Madras School of Economics

(Centre of Excellence in Environmental Economics)

Newsletter

EMCBTAP - ENVIS: Environmental Economics Node

ENVISAGE

Vol : 2, March 2003

Contents...

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From the Director's Desk...

For a long time economists have recommended the use of economic instruments like emission taxes or marketable permits to attain environmental goals. Eco-taxes such as taxes on polluting inputs or outputs are easier to administer and are particularly appropriate for non-point source pollution. In this issue, Dr.Vinish Kathuria explains the concept of eco-taxes with examples from different countries.

Mr.Suresh Prabhu, Chairman of the Taskforce on Interlinking of Rivers visited MSE on February 1st and gave a talk on the proposed project.This time the focus of the section on "Web resources" is on Trade and Environment. The Centre of Excellence , MSE is currently executing a research project in the area relating to the Indian leather industry.A brief description of this project and other on-going projects and events in MSE are included in this issue.

A NOTE ON ECO - TAXES

Any kind of economic activity generates several types of pressures on the environment. Broadly these pressures can be classified into three categories:
a) input demands (e.g., energy, materials, intermediate products); b) pollution / waste flows; and c) ecosystem modifications caused by spatial claims for roads or dams or inter-linking of rivers etc. These pressures are normally buffered by absorptive capacity – i.e., ability to assimilate waste, absorb pollution, resilience of ecosystem to disturbance, etc. – and regenerative processes in the environment. If these pressures exceed the buffering capacity, it leads to environmental change; if the change leads to a reduced capacity of the environment to satisfy the human needs, then one can speak of the environmental degradation. This degradation may lead to policy responses in terms of measures aimed either at reducing environmental pressure or enhancing environmental buffering capacity.

Environmental policy uses a range of instruments that induces behavioural change of economic agents so as to actualise these objectives. Taxes on inputs or outputs – also known as Eco - taxes is one such instrument that can signal the costs of using the environmental resources and thus internalises the negative externalities in decision making by producers and consumers. An Eco-tax is a price-like instrument, which assigns a price to the 'unpaid

factor' of production, thus translating the *polluter pays* principle in practice.

Though Eco-tax is a policy instrument that attempts to internalise the negative externality, it is possible that the existing tax policies may itself encourage inefficient use of environment resources as is evident from following examples. For instance, investment tax credits in Brazil encouraged exploitation of environmentally weak areas. Similarly, in Haiti, a raised export tax on coffee caused coffee trees to be replaced with staple crops such as corn. This led to increase in erosion of steeplands.

Types of Eco-taxes

In general a number of Eco-tax schemes exist to internalise the externality. These include input taxes, output or product taxes, export taxes, tax differentiation, import tariffs, royalties and resource taxes, land-use taxes and investment tax credits. For example, *tax differentiation* involves levying a positive charge on a polluting product and a negative charge, or subsidy, on a cleaner alternative. The most common example of this tax differential is in the context of transport to discourage consumer purchases of polluting vehicles or fuels. High tax/charge on petrol vis-à-vis compressed natural gas (CNG) in Delhi is one such example. Differential taxation of leaded and unleaded gasoline across the Europe and few developing countries is another example. In the Netherlands, for example, unleaded gasoline is taxed at 0.1 ECU per 100 litres and leaded gasoline at 1.74 ECU per 100 litres in 1989.

Taxes on polluting inputs are generally suggested if there is a clear linkage between input use and environmental damages. An interesting example of the above tax is 'forestry tax' in Brazil, Colombia and Venezuela for wood consumption when there is no reforestation activity. A nice feature of such tax is that it alleviates the need for (costly) monitoring. However, it needs to be noted that taxes on polluting inputs not always yield equi-marginal abatement costs (MAC). Since one of the benefits of economic instruments (EIs) often cited in the literature is the cost effectiveness, as they equate MAC across individuals. This implies input taxes are not always cost-effective.

The most important application of input taxes can be in non-point source of pollution (NPSP) setting, such as taxes on fertilisers in agriculture to reduce nutrient loading of water-bodies or taxes on gasoline to lessen vehicular pollution. However, a high tax on either may have undesirable distributional consequences. For instance, a high tax on fertilisers tends to penalise grain farmers with generally lower nutrient leakage. This implies it is not the least-cost policy option. However, in this case by combining percent nitrogen tax with a certain percent of catch crop requirement may yield the desired reductions in nitrogen leakage, as has been done in the Netherlands.

The choice of taxing an input or output is not arbitrary. The suitable option depends on the pollutant in question. This can be easily demonstrated using CO_2 and SO_2 as an illustration. Figure 1 gives the possible policy states (including the state of no control) and the six possible moves between states to control a pollutant.

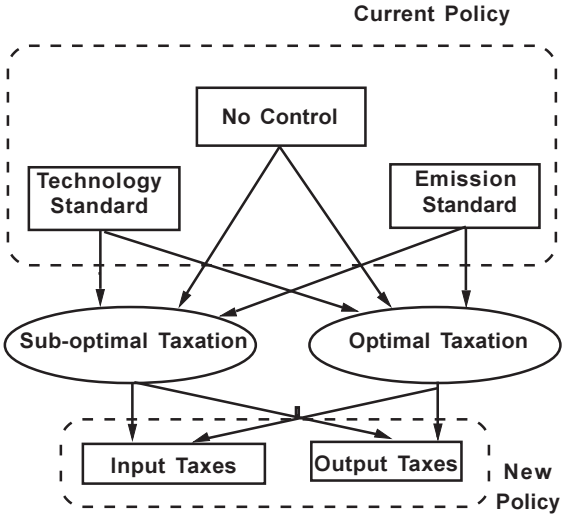

Figure 1: Possible options from No-control or CAC to Eco-taxes

The current policy could be either no control (e.g., on fertilisers), or some technology standards (e.g., mandatory use of catalytic converters) or some emission standards (e.g., EURO II norms for cars). The move to control pollution will be from current policy to input/ output/emission taxes. The taxes levied can be at optimal or at sub/non-optimal rates. The sub-optimal taxes are not by choice, but due to the near impossibility of valuing the future environmental damage caused by the pollutant. The Love Canal in US where the impact of dumping toxic waste got detected only after two decades when the dumping had already ceased reflects these difficulties in valuing the environmental damages. Whereas, optimal tax rates mean that the damage is adequately assessed and the pollution is optimally controlled.

Criteria for selecting a policy option – with CO_2 as an illustration

Crudely speaking, there are four criteria that dictates the move from current policy to eco-taxation. The application of these criteria however depends on the pollutant in question. First, it must be known that emissions cause environmental damage. In the case of SO_2 and CO_2, the local damage caused by SO_2 has been known for decades, though its long distance damage in the form of acid-rain / deposition is fairly recent, whereas the impact of CO_2 on climate change is still controversial. Second the emissions must be controllable. In terms of control of emissions, pollutants can be classified into two broad types: *type 1* are those that are an unwanted byproduct of a production process, and *type 2*, where the marketed output of a production process is or becomes a pollutant. Traditional pollutants like SO_2, particulate matters etc. fall in the former category. However, CO_2 from fossil fuels, Chlorofluorocarbons (CFCs) etc. are in the second group. For pollutants of *type 2*, there is no control technology, and the goal of the environmental policy must be to reduce or eliminate the usage of the product. Incidentally, in the case of CFCs this has been achieved in the developed world as well as in India, but in the case of fossil fuels, no alternatives are available immediately, at least on a sufficiently large scale. However, technologies to control pollutants of *type 1* are commercially available such as tall stacks to disperse and dilute the emissions or flue gas sulphurisation to reduce total emissions.

The third criteria is that it must be affordable for the government / agency to monitor the results of its policy; whereas the last criteria is that there must be 'political will' to impose the costs of control on polluting firms (and their customers). At the moment, there exist huge differences in monitoring costs between SO_2 and CO_2 as shown below in **Table 1:**

Table 1: SO_2 and CO_2 emissions as a proportion of total emissions in U K

	Proportion (%) of total emissions coming from	
Pollutant	Non-point sources(Housing, commerce, transport & agriculture)	Point Sources(Power stations, refineries & industry)
SO_2	11	89
CO_2	44	56

Source: Park and Pezzy (1999 :168) (Original Source: UK.Dept.of Trade and Industry (1996), Digest of UK Energy Statistics,pp.190-91).

Since 44% of CO_2 emissions come from small and often mobile emitters i.e., NPSPs, it becomes prohibitively expensive to monitor individual emissions. Moreover, beyond a threshold it is very difficult to increase the energy efficiency of most existing equipment, it clearly reflects in little political will to set efficiency standards for existing CO_2 technologies. The CO_2 efficiency standards thus apply to only new equipment. Even if technologically it is possible to reduce CO_2 emissions, they hardly give any incentive to find alternative means of controlling the level of emissions.

This implies it is preferable to have emission standards than the technology standards. Emission standards should ideally be set in terms of the total emissions from a site or industrial estate or region, often known as 'bubble' policy in the US, rather than in terms of emissions from one stack or emissions concentrations.

The equivalent indirect move for CO_2 would be to move from setting standards to fixing the amount of carbon energy actually sold (since CO_2 emissions are directly in proportion of this), which is very costly. But this lays the idea of moving from (indirect) technology standards for CO_2 to control it by a tax called as Carbon tax. A Carbon tax will create a pervasive incentive to reduce CO_2 emissions in the most cost-effective way, without specifying which users are to reduce emissions, by how much, or with which technologies. Since direct monitoring of CO_2 emissions is very costly and as almost all carbon fuel used is burned, the tax incentive is applied to carbon inputs instead.

Definition of Effectiveness

Taxes might be called effective if they do what they are intended to do. In theory, environmental taxation should attempt to improve the market efficiency of the environmental goods and services by imposing a price on such goods equal to the marginal costs of their use (i.e., the marginal environmental damage costs, MDC). If policy makers can calculate these costs, environmental taxation is inherently effective, provided no other major imperfections distort the relevant markets. However, finding MDC is difficult. The UK landfill tax launched in 1996 is deemed to be the only example, which is explicitly based on an estimate of MDC.

The environmental taxes can have different functions: a) cost covering; b) creating incentives; and c) revenue raising. In order to assess the effect of taxes, two criteria are generally used that also encompasses these functions. These are:

1. Environmental Effect – The effect of the tax on environmental pollution or the use of scarce resources; and
2. Incentive Effect – A comparison of the tax rate with the MAC, or as a proxy, average abatement costs of measure taken by the polluters.

Together they indicate the 'overall effectiveness'. The main function of *fiscal* or *revenue raising* environmental taxes is raising income for government expenditures with improved environment being a side-effect. However, positive environmental impact may be expected because of the 'price effect' on behaviour. Similarly, incentive taxes are designed to achieve a specific environmental impact.

On the other hand, *cost-covering charges* are designed primarily to raise funds for financing specific environmental systems, measures or programs. Two types of cost-covering charges are – (a) user charge; and (b) earmarked charge. In both cases, funds raised form the key objective, so effectiveness evaluation involves assessing the money available for carrying out the environmental measures. However, the cost-covering charges may also have an incentive impact if charge rates for cost-recovery reach substantial levels as in the case of Dutch water pollution charge. Incentive effects are sometimes aimed for cases where formerly fixed rates for certain environmental services are differentiated according to the level of the service given. Variable charge rates for household garbage collection in the form of 'pay-per-bag' scheme or 'effluent treatment charges' based on the effluent quantity and/or quality are two such examples where rates are differentiated as per the services rendered.

Effectiveness of Taxes/charges - Evidence

As mentioned, the effectiveness of charges / taxes can be assessed based on environmental effectiveness and incentive effectiveness, the **Tables 2 and 3** give the effect for a number of taxes implemented in a number of countries.

Table 2 : Assessment of Fiscal environmental taxes in some developed countries

Country	Tax	Environment Function	Environmental Effects	Incentive Effects	Overall Effectiveness
Sweden	Sulphur tax	Penetration of low-S fuels and abatement	+++↓ of 6,000 tons of S (6% of total) & ↓ of S content of oil by 40%.	+++Av. Abatement costs ~10 SEK lower than tax rate of SEK 40	Though fiscal tax, strong incentive effect due to high tax rate
	CO2 tax	To reduce CO2 emissions	?/+Shift in district heating from fossil to bio-fuel; ↑ competitiveness of combined heat & power	?Unknown	Hard to evaluate due to short period of operation
	Tax on Flights	To ↓emissions in transport	+Some impact on↑of replacement of combustion chambers by one airline	?Unknown	?Unknown
Norway	CO2 tax	To ↓CO2 emissions	++Some signs of ↓in CO2 emissions (3-4%) in 2-3 years (1991-93) from a ↑ trend.	+Price of heating oil by ↑5% & petrol by 10%	?Unknown
Denmark	Waste Charge	To ↓ waste generation & -↑ recycling & reuse	++Reused fraction of demolition waste↑ from 12% to 82%	?Doubles aver. cost of waste dumping &cost of incineration↑ by 70%.	?Unknown

Table 3: Assessment of Incentive Charge in some countries

Country	Instrument	Environment Function	Environmental Effects	Incentive Effects	Overall Effectiveness
Sweden	Tax Rebate on unleaded petrol	To ↑ Penetration of unleaded petrol	+++Emission of lead ↓ by 80% between 1988-1993.	+++Presently tax differential > cost of unleaded petrol	Contributed to phasing out of lead
	Tax Rebate on cleaner diesel	To ↑ Penetration of low-pollution diesel fuels	+++75%↓ of S emissions by diesel cars; 95% in cities: emissions of particles, NOx, hydrocarbons and PAC expected but not quantified	+++Tax differential > Additional production cost	Dramatic ↑ of market share of 'cleaner' fuel
	NOx Charge	To speed up↓ of NOx from large combustion plants	+++Main cause of ↓ by 9,000 tons in 1992 (35% of liable emissions)	+++Charge rate of SEK 40 > av. Abatement costs	Provided incentive for monitoring & abatement measures
	Fertiliser Charge	To↓ the demand for fertiliser	+N down by 25% ; P↓by 65% from 1980-1992 - charge one of the factors	?Unknown	Contributed to↓ use of artificial fertilisers
Denmark	Toxic Waste Charge	To↓the amount of toxic waste	++↓ of toxic waste production of 20-45% between 1991 and 1993.	++↑Av. dumping & incineration costs by at least 5-15%.	Planned capacities for incineration were reduced consequentlly.
	Water Pollution Charge	To support adoption of water pollution abatement in permit application process	+Early announcement helped speed up wastewater treatment capacity	+No relation between charge rate & marginal damage costs	+ve impact on applying for & issuing of lower-pollution permits
France	Water Pollution Charge	To stimulate adoption of in-plant wastewater treatment	+Modest	+Charge rate < Av. abatement costs	Some +ve environmental impacts; revenues are modest

Source: Rebeiro,Schlegelmilch and Gee (1999: 184-85).

Notes: +++/++/+ = high/medium/small,?=unknown

The above tables indicate that at some places actual environmental effectiveness of green taxes could not be ascertained due to non-availability of *ex-post* policy evaluation studies. OECD in a study has concluded that there is little tradition in *ex-post* policy evaluation. A practical reason for non-evaluation studies is the complexity. These studies have to cope up with difficult methodological problems as well as the problems of data availability. Both these problems however can be minimised if the evaluation is built into the process of designing and implementing stage itself. The OECD has deliberated this question deeply. **Table 4** summarises some of the information and design features that will facilitate improve future evaluation studies.

Table 4: Linked Policy Process and Evaluation procedure

Stage	Policy Process			
1	Identifying and defining the environmental problem			
2	Discussing the need for policy intervention and setting objectives	Link	Stage	Evaluation Procedure
3	Designing and assessing effective and efficient options (instruments or instrument mix)	→ ←	1	Description of the instruments and of the institutional context, definition of relevant internal and external factors (baseline inventory)
4	Selecting, discussing and adapting instrument chosen	→		Definition of evaluation criteria
			3	Construction of evaluation model and definition of all data to be gathered
5	Introduction of instrument (mix), implementation of control and enforcement	→	4	Continuous collection of data and reassessment of influential factor and ex post evaluation
			5	Possible adaptation of the evaluation model, evaluation criteria and data
6	Possible modification of instrument (mix) after evaluation	←	6	Conclusions, recommendations and feedback into the policy process

Source :OECD (1997, Table 9:112)

The above discussion indicates that taxes on inputs or outputs are second-best, and

are frequently applied on the energy source or chemical that is generating the pollution. Ideally the pollution charge should be imposed on the emissions. But in practice, this is difficult. Taxing the source of the pollution rather than the pollution itself leads to two problems. (a) It does not allow for the possibility that mitigation measures can be undertaken at the 'end of the pipe (EOP)'; and (b) the fact that the impacts in terms of damages vary spatially, so that a general tax *overtaxes* use in a place where there is no environmental problem, and *undertaxes* it in places where the problem is very serious. The first issue can be tackled by giving rebates for payments when the polluter makes such an investment in an EOP clean-up. For example, giving a rebate on sulphur tax for polluters who have flue gas desulphurisation equipment.

However, the problem of spatial variation is difficult to address. The problem can be circumvented if we have different rates of taxation depending upon where the inputs are used, which is practically difficult to implement even at a crude level. Moreover if input or output taxes are varied across regions, this would result in trade leakages (provided the input or output permit prices exceed the transport costs between regions), which would dilute the impact. Still the other big advantage of using taxes on polluting inputs and outputs is that they can be a major source of revenue, which can generate resources for environmental protection, and even facilitate shifting the structure of taxation away from taxing 'goods' such as consumption and employment to taxing 'bads' such as pollution.

To conclude, the case for using input/output taxes (or charges) as an EI for environmental protection, and as part of the programme to move to sustainable development, is strong but requires qualification. For a number of applications such as NPSPs, taxes on inputs are the only way to deal with the issue. This however, does not solve the problem of 'hot spots' or local concentrations of pollutant, for which direct controls of some kind are mandatory. Thus an optimal mix of policy instruments is going to be one that combines EIs with direct controls. Another argument in favour of input/output taxes is that they are easier to collect. Since emission charges can be extremely difficult to collect and spatial variation may be impossible for them, the case for moving to input taxes/charges gets further support. Lastly, Eco-taxes can be a part of a broader tax reform so as to set the markets right.

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OECD (1997) ***Evaluating Instruments for Environmental Policy,*** OECD Paris.

Opschoor J.B. and R.K. Turner (eds.) (1996) ***Economic Incentives and Environmental Policies: Principles and Practice,*** Kluwer, Dordrecht/Boston/London.

Park, A. and J.C.V. Pezzy (1999) "Variations on the Wrong Themes? A Structured Review of the Double Dividend Debate", in ***The Market and the Environment***, ed. by Thomas Sterner, Edward Elgar, Cheltenham and Massachusetts (pp. 181-203).

Ribeiro, M.B., K. Schlegelmilch and D. Gee (1998) "Environmental Taxes seem to be effective instruments for the Environment", in ***The Market and the Environment,*** ed. by Thomas Sterner, Edward Elgar, Cheltenham and Massachusetts (pp. 181-203).*Policies: Principles and Practice*, Kluwer, Dordrecht/Boston/London.

Useful Weblinks on Eco-taxes:

http://www.eco-tax.info/7links/links.html

http://www.economicinstruments.com

http://reports.eea.eu.int:80/92-9167-000-6/en/gt.pdf

http://www.oecd.org

Vinish Kathuria, MSE

ONGOING PROJECTS AT MSE

Madras School of Economics – Designated as a Centre of Excellence in Environmental Economics by MoEF, GOI.

Madras School of Economics in its quest to achieve excellence in postgraduate teaching and research in economics has reached one of the milestones, with the designation of "Centre of Excellence in Environmental Economics" by the Ministry of Environment and Forest (MoEF). The centre will receive substantial funds over the next five years to undertake projects of national importance in the field of environmental economics and will also develop a website on environmental economics. The website is targeted towards disseminating relevant and important information in the field of environmental economics to Academicians, Industrialists, Scientists, Students, Researchers, Non-economists and Policy makers and will be designed and maintained in-house at MSE. A new building for Centre of Excellence has been proposed by MSE with a view to augmenting facilities for faculty members, researchers and project staff working in Environmental Economics and provide supporting facilities like Lecture hall and Computer rooms. This would also enable MSE to undertake research on important projects, offer training programmes and organize seminars and workshops.

Economic Analysis of India's Space Programme

Project Co ordinator :Prof.U.Sankar

Consultants:D.P.Rao, National Institute of Remote Sensing, S.Raghavan, Indian Meteorology Department, V.S.Sundaramoorthy AIR and Doordarshan, S.Subramanian, Dept.of Telecommunications.

The potential of space science and technology for the socio-economic development of India was recognized in the early sixties. The Indian space programme consists of

(a) the INSAT system related to the design, construction and operation of geosynchronous satellites for broadcasting, telecommunications, meteorology, and development education,

(b) the Indian Remote Sensing system concerned with the design and operation of remote

sensing satellites for application of satellite imagery for various development purposes,

(c) the launch vehicle programme giving indigenous capability for launching sounding rockets, IRS satellites in the polar orbit and INSAT satellites in the geo orbit, and

(d) research and development of space sciences.

India is now one of the six space-faring nations with the capability to design, develop and operate satellites using indigenous launch vehicles. The space programme is a high-tech programme where most of the investments are made for the future and for achieving self-reliance. The amount spent on the space programme till 31, March 2001 was Rs.13434 crore at current prices (Rs.19111 crore at 1999-2000 prices).

This research assesses the direct and indirect, and tangible and intangible benefits of the Indian space programme. Work has been completed on the costing of INSAT communication and meteorology

payloads, and analysis of costs and benefits of the satellites technologies in telecommunications, broadcasting, meteorology and remote sensing. Work on the launch vehicle programme is nearing completion.

Apart from an overall assessment of the India's space programme, the report also considers issues such as privatization and commercialization of space services, cost effectiveness of satellite services in relation to other technologies in different market segments, comparative efficiency of the Indian space programme, and certain legal and other policies relating to access to space, access to technologies and government regulations affecting the world markets for space technologies and services.

This research is being carried out with financial and technical support from the Indian Space Research Organization .

Trade and Environment: Case study on Indian leather industry

Project team:
Prof.U.Sankar,Dr.M.Ramachandran,Dr.N.Jayakumar, S.Tolkappian, Mamtha Rao.

The export import policy of the Government of India aims at increasing the share of India's exports in world exports from 0.7 percent in 2001-02 to 1.0 percent by 2006-07. Some major commodities identified by the Ministry of Commerce for export promotion are agricultural commodities, fish products, processed food, leather and leather products, and textile garments and clothing. India possesses comparative advantage in the exports of these commodities. However, there is a fear that the comparative advantage may be eroded because of trade policies of some developed countries.

India must build the capacity to (a) articulate her concerns in the WTO – Ministerial Meetings on trade negotiations, (b) present her cases in an effective manner before the Dispute Settlement Agencies in the WTO, and (c) take necessary preparatory steps to create an enabling environment for the exporters to meet the environmental standards of importing countries, as and when necessary.

During the next five years MSE will undertake a number of studies on its own or in association with other institutions to gain deeper understanding of (a) the environment trade linkages, (b) the likely impact of trade liberalization on environment, (c) the impact of environment related non-tariff barriers by other countries on India's export prospects, and (d) the preparatory steps to be taken by the Government and the affected industries to tackle these issues in a cost effective manner.

In the first phase MSE plans to undertake an empirical and policy oriented study on the impact of the adoption of environment related non-tariff barriers by European Union, USA and other countries on India's exports of leather goods and the actions needed on the part of the Government and the industry to meet the challenge. The leather industry has been chosen first, as MSE has gained significant knowledge through previous projects which among other things focused on : (i) economic analysis of environmental problems caused by tanneries and (ii) estimates of costs of compliance with the domestic environmental regulations.

The specific objectives of the study are as follows:

a. to review the actions taken by leather importing countries to restrict or ban or reduce access to exports of leather and leather products and examine the cases and judgements on the trade-environment related disputes in the

WTO,

b. to design and conduct a survey on the perceptions of the leather exporters on their awareness of the issues and the problems they face in meeting the standards particularly their access to and costs of environment-friendly inputs and technologies,
c. to estimate the normative or actual costs of compliance with the standards of the importing countries, and their effect on the export prices,
d. to review the policies and practices adopted by the other exporting countries in solving the problem,
e. to suggest a technical-institutional support system, specifying the roles of government, industry, exporters, technical institutions and international organizations such as UNIDO, UNDP and UNEP, to meet the compliance requirements.

EVENTS AT MSE

"Economics of Environmental Management for Indian Industry"

The Environmental Economics Training Committee for Practicing Economists and Non-Economists (EETCPN) under the World Bank aided Environmental Management Capacity Building Technical Assistance Project conducted a workshop on "Economics of Environmental Management for Indian Industry" from December 2 - 4, 2002 at the Madras School of Economics, Chennai.

The programme was designed to meet the current needs of the manufacturing sector, so that the current research findings in environmental economics can be disseminated to the industry to help them transform their operations and gear themselves to the challenges of the 21st century. The workshops comprised of twelve lectures, discussion sessions and a field trip to Common Effluent Treatment Plant (CETP) at Pallavaram, Chennai. The lectures consisted of both theoretical and practical aspects of environmental economics. Prof. U. Sankar, Prof.Paul.P.Appasamy, Dr.G.Mythili and Dr.K.S.Kavikumar from Madras School of Economics gave lectures on externalities and environmental policy, environmental valuation/damage assessment, economic instruments for environmental protection and climate change and clean development mechanism. Prof.R.P.Sengupta from Jawaharlal Nehru University and Dr.R.Nagendran from Centre for Environmental Studies, Anna University spoke on ecology and economics, energy and environment linkages and clean technology options. Issues closely related to the industry were discussed by experts from related fields, Mr.N.R.Krishanan (IAS Retd) on eco-labelling and ISO14001 environmental reporting, Dr.M.D.Nair on bio-diversity and property rights, Prof.M.K.Ramesh (NLSIU) on environmental law and governance, Mr.D.Vaidyanathan (ITCOT) on Appraisal for Environmental Project and Dr.S.Rajamani (CLRI) on pollution abatement.

The participants were mainly general managers, directors from private industries and consultants from leading environmental engineering consultancies. Dr.Sreejata Banerjee, Course Director, Madras School of Economics, was the co-ordinator of the programme. The participants were provided handouts, presentation outlines and books written by eminent authors. They found the reading materials useful and expressed special interest in the training programme as it enabled them to coherently operationlise many environmental issues. They evinced interest in future programs of this nature and volunteered to spread the message of environmental economics in operational decisions.

Visit by Mr. Suresh P Prabhu, M P to MSE

Mr. Suresh P Prabhu, chairman of the task force on Interlinking of Rivers, visited the Madras School of Economics, Chennai on

February 1, 2003. Mr. Prabhu delivered a talk on "The Interlinking of Rivers" project.Mr.Prabhu, currently a Member of Parliament (Lok Sabha), has held numerous ministerial positions in the Government of India,including Ministry of Industry,Ministry of Environment and Forest, Minister for chemicals and fertilizers and Minister of power.

The Interlinking of the Rivers project in brief

The objective of the interlinking of the rivers project involves the transferring of water from water surplus basins to water deficit basins/regions by inter-linking of 15 major Indian rivers to tackle problems relating to droughts, floods and disputes over the sharing of river waters in the country. The agenda of the task force is to bring about a consensus among states on the plan to interlink rivers, to provide guidance on the norms of appraisal of individual projects and to work out the modalities for project funding. The project is expected to have the following significant benefits

. Reduction of floods and generation of hydroelectricity to the tune of 60,000 MW.
· Creation of new opportunities for navigation through the development of waterways.
· Capacity building of at least two proper stations.
· Substantial enhancement in the resultant irrigated area.

In addition to these, the project will also develop fisheries, create opportunities for tourism and employment in rural areas, check encroachment of urban areas onto rural terrains, help the development of rural terrains, improve forest covers and enable cleaning up of the rivers. The project has an estimated cost of Rs.5, 60,000 crores.

A Website is also being setup as part of the project to make available all the information relating to the project on an ongoing basis and to ensure that the project does not follow the fate of delayed deadlines and negative publicities like the other projects. Expert consultation will be sought after in order to handle issues relating to displacement of people and ecological issues and constant assessment of the cost-benefit ratio will be done to ensure that ecological damages are not embarked upon. The project is expected to be completed over a time span of 15 years.

Mr.Suresh Prabhu, Chairman of the task force on Interlinking of Rivers, speaking at MSE on February 1, 2003.

Visits by Environmental Economics Scholars to MSE

- **Prof.Charles Perrings** from University of York, U.K visited MSE on 13.02.2003 and delivered a lecture on "***Environment, Poverty and Development***".

- **Prof.Charles Kolstad** from MIT, USA and Bern School of Environmental Science and Management, University of California, Santa Barbara visited MSE on 26.02.2003 and delivered a lecture on ***"Learning and self-enforcing International Environmental Agreements"***.

Publications/Presentations/Reports by MSE Faculty

Dr.Paul P.Appasamy

- Was the Resource Person for ***"Natural Resource Accounting for Water"*** in the Environmental Economics Training Committee for Practicing Economists and Non-Economists (EETCPN) held at NIPFP ,New Delhi on January 15,2003.

- Presented the project report on ***"Environmental Impact of Industrial Effluents in Noyyal River Basin"*** at the Institute of Water Studies, Taramani, Chennai on January 22, 2003.

- Delivered lectures at the Faculty Upgradation Programme in Environmental Economics on ***"Natural Resource Accounting for water" and "Damage Assessment of Natural Resources"*** at the Indira Gandhi Institute of Development Research, Mumbai, on February 10,2003.

Dr.U.Sankar

- Delivered lectures at the Faculty Upgradation Programme for economics teachers on ***"Economic instruments for pollution control" and "Pollution controls in tanneries"*** at the Indira Gandhi Institute of Development Research, Mumbai on, February 27, 2003.

- Delivered lectures and Participated in the SANDEE research workshop as a resource person at Dhaka, during, December 15-18, 2002.

- Delivered lectures at the Faculty Upgradation Programme for environmental scientists and engineers on ***" Economic analysis of environmental problems and pollution control in tanneries"*** at IIT-Mumbai, during, March 3-4, 2003.

- Was the convenor of the Sub Group on the Task Force on Economic Instruments constituted by the Ministry of Environment and Forests, and organized two meetings at MSE on 11 December 2002 and 13 March 2003, to recommend proposals for
  a. legal support in Indian environmental legislations to introduce pollution charges,
  b. consideration of bank guarantee scheme for pollution control, and
  c. introduction of pollution charges in environmental hotspots on pilot basis.

Dr.G.Mythili

- Submitted a paper on ***"Forest Products, Forest Communities and Determinants of Forest Dependency: An Empirical Study from a Protected Area"***, with C.S. Shylajan at the 39th Conference of the Indian Econometrics Society, held in M.S. University, Baroda, during, Feb 8-10, 2003.

Dr.K.S.Kavi Kumar

- Submitted final report of project on ***"Vulnerability of agriculture and coastal resources in India climate change"*** , funded by Environmental Economics Research Committee of EMCaB Technical Assistance Program of the World Bank and MoEF, GOI; February 2003.

- Gave lecture on ***"Externalities and Economic Instruments related to Climate Change"*** at a seminar on "Business Opportunities in GHG Trading" organized by Ernst & Young on December 19, 2002.

Dr.G.S. Haripriya

- ***"Carbon Budget of Indian Forests"***, Climatic Change, 56(3), 291-319,2003.

- ***"Estimation of biomass from truncated stand tables in India"***, Forest Ecology and Management, Vol 168 (1-3): 1-13, 2002.

- ***"Prototype Carbon fund – Incentive Contracts and Monitoring"***, Chinese Economic Quarterly (Accepted with Revisions); with Yan Guo,2003.

- ***"Prototype Carbon fund and the clean***

Development mechanism", Economic and political Weekly (Accepted),2003.

- ***"Implications of the Clean Development Mechanism of the Kyoto to rural livelihood in India: Analysis using almost ideal demand systems"***, Paper at the 39th Indian Econometric Society Conference, Baroda, Feb 8-10, 2003.

Dr.Vinish Kathuria

- "***Failure of Collective Action as an Institution: Lessons from Kundli, Haryana***", Institute of Economic Growth, Working Paper, E/230/2003, February, Delhi.

- Presented a paper on ***"Industrial Pollution Control – choosing the right option"*** at the 5th bi-annual workshop of The South Asian Network of Development and Environmental Economics (SANDEE) held in Dhaka, Bangladesh, during, December 16-18, 2002.

- Presented a paper on ***"Does Informal Regulation of Pollution Work?: Empirical evidence from Gujarat"*** at the 39th Annual Conference of The Indian Econometric Society held in Vadodara, Gujarat,during, February 08-10,2003.

WEB RESOURCES ON TRADE AND ENVIRONMENT

http://www.cuts-india.org/CITEE.htm
- For discussions, debates and articles relating to trade and environmental linkages and conflicts.

http://www.ciesin.org/
- For information on data and research related to trade and environment.

http://www.gets.org/
- For analytical underpinnings on the trade and environment debate.

http://www.ictsd.org/
- For a better understanding of development and environment concerns in the context of international trade.

http://www.unep.ch/edu/
- For understanding of the environmental, social and economic impacts of trade liberalization and update of activities, news, and events in trade and environment related issues.

http://www.freetrade.org/
- For public understanding of the benefits of free trade and the costs of protectionism, and discussion on arguments supporting free trade as the solution to environmental problems.

http://gurukul.ucc.american.edu/ted/ted.htm
- For inventory on TED (trade and environment database) projects, case studies, research papers and other relevant websites.

www.iisd.org/trade/handbook/default.htm
- Handbook on trade and environment.

http://globalization.about.com/cs/environment/
- For compendium on articles relating to economic development and effects on the environment.

http://www.ncseonline.org/NLE/CRSreports/Economics/
- For discussion on issues relating to trade liberalization and its impact on the environment.