www.sandeeonline.org

MEMBERSHIP FORM

General Information

Name of the Institution :
Name of Contact Person :
Designation :

Mailing Address

Street :
City :
State/Province/Zone :
Country :
Postal Code/Zip/PIN :
Telephone :
Fax :
Mobile :
Email Address :
Home Page/Web site :

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$50 per year for South Asian institutions and US$250 per year for non-South Asian institutions.

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