SANDEE

SANDEE@10

Environment and Development in South Asia

6th - 7th December 2010

Godavari Village Resort, Kathmandu, Nepal

Programme and Abstracts

ECONOMICS & THE ENVIRONMENT

About SANDEE

The South Asian Network for Development and Environmental Economics (SANDEE) is a regional network that brings together analysts from the different countries in South Asia to address their development-environment problems. Its 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's activities cover Bangladesh, Bhutan, Nepal, India, Maldives, Pakistan and Sri Lanka.

SANDEE meets these objectives through four core activities.

- A competitive research grants programme that focuses on poverty and natural resource use, pollution and policy instruments, and climate change economics.
- Training in environment and natural resource economics, both basic and advanced courses are offered.
- An underserved areas programme for regions that require institutional strengthening.
- Publications and regional workshops that facilitate information sharing and networking among individuals and institutions.

SANDEE is based at ICIMOD in Kathmandu Nepal. It is governed by an independent Management and Advisory Committee. Current committee members include Y.K. Alagh, Institute for Rural Management, India; Bill Chameides, Nicholas School of the Environment, Duke University, USA; David Glover, IDRC, Canada; Herath Gunatilake, Asian Development Bank, the Philippines; Madhu Khanna, University of Illinois, USA; Eli Koefoed, NORAD, Norway; Anna Maria Oltorp, Sida, Sweden; and Priya Shyamsundar, SANDEE.

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Welcome

December 5th 2010

Dear Conference Participant,

Welcome to SANDEE@10, an international conference on Environment and Development in South Asia. This conference aims to bring together environment and development economists from across South Asia to examine on-going research and to identify challenges that need to be addressed in the next years. The event also celebrates SANDEE's 10th anniversary.

Kathmandu's valleys are usually crisp and beautiful in December. We hope the white mountains in the background will inspire all of us to think jointly and carefully about solutions to the environment and development concerns in our region.

Many colleagues and sponsors have been generous with their time and support. Our thanks go to SANDEE's donors, the International Development Research Center (IDRC), the Swedish International Development Cooperation Agency (Sida), the Norwegian Agency for Development Cooperation (NORAD), the World Bank, as well as regional partners – ICIMOD, the Asia Foundation, UNDP, and UNEP.

Thank you for participating and welcome to Nepal. Special greetings as well from SANDEE's host, ICIMOD.

Best wishes

Priya Shyamsundar
Programme Director

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Summary agenda

5th – 7th December 2010

December 5th	Time	Front lobby		
Registration	14:30	Registration		
Dinner	19:30	Godavari Main Dining Area		
December 6th	**Time**	**Hall A**	**Hall B**	**Hall C**
Session 1.1	08:00	Low carbon growth and development impacts	Natural disasters — Impacts and responses	Adapting to climate change
Welcome	09:35	Welcome - Priya Shyamsundar		
Inauguration	09:40	Inauguration – Dr. Mahesh Banskota, Kathmandu University		
Session 1.2 (Founder's Address)	09:50	The natural environment and human well-being Karl Goran Maler		
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Session 2.3 (Keynote)	11:30	The challenge of reforming resource governance: Elinor Ostrom		
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Session 2.4	14:00	Environmental economics networks: Examining roles and outcomes	Coastal zone: People and resources	Land economics
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Day 1: Monday 6th December 2010

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	The vulnerability of Bangladesh to cyclones in a changing climate: Potential damages and adaptation cost	Susmita Dasgupta, Mainul Huq, Zahirul Huq Khan, Manjur Murshed Zahid Ahmed, Nandan Mukherjee, Malik Fida Khan and Kiran Pandey
	The economic impact of weather extremes and management options in the case of horticultural crops	P. Indira Devi and G.S.L.H.V Prasada Rao
Hall C	**Adapting to Climate Change**	**K.S. Kavi Kumar**
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	Heat stress, urban health and labour productivity in Kolkata: Adaptation strategy for a megacity in India	Joyashree Roy, Anwesha Chakrabarti and Kuheli Mukhopadhyay
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Session 1.2 Founder's Address 09:50 – 11:10		Chairs and Presenters
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	A critical review of multi-criteria decision making methods in NRM with special reference to water and forest resources in developing countries	Gamini Herath
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	Analyzing the factors affecting the diffusions of cook-stove and biogas in rural Nepal	Krishna Prasad Pant
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	The economics of regional cooperation in trans-boundary water resource management: The case of eastern Himalayan region	Golam Rasul and Arun B. Shrestha
	Estimating willingness to pay for improvements in drinking water quality: Evidence from Peshawar, Northern Pakistan	Himayatullah Khan, Faiza Iqbal and Imranullah Saeed
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Abstracts

Economic incentives and poaching of the greater one-horned Indian rhinoceros in Nepal: A stakeholder analysis

Bhim Adhikari, Wolfgang Haider, Duncan Knowler and Mahesh Poudyal

ABSTRACT

The greater one-horned rhinoceros (Rhinoceros unicornis) is of special conservation importance, playing as it does a key role in Nepal's growing eco-tourism industry. Abundant in the past, this rhino population now faces a multitude of threats, the most serious among which is poaching for the valuable rhino horn. The main aim of this research was to carry out a stakeholder analysis in order to determine who has a stake in the welfare of the Terai's rhino population. We employed the discrete choice experiment (DCE) technique in which the affected stakeholders were asked about their preferences with regard to rhino conservation. Our goal was to investigate the trade-off behavior of stakeholders among indicators of ecological integrity, conservation outcomes and policy options. We conducted a household survey (444 interviews) in six different villages in the buffer zone of the Chitwan National Park (CNP). We also examined the tourists' attitudes towards national parks and eco-tourism in Nepal as well as their opinions on forest and wildlife conservation. The stakeholder analysis revealed that there are five major stakeholders in the CNP buffer zone: 1) landless/marginalized households, 2) farmers, 3) tourism and related sectors, 4) visitors and non-users, and 5) government/NGOs. Each group represents different interests with regard to park management and rhino conservation. The discrete choice experiment conducted confirmed that all stakeholder groups found the proposed alternative management scenarios more attractive than the status-quo. Most respondents were in favour of compensation for rhino-related damage and supported a community development programmefunded by park revenues. Interestingly, the general preference for these compensatory measures peaked at around 50 percent, indicating either that the respondents do not require full compensation or they do not believe higher amounts would be forthcoming. Respondents would particularly value increased tourism employment opportunities and greater possibilities to use park resources. Most importantly, if these compensatory measures were put in place, the majority of the respondents would have a clear linear preference for more rhinos. The various stakeholder groups reacted as expected: the highest income farmers regarded high compensatory measures as less important than the low- and mid-income farmers while the landless marginalised group considered 1) greater park access and 2) an income generation programmeas very important. The challenge for a pro-poor conservation policy is to integrate the needs of poor people into efforts to conserve an international public good, in this case, the rhinos. It is vital to ensure that poor farming and non-farming households are compensated for the costs they incur in supplying this unique good.

PRESENTER

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Does women's presence in forest governance improve conservation?

Bina Agarwal

ABSTRACT

Can the gender composition of a local forest management group affect conservation outcomes? This manifestly simple question remains largely unaddressed, despite the substantial literature on women's representation in public decision-making, as well as the growing research on local environmental governance. Economists studying environmental collective action have paid little attention to the question of gender. Research on gender and environmental governance in other disciplines has focused mainly on women's near-absence from community forestry institutions. This paper reverses that focus in order to ask: what if women were present in these institutions? Would that improve resource conservation and regeneration? Based on the author's primary data on communities managing their local forests in parts of India and Nepal, this paper statistically assesses whether the gender composition of a forest management groups affects forest condition, after controlling for other characteristics of the group, aspects of institutional functioning, forest and population characteristics, and related factors. The study found that groups with a high proportion of women in their executive committee (EC)—the principal decision-making body—show significantly greater improvements in forest condition in both regions. Moreover, groups with all-women ECs in the Nepal sample have better forest regeneration and canopy growth than other groups, despite receiving much smaller and more degraded forests. Older EC members, especially older women, also make a particular difference, as does employing a guard. The beneficial impact of women's presence on conservation is attributable especially to women's contributions to improved forest protection and rule compliance. More opportunity for women to use their knowledge of plant species and methods of product extraction, as well as greater cooperation among women, are the other contributory factors.

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BT cotton technology, land use and biodiversity in Pakistan

Khuda Bakhsh

ABSTRACT

The study looks at the land area allocated BT cotton production and its possible impacts on the diversity of the cotton seed. We collected panel data in three different districts of the Pakistani Punjab from 2008-09 to 2009-10. The results show that farmers have been allocating larger land to BT cotton overtime with around 70 percent cotton area under BT cotton by now. This indicates the rapid pace at which the cotton seed is losing its diversity, which is alarming from the point of view of those interested in its continued availability for future research and development. While increased crop yield and reduced pesticide use are among the reasons for BT cotton adoption, the demand for costly inputs, such as fertilizer and irrigation water, is comparatively higher in the case of BT cotton compared to conventional varieties. The results of the Cobb Douglas type production function show that the coefficient of irrigation water is statistically different from zero and is positively related with cotton yield. Moreover, it is evident that ground water pumped for irrigation purposes is becoming brackish with the passage of time. Since BT cotton demands more irrigation water due to the application of larger amounts of fertilizer, the application of brackish tube-well water deteriorates land fertility. Thus the adoption of BT has significant impacts in the form of less diversity in cotton seed, more use of ground water due to the shortage of canal water, and the resulting higher costs of production. The data and statistics we have estimated, on the economic impacts of BT cotton technology on input use, offer useful information to policymakers, plant breeders and other stakeholders when determining the course of action they should adopt about the appropriate levels of investment and support needed to develop new varieties and hybrids which require fewer natural resources, particularly water in an era of water scarcity.

PRESENTER

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Forest degradation in the Himalayas: Determinants and policy options

J.M. Baland (CRED, Namur), Pranab Bardhan (University of California, Berkeley), Sanghamitra Das (ISI, Delhi), and D. Mookherjee (Boston Univesity

ABSTRACT

This paper provides an overview of a decade-long project on forest degradation in the Indian and Nepalese Himalayas. It is based on LSMS data for Nepal and field work in Indian states of Uttaranchal and Himachal Pradesh comprising sample surveys of forests, households and village communities, besides commissioned anthropological studies for select villages. The purpose was to ascertain the nature and magnitude of deforestation and degradation from ground-level forest measurements, its implications for living standards of local communities, the contribution of different factors commonly alleged such as local poverty, inequality, economic growth, demographic changes, property rights and lack of collective action by local communities. Principal findings, shortcomings and questions for future research are discussed.

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Twin failures and twin tragedies: The case of electricity subsidies and groundwater (over-) exploitation in South India

R. Balasubramanian

ABSTRACT

India is the largest groundwater user in the world. Though the production of diversified, high-valued crops has been made possible by the expansion in groundwater irrigation, in many regions such as the western and peninsular India, groundwater use has expanded beyond sustainable limits. Within a period of 10 years the number of over-exploited blocks (the bottom-most groundwater measurement units) in India has gone up from 4 percent in 1995 to 15 percent in 2004. The state of Tamil Nadu is facing serious problems in its irrigation sector due to perverse incentives which is the legacy of the populist policies of the Government with respect to groundwater, as well as due to the neglect and decay of its traditional community irrigation sources such as tanks. Tamil Nadu is among six Indian states with a high degree of groundwater exploitation. As much as 85 per cent of the total groundwater availability in Tamil Nadu has been extracted. According to the Report of the Expert Group set up by the Planning Commission, Government of India, in 2007, the "groundwater situation in the state is among the worst in the country and is a matter of concern".

Both the problem of over-exploitation and that of pollution and the poor quality of underground aquifers are firmly rooted in typical market failure problems with regard to the efficient allocation of common pool aquifers, on the one hand, and policy failures, in the form of subsidized electricity to groundwater pumping and the failure to regulate the over-exploitation of groundwater, on the other. Subsidized electricity not only leads to excessive groundwater development but to heavy losses to the State Electricity Board. This paper attempts to investigate the nexus between the electricity subsidy and groundwater development and its consequences. The paper starts with a literature review of the nexus between environmentally harmful subsidies and resource degradation and the evolution of electricity pricing policy for irrigation in Tamil Nadu. We then undertake a detailed econometric analysis of the impact of the energy subsidy on groundwater development, the externality impacts of increasing well density on well failures, the area irrigated per well, and electricity consumption per well. We also attempt to investigate the externality and equity impacts of increasing well density using primary data. The paper concludes with a politically and economically feasible roadmap for regulating groundwater exploitation.

PRESENTER

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To conserve or not to conserve? Attitudes of local people towards co-managed forestry in India

Rabindra Nath Bhattacharya and Biswajit Ray

ABSTRACT

Do the conservation attitudes of local people matter in community-based natural resource management (CBNRM)? What makes local people conservation-friendly? Can we associate stakeholder conservation-attitudes with community development? In quest of answers to these questions, we surveyed 484 households in two villages—Panialguri (PG) and Damanpur Poro Basti (DPB)—of the Buxa Tiger Reserve, India, in 2006-2007. We measured stakeholder perceptions of different conservation issues and examined free-riding behaviors of the local people by comparing their actual and stated behaviors on these issues. We examined the link between community development and stakeholder conservation attitudes based on transaction cost, social capital and heterogeneity. Interestingly, we found that actual/revealed behaviors of the sampled households significantly reflect their stated conservation-related behaviors. Regarding stakeholder attitudes, PG appears to be more conservation-friendly than DPB. The lack of robust livelihood alternatives and social interactions are among the factors that may drive the anti-conservation attitude of DPB. In both sites, women, people of higher income brackets, socially better-connected people, and those who have more knowledge about JFM appear to be more conservation-friendly. We also found PG to be more developed compared to DPB due both to ample social capital and more homogeneity among households. The implication is that given due importance, stakeholder attitudes may ensure sustainable co-operation with regard to CBNRM.

PRESENTER

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Transaction hardly costs: Evidence from farmer-managed irrigation systems in Nepal

Ram Chandra Bhattarai

ABSTRACT

The paper attempts to estimate the transaction cost and to compare it with the production cost and the value of output of crops. It also attempts to analyze the factors influencing the transaction cost. For this purpose, we collected information from a field survey of 60 irrigation systems covering 360 households in Nepal. The findings of the study show that the main element in transaction time is the watching, waiting and negotiating time, which constitutes more than 92 percent of the total transaction time. The study also shows that the transaction time is relatively low for Farmer Managed Irrigation Systems (FMIS) in Nepal. The transaction time is approximately 5 percent of the total time required for the production of crops. The transaction time is high for households cultivating the land downstream of the canal compared to households cultivating the land upstream of the canal. In terms of crops, the transaction time for the cultivation of winter crops is three times higher than that for the summer crop. The major determinants of the transaction cost in FMIS in Nepal are farm location, area under cultivation, external support and infrastructure quality. The transaction cost increases with an increase in the size of the cultivated area and an increase in the chances of cultivating land downstream of the canal. The transaction cost decreases with improvements in the quality of canal infrastructure but increases with the chances of getting external support. The study also shows that there is a possibility of improvement in maintenance and water allocation if farmers are able to bear more transaction costs in terms of payments to water guards and for meetings and communication, through which the watching, waiting and negotiating cost may decrease. Since the transaction cost is very low, we conclude that it may not be the reason for the non- performance of the institutions. Further study is needed to determine the reasons that would enable the institutions to perform better.

PRESENTER

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Does common property forest management change on-farm behavior? Evidence on tree planting in highland Ethiopia

Randall Bluffstone and Alemu Mekonnen

ABSTRACT

Policy reform to increase tree cover is a key priority in a number of low-income developing countries and Ethiopia is no exception. Reforms in Ethiopia include a forest proclamation issued in 2007 and the first-ever federal forest policy approved the same year. Both these documents allow a variety of institutional arrangements for investment in forests, including common property forest management (CPFM), private woodlots and on-farm trees. This paper analyzes behavioral change spurred by better CPFM, with a focus on on-farm tree planting in Ethiopia. Results from our theoretical model suggest that on-farm tree stocks, which provide products that can substitute for those from common forests, should increase by better CPFM systems. We test this finding using data from household and village surveys conducted in the Ethiopian highlands in 2007. Using CPFM indices based on survey respondent perceptions, we find that CPFM in the study area is very loose, informal and could be considered weak. We also find that management varies across sites and households and is driven by population density, management level, forest type and other variables. Using a variety of estimation techniques, including treatment effects, count data and IV methods, we show that despite generally loose management CPFM has a positive association with the number of trees grown and in some cases with decisions to grow trees. These findings suggest that what appears to be informal, loose or ineffective management may have important behavioral effects. One of these behavioral effects appears to be that households grow more trees on their farms when CPFM is more stringent. The results of our study suggest that these and likely other behavioral responses should be considered when planning or evaluating CPFM programs.

PRESENTER

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Increasing the height of seawater dikes as an adaptation strategy to climate change: Is it going to work?

Saudamini Das

ABSTRACT

Coastal areas in South Asia which are vulnerable to climate change have seawater dikes and increasing the height of these dikes is being considered at the governmental level as one of the adaptation strategies to counter the increasing threats from sea-level rise and storm surges. In these areas, the sea dikes were constructed along the coastline primarily to stop the intrusion of sea water during high tides so that agriculture is facilitated. Though not constructed initially to provide protection during calamities like storms, over the years governments have been investing in dikes for this purpose and they are now considered a part of life-saving coastal infrastructure that facilitate livelihood options in addition to supposedly providing protection to people from storm surge. However, there is little study and analytical evidence on whether these dikes provide protection from storm surges and, even if they do, how they fare in comparison to natural systems like mangroves. As they are both found in the same areas, the question is whether their protection services complement each other or whether they can be taken as substitutable. The present paper tries to find answers to such issues by examining the protection provided by both mangroves and dikes under different scenarios using data from a case study of the Super Cyclone of October, 1999, in Orissa, India.

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The vulnerability of Bangladesh to cyclones in a changing climate: Potential damages and adaptation cost

Susmita Dasgupta, Mainul Huq, Zahirul Huq Khan, Manjur Murshed Zahid Ahmed, Nandan Mukherjee, Malik Fida Khan and Kiran Pandey

ABSTRACT

An increase in sea surface temperature has been observed all over the world. There is growing concern that this phenomenon of ocean-warming will intensify cyclone activity and heighten storm surges. Available historical evidence highlights the danger associated with storm surges. During the past 200 years, 2.6 million people may have drowned during surge events. The need for disaster preparedness along vulnerable coastlines is especially pronounced in countries where concurrent scientific projections point towards more intense cyclones in a changing climate. However, setting a new course requires better understanding of the expected changes in storm-surge patterns in the future, the associated damages and the adaptation costs. Currently, systematic studies of storm-surge patterns in the future, location-specific potential damage, and adaptation alternatives are scarce in the case of developing countries. This paper is an attempt to narrow the gap by providing itemized estimates of potential damages and adaptation costs upto 2050 for Bangladesh, which is considered a tropical cyclone hotspot in a changing climate scenario. The paper integrates information on climate change, hydrodynamic models, and geographic overlays to assess the vulnerability of coastal areas in Bangladesh to larger storm surges and sea-level rise by 2050. The approach identifies polders (i.e., diked areas), coastal populations, settlements, infrastructure, and economic activity at risk of inundation, and estimates the cost of the damage versus the cost of several adaptation measures. A 27-centimeter sea-level rise and a 10 percent intensification in wind speed due to global warming lead to an increase in the size of the vulnerable zone by 69 percent given a +3-meter inundation depth, and by 14 percent given a +1-meter inundation depth. At present, Bangladesh has 123 polders, an early warning and evacuation system, and more than 2,400 emergency shelters to protect coastal inhabitants from tidal waves and storm surges. However, in a changing climate scenario it is estimated that 59 of the 123 polders would be overtopped during storm surges while an additional 5,500 cyclone shelters (each with a holding capacity for 1,600 people) would be needed to safeguard the population. Investments including the strengthening of polders, foreshore afforestation, additional multi-purpose cyclone shelters, cyclone-resistant private housing, and a further strengthening of the early warning and evacuation systems would cost over USD 2.4 billion with an annual recurrent cost of more than USD 50 million. However, a conservative damage estimate suggests that the incremental cost of adapting to these climate change related risks by 2050 is small compared to the potential damage in the absence of such adaptation measures.

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Exploiting multi-level modeling for institutional analysis in environment and development economics

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ABSTRACT

Although some economists show increasing awareness of institutions, the use of the single actor rational choice model and econometrics may arguably be crowding out institutional analyses. While this is to some extent a matter of interpretation, it is related in part also to observability and to the fact that institutions tend to vary at higher levels. Statistical multi-level models allow us to unpack variations at different levels – household and village, for example. These models may therefore greatly foster analyses of institutions. The study evaluates this claim by re-analyzing and re-interpreting data used in past analyses of protected area biomass extraction, rural indoor and outdoor air pollution, and sanitation which used the individual rational actor mode and were not informed by multi-level modeling. We (1) identify the sources of human interdependence, (2) map the formal and informal institutions, observed and unobserved, to different levels, (3) calculate the variation in indicator variables at different levels, and (4) discuss the statistical and substantive significance of different variables (relating to the state, technology, biophysical realities, and households, for example) in an institutional framework. We conclude by assessing the contribution of the exercise to the discipline of economics and identifing future possibilities for research in this area.

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Valuing recreational use of Pakistan's wetlands: Application of a count data model to the travel cost method

Ali Dehlavi and Iftikhar Hussain Adil

ABSTRACT

Keenjhar Lake, Pakistan's largest freshwater lake and a Ramsar site, is located in the Lower Indus Basin of the Indus Ecoregion, one of the 40 priority eco-regions of the Global 200. This study applies a single-site truncated count data travel cost method to estimate access values of visitors to Keenjhar. By adding a recreational component to an existing estimate of the total economic value of Keenjhar (Dehlavi et al., 2008), the study provides an enhanced comprehensive figure with which to assess whether conservation investments are providing commensurate returns. A basic model applied to a subset of visitors using charter transportation allows analysis of welfare estimations with varying assumptions on visitors' outset origins. The unrealistic simplifying assumption that this category of visitor does not incur travel and time costs before boarding charter transport results in an underestimation of consumer surplus values. Based on our analyses, we argue that data collection and processing strategies need to be revised in valuation exercises because shared and rented transportation is common in developing countries. and cost coefficients tend to figure prominently in welfare measurement irrespective of functional form.

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The economic impact of weather extremes and management options in the case of horticultural crops

P. Indira Devi and G.S.L.H.V. Prasada Rao

ABSTRACT

This paper attempts an estimate of the economic impact of extreme weather events in the case of two major crops in the state of Kerala, which are important to the marginal and small farming community, viz., coconut and banana. We arrive at this estimate using the method suggested by Fernando et al. (2007) employing secondary data. The Agro-meteorological Advisory Service (AAS), which is based on weather forecasting, is a viable risk management strategy to minimize shocks due to adverse weather conditions. We attempt to assess and quantify the impact of AAS (adaptive strategies) on farm output and income through the analysis of economic efficiency in resource use. The data is generated based on field observations of farmers who adopted the advisory services and those who did not. The farmers who followed the advisory services could sizably reduce the risk of economic loss due to extreme weather events and their average additional gains in output were higher by 11-12 percent in the case of these crops. The results suggest the AAS and such services can improve allocative efficiency of resources and should be further strengthened.

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Potential regime shifts: When should optimal management be precautionary?

Aart de Zeeuw, Stephen Polasky and Florian Wagener

ABSTRACT

Complex dynamic systems can undergo changes in interactions between constituent components that cause a shift to different system dynamics. Examples of such regime shifts in ecological systems are shifts between oligotrophic and eutrophic conditions in lakes or shifts from coral dominated to algal dominated coral reef systems. At a larger scale, the global climate system may have regime shifts with potentially major consequences in several dimensions. Economic and social systems can also undergo regime shifts such as shifts in consumer choices and shifts in financial markets. Once a threshold between regimes has been crossed it may be difficult or even impossible to reverse the process back to the original system. In this paper, we analyze how the threat of a potential regime shift affects optimal management. To fix ideas, we focus in our discussion on the case of harvesting a renewable resource (for e.g., a fishery) in which the growth function of the stock depends on the regime (e.g., on the carrying capacity) and where the stock level of the resource can influence the probability of a regime shift. For example, high levels of harvest can reduce the fish populations that graze on algae and, in turn, increase the probability that a bleaching event or other disturbance will shift a coral reef system from coral dominated to algal dominated. We analyze four cases that involve combinations of stock collapse versus changes in system dynamics, and exogenous versus endogenous probability of regime shift. Prior work in economics has focused on stock collapse with endogenous probabilities and reaches ambiguous conclusions on whether the potential for regime shift increases or decreases the intensity of resource use and level of resource stock. We show that all other cases yield unambiguous results. In particular, with endogenous probability of regime shift that affects system dynamics, optimal management becomes precautionary. In the case of the potential for climate change, where it seems reasonable to assume that the stock of greenhouse gases affects the probability of change and that the system dynamics will shift while the world will not come to an end, precaution is optimal.

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The neighborhood effect in conservation practice in Sri Lanka: Do farmers learn from each other?

Jagath Edirisinghe and Wasana Wijesuriya

ABSTRACT

There are many studies in literature that inquire into the nature of farmers who adopt conservation practices. Though these provide important insights into promoting such environmentally beneficial activities, they ignore a pivotal aspect of diffusion: the possibilities of interaction among farmers. In our quest to promote environmental conservation practices in agricultural production, understanding the interaction among farmers have far-reaching policy consequences. In the usual analysis, the emphasis is on the farmers' characteristics, including learning by doing (experience) that defines his propensity to use conservation practices. In this study, we attempt to identify, as is the practice in many studies on 'voting behavior', how the decision of an individual farmer is affected by the decisions of farmers living in the neighborhood. We try to model the neighborhood spatially and study the 'neighborhood effect' on the decision to adopt soil conservation practices among a sample of smallholder rubber farmers in Sri Lanka. We employ a 'Spatial Autoregressive Probit Model' using recent developments in Bayesian econometric techniques. The findings reveal that there exists a positive significant neighborhood effect and highlight the need to take this into consideration in any policy prescription such as the use of extension services to promote conservation agriculture.

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Attempting the development of a conservation-refugee community: Some early lessons

Rucha Ghate

ABSTRACT

This paper is the story of the struggle of a community relocated from a tiger reserve, which finds itself forced into a situation not visualized beforehand. Despite several meetings with the project authorities, the signing of consent forms, and an elaborate project proposal prepared by the offices of the Conservator of Forest and District Collector, the relocated community continues to live on the edge. The paper also documents an attempt by an NGO to help the community to cope with the situation by providing a platform to experiment, learn and earn through allied activities. The process has been one of mutual learning and has brought to the fore several issues related to relocation. While in his conceptual model of induced risks Cernea (1990) mentions joblessness, homelessness, marginalization, absence of access to CPRs, and social disarticulation, etc., associated with displacement, this paper brings out how the disruption of the social fabric impacts a community after relocation. The policy of exclusive management of forest reserves, including National Parks and species specific reserves, which leads to relocation of local forest dwellers, has been questioned by many. Both social scientists and ecologists have expressed concern regarding this form of conservation which artificially segregates the two life forms—human and wildlife—that have been living together for generations on the grounds of appropriateness as well as feasibility. Focusing on the impact of this policy on human beings from the point of view of appropriateness, the paper shows that despite the apparent benefits of relocation, such as proximity to towns, better access to civic amenities, etc., there are hidden costs, which become explicit only after relocation has taken place.

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The role of mangroves, creeks and reserve forests as natural insurance? Findings from the Indian Sundarban

Santadas Ghosh

ABSTRACT

In May 2009, Cyclone Aila led to an unprecedented disaster on the 54 inhabited islands holding more than 3 million people in the Indian Sundarbans. Although the event did not cause a high number of human fatalities, it had grave consequences in terms of livelihood loss to a large agricultural population for more than a year. The submersion of all the low lying islands by sea water for days and months left salt deposits that were large enough to deprive the majority of the population of their all important monsoon paddy for a year. With few other livelihood options, the ensuing economic tragedy continues to be grave and only gradually unfolding. Since the adjacent mangrove forest is a Tiger Reserve (and a World Heritage Site) and is therefore conserved with an exclusionist policy, it leaves the local poor with little option but to fall back on the mangrove forest as a form of natural insurance. The other common resource for the islanders is the surrounding salt water rivers and creeks which produce fish and crab. In the aftermath of Aila, these had played a noticeably significant role in helping a section of the affected people to cope with their immediate livelihood loss. But they are perhaps insufficient and limited due to their carrying capacity to provide an alternative livelihood to a huge population affected by that disastrous event. This paper, which is part of a SANDEE-funded study on understanding the dynamics of the observed coping behavior of inhabitants of remote islands after such a natural disaster, explores the role of such commons as a natural insurance against the temporary disruption of livelihoods. The study also attempts to identify the specific economic classes of people who could and could not fall back on such commons at the time of the emergency.

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Adaptation in the case of the inundation of islands: An exploratory study from the Indian Sundarbans

Indrila Guha, Chandan Roy, Rajarshi Banerji, Joyashree Roy and Somnath Bhattacharya

ABSTRACT

Climate change induced sea level rise will exacerbate changes in landmass or vegetation patterns in the coastal zone through inundation, storm surge, erosion etc. This will in turn threaten vital infrastructure, settlements, and facilities that support the socio-economic well-being and livelihood of island and coastal communities. To design adaptive actions, it is important to know the magnitude of damages, associated costs, and benefits. This study undertakes such an assessment using past experiences with inundation. The present study focuses on the Sagar Block, a small part of the Sundarban Biosphere Reserve. Two islands, namely Lohachhara and Suparibhanga, have already disappeared while other adjoining islands have lost land. While this study does not probe into the reasons for inundation, the loss of property and the consequent distress due to land loss are obvious. Our objective is to trace and analyze the responses of the affected population. Past studies show that a large number of people have migrated to Sagar Island. We analyze reactive and proactive actions to assess private costs and social costs. The assessment and cost estimates are based on secondary information as well as field level information gathered through focused group discussions and Rapid Rural Appraisal (RAP). The vulnerability of migrants settled in various colonies is assessed by the LIFE framework. We carry out the colony-wise vulnerability assessment on the basis of a survey of responses of migrant households in Sagar Islands. We have gathered data on physical changes over time in the selected case study areas through the conjunctive use of GIS techniques and Survey of India topographic sheets. The study will use the results to assess the impact on poverty of the predicted climate change induced risk of inundation.

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Economics of bio-fuels in India: A comparative analysis of ethanol and bio-diesel

Herath Gunathilake, David Roland-Holst, Piya Abeygunawardena and Guntur Sugiarto

ABSTRACT

This study undertakes a comparative economic analysis of ethanol and bio-diesel in India. While an oil price increase will have a negative impact on the Indian economy, bio-diesel can off-set such impacts significantly. The study finds sugar cane based ethanol's offsetting effects to be marginal. The social cost benefit analysis shows the economic viability of bio-diesel. We also found molasses-based ethanol to be economically viable whereas sugar cane juice based ethanol is not viable. Our paper therefore argues that bio-diesel has better potential for carbon emission reduction, rural development and inclusive growth without having an adverse effect on the food sector. The study proposes separate policies for ethanol and bio-diesel and a support programmefor bio-diesel in India.

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Targeting and distribution of post-disaster aid: The case of the fishery sector in post-tsunami Sri Lanka

Asha Gunawardena

ABSTRACT

The study focuses on two types of aid transfer—boats and houses—which were distributed as part of an effort to rehabilitate tsunami-affected fishery households in six districts of Sri Lanka. The study investigates the distributional impacts of these transfers on the affected households. The study also attempts to quantify the factors underlying the allocation of such asset transfers and examines the degree to which the government and donors targeted the right households. The study uses the Census of Tsunami, conducted by the Department of Census and Statistics in 2005, as the baseline survey for pre-Tsunami data and carries out a follow-up survey in 2008 for a sample of fishery households selected from the baseline survey. The results of the study show that that there was better targeting of households for the allocation of houses compared to the targeting of households for the allocation of boats. The findings also show that housing transfers have resulted in improved asset equality among the fishery households compared to what existed in the pre-Tsunami period. The boat transfers on the other hand were not only poorly targeted but have also resulted in an increase in asset inequality. The differences between the two aid transfers may be due to the differences in the nature of the assets transferred, the availability of specific government policies, the availability of systematic information, and the dominant mode of aid delivery. The findings of the study also reveal that households that had access to social networks were more likely to receive aid transfers. Apart from household characteristics, regional disparities also played a role in the allocation of aid due to differences in access to infrastructure facilities, political alliances or the presence and absence of political turmoil. The findings highlight the importance of making a special effort to target such aid to reach certain sub-sets of people such as the very poor marginalized groups and those who lost human capital in disaster situations.

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From macro ‘GDP’ to sectoral ‘GDP’: Making a case for measuring micro-sustainability

Haripriya Gundimeda and Pavan Sukhdev

ABSTRACT

Ecosystems and biodiversity are our stock of ‘Natural Capital.’ They lead to a flow of benefits that support societal and individual well-being and economic prosperity. However, we do not measure this capital effectively enough to ensure its proper management and stewardship. In this paper, we argue that the observed loss of biodiversity and the degradation of ecosystems in many countries with high biodiversity that are pursuing a traditional GDP-growth-led development paradigm is a ‘tale of two tragedies.’ The first is that the exclusion of ecosystem service flows and biodiversity benefits from the accounts of society, including SNA-based GDP (a preferred yardstick of economic progress), results in a lack of policy attention to and public investment in ecosystem and biodiversity conservation, with the attendant risks of triggering the well-documented ‘tragedy of the commons’—in other words, an unsustainable future for generations to come. The second tragedy, which is intra-generational rather than inter-generational, has to do with the ‘tyranny of the average’, or an implicit assumption that an increase in any measure of average progress (such as ‘GDP growth’, for example) can reflect progress in the distribution of well-being within society at large. We shall question this assumption specifically for societies where large populations are still dependent on the free flows of goods and services from nature. We propose the need for a new metric ‘GDP of the poor’, which we believe integrates economic, environmental and social dimensions together. The proportion of the GDP that can be attributed to the rural and forest-dependent poor directly is named ‘GDP of the poor’. We measure this for mixed economies (i.e., where rural and urban economies differ, and where the former are more agricultural and the latter more industrial and service-sector) where at the same time there are wide income disparities (such as India, Indonesia and Brazil). We find that the lower-income, rural and forest-dependent sectors are much more vulnerable to any loss in biodiversity than the country’s economy as a whole.

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Consumer responses to incentives to reduce plastic bag use: Evidence from a field experiment in urban India

Kanupriya Gupta and Rohini Somanathan

ABSTRACT

Plastic bags and packaging materials are a significant component of solid waste in most countries. In recent years, many countries have attempted to limit the use of plastic bags through interventions which operate at the level of the retailer and consumer. These include the mandatory pricing of plastic bags, explicit levies on each bag, subsidies on current or future purchases, awareness campaigns and. in some cases. total bans on their use. There is no systematic evidence on the effectiveness of these policies in poor countries. Our project is designed to fill this gap. We examine the effects of both price- and non-price incentives on the use of plastic bags in the Delhi metropolitan area. We collected data from repeated surveys in 4 neighborhoods in Delhi and 1 in Ghaziabad. Our sample consists of 180 shops selling either groceries or fruits and vegetables. We distinguish between Delhi and non-Delhi areas because, in January 2009, the Government of Delhi introduced a wide-ranging ban on the use of plastic bags in market places. The ban is poorly implemented, but we would nevertheless expect consumer behavior to differ within the area covered by the ban. The study is designed as a field experiment with three types of treatments: (1) Information- Posters providing information on the effects of plastic bags; (2) Cash-Subsidies of 1 percent or 2 percent on the value of purchases for consumers not using a retailer-provided plastic bag; (3) Availability of cloth bags (cloth bags were stocked in the shops for purchase at the cost price of INR 15. In each neighborhood, we introduced these interventions sequentially in each shop with a gap of 2 weeks between each intervention. We hope that our results will point to policies that can effectively reduce plastic waste in urban India. Although the study consists of subsidies offered by retailers, it can provide estimates of the price elasticity of demand for plastic bags. These can then be used to formulate appropriate tax policies

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Price behaviour in tradable permit markets for greenhouse gases and its relevance for climate change policy

Shreekant Gupta

ABSTRACT

This paper investigates factors affecting the price of tradable permits for greenhouse gases (GHGs) and focuses in particular on the stabilization of permit prices. A critical review and analysis of permit price behavior can lead to a better understanding of tradable permit markets for GHGs and their acceptability by countries in the North and South. In doing so, a solution is proposed to two key problems holding back an international agreement on global warming, namely, (1) uncertainty about the cost of abatement of GHGs, and (2) sharing of this burden across countries.

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Economic benefits of reduced urban air pollution: A symptom specific analysis

Usha Gupta

ABSTRACT

This paper estimates economic benefits of reduced urban air pollution and, therefore, reductions in the occurrence of specific symptoms (viz., headache, cough, cold and fever) in the city of Kanpur, State of Uttar Pradesh, India. Using panel data from Weekly Household Health Diaries, the study estimates the Household Health Production Function and measures an individual's willingness to pay (WTP) for improved air quality. The dose-response relationship has been estimated using the logit model. The costs due to an increase in air pollution induced morbidity include the expenses on mitigating activities, loss of wages due to workdays lost, and an increase in restricted activity days. The study estimates that a representative individual would gain INR 129 per annum if air pollution were reduced to the safe level. Extrapolating this gain to all citizens of Kanpur, the total benefit from a reduction in the occurrence of symptoms would be INR 469 million per annum.

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Climate change impacts on development projects

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ABSTRACT

Climate change has become a topic of intense interest ever since the discovery of the ozone hole over the Antarctic in the 1980s. Around the same time, research on carbon dioxide concentration in the atmosphere led scientists to believe that human-induced climate change is a very real phenomenon although it is only recently that scientists have been able to predict, using large computer simulation models, the consequences of CO_2 concentration on the climate with a reasonable degree of accuracy. In a typical year, Bangladesh spends nearly USD 4.7 billion in development projects in its 18 sectors. Of these, about USD 2.7 billion of investment is now at risk due to climate change. While we have not attempted a detailed estimate on the cost of adaptation and mitigation in this paper, a rough estimate suggests that an additional 10-30 percent of funds might be needed to retain the current level of benefits of the projects if present climate change trends continue. The findings of our study show that our investments in all the sectors are at risk unless we undertake a proper evaluation of the climate change impacts on projects. Such an evaluation will also affect the choice of projects as climate change would change the benefit-cost ratio of projects.

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The double burden of adaptation to climate change while accelerating development in sub-saharan Africa

Rashid Hassan

ABSTRACT

Accelerating economic growth and social development is necessary to reduce the vulnerability and enhance the adaptive capacity of sub-Saharan Africa to cope with the consequences of the predicted unfavorable future climate. This requires major investments and policy reforms to induce a needed radical transformation in the way development is currently pursued to a more climate-sensitive path of low carbon growth. Key gaps in the current knowledge base that call for major investments and urgent attention include: the ability to forecast local future climate, account for the uncertainties associated with climate risks to ecosystems' functions, identify probable non-convexities in future impacts and provide better information on the costs and benefits of potential actions to avert the negative consequences of climate change.

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A critical review of multi-criteria decision making methods in natural resource management with special reference to water and forest resources in developing countries

Gamini Herath

ABSTRACT

This paper provides a review of research contributions to forest and water resources management and planning using multi-criteria decision (MCDM) making with special reference to developing countries. MCDM is particularly useful for water and forest resources because their management problems often involve maximization of multiple attributes. The review focuses primarily on the application aspects highlighting the difficulties involved and the need for new empirical approaches to increase their use especially in a developing country context. It also examines the nature of the problem addressed and the incorporation of risk into forest and water resources planning and decision-making problems. The MCDM techniques covered in this review belong to several schools of thought. For each technique, we have reviewed a variety of empirical applications including recent studies. More than 60 studies have been reviewed and classified by the methods used, country of origin, number and type of criteria and options evaluated. Based on the review, we identify some recent trends and future research directions. The paper shows that MCDM is relevant to developing countries and can contribute significantly to improving the problem of natural resources management. The Analytic Hierarchy Process (AHP) is relatively easy and requires less cognitive skills than say MAUT (Multi-Attribute Utility Theory) and hence is widely used. The potential of MCDM has increased due to the development of hybrid methods where the synergistic insights can be maximized. Risk preferences have been incorporated in some of the MCDM models with innovative modifications. In general, however, despite the development of newer empirical approaches and software to facilitate analysis, MCDM methods in natural resources planning has limited use for South Asia although, as a whole, the picture remains promising for developing countries..

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Motives for firms to adopt solid waste management controls: The case of the food processing sector in Sri Lanka

Udith K. Jayasinghe-Mudalige and Menuka Udugama

ABSTRACT

This study attempted to quantify the effect of “market” (i.e., cost/financial implications, human and technical efficiency, sales and revenue, reputation and commercial pressure) and “non-market” (i.e., existing and anticipated government regulations and liability laws) based incentives on the private actions of firms with regard to environmental quality. The case-study under consideration in the paper is the adoption of solid waste management practices (SWMPs) by the food processing firms in Sri Lanka. Out of 325 firms contacted, 153 firms (47.1 percent) did not adopt a single SWMP suggested by the MENR. Another 85 (26.2 percent), 31 (9.5 percent) and 23 (7.1 percent) firms have adopted 1, 2 or 3 out of 8 practices respectively while only 17 (5.3 percent) firms have adopted more than 5 SWMPs in the firm. Market-based incentives can play a significant role in motivating firms towards adopting SWMPs, but lack of mechanisms to augment such incentives at the firm-level results in low rates of adoption. Further, non-market incentives such as existing and anticipated regulations and liability laws play a much more prominent role as compared to market-based incentives.

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Addressing the water shortage of Kathmandu through payments for ecosystem services: A case study from the Shivapuri-Nagarjun National Park

Laxman Joshi, K.P. Pant and Golam Rasul

ABSTRACT

The shortage of drinking water is a chronic problem in the city of Kathmandu. The drinking water supply to the valley mostly comes from the foothills around the valley. Shivapuri-Nagarjun National Park provides 21 percent of the piped water supply in the city. Deforestation and land degradation in the water catchments are often blamed for the reduced quantity and quality of water supplied. The numerous communities who live inside and around the park have a large stake in how the park area is managed. However, their role in the provision of environmental services is not appreciated. Using secondary data and direct consultations with local communities and officials, we estimated the value of piped water services from the Sundarijal watershed, a sub-catchment within the Shivapuri-Nagarjun National Park that provides 13.67 million m3 of drinking water per year (the equivalent of NPR 533 million). The watershed also supports five mineral water companies and numerous small irrigation systems. We used both market and non-market valuation techniques to estimate the monetary value of water and other regulation services of the watershed. Estimates of the value of the water services should help in the development of a fair and equitable payment or incentive system and help enhance ecosystem services.

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State and communities in forest governance: Lessons and challenges from Nepal

Keshav Raj Kanel

ABSTRACT

While the state played the dominant role in forestry management before the seventies, this led to significant deforestation. An alternative governance mechanism therefore had to be sought to reverse this process of deforestation and degradation based on a new paradigm: placing the people and their institutions as the driving seat of forest governance at the local level while changing the role of state foresters to that of facilitators and advisers. This entailed the unbundling of classical functions of the forest agency and the creation of new local institutions. This transformation of state-led forest management to Community Forestry (CF) is made up of at least four aspects: (1) incorporation of a Community Forest Users Group (CFUG) as an institution at the District Forest Office (DFO); (2) undertaking of inventory and assessments of the local forest by the CFUG with the assistance of DFO staff; (3) preparation of an Operational (management) Plan of the forest for a duration of five to ten years with the joint agreement of CFUG and DFO; (4) creation of a CFUG fund, which is used for forestry and community development and livelihood promotion. This devolution of forest governance to CFUGs has virtually transformed the landscape and livelihood of the people in Nepal. Our intention in this paper is to discuss some emerging issues with community forestry in Nepal.

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Do stock markets value carbon credits? Evidence from India

Vinish Kathuria

ABSTRACT

Sufficient literature exists on the fact that markets, especially the capital markets, respond to environmental news. This favorable impact on capital markets has been observed to a great extent in developed country settings although to a lesser extent in developing countries. This creates incentives for firms to adopt pollution control. One such environmental effort is to buy carbon credits while implementing the clean project and, once the project is implemented, selling the credits in the market. The literature however is silent on how the capital market responds to a firm's decision to register for carbon credits. This paper using event analysis aims to examine the impact of registering for carbon credits on the performance of the firms. The setting is India, which has the maximum number of registered clean projects. We measure the impact on stock prices as well as on the financial performance of firms for the five-year period from March 2005 to February 2010.

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Estimating willingness to pay for improvements in drinking water quality: Evidence from Peshawar, Northern Pakistan

Himayatullah Khan, Faiza Iqbal and Imranullah Saeed

ABSTRACT

This study was conducted in the town of Hayatabad,in Peshawar, Northern Pakistan. The study was based on a survey of 150 randomly selected households. The study used the contingent valuation method and applied the multinomial logit model to elicit the households' willingness to pay for safe drinking water as well their risk averting behavior. The study revealed that the sample households' willingness to pay for improved drinking water was significantly determined by the households' awareness, levels of education, income, etc. The study concluded that the sample households were willing to pay much higher amounts than that charged in their current monthly bills by the City Development and Municipal Department, Peshawar.

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Food versus fuel: The role of technology and policy

Madhu Khanna

ABSTRACT

Concerns about energy security, high oil prices and climate change mitigation have led to increasing policy support for the production of bio-fuels worldwide. However, the diversion of increasing shares of food crops for bio-fuel production and the doubling in prices of agricultural commodities between 2001 and 2008 led to controversy about the extent to which it was caused by biofuels and the competition for land induced by them. Bio-fuel policies in the US now seek a six-fold increase in bio-fuel production by 2022 with increased reliance on advanced bio-fuels from feedstocks other than corn starch. Similarly, other countries such as India have set targets for blending ethanol with gasoline by 2017. This paper will discuss the implications of these policies on the allocation of land among food and fuel crops and on food and fuel prices. These implications are found to depend critically on the potential for technological change in the agricultural and biofuel sectors and on the policies used to support biofuel production.

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Household fuel consumption projections in India: Implications for health and greenhouse gas emissions

K.S. Kavi Kumar and Brinda Viswanathan

ABSTRACT

Solid fuels are still a major source for cooking in many households in India causing significant disease and global warming burdens. This study analyses the energy-income relationship, separately across rural and urban households in India, based on unit record data on fuel consumption obtained through the National Sample Survey 2004-05. Based on the estimated fuel demand equations, the study makes an attempt to project household fuel consumption for 2026 along with projections of associated local and global emissions and the health burden. The study further analyzes the health burden and greenhouse gas emissions under various policy scenarios including deeper penetration of clean fuels and wider utilization of improved cook stoves.

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Do transaction costs matter in sustainable natural resource management? The case of watershed management in India

Suresh D. Kumar

ABSTRACT

Watershed development is an important natural resource intervention in India. Considering the importance of watershed development in natural resource management, the present paper analyses the transaction costs involved in watershed management. More specifically, the present paper aims at (1) critically reviewing and developing a framework for identification and measurement of transaction costs involved in watershed management, and (2) quantifying the transaction costs involved in the implementation of watershed development. This calls for building on the existing governance instruments that range from regulation to consensus-building in order to address the natural resource crisis in the rain-fed lands in India. For the purpose of examining the transaction costs involved in watershed management, the present paper identifies three broad types of transaction costs, namely (1) the searching [opportunities and information cost, (2i) the negotiation and contractual costs and (3) the monitoring and enforcement costs. These costs are decomposed into government and private transaction costs. The government transaction cost includes the costs incurred by the state agencies in the planning, implementation and maintenance of the watershed development program. The private transaction costs include the costs incurred by the watershed community through time spent in the identification of location for different structures, the participation in PRA exercises, meetings, monitoring, and the contribution in terms of cash and kind for the implementation of watershed development. The total transaction cost incurred on average in a watershed with an area of 500 hectares is worked out to around INR 8.11 lakhs (or USD 17641). The decomposition of the transaction cost indicates that the government transaction costs account for 82.1 percent and private transaction costs for 17.9 percent of the total transaction cost involved in watershed management. Being an important transaction cost reducing mechanism, the setting up of an effective institutional mechanism will help reduce the transaction cost involved in watershed management, particularly in the post-project period. The roles of different stakeholders like state agencies, local panchayats and watershed community based organizations are extremely important in implementing the negotiation support system and in developing a multi-stakeholders' strategy to reduce transaction costs, especially to ensure sustainability in watershed management.

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Conservation tillage through the two-wheel tractor-operated seeder in Bangladesh: Increasing crop productivity and adding less CO_2 to the environment

M.A. Monayem Miah, A.K. Enamul Haque and Md. Abdul Wohab

ABSTRACT

About 80 percent of the tillage and land operations in Bangladesh are done through the power tiller which create various adverse effects (for e.g., reduction in soil organic carbon, decrease in soil fertility, serious water loss, soil erosion, and higher demand placed on diesel etc.) on the environment. Taking these issues into consideration, the Bangladesh Agricultural Research Institute has been conducting research and development activities on conservation tillage since 1995 with the financial assistance of CIMMYT and has developed a two-wheel tractor-operated seeder (TTOS), which it has disseminated for farm level use. This device has been used for tilling, sowing and laddering operations for wheat, paddy, maize, jute, pulses, and oilseeds simultaneously in a single pass. It ensures timely planting, addresses the problem of labor shortage, increases crop productivity, enhances cropping intensity, and requires low fuel. Our study revealed that conservation tillage (CT) through the use of TTOS was largely for crop establishment. The CT created a tremendous impact on farmers' income through crop cultivation. It saved land preparation costs ranging from 16.98 to 30.67 percent and the seed cost from 15.06 to 25.37 percent. CT ensured a 16, 15, 18, and 18 percent higher yield respectively for wheat, jute, onion, and mung bean compared to traditional tillage (TT) through the power tiller. This also increased farmers' net income by 30, 23, 46, and 45 percent respectively for the aforesaid crops. Farmers that used CT technology received a 17.9 percent higher gross return per hectare than the TT-using farmers. We also found that TTOS is environment friendly since it could save 40 percent of fuel per hectare and an emission of 43 percent less CO_2 into the atmosphere. The service providers mentioned a few problems with regard to the TTOS service, such as the lack of a ridding facility, roller jam, and shallow tilling. The study recommends that authorities take the initiative to immediately disseminate this device throughout the country to make agriculture sustainable.

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Costing adaptation: Preparing for climate change in India

Arabinda Mishra and Anil Markandya

ABSTRACT

Costing adaptation needs for key sectors is a prerequisite to national planning efforts for climate resilient development. Since the projected outlays are huge in scale, financing opportunities and absorptive capabilities have become important considerations for developing countries. It is in this context that The Energy and Resources Institute (TERI), in collaboration with the Basque Centre for Climate Change (BC3), did a cost assessment of the additional adaptation measures for India under different climate scenarios. Working from the bottom-up it represents the first attempt at a national review of the measures that are feasible and will be needed in the medium term (by 2030 to 2050) for five key sectors – health, coastal zones, water, agriculture, and forest ecosystems. The literature on adaptation is considerably weaker than that for mitigation and detailed assessments such as this one are very rare, especially for developing countries. Cost estimates of the kind presented in this study are expected to serve two primary purposes: one, they inform the policymakers the net and additional investment required for adaptation measures in specific sectors for a given time period; and, two, they force a discussion on financing issues. Though there is considerable scope for refining both the methodology and estimates presented in this study, the value addition has been in terms of the following key lessons: (1) that the scope for government intervention on adaptation is large even in the short- and medium-term with all its information constraints; (2) that the nature of such intervention would be additional to and different from business-as-usual development programming; and (3) that the scale of action required is large and likely to increase as we receive more knowledge about impacts and include more sectors for intervention (though development may act as a mitigating factor by building up coping capacity over time). The concept of adaptation is inherently dynamic in nature and there would be a constant need to monitor and evaluate our options and resource requirements as the nature of vulnerabilities change over time.

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Toxicity and profitability of rice cultivation under waste water irrigation: The case of the East Calcutta wetlands

Vivekananda Mukherjee and Gautam Gupta

ABSTRACT

The paper empirically studies the profitability of rice cultivation in the East Calcutta Wetlands region where untreated sewage water from the city of Calcutta, India, is used for irrigation purposes during the winter/summer crop. The results show that plots using wastewater earn higher profits compared to those using groundwater. Therefore, we conclude that, of the two opposing effects of wastewater irrigation, the positive effects of organic nutrients dominate the negative effects of heavy metals toxicity. However, we also find that the profitability of plots using wastewater is negatively affected by the presence of lead in the water. The results support both conservation of the Wetlands generating a number of ecological benefits and regulation on the use of lead in industries located upstream in the city of Calcutta.

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Sustainability of local forest commons: A multi-country analysis

Pranab Mukhopadhyay, Ingela Ternström and Rucha Ghate

ABSTRACT

Local forest commons provide an important source of income, livelihood support and safety net for a large number of people across the globe. Dependence on forest commons is especially high among poor people living in developing countries but there is increasing acknowledgement of the global benefits of local forests. Meanwhile, there is an ongoing debate about the most efficient property rights arrangement for local natural resources, where one side argues that forest commons should be transferred into private or government ownership. Despite extensive research into the management of local commons, there is still a lack of convincing cross-country analyses of the sustainability of local forest commons. This paper uses a multi-country dataset collected by IFRI (International Forest Resources and Institutions) and sheds light on two aspects of forest commons; 1) whether forest commons contribute to sustainable development and 2) what factors contribute to the well-being of the users of forest commons.

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Air and water pollution accounts for the state of Andhra Pradesh, India

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ABSTRACT

This paper discusses the methods for preparing environmental and economic accounting at the sector level in an economy. It provides a methodology for estimating the cost of environmentally sustainable industrial development. Case studies of environmental valuation and accounting are undertaken for three important polluting sectors: thermal power generation, urban water pollution and the paper and pulp industry in the state of Andhra Pradesh, India.

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Unbelievable: But improved cook-stoves do not help reduce firewood demand in Nepal

Mani Nepal, Apsara Nepal and Kristine Grimsrud

ABSTRACT

This paper analyzes the effect of different types of cook-stoves on firewood demand at the household level using nationally representative household survey data from Nepal. The traditional mud stove user households seem to use less firewood than the open-fire stove users. Surprisingly, households with the so-called 'improved' stoves do not seem to use less firewood than households with the open-fire stove. If this is true, then the programme to disseminate improved stoves, which hopes to reduce the use of firewood consumption, needs re-examination if the improved stove technology that was in use during the 2003/04 period remains unchanged. In the medium to long run, making cleaner fuel more accessible to rural households might be a better option than cook-stoves since it would reduce firewood demand as well as indoor air pollution.

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Energy efficiency, climate change and income distribution in the Indian economy

Vijay P. Ojha

ABSTRACT

Energy efficiency improvement (EEI) is increasingly being suggested as a means to mitigate climate change. However, this strategy per se is not without pitfalls. EEI, because of the resulting decline in relative energy prices, eventually leads to an increase in energy use. The latter, in turn, leads to higher carbon dioxide emissions per unit of GDP. This would mean that, for a rapidly growing economy like India, CO_2 emissions would grow faster in an enhanced energy efficiency (EEE) scenario, unless and until explicit carbon emissions abatement policies—such as carbon taxes and/or emissions trading—are put in place to counter the climate unfriendly effects of EEI. The tentative results from our study using a computable general equilibrium (CGE) model of the Indian economy indicate that a combination of carbon taxes and EEI measures are effective in reducing carbon emissions without any adverse effect on GDP. Moreover, the recycling of revenues from carbon taxes facilitates poverty alleviation.

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Green accounting in India: A synthesis paper of eight CSO studies

Manoj Panda, G. Mitra and M.N. Murty

ABSTRACT

In recent decades, the need for developing green accounts has been well recognized across various countries. A few years ago, the Central Statistical Organization (CSO), India, commissioned eight studies with a view to developing a sector-specific methodologies for natural resource accounting (NRA). The studies used various NRA methods and adopted them in order to arrive at a possible empirical basis for adjustment to state income in different sectors. The aim was to extend national income accounts in India to a system of environmental and economic accounting (SEEA) by incorporating environmental dimensions to input-output tables and estimating maintenance cost, abatement costs or non-market valuation of environmental resources in areas such as land, forest, air, water and mining for some of the Indian states. The studies reached very different conclusions in their suggestions regarding green accounting in India. This synthesis paper attempts a comprehensive review of the eight CSO studies on NRA. It examines the methodology used across the CSO studies with respect to both the physical accounts as well as the monetary accounts. The paper evaluates the various costing methods and extensions suggested to SNA in light of the literature developed in recent decades for environmentally adjusted GDP. It scrutinizes the database and the assumptions made by the eight studies with regard to practical implementation. In the process, it identifies the data gaps that need to be filled for green accounting. The paper finally discusses the current state of environmental valuation in India and evaluates the feasibility of estimating green GDP for India in the near future.

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Climate challenge to cities

Jyoti Parikh and V. Shukla

ABSTRACT
The phenomenon of urbanization is connected with climate change in two ways. First, due to the density of population, economic activities and infrastructure, cities generate considerable amount of GHG emissions. Emissions from countries are even more linked with the levels of urbanization than with per capita income levels in developing countries as shown by Parikh and Shukla (1995) in a study that covered 82 countries. Second, due to poverty and congestion, urban areas are susceptible to storms, floods, excessive rainfalls, cyclones, landslides and heat island effects due to temperature-rise. Thus, climate change poses a new challenge to urban areas already constrained from congestion, un-planned urban development and lack of infrastructure. The article will elaborate on this challenge with special reference to India.

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Modeling self-protective behaviors against infectious disease: Estimates of prevalence elasticity for malaria

Subhrendu K. Pattanayak , Christine Poulos, George Van Houtven, Jui-Chen Yang and Kelly Jones Wendland

ABSTRACT

Vector-borne diseases such as malaria, dengue, and diarrhea that are spread by vectors such as mosquitoes and flies are rife in the much of the developing world, potentially impacting more than two-third of the world's population. Economic epidemiology (EE) applies the economic methods originally designed to model market exchanges and adapts them to examine the "non-market" exchanges that underpin the development, spread, and control of infections and diseases. In Philipson's (2000) introduction to EE, he focuses on the critical role of private preventive behaviors in suggesting that public health interventions will be self-limiting. In adapting EE to explore its implications for vector-borne disease, Gersovitz and Hammer (2003) highlight the critical role of prevention and infection externalities and conclude that public intervention is critical. To address this ambiguity regarding the appropriate role for public health interventions, we present the first tests and measures of the relationship between the demand for prevention and disease prevalence, e.g., the prevalence elasticity of demand for prevention. Measuring prevalence elasticity is important because (1) changes in protective behaviors against infectious diseases will alter the rate of transmission and therefore affect the dynamics of disease; and (2) these behaviors involve economics costs, they affect the welfare of the affected population. This paper presents three empirical applications. The first combines data from four different sources to analyze the relationship between malaria prevalence and malaria prevention at the country level. The second and third use cross-sectional microeconomic datasets on malaria prevention and malaria prevalence in Ethiopia and India. These analyses provide consistent evidence supporting the predictions of economic epidemiology models for both malaria and diarrhea. The final part of the paper discusses some of the implications for research and policy.

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Analyzing the factors affecting the diffusions of cook-stove and biogas in rural Nepal

Krishna Prasad Pant

ABSTRACT

Scientists have generated enough information to show that adoption of improved cook-stoves and biogas by those rural households using biomass fuel reduces indoor air pollution and, hence, respiratory health problems. Several benefits of such technologies are reported although health benefits alone are found to cover their costs of installation. But researchers remain puzzled why such beneficial technologies are not widely adopted in the rural communities. This paper, using primary data from 931 households randomly sampled from the Shyangja, Chitwan and Kapilvastu districts of Nepal, analyzes socio-economic factors affecting the diffusions of cook-stove and biogas technologies. We use the technology adoption lifecycle model (TALM) with Rogers' bell curve, after correcting for the use of other non-polluting higher ladder fuels, to describe the adoption of the technologies. We analyze the factors affecting adoption using the technology acceptance model (TAM), benefit-cost analysis, and mean differences of the factors affecting adoption at different stages. The analysis is up-scaled to the national level using Nepal Living Standard Survey data for 3912 households. The results would be helpful in devising policies for the wider adoption of the technology among rural households.

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The value of reduced risk of injury and deaths in Pakistan using actual and perceived risk estimates

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ABSTRACT

This study aims to obtain the value of statistical life (VSL) and health in Pakistan by examining compensating wage differentials among blue collar workers of the manufacturing sector in Lahore. This is pioneering work in Pakistan because, so far, there have been no estimates done for the country based on compensated wage models or the contingent valuation method. The results are based on interviews with 680 workers. We estimate the VSL and VSI (value of statistical injury) based on actual and perceived measures. The study estimates the VSL to be between USD 122,047 (or PKR 10,374,000) and USD 435,294 (or PKR 37,000,000) per statistical life. Moreover, the VSI is within a range of USD 417(or PKR 35445) and USD 1654 (or PKR 140,590) per statistical injury. These values are low in comparison with the values for developed countries. However, our results are similar to the results of many developing countries including India, South Korea and Mexico. The variations in the results are due to the use of different risk measures, that is, actual and professed or perceived risk measures in alternative regression equations. The results of the study will help different public and private sector agencies in the future to better approximate the benefits of pollution reduction and other safety measures such as traffic safety measures and medical intercessions. Furthermore, the study will also provide fertile grounds for supplementary exploration and research in the area.

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The economics of regional cooperation in transboundary water resource management: The case of the eastern Himalayan region

Golam Rasul and Arun B. Shrestha

ABSTRACT

The Eastern Himalayan countries of Nepal, Bhutan, India and Bangladesh are bounded by the common river systems of the Ganges, Brahmaputra and Meghna (GBM). With a drainage area of about 1.75 million sq. km and an average runoff of around 1,200 cu km, the GBM basin constitutes the third largest hydrologic region in the world. About 700 million people, comprising over 10 percent of the world's population and about 40 percent of the world's poor live in this basin. The economy and the environment of the GBM region are crucially dependent on water. While the need for water has increased rapidly, water supply has become erratic due to poor management and climatic effects. The upstream–downstream interdependencies necessitate the development of shared rivers in an integrated manner through collaboration between all riparian countries. However, in the recent past, water has become more the site of contestation than a source for deriving synergistic benefits through the regional development of water bodies. Despite the growing realization of the importance of collaborative development of trans-boundary water resources, little effort has been made so far to understand how regional cooperation could provide additional economic and social benefits to riparian countries. This paper, thus, examines the opportunities for regional cooperation in water resources management and explores the benefits that may accrue to all the riparian countries through collaborative efforts. The analysis suggests that when a regional perspective is taken, which approaches the issue from an entire river perspective, the benefits of water resources increase considerably as it allows the optimum use of water resources for both consumptive and non-consumptive purposes. Regional cooperation, thus, is found to be superior to bilateral cooperation in bringing about additional economic, environmental, social, and political benefits to all riparian countries through the development of multi-purpose river projects. The cooperative development of trans-boundary water resources can help in storing monsoon water, mitigating the harmful effects of floods and droughts, augmenting dry season river-flows, expanding irrigation and navigation facilities, generating hydropower, and enhancing energy and environmental security. The study therefore makes recommendations to facilitate regional cooperation in trans-boundary water resource management in the Eastern Himalayas. The insights gained through this study might be useful for trans-boundary water resource management in other river basins in South Asia and elsewhere.

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Heat stress, urban health and labor productivity in Kolkata: An adaptation strategy for a megacity in India

Joyashree Roy, Anwesha Chakrabarti and Kuheli Mukhopadhyay

ABSTRACT

Climate projections for India indicate an expected increase in temperature to the order of 2-4°C by the year 2050. It goes without saying that climate change induced heat stress would impose an extra layer of threat to the already stressed sustainable development agenda in India. The case study of Kolkata (a mega-city with the second highest population density in the world and the highest population density in India) shows that heat stress is going to affect human well-being adversely due to loss in labor productivity. The large informal economy in the urban areas adds a new dimension to the problem. This paper tries to capture the loss in labor productivity in terms of the WBGT index. The index shows that the loss of productivity is sometimes 100 percent of the working day for some occupation categories. It also shows that labor productivity can be enhanced with proper adaptation strategies. But adaptation is not without a cost. Therefore, a comparison of costs against benefits is necessary. We therefore estimate productivity loss without adaptation and simulate various scenarios for adaptation and identify associated costs. Our estimates show that low cost adaptation has limited scope and that therefore high adaptation cost and investment is needed is order to maintain 100 percent labor productivity. However, many of the adaptation strategies also have interesting mitigation implications..

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A low carbon inclusive growth strategy for India

U. Sankaranarayanan

ABSTRACT

India's greenhouse gas emissions in 2007 were estimated at 1.728 billion tonnes of carbon dioxide equivalent. India's share in global emissions is about 3.2 percent, compared with her share in the global population at 17 percent. Despite India's primary concerns with rapid development and greater access to commercial energy for the poor, the emission intensity of GDP declined by more than 30 percent during the 1994-2007 period. India has no emission reduction commitment under the Kyoto Protocol but it has announced a reduction in emission intensity by 20-25 percent between 2005 and 2020. But India needs a carbon strategy not only to reduce emission intensity but also to keep her per capita emissions below her entitlement in the global carbon space by 2050 in order to avoid potential threats to her exports to developed countries, to access climate-friendly technologies, to seek financial assistance from developed countries, and also to influence other countries to negotiate for time-bound emissions reduction commitments to prevent global average temperatures exceeding 2°C. India's low carbon inclusive growth strategy is framed in the context of multiple goals and its national circumstances. In many cases, co-benefits such as energy security, universal access to clean energy at affordable prices, decentralized development, employment generation and improvements in local environmental quality are important. Therefore the weights for GHG emissions reductions and other goals vary from sector to sector and sometimes among schemes within a sector. For this reason, India has opted for bottom-up/sectoral/program-oriented policies rather than economy-wide GHG emissions reductions policies such as carbon taxation or cap-and trade system. India has taken the initiatives to enhance energy efficiency in thermal power plants, promoting nuclear power and renewable energy and tapping energy savings potentials in a few sectors. However, there is a heavy reliance on technology development, regulation and subsidies than on the use of economic instruments. This paper examines the present policies in the light of the inclusive growth objective and financial and environmental sustainability.

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Integrating methods for assessing sustainability: The case of small-scale farming in Karnataka

P. Seema

ABSTRACT

The literature on sustainability abounds with arguments for adopting a holistic 'systems approach' to the assessment and monitoring of ecosystems. While most real world problems call for a systems perspective, there are few real-life analyses using empirical information on the social, ecological and economic systems surrounding a problem. This may be because integration of different systems across scales, times, and stakeholders could potentially undermine the rigor of the commonly-used analytical tools. The paradox of having to compromise on rigor/clarity in order to obtain a holistic view of the system poses a greater challenge in developing countries where linkages across systems and scales are more complex. Here, the integration of diverse indicators (for quantitative or qualitative analysis) is challenging in attempts to detect and understand shifts in sustainability at the grassroots. Nevertheless, real-world models, which also do not comprise on rigor and complexity for 'misplaced' certainty, that speak to policy makers are a necessity in emerging economies. More often than not, holistic interpretations of changes in social-economic-ecological systems (SEES) depend on narratives or abstract models ignoring other approaches as reductionist. However, for science-based policies being formulated or analyzed in a SEES context, we may actually need multiple approaches. The challenge seems to be which approach to use where and how and for what purpose. The paper will discuss the above in the backdrop of a case study that is trying to adopt different methods to successfully reflect on a SEES of small farms and policies.

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Diversion of land from the primary sector and implications for livelihood under the changing land use pattern: Evidence from Sezs in Gujarat

Amita Shah

ABSTRACT

The policies for the conversion of land from the primary to the secondary sector and from rural to urban settlements remained fairly conservative in a large number of countries, including India, till the end of the eighties. Land (along with all natural resources) more often than not is vested with the state, which then controls, plans, and regulates use in consonance with the changing socio-economic needs of the country. The central idea is that the state ought to operate in matters of land in order to safeguard the public interest, i.e., the doctrine of eminent domain. What is however, questionable are the processes of obtaining land rather than the diversion of land per se for economic activities such as industry, infrastructure, and urban growth. In fact the faulty processes invariably end up diverting larger expanses of land, often fertile, than is actually required. Much of this land ends up in the hands of the real estate developers as against the productive sectors of industry and infrastructure. The absence of land use policy and planning is often cited as the main culprit for haphazard land conversion. Given this backdrop, the study seeks to engage with an important, emerging development issue in the context of Special Economic Zones (or SEZs) in Gujarat. It intends to understand how SEZs impinge on the livelihood bases and options of the agrarian and marginalized communities in India. Specifically, it seeks to examine whether the acquisition of lands for SEZs destroys the livelihood sources of agrarian and landless households and thereby leads to their displacement. If that is the case, the study seeks to find out whether farmers voice their claims/protests against the acquisition. The paper also inquires into what kinds of new opportunities come up in the local economy and who gains and loses in the process of mainstreaming local communities into the development dynamics and whether the processes and impacts vary between different SEZs located in the state. The study seeks to address these issues in the light of an analysis of three SEZs in Gujarat. They are the Mundra, Dahej and the Reliance Industries Limited. The analysis is based mainly on secondary and primary data sources—both quantitative and qualitative. We have collected the primary data by conducting a census survey of households in 7 villages around the three SEZs in Gujarat.

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Leasehold forestry regime in Nepal: Need for institutional restructuring to meet poverty reduction objective

Bishnu Prasad Sharma

ABSTRACT

The paper analyzes the role of leasehold forestry (LHF), an innovative forest management regime being experimented in the hills of Nepal with the objective of reducing poverty among participating households. LHFs are degraded public forest lands granted on a 40 years lease to identified poor households with the purpose of forest regeneration and raising forest incomes. Using micro-data collected from some 508 LHF households and 61 control households, the contribution of the LHF in reducing various dimensions of poverty and inequality has been examined.

The findings reveal that LHF biomass contributed around 5 percent of household income and led to slight reduction of poverty incidence, poverty gap and severity. On the other hand, while the non-LHF households with similar poverty and resource characteristics receive about one fourth less biomass flow income annually, the poverty incidence, poverty gap and severity among these two categories of households is not significantly different. This raises serious doubts on the effectiveness of the LHF regime. In addition, there exists considerable inequality in the biomass income from LHF among LHF households and the LHF benefit sharing was not found to be pro-poor. The study concludes that allocating land alone is not sufficient to ensure utilization and benefit flow for resource poor, socio-economically weak people as high transaction cost and lack of strong economic incentives discourage defending property right and utilization of leased forest land.

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Promoting the wise use of water for the future: Lessons learned and the way forward in economic instruments application

Sangam Shrestha and Yatsuka Kataoka

ABSTRACT

Historically, people coped with water shortage problems by developing water storage facilities and supplying more water. However, the development of new water sources is not economically or environmentally feasible in many cases. Moreover, water is a finite resource and therefore it is necessary to promote sustainable consumption in order to address water stress rather than strengthening water supplies. It is recognized that one of the underlying causes of the inefficient use of water is that people perceive water as a resource that can be accessed freely or at a very low cost. Therefore, to promote sustainable consumption of water, it is important to change the consumption behavior of people that would entail recognition of the economic value of water. There are various ways to change water consumption behavior, such as laws and regulations, education and communication campaigns, etc. Among these, economic instruments, such as water charges and taxes, are considered to be one of the most effective tools in promoting water saving practices. They are also recognized as useful tools for cost recovery of water services, rendering it more sustainable. These economic tools can be more efficient than command and control type of regulations and give users more flexibility to adapt. However, there are various barriers to the implementation of economic instruments such as users' unwillingness to pay and undefined water user rights. In addition, there is a suspicion that the introduction of economic instruments may increase the cost of water and keep the poor from accessing safe water supplies. Therefore this paper makes use of original case studies to demonstrate how economic instruments, in combination with other methods, can promote sustainable consumption of fresh water. Unique approaches are used for minimizing water waste; maximizing water use efficiency; maximizing water availability by limiting the degradation of water supplies; optimizing water allocation to competing users, including the environment; and limiting access to sustainable levels. These cases, from across Asia and the Pacific, show that economic instruments are not the only option for promoting sustainable water consumption. Complementary measures appropriate for the context can facilitate an adequate water supply and sustainable consumption.

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User-based financing of environmental conservation of the Maldivian atolls: An application of the travel cost model

Md. Shumais

ABSTRACT

This paper provides an economic valuation of the recreational uses of the atoll resources in the Republic of Maldives. A travel demand model was developed to estimate the benefits of atoll-based marine tourism. The study found a large disparity between the amount of economic value generated from this nature-based tourism and the amount going into atoll environmental conservation. More than half of the current environmental protection expenditure comes from unstable international sources. The study found that even a small percent of tax added to tourist expenditures on the islands or a direct conservation check-off as user fee collected from the tourists would help defray the costs of atoll conservation. The paper also discusses the various policy implications of a sustainable user-based financing mechanism.

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Rules and collective action: An institutional analysis of irrigation systems in Nepal

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ABSTRACT

This paper documents the various existing rules and how they have been devised over time in the case of irrigation management in Nepal. We analyzed the rule configuration based on the ADICO syntax proposed by Crawford and Ostrom (1995) and Ostrom (2005). The economic incentive and transaction cost involved in making any changes in the rules were important. The farmer managed irrigation systems are generally free to devise their own rules based on the local context and taking into consideration the ideas, norms, and beliefs shared by the community. Rule formulation in agency managed irrigation systems, on the other hand, was mostly done by officials. However, strong rule enforcement mechanisms were found in farmer managed systems compared to agency managed systems. Better rule enforcement created favorable conditions for collective action among the users and ensured better performance of the irrigation systems. The results imply that institutional changes in the form of new rules should take into account both biophysical attributes and community beliefs and ideas.

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Do embankments on Himalayan rivers raise welfare? A case study of the Koshi

E. Somanathan

ABSTRACT

We compare 8 villages that suffered from floods due to an embankment breach in August 2008 on the Kosi River with 8 villages that were not prone to flooding by rivers and 2 villages prone to regular flooding, one by the Kosi and the other by the Ganga. We compare agricultural incomes, agricultural employment and wages to see if getting protection from an embankment is worth the risk of the severe flood that occurs when the embankment is breached.

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A global climate strategy: Examining options and understanding limitations

Thomas Sterner

ABSTRACT

A number of features set climate change apart from other environmental problems. It spans several generations forcing us to think in new ways about intergenerational fairness. Even more importantly, it involves the delicate problem of coordination between countries and other agents at a truly global scale. As long as it is very profitable to use fossil fuels, policy coordination must include basically all major economies. The costs are sufficiently sizeable to make it important that the policy instruments chosen encourage efficiency in abatement. Ultimately this means striving towards a single market for carbon. The importance of getting near-universal adhesion to a treaty makes fairness and procedure important but we know how difficult it is to build a truly global agreement. Some people, both environmentalists and business leaders, see green growth as the magic bullet: we should stop talking about who gets to use fossil fuels and instead focus on who will lead us into the green valleys of the future and there reap all the benefits of being first. This sounds good but who is going to stop laggards from simply continuing to burn coal? This paper discusses the necessary ingredients for a long-run Global Climate Strategy. At the end we will dwell on the 'short-run' issue of what policies to pursue in the mean time. As we wait for the final (and maybe elusive) Worldwide Treaty, we must have a policy that makes sense and in fact is not only compatible with, but hopefully facilitates, the development of this worldwide agreement! The last section will focus on what forms of 'green growth' strategy are reasonable for this intermediate period that we are in and which may end up being more long than short.

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Rice and climate change

Jeffrey R. Vincent

ABSTRACT

Rice is the most important food crop in the world and the foundation of human diets in most of Asia. Understanding the impacts of climate change on rice harvests is thus important. Most studies on the agricultural impacts of climate change focus on potential impacts in the distant future. There is evidence, however, that rice harvests in Asia have already been affected by various dimensions of climate change, including changes in monsoon rainfall, temperatures rising more rapidly at night than during daytime, and reduced sunlight reaching the earth's surface. My presentation will review this evidence and consider the implications for climate change research and climate change adaptation and mitigation.

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