

National Seminar on Climate Change and the Green Economy with reference to India

The Indian Human Ecology Council, Jaipur, hosts the Seminar on
World Environment Day, 5th June 2012.



The opening session with Professor R.N.Misra, Professor H.S. Sharma, Professor Ian Douglas, Dr. S.K. Wadhawan and Professor K.R. Dikshit.

Introduction

Every year since 2008, the Indian Human Ecology Council (CHEC-India) has organised a national seminar to celebrate World Environment Day (June 5th). I, Ian Douglas, was kindly invited by Professor H.S. Sharma, President, CHEC-India and a former Dean of Science, University of Rajasthan, to deliver the Opening Address at the 2012

seminar. Professor Sharma had invited a wide range of senior academics from a broad spectrum of disciplines, from sociology to medicine, the sciences, engineering, and particularly from geography to speak at the seminar. Collectively they brought innovative and insightful perspectives on the theme “Climate Change and the Green Economy with reference to India”.

The presentation and discussions explored the nature of climate change in India, the potential and characteristics of the green economy and the human dimensions of environmental problems. Outstandingly, there was a vigorous discussion about reducing the growth of the human population, a controversial topic that seldom is at the forefront of environmental debates at the present time.

Prof. H.S. Sharma in his welcome address pointed out that India is

increasingly at the forefront of some of the 'Green Shoots' of a Green Economy that are emerging across the globe. From its manufacturing of solar and wind turbines to its Mahatma Gandhi Rural Employment Guarantee Act, which underwrites paid work for millions of households via investments in areas ranging from water conservation to sustainable land management, the foundations are being laid in India for a fundamental and far reaching new development path.

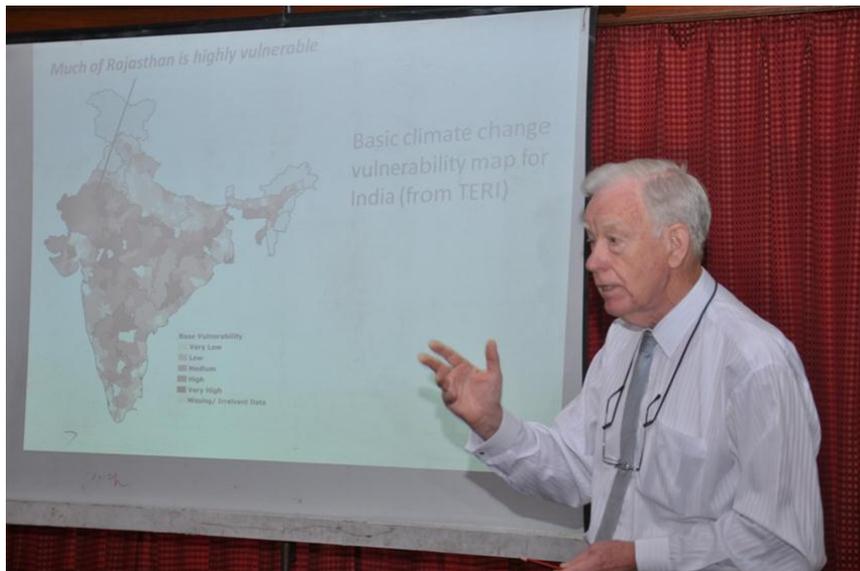
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Climate Change

The widely quoted probability that there is likely to be a 2.5° to 5° C rise in annual mean surface temperature by 2100, which will be more pronounced in northern India, was criticised by Professor M.N. Koul (University of Jammu) who has found that climatic change has brought increased winter rains and snow that have led to advances by some glaciers. This is counter to a generalised retreat of glaciers observed in Sikkim, further east, by Professor Chattopadhyay (Visva-Bharati) who demonstrated that some large glaciers had retreated over one kilometre in the last 50 years. Rapid decay of the glacier ice-mass often gives rise to debris-dammed lakes adjacent to the glacier snout. The dams sometimes break, causing catastrophic flooding and damage to settlements down-valley. Similar changes have also occurred in Himachal Pradesh where the magnitude and frequency of droughts, floods and glacier retreat has increased in recent years, according to D.D. Sharma (Himachal Pradesh University). These climatic changes have led farmers in the mountain valleys to change from wheat to barley cultivation in order to increase

their earnings. Already adaptation to climate change is in progress.

In 2008, the Indian Union budget statement recognized that the country was one of the most vulnerable to climate change, although its per capita greenhouse gas emissions were among the world's lowest. The 2008 Indian National Action Plan on Climate Change included strategies to reduce emissions and to mitigate climate change, especially through solar energy and energy efficiency, wise water use, afforestation, agricultural improvement and sustainability in urban environments. However, Professor R.P.Misra (formerly Vice-Chancellor, Allahabad University) noted that none of these strategies have so far produced assuring results. What is lacking, he wrote, is people's participation in the efforts being made by the government channels. In my opening address, I had emphasised Zena Daysh's often stated comments about the need for individuality responsibility in human ecology and indicated what could be done about climate change and the green economy at all scales from the individual to national governments and international bodies. Several subsequent speakers took up this issue.



Ian Douglas explaining variations in vulnerability to climate change in India in his opening address

The Green Economy

The Green Economy initiative launched by the United Nations Environment Programme seeks to encourage economic development that is ecologically sound, economically productive and socially inclusive. Professor K.R. Dikshit (University of Poona) said that the crux of the initiative was to minimize the use of energy, avoid using fossil fuels to generate energy, refrain from polluting natural resources such as water, soil and air, preserve green vegetation, and protect wildlife. For Dr. N.S. Nathawat (Indira Gandhi National Open University) the term “green “ is used to describe those activities, products, or systems that reduce non-renewable energy and raw materials consumption and reduce or eliminate harmful emissions or discharges and their impact on the environment.

Asking the question: “Green economy for sustainable development: are our actions louder than words?” Professor Krishna Mohan (Panjab University) discussed challenges to environmentally sustainable growth in India, pointing out that the 12th India Five-Year Plan, started in April 2012, identified

challenges relating to the management of the environment that include i) land, mining, and forest rights; ii) mitigation and adaptation strategies for climate change; iii) waste management and pollution abatement; iv) degradation of forests and loss of biodiversity; and v) issues of environmental sustainability. Others commented upon the appropriateness of the Green Economy initiative for a country where 30 per cent of the people are still living below the basic poverty level. In countries like India, Pakistan, Afghanistan, Bangladesh and Nepal, the primary objective has to be to nourish those in greatest need to sustain livelihoods and to develop their ability to contribute to a modern labour force. Expanding on this, Dr. Vinod K. Bhardwaj (University of Rajasthan) argued that quality of living is an agenda that may be attended to after ensuring sufficient food, shelter and work for all needy people. Poverty, food crises, unemployment and rooflessness are the major issues that have to be dealt with, whereas moving towards Green Economy production may adversely affect the majority of people in South Asia.

Not everyone agreed with Dr. Bhardwaj. Dr. Suraya Kant (Panjab University) discussed the wide gulfs between Indian states in mean per capita income (e.g. Bihar only Rs 17,590; Panjab Rs 67,473; Maharashtra: Rs 83,471). This income disparity between states has increased in recent years, economic growth being spatially uneven. Among the 253 million middle class Indian population consumption has increased by 4 per cent annually. Yet the numbers of poor, vulnerable people are also growing. Spatially and socially, inclusiveness and incomes are highly variable. Nina Singh (Maharshi Dayanand University) talked of a culture

of marginalisation in terms of water resource distribution and access, using examples from the Indo-Gangetic plain in Haryana state. In some villages, water mafias controlled the distribution of water. Rich farmers who could afford to buy the necessary pipes could irrigate, giving them higher yields and increasing the income disparity between rich and poor. For women, falling water tables meant they had to walk further to get water and issues such as the education of girls, social conflicts, out migration and increased disease remained serious problems that the Green Economy approach could possibly help to overcome.



Bicycles and motorbikes in the Sireh Dyodhi Bazar, Jaipur: are bicycles part of the Green Economy?

Green Technologies

Practical contributions and potential solutions to the Green economy were discussed in terms of renewable energy, uses of plants, and nano-biotechnology. Discussion of renewable energy concentrated mainly on biofuels with two outstanding practical examples from Rajasthan. Anand Chopra (Kalptaru Power transmission, Jaipur) explained how the UN Clean Development Mechanism (CDM) had helped his

company to establish two power stations in Rajasthan (a 7.8 MW project at Chak in 2003 and an 8 MW project at Khatoli) using mustard crop residue biomass as fuel. There is no alternative use for the mustard residues and the sale of them to the power company provides farmers with additional revenue. The plants feed electricity into the state electricity grid. However prices paid for the residues to farmers have risen, while the revenues

from sale of the electricity have not increased significantly. The funds from CDM help to bridge any gap between costs and revenues for the power company. The plants contribute to the regional economy and also help to reduce reliance on fossil fuels, so reducing greenhouse gas emission.

Sarina Kalia and Deepika Sharma (University of Rajasthan) argued that Rajasthan has a high potential for bio-energy development because it has a large surplus of agricultural and forest wastes; a large livestock population generating cow dung for use as fuel; and potential for crops used for biodiesel such as Jatropha and Karanj. Because different crops are harvested at different times of the year (for example, cotton stalks January to March, mustard April to June, maize July to December), residues are available continuously and power plants could use a combination of residues as feedstock, avoiding the storage problems the Kalptaru plants have with the use of mustard alone. Careful calculations show that from 2005-2010 the annual average availability of crop residues in Rajasthan was 3 million tonnes, with a potential power output of over 2.5 million MWh.

Hydropower produces over 19 per cent of India's electricity but further hydro development is meeting stiff societal resistance. Professor K.R. Dikshit (University of Poona) said that the 2000 MW Lower Subansiri project in Arunachal, Assam is meeting stiff resistance. The local opposition to major projects may mean that the overall Arunachal potential for 50,000 MW will take a long time to realise. Small scale hydro has potential, with 1,423 MW installed so far, but so critical is irrigation for food production in India that water for crops is likely to always have precedence over water for power generation.

I emphasised India's huge solar power potential in my address. The Indian national government has set a target of 20,000 MW of installed solar generation

by 2022, but that would still be 5 per cent or less of the total installed power generation capacity in India. Several new major solar power projects show the potential for large scale installations (Table 1), but as yet there are few small scale installations on buildings, whether commercial premises or houses.

Companies such as Tata, Reliance and Mahindra are each planning at least 100 MW of solar installations. The two key factors will be the reliability of the grid into which the power is fed and the feed in tariff in the appropriate state. However solar power has the potential to be a key player in India's Green economy.

**Table 1:
Large scale solar power developments in India**

- 25-MW solar PV plant in Gujarat (commissioned January 2012)
- 40-MW Dahanu Solar Power Project in Jaisalmer district, Rajasthan (commissioned April 2012)
- 125-MW Shivajinagar Sakri solar project in Maharashtra (being funded)
- Megha parabolic trough concentrating solar thermal power plant to be built by Siemens in Andhra Pradesh, near Hyderabad, India.
- Rajasthan is expected to be the leading state for large scale solar power because it has a good grid network.

Professor R.P. Misra (University of Allahabad) wrote that India is among the five leading nations in wind power generation with an installed capacity of 1,507 MW. It manufactures 250-600 KW capacity wind generators. Urban, industrial and commercial waste incineration projects are recovering about 15 MW of energy, but with its high

organic content, more could be done with municipal waste.

Plants support all other life on land yet in India, according to Amla Batra (University of Rajasthan), the plant cover is being lost as a consequence of both human activity and climate change. Valuable medicinal plants are disappearing and many flowers are threatened species. However, new technologies such as drip irrigation, better sprinkler systems, ex situ cultivation, plant conservation and growing germoplasm can all help plants survive. Rajasthan University has developed synthetic seeds and better varieties of rice. Genetic modification can help plant survival and increase food production. Nevertheless, care has to be taken in commercial crop production as Sunil Kumar De (Tripura University) illustrated in a case study of rubber plantations in Tripura. Problems of soil erosion beneath rubber trees, toxic chemical release during the processing of latex, loss of species during the clearing of forests for new plantations, and the leaching of plant nutrients from plantation of soils all contribute to environmental deterioration. Experience elsewhere in the Commonwealth could be used to develop improved plantation management in Tripura.

Nano-biotechnology is a hybrid discipline arising from nanoscience and biotechnology. Nano particles are 1 to 100 nanometres in diameter. They differ in properties from larger particles and are increasingly important in health care, agriculture, food and in the environment according to Professor S.L. Kothari (University of Rajasthan). Application of nano-materials can help seeds germinate faster, deliver genetic materials to plants, and provide better controls and site specific means of releasing pesticides and fertilisers to plants. Thus nano-biotechnology is likely to become an increasingly significant part of the Green Economy. However, an interdisciplinary

team ought to be investigating the toxicological effects of nano-materials on the environment, food chain and human health.

Green chemistry too has a role to play, by reducing reliance of powerful solvents and finding methods to make polymers bio-degradable, as Professor P.S. Verma (University of Rajasthan) explained. We can avoid using benzene in dry cleaning by using liquid CO₂ as a solvent. Ozone would be a safer chemical for purifying water than chlorine.

Measuring the success of the Green Economy

Several speakers addressed the important topic of evaluating the Green Economy. The United Nations Environment Programme (UNEP) established a system of green accounting which has been adopted in India in studies such as assessing the true economic value of Himachal Pradesh forests, highlighting the value of watershed ecosystem services to the local and regional economies and in the gross domestic product of the state. Dr. S.K. Wadhawan (Deputy Director General, Geological Survey of India, Rajasthan) explained how the UN System of Environmental Economic Accounting works and can assess the degradation and depletion of environmental assets in both physical and monetary terms. Professor M.S. Nathwat (Indira Gandhi National Open University) showed how geographical information systems could be used to monitor, model and manage the Green Economy. Surya Kant however noted that "Green Economy" is a value loaded term and that the Indian government had established eight National Commissions to work on meeting the challenges of climate change and promoting the green economy. Clearly all the accounting and evaluation efforts will be extremely important.



*Part of the city of Jaipur from the Nahargarh Fort:
how can urban society become part of the Green economy?*

Population: the underlying problem?

Towards the end of the seminar Professor N.K.Lohiya (University of Rajasthan) discussed how the establishment of the Green Economy in India would largely depend on slowing the population growth rate. Pointing out that one-third of the world's population is under 20 years old, he said future growth was inevitable. People needed education, and particularly education about contraception. He spoke of a form of single injection male contraceptive with the reversible inhibition of sperm under guidance (RISUG) developed at IIT Kharagpur in India by Dr. Sujoy K Guha. Clinical trials of this system at the University of Rajasthan have indicated that it has great promise. He considered this would be a great possibility for the Green Economy, but said that population reduction was "The elephant in the room that no one wants to talk about".

Professor Devendra Kothari (Forum for Population Action) also stated that "Population is the problem", talking of

unwanted village children and unwanted fertility, arguing that the issue of population is not getting discussed. He calculated that 450 million people out of 1200 million in India were the result of unwanted pregnancies. His forthright remarks led to a vigorous debate. As Amartya Sen has pointed out, fertility has declined in the south of India, but not so much in the north. The lowest fertility is in Kerala, the very state that has done most for women's empowerment, particularly through female education, economic independence and involvement in remunerative work outside the household. Rising living standards and coping with environmental change depend on alleviating poverty and providing universal education. The key to population growth reduction is the availability of appropriate family planning services. India has the knowledge and methods for birth control, but many of the poorest people still cannot get access to them.

Conclusion

This lively seminar had many other excellent contributions that showed the wide appreciation of the multi-faceted consequences of climate change and the different aspects of the Green Economy. Several key points emerged:

1. India has potential to greatly expand its Green Economy.
2. There is no uniform evidence of either the effects of climate on glaciers and river runoff, or the social appropriateness of action to promote a green economy, rather than general economic expansion.
3. Population growth reduction is required but the key is access to appropriate family planning services.
4. Biomass power generation is a reality in Rajasthan with the two plants using mustard seed residues
5. Examples of inappropriate recent developments, such as beach tourism in Goa and rubber plantation in Tripura, could have been avoided if lessons learned elsewhere had been applied.
6. India has many projects involving poverty reduction that have done well out of the CDM mechanism, but such funding should be regarded as risk alleviation, not profit.
7. Green accounting could assist in identifying green industries and technology and the values of ecosystem services.
8. Biotechnology offers many ways of using plants to help alleviate environmental and agricultural

- problems, especially in making irrigation more effective.
9. Groundwater and geologic conditions are extremely important for water resources management. With the heavy reliance on irrigated crops, wise water management is the key to success for India's food security.
10. Nanotechnology and chemistry are important elements in the Green Economy offering solutions and new opportunities.

Prof. Y.G. Joshi (M.P. Institute of Social Sciences Research, Ujjain) in his valedictory address argued for the quest for Social Inclusion in the perceived Green Economy based on a number of studies conducted by him in Central Tribal Belt of India. He further stressed that the slogans of environmental conservation and sustainability cannot invoke the necessary responses unless the life supporting system is strengthened and viable alternatives are provided to the poor.

Prof. L.S. Bhat (Former National Fellow, ICSSR, New Delhi) in his presidential address to the valedictory session stressed the role of regional planning in removing regional disparities and fulfilling the desired social, economic and environmental goals for achieving sustainability.

The underlying message is that the human dimensions are fundamental. Behaviour and attitudes have to change. Understanding and awareness of the issues have to be extended so that people can recognise the opportunities, take action on the best options and fully recognise their individual and collective responsibilities.

This was an excellent seminar and I am extremely grateful to Professor H.S. Sharma for the opportunity to contribute to it and for the generous hospitality in Jaipur and all the kindness that he and his colleagues showed me.

Ian Douglas, 12 June 2012