

Executive Summary

In recent years there has been considerable interest in using economic instruments for environmental management. There has also been increasing realisation that economic instruments offer scope to achieve environmental objectives in more cost-effective ways than traditional command-and-control or regulatory mechanisms. Thus, the use of economic instruments for environmental management may be a way to have more efficient governance and good environmental practices while improving economic performance and international competitiveness. There is however, a need to analyze the existing experiences, with their successes and failures, and consolidate the lessons learned for future environmental policies.

To this end, the Integrated Research and Action for Development (**IRADe**), New Delhi, supported by the United Nations Environment Programme (**UNEP**), convened a participatory training workshop on the “*Use of Economic Instruments for Environmental Management in Asia*” on 27-29 April 2005 in Delhi. The focus of the workshop was to train the trainers who in turn will propagate the ideas to policy makers, practitioner and academics.

In total 19 participants from 11 Asian countries attended the workshop. Countries represented were China, South Korea, Japan, Thailand, Philippines, Mongolia, India, Nepal, Sri Lanka, Pakistan and Bangladesh (see Annex 2). Participants included representatives from policy research and environmental institutes, universities and training institutes.

UNEP’s staff as well as eminent Asian experts provided comprehensive training to the participants. Presenters from India included Dr. Jyoti Parikh from IRADe, Prof. U. Sankar from Madras School of Economics, Dr. Madhu Verma from Indian Institute of Forest Management (IIFM), Bhopal and Ms. Divya Dutta, from The Energy and Resources Institute (TERI), New Delhi.

The Workshop was structured so that the participants could both receive information and share their own experience. There was a mix of presentations covering areas from basic concepts to technical matters. Emphasis was given to case studies from different countries of Asia.¹

The Workshop covered the following aspects:

- (i) Concepts underlying economic instruments,
- (ii) Economic instrument and environmental fiscal reforms,
- (iii) Policy design and implementation,
- (iv) Multilateral Environment Agreements.

Interactive breakout sessions allowed the participants to discuss in small groups and to prepare presentations, including findings and recommendations. For the breakout

¹ The workshop agenda is presented in Annex 1.

sessions, the facilitators made brief introductions about the concept and then divided participants into working groups. Each working group then had to select one prominent environment problem from a country present and analyze it, using the concept developed in the relevant session. Each working group selected its own discussion moderator and rapporteur who represented the group at the plenary discussion. The plenary discussions became the basis for formulating the final workshop recommendations.

Participants deliberated on the theme of Economic Instruments (EI) and emphasized that the policy tools should be clearer, more easily understandable and holistic in approach for implementation in Environmental and Natural Resource Management. Participants underlined the need for further research and to initiate interactive concept-sharing sessions with industries, policy makers and communities in order to identify the possible economic failures (market, policy and institutional) underlying different environmental problems and to support a stepwise planning of economic instruments.

In the follow-up session, participants stressed the need for feedback sessions to keep track of how participants used the concepts back in their respective countries. They also highlighted the need to expand the workshop in the future to include more countries.

Some of the follow-up activities suggested by the participants for using the concepts discussed in the workshop were:

- Undertake case studies on existing economic instruments for a particular sector and share it with policy makers and other stakeholders. Use those case studies for training and capacity building programmes,
- Apply knowledge to ongoing projects on environmental sustainability in trade policy and economic integration in Asia,
- Undertake research work on the design and implementation of EI,
- Use the concepts to solve problems related to biodiversity conservation and forestry,
- Conduct comparative studies between different countries in Asia regarding the use of EI under the particular circumstances of each country,
- Include topics in the curriculum of undergraduate and postgraduate students at universities for environmental management.

Participants also highlighted the need for support in the form of funding and technical assistance (literature, consultations, etc.), level guidance, updates on technical publications and contacts to possible resource persons.

In the closing ceremony, Dr. Jyoti Parikh thanked the UNEP team for their effort and support in conducting the workshop and the participants for their active cooperation and participation in group work exercises and general discussions. Dr. Kirit S. Parikh distributed certificates to the participants along with a CD-ROM containing training material. He stressed the need for participants to follow up and effectively use the concepts discussed in the workshop in strategic planning at different policy levels.

The participants conducted a workshop evaluation (see Annex 4). The overall evaluation of the workshop was "excellent". IRADe and UNEP successfully conducted the training of trainers programme, with support from the Ministry of Environment and Forests, Govt. of India.

The training workshop material is available on CD-ROM.

DETAILED PROCEEDINGS OF THE WORKSHOP

1. Background of the workshop

In recent years there has been considerable interest in using economic instruments for environmental management. There has also been increasing realisation that economic instruments offer scope to achieve environmental objectives in more cost-effective ways than traditional command-and-control² or regulatory mechanisms. Thus, the use of economic instruments for environmental management may be a way to have more efficient governance and good environmental practices while improving economic performance and international competitiveness. There is, however, a need to analyze the existing experiences, with their successes and failures, and consolidate the lessons learned for future environmental policies.

To this end, the Integrated Research and Action for Development (**IRADe**)³, Delhi, supported by the United Nations Environment Programme (**UNEP**)⁴, convened a participatory training workshop on the “*Use of Economic Instruments for Environment Management in Asia*”. The regional training workshop targeted representatives from policy research and environmental institutes, universities and training institutes and provided an opportunity to systematically exchange experiences on the use of economic instruments among Asian countries.

The training put great emphasis on understanding the reasons behind environmental and natural resource management problems and on choosing the instruments most suited to the prevailing economic, political, social, institutional and environmental circumstances in developing and emerging countries.

2. Objectives of the training workshop

The basic objective of the workshop was to train potential trainers with background experience and understanding of environment and natural resource management, to enable them to spread their knowledge onto others in the future. The agenda of the

² Command and Control (CAC) is an approach to policy where behavior is mandated by law and then enforced through various means. A standard is the mandated level of performance.

³ **Integrated Research and Action for Development (IRADe)** was set up as a fully autonomous advanced research institute, with the aims to do research, policy analysis, train people and be a hub network among various stakeholders. This unique institute works to exploit synergies to increase effectiveness through research, public policy forums and capacity building. To date IRADe has worked with government, non-government and multilateral agencies as well as private sector. IRADe has been fortunate to work with organizations such as UNDP, SANIE-World Bank, Winrock International, Stanford University, the Indian Ministries of Non-Conventional Energy Sources, and of Environment and Forests, the Institute of Global Environment Strategies etc.

⁴ In addition to publishing reference material on economic instruments **UNEP** has supported country studies in Asia on economic instruments. These were undertaken by policy research institutes familiar with local conditions and priorities and involved a broad range of stakeholders, including relevant government ministries.

workshop was designed to give an understanding of the key factors for a successful application of economic instruments, in general and in Asia, in particular.

The specific objective of the workshops were:

- To train participants from research and training institutes in Asian countries in the use of economic instruments in the particular circumstances prevailing in developing and emerging countries, to equip them to initiate such activities at national level,
- To present available reference material on the use of economic instruments for environment and natural resource management and to give guidance for its future use,
- To disseminate recent publications by UNEP-ETB on economics and the environment for wider use,
- To develop a pool of regional experts/trainers knowledgeable in the use of economic instruments in environment and natural resource management in Asia in order to facilitate regional and national level dissemination.

3. Expected results

It was expected that by the end of the workshop each participant would have developed an understanding of the economic principles in environmental problems and the economic instruments available to address these problems. They would also be aware of the policy framework necessary to control and monitor environmental issues in their own country and possible ways to implement these measures. Subsequent to the workshop, it was expected that the participants would develop proposals for future activities and initiate discussions with the appropriate bodies in their countries. It was expected that the information provided at the workshop and in the UNEP reference material would adequately equip participants for this work at the national level.

4. Workshop participants and workshop team

The workshop targeted representatives from policy research and environmental institutes, universities and training institutes. Nineteen participants attended the workshop from eleven Asian countries, including China, South Korea, Japan, Thailand, Philippines, Mongolia, India, Nepal, Sri Lanka, Pakistan and Bangladesh.

The workshop was facilitated by Fulai Sheng and Vera Weick of UNEP-ETB, Geneva, and four resource persons from academic institutes gave presentations (Dr. Jyoti Parikh from IRADe, Prof. U. Sankar from Madras School of Economics, Dr. Madhu Verma from Indian Institute of Forest Management (IIFM), Bhopal and Ms. Divya Dutta from The Energy and Resources Institute (TERI), New Delhi).

. The workshop team comprised the following:

- Dr. Jyoti Parikh, Executive Director, IRADe Delhi,
- Fulai Sheng, UNEP-ETB, Geneva,
- Vera Weick, UNEP-ETB, Geneva,

- Krishan Kumar Kapil, Consultant, IRADe, Delhi,
- J. M. Singh, Consultant, IRADe, Delhi,
- Kavita Singh, Research Assistant, IRADe, Delhi.

Contact details of all experts and participants are provided in Annex 2.

5. Methodology

The workshop was structured into plenary presentations and working sessions to give participants the opportunity to both receive information and share their own experiences. In the plenary presentations, the speakers addressed the concept of economic instruments and economic principles in environmental problems. Highly experienced experts provided input for the participants. In the working sessions participants could exchange their own opinions on the issues covered by the workshop as well as work on suggestions for necessary actions to be undertaken in their countries. For the working sessions, the facilitators gave brief introductions and then divided participants into working groups. Participants were divided into different working groups for each working session. Each working group selected its own discussion moderator and rapporteur who represented the group at the plenary discussion at which results of each particular working session were discussed. The facilitators visited each of the working groups during the working sessions.

6. Workshop programme

The Workshop agenda is presented in Annex 1. The interactive and participatory workshop comprised the following major components:

- Opening,
- Session on concepts underlying economic instrument with group work on identified environmental problems,
- Session on economic instruments and environmental fiscal reforms with group work using case studies on the success and failure of economic instruments in selected countries,
- Session on policy design and implementation with group work on economic instruments for identified environmental problems,
- Review and evaluation of workshop,
- Closing.

7. SUMMARY OF THE WORKSHOP SESSIONS

7.1 DAY 1:

INAUGURAL SESSION

Dr. Jyoti Parikh, Executive Director, IRADe, opened the workshop at 9:30 a.m. on 27 April 2004. She welcomed all participants to Delhi and introduced the representatives responsible for planning and organizing the workshop. She underscored the importance of economic instruments for sustainable environmental protection. She discussed the purpose and objective of the workshop and its importance in the context of the present environmental policy structure.

Dr. Kirit S. Parikh, Member, Planning Commission, welcomed the participants and gave an overview on the evolution of economic instruments. He said that economic instruments are now at the centre stage of environmental governance. He emphasized that the planning and implementation strategy need to be holistic for better environmental and natural resource management.

Mr. Naresh Dayal, Additional Secretary, Ministry of Environment and Forests, India, welcomed the participants and stressed the need for effective implementation of economic instruments for environmental management. He gave a brief overview of multilateral environment agreements promoting the use of economic instruments as well as examples of industrial projects where the use of economic instruments could curtail unsustainable patterns of production and consumption. He also gave a summary of MoEF's policy instrument initiatives, including examples from the national environment policy report.

Mr. Fulai Sheng, UNEP-ETB, Geneva, welcomed the participants and thanked IRADe for hosting this workshop. He also thanked the Planning Commission and the Ministry of Environment and Forests on behalf of UNEP for their support of the workshop. He said that he recognized that there were experts among the participants and explained that one of the purposes for this training of trainers workshop would be for participants to share experience among themselves and to provide local capacity building activities after they return to their own institutions.

Following the opening ceremony, Ms. Vera Weick, UNEP-ETB, Geneva gave a brief introduction to the objectives of the trainers' workshop, which included:

- To deepen understanding of the use of EI for environmental policy making,
- To enable participants to present the main concept underlying EI and different types of EI,
- To enable participants to guide policy-makers step-by-step to find policy responses to an environmental problem.

She also introduced the participants to the workshop's agenda and *modus operandi*.

SESSION 1: CONCEPTS UNDERLYING ECONOMIC INSTRUMENTS

In introducing this session, Fulai Sheng highlighted the basic economic concepts underlying economic instruments. He said that most environmental problems are the result of human activities, which in broad terms are fundamentally influenced by cost-benefit considerations. He said that environment problems arise due to: (1) the cost of an environmentally damaging activity not having to be paid for by those involved in the activity, i.e. market failure; (2) the cost of an environmentally damaging activity being made artificially low by a subsidy, i.e. policy failure; (3) the long-term cost of a resource-use activity not being considered because of the lack of clear and secure property rights, i.e. institutional failure. Economic instruments are used to correct these failures. To these price distortions, Prof. Nurul Amin added the failure of the market to reward environmental protection efforts.

Following the introduction, participants were divided into three groups to apply the concept of externalities, subsidies, and property rights to the problem of shortage of drinking water. (For further information on group exercise see the session 1 handout on CD-ROM.)

SESSION 2: GROUP WORK ON IDENTIFIED ENVIRONMENTAL PROBLEMS

Prior to the workshop, participants had been asked to describe a pressing environmental problem in their country along with a set of guiding questions. In session 2, these problems were used as basis for group work (for further information see problem identification questionnaire and session 2 handouts on CD-ROM).

Participants were divided into groups of five and asked to prepare a case study on a national environmental problem identified by a group member. The participants analyzed the problem using the concepts discussed in the session, identified the specific economic failures and presented the respective cases. A summary of the four group presentations is provided below:

Group 1: The members of first group selected the problem of increasing **urban air pollution** caused by the widespread use of personal cars and limited mass transport in Bangkok, Thailand. According to the group, the price of driving a car was not the true reflection of actual cost, as the costs of fuel, registration and licensing did not reflect the environmental or congestion cost. This points to a market failure. Government-induced policy failures, such as removing import duties on cars, subsidization of petrol, non-promotion of mass transport, absence of congestion pricing, industrial promotion policy etc. exacerbate the problem. Lack of willingness to share and promotion of individualism and consumerism were identified as indicators for institutional failure.

Group 2: The second group took up the issue of **dynamite and cyanide fishing** in the Philippines, which has led to depletion of fisheries. According to them, the improper pricing of fish was the major market failure, i.e. the price of fish does not reflect the cost/damage caused by the fishing method. Policy failures cited by them were

government subsidies and the easy availability of loans for boats and advanced tools for fishing, motivating more people to fish and resulting in over-fishing. Lack of property rights was identified as the major institutional failure in this case.

Group 3: The group members considered **sand-mining** in India to be a major environmental issue. According to them, the price of sand, which does not include the negative externality caused to groundwater wells through the depletion of the existing groundwater base, was the indication of market failure in this case. The flouting of rules by all stakeholders, including government, and the lack of implementable policies were the cited policy failures. Lack of understanding of the role of sand in groundwater wells, lack of property rights and a failure to formulate rules for pollution standards for distilleries in sand-mining areas were the major institutional failures highlighted in this case.

Group 4: The last presentation was on the **overuse of pesticides and fertilizers** leading to desertification in Pakistan. The major problems cited were soil erosion and pollution, water pollution and the greenhouse effect. The group said that government subsidies on fertilizers (N & P) and pesticide, leading to their overuse, was the major government policy failure and the problem with tenants was the institutional failure.

In all four presentations the market, policy and institutional failures behind the environment problems were highlighted. Participants suggested that improper pricing of the commodity could be considered as the major market failure, while subsidies, flouting of rules by all stakeholders, including government, and undefined implementable policies were the major policy failures. Undefined property rights and lack of willingness to share were the major institutional failures suggested by participants.

At the end of day one, Ms. Vera Weick gave a brief overview on the UNEP reference materials on economic instruments. The following publications were distributed to each participant:

- The Use of Economic Instruments in Environmental Policy: Opportunities and Challenges (UNEP 2004).
- Economic Instruments in Biodiversity-related Multilateral Environmental Agreements (UNEP 2004).
- Energy Subsidies: Lessons Learned in Assessing their Impact and Designing Policy Reforms (UNEP 2004).
- Analysing the Resource Impact of Fisheries Subsidies: A Matrix Approach (UNEP 2004).
- Incorporating Resource Impact into Fisheries Subsidies Disciplines: Issues and Options, A Discussion Paper (UNEP 2004).
- Draft Training Resource Manual on Economic Instruments (electronic version on CD-ROM).

7.2 DAY 2:

SESSION 3: WHAT ARE ECONOMIC INSTRUMENTS?

In this session, Dr. Madhu Verma from IIFM, Bhopal, gave a technical presentation on economic instruments. She said that economic instruments arise due to failure of command and control approaches, market failures, institutional failures and policy failure. These failures generate environmental problems; subsidize unsustainable development and tax sustainable development. To address environmental problems we therefore need instruments that integrate environmental and economic policy, that are parsimonious in the use of scarce resources, that allow for a differential response by economic units and that can motivate a change in behavior by altering incentive structures. Economic instruments, such as user fees, impact levies, betterment charges, pollution taxes, tradable pollution permits, transferable development rights and payments for environmental services, among others, meet most of these conditions, are uniquely suited for the integration of environmental and economic policy, and can be designed to advance sustainable development. According to Dr. Verma, for a given environmental budget, economic instruments can buy more environmental protection than CACs. However, she cautioned that economic instruments could be misused if not properly selected and tailored to suit the problem at hand and the socio-cultural context. She used two case studies to illustrate the issues and concepts, namely water pricing in Mexico and New York City's payment for watershed management. She also gave an introductory note on three projects undertaken by IIFM, Bhopal, namely the economic valuation of the Bhoj wetland for sustainable use, the economic valuation of forests of Himachal Pradesh and the Bhopal gas leak case viewing damages from the eye of an environmental economist. (For further information see presentation included on CD- ROM).

Dr. Dilip Biswas, former Chairman, CPCB India, gave a governmental perspective on economic instruments stressing the need to make instruments clear and easy for effective implementation.

SESSION 4: ENVIRONMENTAL FISCAL REFORMS

Ms. Divya Dutta from TERI, Delhi, gave a technical presentation on environment fiscal reforms. She said that environmental fiscal reforms are the intersection of the environmental policy matrix and budgetary policies (revenue and expenditure). To be effective, environmental fiscal reforms should be made consistent with laws and ongoing fiscal reform, involve states in strengthening environmental management, and should inform and engage stakeholders. (For further information see presentation included on CD-ROM)

SESSION 5: GROUP WORK: CASE STUDIES ON THE USE OF EI'S IN SELECTED COUNTRIES

In this session, participants were divided into groups of four or five and asked to use a set of analytical questions to analyze the case study provided to them. Each group analyzed the case studies and described the environmental problem, the baseline conditions in the countries, the main stakeholders involved, the economic instruments chosen in the specific case and the main reasons for success or failure of the instrument. One representative from each group presented the overall analysis of the case followed by a general discussion on the outcome of the case analysis.

The topics of the case studies included:

- Recovering reasonable fees from resource users,
- Limiting access to publicly owned resources,
- Reducing pollutant loadings to the environment,
- Subsidizing transition to more sustainable alternatives.

Important points to ensure success were summarized as follows: high political will, availability of funds for implementation and monitoring, stakeholder support, capacity building, and imposing the right amount of tax or levy. (For further information see session 5 handouts on CD-ROM)

SESSION 6: POLICY DESIGN AND IMPLEMENTATION

In this session, Mr. Fulai Sheng introduced the participants to a step-by-step approach that can be used to assist policy makers to choose an effective environmental policy package that addresses a pressing environmental problem and considers existing institutional capabilities and environmental policies.

Four phases for design and implementation were discussed:

Phase 1: Assembling existing information in a structured way.

Phase 2: Moving from template to draft policy option.

Phase 3: Engaging stakeholders and refining policy choice.

Phase 4: Policy implementation and evaluation.

SESSION 7: GROUP WORK ON ECONOMIC INSTRUMENT FOR IDENTIFIED ENVIRONMENTAL PROBLEMS

In this session participants went back to the cases they had worked on in session 2 and discussed possible policy solutions to address the chosen environmental problems. The group work was presented on the third day during session 9. (For further information see session 7 handout on CD-ROM).

At the end of day two, two participants were given the opportunity to present projects that they are currently working on. The presentations are summarized below (for further information see presentation included on CD-ROM).

Dr. Ramachandra Bhatta, Professor and Head, Department of Fisheries Economics, University of Agricultural Sciences, College of Fisheries, Mangalore, India gave a presentation on his present project entitled “Use of economic instruments for regulating shrimp farming in India”. Coastal shrimp farming is undergoing structural changes in response to changing technologies, economics, policies and institutions. The profitability of shrimp farming makes it economically optimal to convert larger crop area into commercial shrimp farming. One of the reasons for the economic profit earned by commercial shrimp farmers is that the full cost of commercial shrimp farming, including pollution treatment, is not borne by the farmers. This profit-induced shrimp farming makes it less attractive to adopt better management practices by small farms. The higher economic efficiency of small farms compared to large farms and stringent pollution control measures on large farms are encouraging the dismantling of corporate farms. Further larger shrimp farms are likely to suffer more from on-site pollution problems and increased cost of pollution control. On the other hand, the increased number of small farms has resulted in the problem of non-point source of pollution and increased transaction costs of organizing common pollution control measures. The suggestions for the implementation of better management practices for sustainable shrimp farming should be based on the premise that it will enhance ecological and economic benefits of shrimp farming.

Dr. M G. Chandrakant, University of Agricultural Sciences, Bangalore, India discussed the causes for the cumulative interference with irrigation wells in peninsular India. According to him, the declining number of rainy days, poor recharge rates (10 to 15 percent of the rainfall), reduced recharge potential resulting from lack of desiltation of irrigation tanks, increased number of irrigation wells per unit volume of groundwater, shift in crop pattern towards water intensive commercial crops and subsidies for electrical power to lift groundwater for irrigation are the main reasons behind the problem. According to his study, the average gross irrigated area per groundwater irrigated farm is 5.71 acres applying 11.6 acre inches of groundwater per acre of land, using 487 kilowatt hours of electricity to lift groundwater for one acre of gross irrigated area. With an estimated use of 42 kilo watt hours to lift one acre inch (22,611 gallons) of groundwater, at a price of Rupee one per kilo watt hour to agriculture, the total electricity bill amounts to Rs. 2781 per annum for using a total of 66.24 acre inches of groundwater using 2781 Kwh.

7.3 DAY 3:

SESSION 8: CASE STUDY ON ECONOMIC INSTRUMENTS FROM THE PHILIPPINES

Mrs. Margaret M. Calderon, University of the Philippines Los Baños, Philippines presented a “Case study on Developing Economic Instruments for the Makiling Forest Reserve (MFR)”, a project that was supported by UNEP. The project assessed the feasibility of developing economic instruments for water resources, recreation and ecotourism, land resources, and non-timber forest products. Some of the economic instruments implemented were increased entrance fees to the MFR and upgraded prices

of NTFPs⁵. The project tried to build linkages with different stakeholders and involve communities. The assessment of the feasibility of implementing the economic instruments revealed that its implementation for forest recreation and eco-tourism, non-timber forest products and water was highly desirable. Some of the lessons learned were:

- The mandate should be clear,
- Time-consumption and cost should be considered,
- There is a general resistance to any new fee,
- Changes in leadership and leakages affect the implementation.

SESSION 9: COUNTRY PRESENTATIONS ON POTENTIAL POLICY INSTRUMENTS

This session was the continuation of session 7, during which the participants had worked in groups on their selected country cases. In this session, the four groups presented possible economic instruments to address urban air pollution in Bangkok, Thailand (Group 1), over-fishing in the Philippines (Group 2), groundwater depletion due to sand mining in India (Group 3) and desertification due to overuse of pesticides and fertilizers in Pakistan (Group 4).

Group 1 presented the case of vehicle air pollution in Bangkok. They identified the mode of transportation as the information needed and suggested the use of surveys for measuring users' attitudes towards transportation modes. Per capita emissions for alternative modes of transportation were the technical and scientific data needed in this case. They identified transport users, automobile manufacturers, the urban planning department, the pollution control department and the health department, as the major stakeholders. According to Group 1, focus group discussions and stakeholders meetings were the mechanisms to involve stakeholders in the policy formulation process. Lastly, they proposed to design instruments based on the results of the users' survey to reduce car use and promote mass transit. They identified a strong institutional structure, familiarity with economic instruments and appreciation of their roles, enhancement of human and institutional capacity, improvement of the legal framework and awareness of the need for clean air as the prerequisites for the implementation of the economic instruments.

Group 2 discussed the issue of over-fishing in the Philippines. According to them, human activities, like the conversion of mangrove swamps into fishponds, encroachment of commercial fleets in municipal fishing waters and effluent discharges from shrimp farming, are the major causes of depleted fishery resources. They suggested four economic instruments to tackle this problem: (1) common property rights (empowerment mechanism); (2) permits for quotas (fishermen are granted a catch quota per fishing season that they can catch themselves or sell to others); (3) environmental charges on polluters (shrimp farms, fishing vessels); and (4) penalty/fines/enforcement incentives.

Some of the advantages of using these instruments would be:

⁵ Non Timber Forest Products

- Community-based efforts for improved enforcement,
- Optimal total catch at the minimum cost,
- Assignment of catch quota (i.e. socially optimum catch level that equals the sum of individual quotas),
- Gives pollution producers the flexibility to decide on the extent and method of pollution control (e.g. effluent treatment systems) on the basis of their cost structures and market position,
- Encourages long-term development and use of cleaner processes (e.g. environment-friendly methods of fish culture),
- Ease of administration.

They also highlighted duration of rights, species to be covered, estimation of optimal catch, setting of an appropriate tax rate and fees/fines higher than the profit for non-compliance as the design parameters, which needed to be kept in mind.

The prerequisites for instruments implementation suggested by them were:

- Allocation criteria should be well defined and transparent,
- Monitoring and enforcement,
- Macroeconomic conditions such as unemployment rate,
- Monitoring costs,
- Involve different adjustments costs and distributional impacts on various firms, sectors, regions and income groups.

Group 3 discussed the environmental problems caused by sand-mining in India. Sand-mining excavation beyond the permissible three feet limit is causing depletion of groundwater for irrigation and drinking water wells and affecting groundwater quality. According to Group 3, the major factors responsible for increased sand-mining activity were the increased demand for sand in construction, recurrent repairs and the non-availability of a cheaper substitute for sand (e.g. wood). Riparian farmers who allow sand extraction, people who construct houses or buildings in urban areas, construction companies and contractors, and sand truck transport owners were the major stakeholders. Currently, existing policies are unable to address the problem because of law enforcement failure, poor monitoring and a lack of synergy between policies on sand-mining and groundwater extraction.

Some of the economic instruments suggested by them were:

- Environment tax on large house construction activity,
- Environmental tax on sand mining,
- Subsidy for low cost/low resource use construction activity,
- Incentives for research and development on construction methods that reduce dependence on sand,
- Compensation mechanism for farmers.

They also highlighted stakeholder participation in the process (farmers, land miners, construction industry, government and local authorities) and clarification of legal

ownership over riparian land (not open access resource) as the bases for effective implementation of these instruments.

Group 4 looked at the overuse of pesticides and fertilizers in Pakistan. According to them, the information needed for the design of economic instruments includes: trend of increase in desertification, estimation of damage in economic and financial terms, trend of use of fertilizers and pesticides, and a study of past policies to curb the problem, such as legal provisions. They identified tenants, landlords, peasants, government, consumers, and input suppliers as the major stakeholders. They proposed a participatory approach (stakeholders' workshop, field visits, agriculture extension), public debates/hearings, and media and environmental auditing as mechanisms to involve stakeholders. Economic instruments proposed included:

- Special credit, low interest loans, subsidies offer to establish waste management system,
- Environmental fiscal reform (budget),
- Trade barriers on custom duties and non-tariff barriers,
- Environmental barriers on agricultural products.

Incentives included:

- Reduced tariffs, tax reduction, other incentives,
- Sustainable development fund operationalized,
- Environmental accounting system,
- Green labeling,
- Green business (eco tourism, conservation companies),
- Awareness raising.

Prerequisites for implementing economic instruments included:

- High political will,
- Availability of implementation and monitoring funds,
- Stakeholder support,
- Capacity building,
- Tax amount (levied/imposed).

At the end of the session, Prof. A.T.M. Nurul Amin, AIT, Thailand, discussed the theory and practice of using economic instruments for environmental protection and management. His presentation is summarized below. (For further information, see presentation included on CD-ROM).

Prof. A.T.M. Nurul Amin, AIT, Thailand, discussed the theory and practice of using economic instruments for environmental protection and management. He said that three environmental problems that figure prominently in economic analyses are pollution, destruction of natural resources and free-riding on environmental resources. These environmental problems and the corresponding economic concepts used for their analyses have led economists to suggest that (i) regarding pollution, environmental policy needs mechanisms to internalize externalities (external costs and external

benefits), (ii) regarding destruction of natural resources, enshrining of property rights was needed, and (iii) regarding free-riding on environmental resources, finding a mechanism to infuse private good characteristics is required, so that pricing of such goods becomes possible and free-riding can be curtailed, if not totally stopped.

SESSION 10 & 11: THE USE OF ECONOMIC INSTRUMENTS IN MULTILATERAL ENVIRONMENTAL AGREEMENTS

Dr. Jyoti Parikh, Executive Director, IRADe, and Prof. U. Sankar, Madras School of Economics, discussed the role of economic instruments in the design and implementation of multilateral environmental agreements. They gave insight into the evolution of different conventions and agreements, starting with the Stockholm Conference on the Human Development and the 1992 United Nations Conference on Environment and Development, including the agendas discussed and the principles developed. They also addressed the Millennium Development Goals from the UN Millennium Declaration and their approval by the UN General Assembly. They highlighted a number of principles for environmental policy and looked at the implementation of various economic instruments at the national and global levels. These included, at the national level, user charges, market creation, liability systems and fiscal instruments and, at the global level, the flexible mechanisms to reduce green house gas emissions under the Kyoto Protocol, such as emission trading, the clean development mechanism and joint implementation.

SESSION 12 & 13: WORKSHOP EVALUATION AND FOLLOW-UP ACTIVITIES

The participants conducted a workshop evaluation and agreed on a final set of recommendations (see Annex 4).

8. Closing

In the closing ceremony, Dr. Jyoti Parikh thanked the UNEP team for their effort and support in conducting the workshop and the participants for their active cooperation and participation in group work exercises and general discussions. She also thanked the IRADe team, especially J.M. Singh, Krishan Kumar Kapil, Kavita Singh and Sharad Garg, for their efficient organization of workshop.

Dr. Kirit S. Parikh, on behalf of IRADe, thanked the participants and stressed the need for follow up and effective use of the concepts learned by the workshop participants at the policy level for strategy planning.

Lastly, Mr. Fulai Sheng and Ms. Vera Weick thanked the organizer (IRADe) and all the participants.

9. Results, conclusions and lessons learned

During the workshop, the participants had the opportunity to acquire valuable information on existing economic instruments in environment and natural resource management. The participants also had the opportunity to share their own experiences in respect of these issues with their colleagues from other countries in Asia. Countries with less experience in implementing economic instruments were advised on how to select, establish and sustain such systems while countries with more experience could acquire information to help them to improve their current systems.

Some of the follow-up work to use the concepts discussed in the workshop suggested by the participants were:

- Undertake case studies on existing economic instruments for a particular sector and share it with policy makers and other stakeholders. Use the same case studies for training and capacity building programmes,
- Apply knowledge to ongoing projects on environmental sustainability on trade policy and economic integration in Asia,
- Undertake research work on the design and implementation of economic instruments;
- Use concepts to solve problems related to biodiversity conservation and forestry,
- Conduct comparative studies between different countries in Asia regarding the use of economic instruments in the particular circumstances of each country,
- Include topics in the curriculum of undergraduate and postgraduate students at universities for environmental management.

Support requested included:

- Collaboration for funding and technical support (literature, consultations etc),
- Level guidance,
- Providing update on technical publications,
- Providing resource persons.