



South Asian Network for Development
and Environmental Economics

Newsletter

No. 6

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Dear Friends and Colleagues:

We had a full year last year with four training workshops, two research workshops, and several new research studies started. SANDEE is now entering a new phase after having been in existence for three years. At this point, it seems appropriate to evaluate our progress and think about the future. Thus, SANDEE will soon be externally evaluated, which should help strengthen our mandate and design our next set of activities.

SANDEE has added a new training activity to our annual schedule. For the first time we held a workshop on Research and Proposal Writing in Islamabad, Pakistan – the objective was to provide focused attention to researchers within one country and help them think through their research ideas. We also followed up on the environmental economics course held in the summer, with a course on econometrics for environmental economists. This course included some theory and plenty of practice with local datasets.

A few words on SANDEE outputs – four colleagues have almost completed their research studies. Please be on the look out for final papers on Air Pollution in Dhaka, Forest User Groups in Nepal, Dryland Migration in Gujarat and Irrigation Tanks in Tamil Nadu. We hope to have working papers and policy notes available on our website once these studies have been peer reviewed.

Be well and take care,

All of us at the SANDEE secretariat.

SANDEE...

The South Asian Network for Development and Environmental Economics (SANDEE) is a regional network that seeks to bring together analysts from the different countries in 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. SANDEE is supported by contributions from international donors and its members.

RESEARCH NEWS

SANDEE recently made several new grants to researchers from South Asia. A brief description of these grants is presented below. This information may be particularly useful to new applicants seeking to obtain SANDEE research funding.

SANDEE's Fourth Set of Research Grants, Dec 2002

A Research Proposal for Economic Valuation of Dutch Canal Associated Wetlands: W.R. Rohitha, Industrial Services Bureau, Kurnegala, Sri Lanka.

This study seeks to assess the environmental services of Dutch Canal associated wetlands, and changes in social welfare resulting from the presence of the shrimp industry (including shrimp farming, shrimp hatcheries and shrimp processing plants) in the region. The overall objective of the study is to formulate policy guidelines for the expected development of coastal aquaculture in Eastern and Southern Coastal belts of Sri Lanka by analyzing the current impacts of coastal aquaculture in the North Western Coastal belt.

Environmental Regulations in the Manufacturing Sector of Pakistan and their Effects on Output and Consumer Welfare: A CGE Approach, Malik Mohammad Sajid Manzoor, Quaid-I-Azam University, Islamabad, Pakistan.

The aim of this study is to identify economy-wide impacts of imposing environmental standards on industries. By constructing a CGE model that incorporates environmental variables, this study seeks to show how and to what extent implementation of environmental quality standards or imposition of environmental taxes will change overall welfare and economic productivity in Pakistan.

Conservation and Management Practices of Non-Timber Forest Products (NTFPs) in Mid-Hills of Nepal: Arun K.C., Institute of Agriculture and Animal Science, Chitwan, Nepal.

The study seeks to foster NTFP conservation and management in the mid-hills of Nepal by assessing indigenous conservation practices, and, the problems and possibilities of developing management and marketing systems for NTFPs. The most important part of this research is the empirical analyses of contributions of NTFPs to household income.

An Investigation of Socio-economic and Institutional Factors that Determine the Sustainable Management of Seasonal Village Tanks in Dry Zone Sri Lanka, D.M.A.H. Senaratne, National Aquaculture Development Authority of Sri Lanka.

This study investigates a paradoxical situation found in rural dry-zones of Sri Lanka where numerous villages face a situation of protein malnutrition, have reservoirs that are physically suitable for fish production, yet do not fully utilize these tanks. Based on a few broad hypotheses, this study sets out to investigate institutional and socio-economic aspects of this problem in order to identify a solution that is economically acceptable to local communities.

Exploring the Poverty-Environment Nexus in the Indus Delta - Who is the Most Affected and what are their Responses to Environmental Degradation?: Usman A. Iftikhar, IUCN, Pakistan.

The aims of this project are two-fold: first, to generate and provide empirical evidence to policy-makers for addressing poverty-environment linkages especially as they prepare the final draft of Pakistan's Poverty Reduction Strategy Paper (PRSP). Second, and in the same vein, to demonstrate to policy-makers how the neglect of environmental constraints impacts both economic development and poverty alleviation. This study, which focuses on the downstream impacts of water scarcity, has been conditionally approved and is awaiting a final revision.

Air Pollution Health Impacts in Angul-Talcher Area in Orissa, India - An Economic Assessment: Mrutyunjaya Mishra, Department of Economics Science College, Hinjilicut, India.

This study is an attempt to assess the health damage caused by air pollution in the Angul-Talcher industrial agglomeration in Orissa, India. The study proposes a dose-response method to estimate the extent of morbidity caused by PM10 air pollution. Economic estimation will be made on the basis of the cost of illness method. This is a conditional grant with approval pending a final revision.

ECO-NEWS

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

More than ten years after the Convention on Biological Diversity (CBD) was conceived, the debate over the value of biodiversity, particularly for its medicinal uses, continues. As argued below, questions about whether returns from bio-prospecting can finance conservation of medicinal plants, and, how benefits to stakeholders can be calculated remain un-resolved.

Valuation of Medicinal Plants: -- Unresolved Issues and Emerging Questions

K. Aparna Bhagirathy, Madras School for Development Studies, Chennai

The CBD provides a framework for the conservation and sustainable use of biological resources and for equitable sharing of benefits. In the case of medicinal plants, this has resulted in a great deal of interest in pharmaceutical prospecting as a means of generating revenues to finance conservation. Intertwined in this discussion is the issue of bio-piracy and who should benefit from financing medicinal plant conservation.

The Valuation Debate: The debate on whether revenues from pharmaceutical prospecting of medicinal plants are sufficient to finance biodiversity conservation has gone through a full circle over the last two decades. The late eighties were marked by optimistic estimates of revenues generated from trade in plant-based medicinal drugs. Studies estimated the total value of medicinal plants in the US to be in the range of US \$6 - 8 billion (Farnsworth and Soejarto, 1985; Principe, 1991; Pearce and Puroshothaman, 1994). In the mid-nineties, the picture changed. Using net revenues and including costs of bio-prospecting showed that the returns from pharmaceutical prospecting are more modest. For instance, Aylward (1993) and Artuso (1997) estimate the net return to prospecting to be around US \$33 - 70 million. The value per hectare of land supporting medicinal plants are also calculated; the lowest is at \$ 0.01 / hectare to \$ 21 / ha (Pearce and Moran, 1994). A landmark study by Simpson et al. (1996) calculates the marginal value of species as opposed to total / average values and with numerical data on 18 ecologically distinctive ecosystems shows that the value of an additional unit of land is rather modest. The highest value estimated is for Western Ecuador at US \$ 20.63 / ha (the lowest value is \$0.2/ ha). The central point made by this study is that discoveries may be redundant -- once a successful product is found, further discoveries of the same product from different species are valueless.

Publications and Presentations by SANDEE researchers

A. Shah, 2001. "Water Scarcity Induced Migration: Can Watershed Projects Help?", Economic and Political Weekly, Vol. XXXVI, No. 35, September, 2001.

_____, 2002. "Dwindling Agriculture and Migration: Tale of a Dry Land Region in Gujarat," presented at a National Seminar on Labour Mobility in a Globalising World: Conceptual and Empirical Issues, V.V. Giri National Labour Institute and Institute for Human Development, New Delhi, September, 2002.

B. Adhikari, 2003. "What Determines Household Dependency on Community Forests? Empirical Evidence from Nepal," Paper accepted for the XII World Forestry Congress, 21-28 September 2003, Quebec, Canada

_____, 2003. "Property Rights and Natural Resources: Socio-Economic Heterogeneity and Distributional Implications of Common Property Resource Management," submitted to EDE, 2003.

S. Madheshwaran and K.R. Shanmugam. "The Impact of Trade Unions on Compensation for Job Risks, International Review of Economics and Business (RESIC), " University of Milan, Italy, forthcoming.

V. Kathuria and G.S. Haripriya. 2002. "Industrial Pollution Control – Need for Flexibility", India Development Report - 2002, eds. K. Parikh and R. Radhakrishna, Oxford University Press, Delhi, pp. 140-56.

V. Kathuria. "Failure of Collective Action as an institution – Lessons from Kundli, Haryana", Institute of Economic Growth, Working Paper, forthcoming.

P. Mukhopadhyay, 2002. "Institutional Change & Resource Use: A case study in Western India," Presented at the International Conference on 'Environmental History of Asia', New Delhi, December, 2002.

_____, 2003. Goa – "Been there. Done That. Now What? Resource Management and Democratic Processes: A Note," Paper accepted for the National Seminar on 'New Developmental Paradigms and Challenges for Western & Central Regional States in India', Ahmedabad March 4-6, 2003.

The third phase of the valuation debate focuses on the importance of 'prior information' or 'leads' related to medicinal plants. This debate is led by a study by Rausser and Small (2000), which contests the Simpson et al. model. By explicitly incorporating the use of prior information in guiding pharmaceutical prospecting, they show that promising leads generate 'information rents' in addition to 'scarcity rents,' thus increasing returns to bio-prospecting. The value recalculated under this model for Western Ecuador is US\$ 9177 /ha (lowest \$231/ha). Kotagama et al. (2002) similarly recalculated the values for the Knuckles forest in Sri Lanka by incorporating leads from traditional knowledge. The potential revenue from pharmaceutical prospecting is estimated to be US \$785.188 per ha/yr as opposed to US \$19.67 per ha/yr, the value from an earlier study that does not include prior information.

The debate on a suitable methodology for valuation models continues. Craft & Simpson (2001) provide yet another approach by extending two models of competition between differentiated products to calculate the aggregate value of the marginal species. They find the value of marginal species to private researchers to be negligible and may be even negative. Thus, private companies cannot be relied upon to finance conservation of biodiversity. They conclude that estimating the social values of biodiversity in pharmaceutical product development can be very model-dependant and parameter-specific. In any case, an important result from the valuation debate for countries in South Asia is that the use of leads from indigenous/traditional knowledge (IK/TK) can improve the returns from pharmaceutical prospecting.

Status of benefit sharing cases: A similar picture emerges from several case studies of prospecting and benefit sharing initiated in the early nineties: INBio-Merck & Co., Shaman Pharmaceuticals and Government sponsored programs like the International Cooperative Biodiversity Groups (ICBG) program of the U.S. Government and research institutes like the Tropical Botanical Gardens Research Institute (TBGRI), India. These cases show that using leads from traditional knowledge reduces search costs related to identifying potential samples. However, there are very high transaction costs in obtaining consent and collection of samples from indigenous peoples and in further clinical trials for research and development. Except for the case of TBGRI, commercial drugs are yet to be completely developed from any of the other initiatives. In fact,

these extremely high costs, and the risk and time involved resulted in the bankruptcy and closure of Shaman Pharmaceuticals.

While government sponsored programs are in a better position in terms of availability of funds, they face other problems regarding valuation of the monetary benefits and in identifying and compensating the beneficiaries. After the development of the drug 'Jeevani' from the Kani-TBGRI case in Kerala, India in the early nineties, there were problems in terms of access to the plant resource, market establishment, balancing competing claims of representation and calculation of shares in distributing the benefits from royalties and license fees. Some of these issues are yet to be resolved.

In sum, there is little evidence from these case studies to support the contention that pharmaceutical prospecting generates sufficient revenues and provides incentives for conserving medicinal plants resources. On the contrary, the Kani Tribes and Shaman cases seem to indicate that the benefit sharing models adopted have not been successful in implementing the provisions for equitable sharing of benefits as envisaged by the CBD.

Emerging Questions: Valuation studies so far have largely focused on markets for plant-based drugs developed by bio-prospecting and marketed by the pharmaceutical companies. There is another very large market, which has not yet received much attention: this is the market for traditional / complementary and alternative medicine (TM/CAM). According to WHO estimates, 80% of the world's population depends on traditional medicine for its primary health needs; the global market for traditional therapies stands at US\$60 billion a year and is steadily growing. Australia, China, India, Indonesia, Malaysia, Nigeria, Philippines, Thailand and other countries are now trying to develop policies to integrate, promote and regulate the use of TM/CAM. Further, the WHO has initiated a Global Plan to assist countries in their efforts.

The validation and integration of the TM/CAM into national systems and the growing markets for these medicines adds an important dimension to the debate on valuation of medicinal plants. Of all the valuation studies so far, only Principe (1991) explicitly includes the value of traditional and herbal medicines in calculating the value of medicinal plants. New models, based on the value of

medicinal discoveries for alternative markets, will be particularly useful for developing policies and legislation governing access and use of medicinal resources for TM/CAM. Further research is also required on methods for valuing the contribution of IK/TK in reducing the search costs of prospecting.

For details and references, please contact Aparna at kaparnab@yahoo.com, who is undertaking SANDEE supported research on intellectual property rights for traditional knowledge.

Profile: Department of Agricultural Economics, University of Peradeniya, Sri Lanka

In each newsletter we inform you about a center of learning in the region in environmental economics. Here is a brief description of a program in Sri Lanka.

The Department of Agricultural Economics, in the Faculty of Agriculture, University of Peradeniya has provided a bachelors degree in Agricultural Economics since 1972 and graduate courses in environmental economics (EE) and natural resource management (NRM) since 1994. The department is responsible for teaching Agricultural Economics to over 500 undergraduate students at any time. Undergraduate training emphasizes Agriculture/Applied Economics, Business Management and Natural Resources and Environmental Economics. The Postgraduate Institute of Agriculture offers M. Sc. Degrees in Agriculture, NRM and Environmental Economics, a MBA, and M. Phil and Ph. Ds in AgEconomics.

Among the graduate programs, the M.Sc. in NRM and Environmental Economics are of interest. These two programs were started with financial help from the USAID and are now mature programs that can cater to foreign students from the Asian region. The NRM program is interdisciplinary -- it aims to produce managers of environmental/development projects. The EE program focuses on policy analysts. The department has also recently added a new degree in Integrated Water Management. Interested candidates can write to the Deputy Registrar, Postgraduate Institute of Agriculture, University of Peradeniya, Sri Lanka, in May.

The nine core faculty in the Department undertake research and provide advisory services to the public and private sectors. Research includes academic research for journals, and, assessment and evaluation studies for development agencies. Research themes include natural resource and environmental economics, international trade, globalization, poverty, agricultural marketing and development. The department 's research has had significant impacts on various policy fronts.

Overall, the Department of Agricultural Economics is one of the top-notch institutes in the area of applied economics in South Asia. Established in sylvan settings, it also has the appropriate atmosphere for studying the economics of nature. For further information, please contact Prof. Gunathilake at hmgune@pdn.ac.lk

Many South Asian cities have looked to natural gas to solve their pollution problems. Here, a journalist from Dhaka, discusses his own city's effort to improve air quality.

Dhaka's Ban on Baby-Taxis

Mahtab Haider, Weekly Holiday, Dhaka

In a landmark decision and in a bid to curb dangerously high-levels of air pollution, the Government of Bangladesh recently banned two-stroke three-wheelers from its capital city, Dhaka. Driven by mounting pressure from the environmentalist-lobby and rationalized by the intensifying health hazard that Dhaka's pollution levels pose, the Communications Ministry opted for a gradual phase out of the vehicles since late last year, imposing a complete ban effective from January 1, this year. The main momentum behind this move — perceived to be a political minefield — come from a ruling by the Bangladesh Supreme Court that all two-stroke vehicles should be removed from the city limits by the end of 2002.

'Baby Taxis', otherwise known as auto-rickshaws, are a popular and essential means of public transportation for thousands of daily commuters in Bangladesh and other South Asian countries. However, they are also a major source of hydrocarbons, carbon monoxide, carbon dioxide and other emissions. Thus, noted environmentalists, such as Salimul Haq of the Bangladesh Centre for Advanced Studies, say the ban will immeasurably improve air quality in one of the most polluted cities in the world.

Dhaka used to sustain approximately 18,000 three-wheelers prior to the ban. Of these, the government allowed 6,500 baby taxis, 500 auto-tempos and 350 auto-trucks to operate until December 31 last year. All of these came to a halt as of January this year. Apparently, some forty check-posts, nine mobile check-posts and twelve special teams of Dhaka

Metropolitan Traffic Police will remain alert in Dhaka to implement the government ban. In an attempt to protect the economy from an unemployment backlash, the government has permitted Baby Taxis to continue to ply in smaller cities around the country.

There are two main economic costs associated with the health benefits of banning baby taxis. The first is the cost to commuters who used this service routinely to get around Dhaka. The second is of course the cost to the operators of these baby taxis. The primary solution being put forth is an environmentally-friendly, CNG-run, four-stroke three-wheeler that is slowly replacing all forms of two-stroke vehicles. The government's ban has been met with relief and support from the residents of Dhaka so far, who are ready to suffer the vagaries of a temporary transport vacuum as a price for cleaner air. Further, Baby-taxi owners, who generally own a fleet of vehicles, are bringing in 50 to 100 new CNG vehicles each day. Thus all would be well except for the difficulties in obtaining CNG. Currently, lines to existing CNG filling stations are incredibly long. This short-term economic cost was anticipated but perhaps underestimated. In response, the Government has recently launched a project to install new (wider) CNG pipes that can increase gas availability. How quickly this project is implemented will have economic implications and also influence the current public support for the ban on baby taxis.

Please contact Mahtab Haider at slate@bangla.net for further details.

Of Snow Leopards, Insurance and Trekking...

Usman Ali Iftikhar, IUCN, Karachi

Project Snow Leopard (PSL) was developed in Skoyo, Baltistan, in response to the challenge of balancing conservation efforts with local livelihoods. More specifically, the challenge was to resolve the conflict between the Snow Leopards' predation of local farmers' livestock and the subsequent retaliatory killings of the Snow Leopard by the same farmers. Bearing this challenge in mind, PSL staff designed a two-pronged approach: a collective insurance fund to compensate local farmers for loss of livestock, and, eco-tourism to enhance the economic value of the snow leopard. The former consists of premium contributions paid by farmers per head of livestock. The latter generates income for a second fund that co-finances insurance compensation if losses incurred are higher than expected. While the first fund is purely for

compensation, the second fund can also be used for village-level schemes or revenues can be distributed among village members. Thus, the second fund is a private-community partnership with the proceeds of trekking packages, for example a Snow Leopard Trek, being shared with the community.

At present, PSL is being implemented on a pilot basis in the small village of Skoyo. This village is located on the Indus in ideal Snow Leopard habitat and is approximately 60 km west of Skardu, the regional capital of Baltistan. Funds 1 and 2 were set up in September 1999, and currently hold Rupees 15,000 and Rupees 80,000 respectively.

From theory to practice: In designing Project Snow Leopard, the incentives for collective action that individual villagers faced had to be taken into account. Project staff understood that villagers faced the following options:

- a. Make a collective effort (by pooling resources) and eliminate the risk or predation by hunting down and eliminating the Snow Leopard;
- b. Set-up an insurance mechanism (again by pooling resources) to eliminate the risk but still try to eliminate the Snow Leopard if the opportunity presents itself;
- c. Set-up an insurance mechanism to eliminate the risk and endow the Snow Leopard with Economic Value that could be captured by the locals.

While *a* and *b* could be achieved by the local community without outside intervention, *c* required other actors, who could provide access to the tourism market. Thus, there is a clear link among institutions, incentives and collective action. Locals in Skoyo Village face a random shock (Snow Leopard attacks on livestock) that has the same distribution across farmers, but affects each one independently. Economic theory would then suggest that by pooling resources, that is, contributing a proportion - *an insurance premium* - of the total loss, the risk is spread over the entire village and no individual need bear the entire brunt of the risk. Moreover, if an added incentive of additional income, for example from eco-tourism, is available, there is a stronger basis for collective action to create an institution for collective benefit. No longer would the Snow Leopard or the poor local community be in conflict with one another.

In operation, the insurance scheme is largely self-sustaining. A Village Insurance Committee (VIC), with members from Skoyo village, manage the scheme. Claimants must formally file applications

with the VIC, which verifies the killings. If the VIC recommends a compensation, the following steps are taken: 1) The claimant receives his/her individual accumulated premium amount from Fund 1 as compensation. 2) If the claimant's accumulated premium amount in Fund 1 is not high enough to cover the full value of the loss incurred, money is taken from Fund 2 to cover the remaining costs. For example, a farmer has 30 goats. In the first year, he pays $30 \times \text{Rs. } 15 = \text{Rs. } 450$ into Fund 1. The same year, a snow leopard kills two of his goats, the value of which is $2 \times \text{Rs. } 1500 = \text{Rs. } 3000$. The VIC verifies that the goats were killed by a snow leopard and approves the claim for compensation. To pay the amount agreed on, the VIC uses the total premium amount paid by the farmer into Fund 1 (i.e., Rs. 450). The remaining amount, Rs. 2550, comes out of Fund 2.

Premiums are paid annually. The members of the insurance scheme are entitled to interest earned, which is paid out in proportion to individual accumulations. Entitlement to money from Fund 2 is restricted to those members of the community who have paid premiums into Fund 1. In the case used as an example, the farmer exhausts his premiums paid into Fund 1 by receiving compensation. He must therefore make sure that he pays in the premiums on the remaining 28 goats to insure them for the next year. In such a case, the premium rate for this second payment may be higher as a result of his having received compensation the first year.

Recent Developments: Two events in 1999 have contributed to the acceptance and sustainability of

As so many South Asian cities struggle with water scarcity and pollution, some new solutions are beginning to emerge. Alpana discusses the problems and possibilities associated with one such solution.

Rain Water Harvesting -- A Viable Response to Water Scarcity?

Alpana Bose, SHODH, Nagpur

Nagpur, the winter capital of Maharashtra, is one of the hottest places in India with temperatures reaching 47 degrees during the summer. It faces a major problem of water scarcity, particularly during the hot summer months. Water is supplied by the Nagpur Municipal Corporation (NMC) from various lakes and rivers in and around Nagpur. However, these sources dry up as summer progresses and the Corporation is increasingly spending larger sums of money on purification and supply of limited water.

PSL. First, successful marketing of Snow Leopard Trek has generated Rs. 70,000 for Fund 2. Second, a claim was filed against predation, where VIC and project staff verification (the goat carcass showed classic snow leopard signs such as bite mark on throat) led to the subsequent approval and compensation payment. Rs. 300 were paid out from Fund 1 and Rs. 900 from Fund 2. The insurance system passed its first test.

More recently, in 2001, an interesting change has taken place. Skoyo is also a participant in the Mountain Areas Conservancy Project of IUCN-Pakistan, which has established Village Conservation Funds and introduced trophy hunts to raise revenues. The last trophy hunt generated a total of \$20,000. While at least 30% of the proceeds are invested back into the VCF, this time, at the request of the locals, 10% of the proceeds were channeled into the snow leopard fund. This shift signals interest in building on and capturing the Snow Leopard's economic value whilst protecting local livelihoods.

PSL is an initiative of Shafqat Hussain, Project Manager (with support from the Aga Khan Rural Support Programme) and Jawad Ali Khan and Usman Ali Iftikhar (IUCN-Pakistan). A looming question with innovative schemes such as these is how to scale such efforts upwards? What design issues are important when we go from individual villages to entire eco-systems? For these and other questions, please write to Usman Iftikhar at usman.iftikhar@pc.iucnp.org

Given increasing demand and costs, the Corporation recently increased water charges substantially. Charges have been raised for domestic consumers from Rs 1.50 per unit to, for some consumption groups, Rs. 4 per unit (1 cubic meter/1000 liters). For institutions, charges have skyrocketed to Rs. 12 per unit from a mere Rs. 3. The same is true for commercial users who will now pay Rs. 20.00 per unit-consumed. This is a wise strategy for ensuring more sustainable water use because it discourages waste. This change in water charges has also proved to be an incentive to move towards an unconventional but cheaper method of obtaining water – rainwater harvesting (RWH). Large-scale users of water, such as the Government Medical College, the Railway Station

and the Airport, have now approached the Central Ground Water Board for creating RWH structures on their premises.

The Nagpur Improvement Trust, the municipal body responsible for developmental works in the city, recently mandated all new construction across the city to make provisions for rainwater collection. Old buildings are also required to make some changes for this purpose. If this resolution is implemented, then an estimated total of 16,852 tcm (thousand cubic meters) of rain water -- based on the current rooftop area of the city -- can be harvested in a normal monsoon year. To facilitate this plan, municipal authorities have agreed to provide technical support. However, several policy challenges remain.

Should the government subsidize RWH structures in Nagpur? The cost of building and maintaining a RWH structure is influenced by a number of factors such as height and size of the building, type of storage-structure, whether water is used to recharge groundwater etc. Nonetheless, in general, the cost of constructing a RWH structure is not expected to exceed 3-4% of total building cost. Further, this is not huge relative to the cost of buying municipal water at the new prices. According to an experiment conducted by the Central Ground Water Board, creating and maintaining a RWH structure costs almost half the cost of buying municipal water. So finally, here is a win-win solution for resolving water scarcity. Thus, given the high private returns to rain water harvesting, there is no case for the government to subsidize private construction of RWH structures.

The idea of RWH has been around, so what explains the low rates of adoption of water harvesting so far? Part of the answer probably lies with lack of awareness (in combination with the availability of cheap municipal water). Thus, there is a clear need for knowledge creation, awareness building, and, demonstration projects. Further, given the economics of RWH, technical support

need not be free except during the early 'demonstration' phase.

Another key issue is the environmental implications of rainwater harvesting. In some areas of Nagpur, the groundwater level is between 3 and 8 mbgl (meters below ground level) in the driest season, but rises to about 0.55 mbgl after the monsoons. Hence, in these parts, if RWH results in additional recharge to groundwater, this could lead to water logging, soil salinization, and damage to buildings. Yet another problem is percolation of poor quality water into the earth. In the absence of properly defined property rights over harvested water and due to the mandatory nature of the policy, little attention will be paid to the quality of percolated water .

Thus, rain water harvesting, though eco-friendly, raises some environmental and economic concerns. Hydro-geological and incentive considerations need to become an integral part of any town planning related to RWH. Even if RWH is mandatory, location-specific ground water standards may need to be established. Communities would then have to work out how they meet these standards. Groundwater recharge would need to be stressed in areas with ground water level deeper than the fixed standard, and construction of underground sumps emphasized in shallow ground water areas. Here, harvest of groundwater can also be encouraged by manipulating the water prices.

Rain water harvesting, being cost-effective, easily applicable, and sustainable, the move to incorporate it in the basic lifestyle of the city was an inspired decision. If applied carefully, it could remove a huge burden from surface water resources, improve the groundwater tables through increased recharge and provide people with greater accessibility to water.

For further details please contact Alpana Bose at shodh@nagpur.dot.net.in



SANDEE'S TRAINING ACTIVITIES

Training is an important part of SANDEE's mandate. Please read on to find out about our training workshops.

Research and Proposal Writing Workshop, Islamabad, Pakistan Manik Duggar

SANDEE started a new training initiative for researchers and environmental economics practitioners last year, and, organized a four-day Research and Proposal Writing Workshop in Islamabad from September 23-26, 2002. The main objective of the workshop was to provide participants training in logical thinking and research proposal writing and presentation skills. An equally important objective was to help forge links among environmental economists in Pakistan. The training workshop was organized jointly with IUCN's Regional Environmental Economics Program. Besides Pakistanis and Nepali participants, four experts from Bangladesh, Pakistan, the UK and SANDEE helped deliver the training.

The workshop was designed to introduce researchers to a number of topical themes in environmental economics, thus forging the link between policy concerns and environmental economics research. Researchers made presentations and discussed specific research topics they were interested in, and, received collective feedback from technical experts on their research ideas. Participants also received individual feedback and information in one-to-one session with resource persons. The workshop also included presentations on research and proposal writing skills and methods.

SANDEE hopes to introduce this training in other countries in S. Asia. As, Aneel Salman, one of the young researchers at the workshop, said, "The eight-hour grueling each day was hard work, but this was a great opportunity to learn and was of course fun as well. I met some great guys who are doing very interesting work in Pakistan right under my nose and I didn't even know. Thanks to SANDEE for organizing this workshop." This sums it up!

Econometrics Workshop for Environmental Economists, Rajendrapur, Bangladesh D.M.A.H. Senaratne

SANDEE organized an "Econometrics Workshop for Environmental Economists" from December 9th to 14th, 2002 at the BRAC Center near Dhaka. Most participants had some background in Econometrics, yet the course had something more to offer. Its distinguishing feature was that it covered many essential topics of econometrics using examples from environmental economics, especially valuation techniques. The course also provided exposure to technical details of valuation techniques such as travel cost, hedonic and contingent valuation methods where econometric applications play a major role. Every major topic taught in the classroom was practiced later in lab sessions using real data.

Course faculty included Dr. H.M. Gunatilake, Peradeniya University, Sri Lanka, Dr. Enamul Haque, North South University, Bangladesh and Dr. S. Madheswaran, Institute of Social and Economic Change, India. All practical modeling exercises included data from countries from the region, allowing participants to deal with familiar issues. The core text used was Gujarati's Basic Econometrics, which was supplemented by articles on environmental topics. Overall, it was a good example of SANDEE's commitment to promotion of serious quantitative research on environmental economics in the region. One issue that could be given additional time when the course is held again is policy discussions of the results from the practice lab sessions.

Of course, the workshop had its externalities too, but these were positive. The greatest was the opportunity it provided new members (like me) of the expanding SANDEE family to get acquainted with colleagues from the region. I feel that this has already begun to pay dividends.

WEBNEWS...

New Bibliography on Common Property and Community Management of Natural Resources (www.sandeeonline.org):

The Center for Multi-disciplinary Development Research has developed a new fifty-page bibliography on community management of natural resources and common property. This comprehensive bibliography covers a variety of sectors including forests, water and land, and fisheries. This is part of an on-going effort by SANDEE to support researchers with information on peer-reviewed research material. Please keep your eyes for the next bibliography on the economics of biodiversity management.

Grants for Poverty and Environmental Management Research, Deadline March 27th, 2003 (<http://www.premonline.nl>):

The Poverty Reduction and Environmental Management (PREM) program invites economists in developing countries to submit project ideas in the form of pre-proposals for the first round of PREM grants. This new initiative (linked to the previous CREED program) seeks to deepen and broaden the exposure of researchers and policy advisors in developing countries to the theory and methods of natural resource and environmental economics. SANDEE resource persons and colleagues finishing SANDEE research are strongly encouraged to apply.

Pacific Institute Launches Water and Climate Bibliography (<http://www.pacinst.org/resources/>):

How will climate changes affect freshwater resources? In an effort to aid those studying this question and related issues, the Pacific Institute has created the Water and Climate Bibliography -- a searchable, online database containing over 3,000 references to books, articles, and other scholarly works. Researchers are encouraged to submit new citations for consideration using the online form, accessible from the main bibliography page.

Happenings....

Dr. G. Kadekodi, from the Center for Multi-Disciplinary Development Research in Dharwad, has been appointed Director, Institute of Social and Economic Change, Bangalore.

Dr. T. Sterner, who is on SANDEE's management committee, has a new book on Policy Instruments for Environmental and Natural Resource Management, RFF Press. This book should be quite useful to university teachers.

Seema Purushottaman has accepted a job with Ashoka Trust for Research in Ecology and Environment, Bangalore.

Vinish Kathuria has joined the Madras School of Economics as Associate Professor.

S. Madheshwaran is now Associate Professor with Institute of Social and Economic Change.

Himmayatullah Khan of Peshawar University has been accepted for two training courses in Environmental and Natural Resource Economics and Policy at the University of Gothenburg in Sweden.

Anuradha Kafle has joined SANDEE to help set up our database. Welcome Anu!

Short-term Fellowships at the Resource Management in Asia-Pacific Program in Australia *Deadline July 31, 2003*

(<http://rspas.anu.edu.au/rmap/>):

Based at Australian National University, this program invites applications from developing country researchers within the Asia-Pacific region to do research and writing for a three month period. This promises to be a very good opportunity for researchers interested in library research or finalizing manuscripts.



South Asian Network for Development
and Environmental Economics

Information about SANDEE and our activities can be obtained online at www.sandeeonline.org. Our mailing address is IUCN Nepal, PO Box 8975 EPC-1056, Kathmandu, Nepal. Telephone: 977-1-528761; Fax 977-1-536 786. If you have any questions about our programs, please write to Priya Shyamsundar at priyas@sandeeonline.org or Manik Duggar at manikd@sandeeonline.org

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Notes:

1. This form is for institutional members only. The institutional membership fee is US\$25 per year for South Asian institutions and US\$250 per year for non-South Asian institutions.
2. Payments must be made in US dollars payable to **IUCN Nepal** and must accompany the Membership Form. **Please do not send any cash.**