



MEETING REPORT

INDIA ROUNDTABLE ON SUSTAINABLE CONSUMPTION AND PRODUCTION

MUMBAI

29TH SEPTEMBER 2006

This paper was prepared by Safety Action Group (SAG) in collaboration with the United Nations Environment Programme (UNEP), Division of Technology, Industry and Economics (DTIE) and the European Commission (EC), Directorate General Environment.

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introduction

The India Roundtable on Sustainable Consumption and Production was held in Mumbai on 29th Sept 2006.

The Roundtable was organised pursuant to the Marrakech Process, a global framework of initiatives for promoting sustainable consumption and production patterns, which called for national and regional consultations on Sustainable Consumption & Production and the formulation of action plans leading towards these.

The Roundtable was initially proposed by the United Nations Environment Programme (UNEP), Division of Technology, Industry and Economics (DTIE), Paris. The official hosts were the Ministry of Environment & Forests (MoEF), Govt of India and UNEP. The European Commission and UNEP sponsored the Roundtable, consequent to the decision taken at the November 2004 European stakeholders meeting in Ostend, where Europe had expressed its interest in supporting the promotion of sustainable consumption and production at a global level.

Air India generously provided the logistical support, including the use of its Board Room as the venue of the Meeting. A local NGO, Safety Action Group (SAG), were responsible for the organisation, including the background paper, speaker invitations, agenda and facilitation. On the previous evening, delegates were invited to cocktails by the British High Commission and to a dinner hosted by Tata Chemicals Ltd, a large Indian company.

The Roundtable was planned in close coordination with the MoEF. During the planning stage itself, it was realised that India had not thus far viewed sustainable development from the viewpoint of sustainable consumption and production in a holistic manner. Therefore the initial priority was deemed to be the tabling of India's immediate priorities on production processes and consumption patterns and the recognition of their respective importance by experts and concerned stakeholders. It would have been premature to formulate detailed action plans before a consensus was reached on priorities. It was also felt that in a country as diverse as India, there had to be widespread consultations amongst experts and committed stakeholders and the Roundtable was perceived as a forum for such consultations.

Invitations were sent to over 70 organisations broadly comprising equal numbers from Government bodies (Central, State and Municipal), Public Sector Undertakings and Autonomous Government Bodies, Industry, Academic Institutions and NGOs. 37 persons attended the Roundtable: 4 from the Central Government, 4 from the State Government, 7 from Government bodies and PSUs, 4 from Industry, 4 from Academic Institutions, 8 from NGOs, 2 independent consultants.

The particulars of the participants are given in Annex II to this note.

objectives

Broadly, the Roundtable had the following objectives:

- Initiate a national dialogue on sustainable consumption and production.
- Improve awareness of the Marrakech Process of a broader range of stakeholders. Information on the Marrakech Process had not yet widely been disseminated in India, with knowledge mainly confined to a handful of experts.
- Table and prioritise India's specific areas of concern, as viewed from the SCP perspective.
- Pave the way to action plans and short-list possible modes of implementation in the areas prioritised.

agenda and conference structure

The Agenda (See Annex I) was prepared by SAG based on guidelines received from UNEP/DTIE and was agreed after discussions with the MoEF. For a wide variety of reasons, a sectoral approach was chosen. MoEF and SAG agreed that the following sectors were of immediate concern:

- Energy:** India's exponentially increasing demand for energy as well as the relative inefficiency of energy utilisation were well known. Of equal concern was the need to balance energy utilisation with GHG emissions.
- Water:** Over-withdrawal and depletion of ground water, its contamination due to industrial pollutants as well as pesticides and agro-chemicals and alarms over an erratic Monsoon due to global climate change were clearly areas where an SCP approach could conceivably provide solutions to a problem which was becoming acute.
- Waste:** Increased urbanisation and the emergence of a burgeoning consuming class of 250 - 300 million meant that waste management was becoming crucially important. Adding to these was the new threat posed by E-waste, generated from within the country as well as from imports, as also hazardous waste generated by a rapidly growing industrial sector. Compounding the issue were India's somewhat primitive methods of waste collection, transportation and disposal.
- Agriculture:** No discussion on sustainability would be complete without reference to agriculture, which is responsible for the livelihoods of two-thirds of India. There was increasing concern that the methodologies India had adopted to achieve food self-sufficiency had caused considerable environmental damage and led to social tensions. India's agricultural policies and practices needed to be re-examined and re-cast if necessary.
- Consumer Demand:** The liberalisation of the Indian economy since 1991 and rising disposable incomes have given rise to un-restrained consumer demand even for goods and services which are patently un-sustainable. The clear-cut need was to not to reduce consumer demand, but to optimise it by better consumer education and equipping the consumer with the tools to make an informed choice.

It was evident to MoEF and SAG that it would be impossible to do full justice to all the above issues in a 1-day round of consultations, but the intention was to table the problem areas, to obtain consensus that the key priorities were adequately considered and thereafter to start the process of taking action rather than draw up specific action plans.

MoEF and UNEP/DTIE guided the selection of speakers on the above issues. SAG felt that the contributors should also speak at the Roundtable and thus be given an opportunity to expand and personally explain the issues involved; this suggestion was accepted. Contributors and speakers were requested to prepare their presentations in a manner which would provoke discussion.

Invitations were issued by the MoEF, individually signed by Mr Sudhir Mital, Jt. Secretary and contained a 1-page Backgrounder prepared by SAG.

opening session

Mr K M Unni, Executive Director of Air India welcomed participants to the Roundtable. He apologised for the absence of Mr V Thulasidas, the Chairman of Air India who had nevertheless asked Mr Unni to convey his warm greetings to the participants and his best wishes for the success of the meeting.

Sustainable Consumption and Production were two sides of the same coin, felt Mr Unni. The crucial issue was how to satisfy needs without jeopardising the ability of future generations to meet their own needs. In poor countries, environmental problems were often greatly aggravated by the use of obsolete technologies.

Giving examples of its commitment to the environment, he said that Air India had switched over to more energy-efficient compact fluorescent lamps, comprehensive effluent treatment in its plating workshops and switching over to CFC-free air-conditioning. In order to impress upon young minds the importance of protecting the ozone layer, an “Ozzy Ozone” cartoon booklet was being distributed to children. In the coming months, the Air India building where the Roundtable was being held was being converted to a “green” building with power saving measures in lighting, air-handling units and recycling of water.

Air India had signed the U N Secretary General's Global Compact and was supporting the Global Reporting Initiative as well as activities of UNEP. The support to the Roundtable was a logical extension of its continuing support to UNEP and he once again wished the participants success in their deliberations.

Mr Siddharth Behura, Additional Secretary, Ministry of Environment & Forests apologised for the absence of Dr Prodipto Ghosh, Secretary, who had been called away at the last minute. Mr Behura thanked the EU for sponsorship of the Roundtable and UNEP for co-hosting it, and also Air India and SAG for providing the logistical and operational support. He reiterated that Sustainable Consumption and Production were the two legs on which Sustainable Development stood. He reminded participants that India's population had crossed one billion and that it had a young population which was soon going to join an already burgeoning consuming class. Therefore it was crucial for India to take whatever steps it could today so as to insure for tomorrow.

Ms Astrid Schomaker Head of International Relations, Governance and Development Unit, Directorate General of Environment, European Commission said that for the European Union, Sustainable Consumption and Production was now at the centre of the political arena and at the core of its concerns. The issue was not merely of looking at methods of production or consumption patterns but also about concerns such as fighting poverty and health and safety issues.

Following the developed countries' commitment at the World Summit on Sustainable Development held in Johannesburg in 2002 of taking the lead and sharing best practices on sustainable consumption and production, the EU is currently developing an Action Plan on SCP, due in 2007. The EC wished also to underline that international cooperation is vital. Best practices of different countries need to be shared and ideas exchanged, as supply chains are increasingly global in nature and problems transcended national boundaries. Ms Schomaker also felt that the market for sustainable products is large and attracting the attention of producers throughout the world.

Ms Schomaker expressed her gratitude to the organizers of the Roundtable and hoped that SCP initiatives would gather momentum in India. Promoting sustainable development was part of the EU-India Strategic Partnership and the outcome of the roundtable should be reflected in further joint work by the parties.

Mr Bas deLeeuw, Acting Head of Integrated Resource Management, SCP Branch, UNEP spoke next. Expressing his gratitude to the MoEF for hosting the Roundtable, he said that this meeting belonged to a series of national roundtables that UNEP is organizing with the support of the European Commission with the aim of strengthening the involvement on the Marrakech process and the commitments to SCP of key emerging developing countries. A national roundtable on SCP had been held in China in May and the India Roundtable would be succeeded by similar events in Brazil and South Africa in 2007.

The reason why India has been chosen among the first countries to held this series of roundtables is that the size and the rapid growth of its economy is associated with a rapidly increase of resources consumption and pressures on the environment, requiring new models of development to be implemented.

He expressed the hope that India would take the lead in the regional SCP initiatives and act as an inspiration to neighbouring countries. The idea behind the Marrakech Process was that each country and region would choose its own set of priorities and UNEP could provide assistance where required.

He emphasized the opportunity offered by this roundtable to increase cooperation between European, international and Indian experts on SCP, deepen the analysis of different SCP concepts and tools but, most importantly, to enable Indian experts to identify their own priorities, preferences and action plans in the framework of the Marrakech process and on-going international and regional consultation processes on SCP. Indian ownership of the process is fundamental. From the UNEP perspective, he said that UNEP will encourage India to look at a range of implementation mechanisms, build private-public partnerships and work actively with Development Agencies and Regional Banks. India is very welcome to participate more actively in the activities of the Marrakech process, implementing concrete projects at regional, national and local level.

session I - international framework and national priorities

Chairman: *Mr Sudhir Mital, Jt Secretary, Ministry of Environment & Forests*

Mr Sudhir Mital provided a brief background of the process which led to the Roundtable and acknowledged with gratitude the role played by UNEP, the European Commission, Air India and Safety Action Group (SAG). The Indian Government linked its environmental agenda with poverty alleviation. The MoEF was deeply committed to sustainable development which meant not merely looking at environmental issues but the economic and social impact or production processes and consumption patterns as well. Acknowledging that the Marrakech Process was relatively new to India, he said that he hoped that the Roundtable would result in fresh ideas and action-oriented plans.

Bas deLeeuw of UNEP/DTIE introduced participants to the work of UNEP's Division of Technology, Industry & Economics and more specifically to the SCP Branch whose role was to promote sustainable consumption and production patterns to contribute to human development through the market. He stressed the need for arriving at an equilibrium between the use of natural resources, economic growth and the quality of life. To arrive at such an equilibrium required the coordinated efforts of Business (to improve manufacturing processes, goods and services), Government (to act as a facilitator and to provide the policy framework) and consumer and civil society groups (to raise awareness and encourage reflection).

The Marrakech Process was derived from the Johannesburg Plan of Implementation (JPOI) which called for the development of a 10-Year framework of programmes on sustainable consumption and production and which linked poverty eradication using resources more efficiently (Chapter II) with sustainable consumption (Chapter III). The Process called for national and regional consultations to establish needs and priorities, to draw up plans for programme implementation and for monitoring, co-ordination and information sharing. The first of the International meetings post Marrakech was held in Costa Rica in 2005 and resulted in the establishment of 7 Task Forces whose descriptions were spelt out.

As he saw it, the challenges before India were to identify its own needs, gaps and priorities, to participate more proactively in the Marrakech Process by proposing projects to UNEP/EC and to contribute to the Task Forces.

Ms Astrid Schomaker stated that SCP had been a priority issue for the EU from the World Summit on Sustainable Development. In Nov 2004, the EU had held a European Stakeholder Meeting in Ostend which conducted a review of existing policies and identified future priorities. The Ostend meeting also resulted in a recommendation that the EU enhance bilateral and regional cooperation with key partner countries and the support to the India Roundtable was an outcome of this recommendation.

After WSSD, the EU has adopted several new policies and tools that contribute to SCP. The EU's thematic strategy on the sustainable use of natural resources (2005) aims at decoupling economic growth from environmental degradation and reducing the negative impact of resource use. It aims to move Europe towards a recycling society while simultaneously reducing the environmental impact of products at all phases of their life cycles. Partially, this could be implemented by better "Eco-design". Innovation which leads to cleaner technologies and thus products and processes is also a key component. EU level eco-labelling, using a "Daisy" logo to signify ecological soundness, is another key tool aimed at consumers, whilst "green" procurement by public authorities is also encouraged. Finally, an effective management and audit scheme is considered to be a key component.

The future challenges for the EU lay in drawing up a concrete, prioritised action plan on SCP, addressing the demand side, involving key stakeholders to participate and enhancing international cooperation.

Mr Rajan Gandhi, Director of Safety Action Group (SAG), introduced himself and his NGO as being the persons responsible for the agenda, selection of speakers and contributors, the organisation and logistics of the Roundtable and for the preparation and editing of the Background Paper which was included in the conference folders of the participants. He gratefully acknowledging the assistance and "mentoring" provided by Bas deLeeuw of UNEP and Sudhir Mital of MoEF.

When the Roundtable was first mooted, it was evident that the approach to sustainable development through examination of production processes and consumption patterns had not been seriously considered in India; there was inadequate knowledge and appreciation of the Marrakech process in the country. Thus the first steps were simply to identify and prioritise the critical issues for India. It was felt that 5 areas would be put forward for discussion as the initial set of priorities: Energy, Water, Agriculture, Waste Management and Consumer Demand.

SAG approached the best possible contributors to the Background Note for the selected subjects. Unfortunately a paper on Water could not be included for operational reasons. Each of the contributors was also to make a presentation so that participants would have ample opportunity to interact and query. The papers were an edited version of the originals, the editing being necessary on grounds of brevity. However the full text was available either by contacting the authors or SAG, whose E-mail addresses had been provided.

session II - sectoral issues

Chairman: *Dr K P Nyati, CII-ITC Centre of Excellence for Sustainable Development*

GOVERNMENT'S ROLE IN WASTE MANAGEMENT

Ms S Gokhale, *Principle Secretary (Environment), Govt of Maharashtra*

The issue of waste management, particularly solid waste management was closely correlated to urbanisation. Maharashtra was the second most urbanised state in India, after Tamil Nadu. At present, 44% of Maharashtra's population lived in urban agglomerations of which 30% lived in Mumbai alone.

Solid waste varied directly with economic activity and waste produced ranged from 106 - 630 gm/person/day, averaging 350 gm. Due to humidity and other factors, waste was very wet as compared to other countries. Of the 23 Municipal Corporations in Maharashtra, only 9 had some semblance of disposal facilities. She regretted that traditionally, waste had simply been dumped and most cities had not provided for land-fill sites. When sites had been identified, vested interests - sometimes even by environmentalists - often prevented their use for waste disposal. Other problems included the segregation and transportation of waste.

The Non-biodegradable Garbage Control Act only applied to Municipal Corporations (serving cities with a population of over 1.0 million), not for the smaller city Municipal Councils and thus disposal problems particularly of plastic waste were spreading even to smaller cities. Sewerage and sewage treatment was also becoming a major problem area, particularly since some 86% of drinking water had to be treated as sewerage. The way forward lay in fixing the responsibilities for waste generation and not dumping the problem with the Government only.

Integrating participation of local communities in urban environmental issues and linking the environmental agenda with measures to combat poverty is the basis for a successful waste management.

INDUSTRIAL PRODUCTION AND ENERGY UTILISATION

Dr Ajay Mathur, *Director General, Bureau of Energy Efficiency*

Industrial consumption of energy was critically important to India since industry accounted for about half of commercial energy consumption and was showing a growth rate of 8-10% per annum. Concern for energy efficiency in the industrial sector had long been felt and had resulted in the landmark passage of the Energy Conservation Act of 2001. This had resulted in the establishment of the Bureau of Energy Efficiency. The Act also paved the way for sectoral benchmarks and mandatory energy audits by certified energy auditors.

Providing examples of improved energy efficiency in the Cement, Steel and Paper industries, Dr Mathur also acknowledged that SMEs lagged behind their counterparts in developed countries. There were, however islands of excellence such as cement, oil refineries, copper smelters and the rayon industry which had much to offer in terms of information exchange. As of now, energy intensity in the industrial sector (energy consumption per unit of GDP measured at purchasing power parity) is near optimal, but the market for energy efficiency products and technology was huge. He proposed a framework for further progress which included the establishment of sectoral task forces, a National Award Programme, energy labelling of appliances, software tools to assist in equipment and technology selection, a cluster/sector-specific approach for SMEs, financial assistance to mitigate risks and performance-based fiscal incentives.

WATER RESOURCES - THE NEED FOR CHANGE

Mr K R Joshi, *Chief Engineer, National Water Academy*

In India, water was covered by Constitutional provisions which provided supremacy to Parliament in matters relating to its utilisation, control, distribution and sharing between States. Providing statistics which showed India's dependence on rainfall, Mr Joshi said that on a country-wide basis, about 75% of rainfall occurred in just 4 months but this too was misleading since different parts of the country witnessed the Monsoon in different seasons. Some 40 million hectares fell under flood-prone areas while 23% of the country was covered by the Drought-prone Area Programme.

Water demand in the country was estimated at 710 billion Cu M in 2010, rising to 1180 Billion Cu M by 2050. At present about 80% of the demand was for irrigation; whilst this was expected to fall in percentage terms to about 70% by 2050, in absolute terms water availability per capita was likely to show an alarmingly downward trend; the likelihood of a crisis situation being exacerbated by inadequate storage capacity.

Other critical areas were: over exploitation of ground water resources, fall in ground water quality due to excessive usage of chemicals fertilisers and pesticides, reduction in storage capacity due to sedimentation, erosion of river banks and poor management including low efficiency in irrigation systems. An accelerated reform process and increased community participation is urgently required.

SUSTAINABLE AGRICULTURE

Prof P S Ramakrishnan, *Jawaharlal Nehru University*

Prof Ramakrishnan clarified at the outset that he was speaking as an environmentalist rather than an agricultural scientist. According to him, the "green revolution" model that India had adopted had succeeded in making the country self-sufficient in foodgrains but at a great cost. The model called for intensive agriculture using chemical fertilizers and pesticides in areas with assured provision of irrigation. This model was adopted without proper appreciation of the fact that tropical ecosystems are more fragile than in temperate countries; soil fatigue sets in much faster.

The bio-physical consequences of this model were soil degradation (in terms of both physical structure and chemical quality), declining water tables and increased soil salinity. There were also severe social consequences with the majority of farmers being left out of the model.

There was, consequently, a serious need to re-think the model particularly since land productivity from "green revolution" areas was showing a decline. Giving examples of the NEPED Project in Nagaland in N-E India, he showed how traditional ecological knowledge (TEK) involved appropriate agro-forestry, community participation and acceptance, took on board well-established institutional mechanisms and was more adaptive. There was a need to reduce subsidies that promoted excessive use of water, fertilizers, pesticides and insecticides, and compensate for this through agro-forestry models involving increased tree cover. The optimal model would be a hybrid, incorporating both TEK as well as "formal" systems for preserving and improving the biodiversity associated with agriculture, guaranteeing agriculture sustainability and food security.

In the ensuing discussions Mr Alok Sinha, Additional Secy, Ministry of Agriculture, noted the sentiments and added that his concern was the declining role of the Government in agriculture. Citing an example, he said that it was possible to obtain finance for a luxury car at negligible rates of interest whereas if a farmer wanted to purchase a tractor, he would have to pay the highest interest rates in the country. Rural indebtedness resulted from such policies, and these needed to be addressed and corrected immediately.

session III - sectoral issues(continued)

WASTE MANAGEMENT

Chairman: *Mr Vivek Bharati, Adviser, Federation of Indian Chambers of Commerce and Industry*

EU EXPERIENCE WITH E-WASTE MANAGEMENT

Ms Astrid Schomaker, *Head of International Relations, Governance and Development Unit, Directorate General of Environment, European Commission*

The EU approach to E-waste management is based on two directives founded on producer's responsibility: on Waste Electrical and Electronic Equipment (WEEE) and Restrictions on the use of Hazardous Substances (RoHS) that applies to EU produced and imported material, thus affecting the producers worldwide.

In Europe WEEE amounted to about 14 Kg per capita per annum and 90% of this was simply dumped in landfills. Recognising this as an increasingly serious problem, the EU had initially identified 10 product categories and had stipulated conditions on design, marking, information and modes of collection, treatment and recovery and affixing producer responsibility. The cost of implementing the WEEE directive on these selected categories was estimated at Euro 500 - 900 million/annum and a price increase of up to 3% could be consequently expected. However, significant savings in production and disposal costs and energy savings equivalent to 2.8 million tonnes of oil were expected.

The RoHS restricted the use of four heavy metals, PBB and PBDE in electrical and electronic equipment after 1st July 2006, with some exceptions. The EU has set targets for achievement by Member States by Dec 2006 and a Review was targeted for Sept 2007. However, how the respective Member States were to implement the RoHS Directive was up to them.

The Directives on WEEE and RoHS were both subject to review for the purpose of establishing targets, simplification where possible, further development and inclusions to the product categories.

The EU maintains on-going bilateral contacts with other nations and wished to enhance EU-India ties with a view to improve understanding of legislation and policies, exchanging of expertise, improving enforcement of trans-boundary waste movement, especially ship dismantling.

E-WASTE MANAGEMENT IN INDIA: CHALLENGES AND OPPORTUNITIES

Mr. Satish Sinha, *Toxics Link*

E-waste was a major national problem with global ramifications. India was one of the two fastest growing countries in the world for sales of computers and mobile phones, and increasing computer penetration was being actively encouraged by the Government. India's computer population is expected to grow from 15 million now to 75 million in 2010. Mobile telephones are likely to increase in numbers from 75 million to 200 million by 2010, and new products such as MP3 players were entering India.

In India's favour was the fact that sheer poverty meant that computers, for instance, were not discarded every 3-5 years as in the West and were in use for well over 7 years. Still, old computers and TV sets had to be discarded at some stage and it is estimated that India generates approx 146,000 tonnes of WEEE per annum. India has also become the dumping ground for electrical and electronic goods imported from the West ostensibly for continued usage. In reality, they were imported solely for their scrap value.

The Basel Convention restricts the trans-boundary movement of hazardous goods but the imports were not of hazardous good but of appliances with a residual working life. Recycling/recovery operations in India were almost entirely conducted in the unorganised sector using primitive technology to recover gold, copper and other heavy metals. The methods employed carried very heavy environmental and health risks.

Possible approaches to the problem included labelling using a life-cycle approach, addressing the issue of imports of used electrical/electronics goods, regulating the recycling industry, encouraging investments in upgrading the recycling technology and educating consumers to make an informed choice.

INITIATIVES TOWARDS SUSTAINABLE E-WASTE MANAGEMENT IN INDIA

Ms. Deepali Sinha-Khetriwal, *EMPA*

At present, the entire chain of activities relating to collection of E-waste and its transportation, storage, segregation, refurbishing and material recovery lay in the informal/unorganised sector in India., with Delhi emerging as a major hub. The rudimentary technology employed by units in this sector meant that the processes most hazardous to human and environmental health were those of dismantling, burning and smelting for precious metal recovery.

The seriousness of the problem had at last been recognised and there were several national and international initiatives to address it. Prominent amongst the international initiatives were those of the EU's Asia Pro Eco programme, UNEP's programme in the Mumbai-Pune belt and the Indo-German-Swiss programme to set up clean waste channels capable of scaling up to deal with different product groups and across different geography and time.

Local initiatives include those set up by industry associations such as the Council of Electronic Hardware Associations (CEHA) and the e-waste committee of the Manufacturers Association of Information Technology (MAIT), as well as NGOs and the Ministry of Environment & Forests. In addition, 2 enterprises - e-Parisaara in Bangalore and Trichyraya in Chennai had been processing e-waste on a commercial basis.

A model E-waste channel needed to be evolved along with an infrastructure of regulations and enforcement tools. The model E-waste channel would ideally keep in place the current informal sector activities of door-to-door collection and segregation of waste. However, the hazardous processing activities of burning, smelting and chemical recovery would be carried out by licensed and regulated operators in the organised sector. In Sept 2006, companies in Bangalore had set up the country's first clean e-waste channel. The challenge lay in now scaling up and replicating these successes. In the meanwhile consumers should be better informed on how to contribute to sustainable e-waste management.

session IV - tools for sustainable consumption

LIFE-CYCLE APPROACHES FOR APPRAISING SUSTAINABILITY

Prof Vinod K Sharma, *IGIDR and Ms Sangeeta Thakore, IIT Mumbai*

Internationally, the analysis of the Life Cycle of a product commenced around the 1960s but there has been considerable evolution in the succeeding years. Life Cycle Analysis was a cradle to grave approach which studied all the stages that a product went through - from the acquisition of raw material to the manufacturing processes, transportation and delivery, its use and re-use, the maintenance of the product to its recycling and return to the environment. LCA investigated the inputs and outputs at every stage and was thus a management, decision-making and analytical tool which compared the environmental performance of various products, processes and services.

There were 4 steps in Life Cycle Analysis, each covered by a relevant ISO 14040 series standard: a) Goal Definition and Scope, b) Life Cycle Inventory and Analysis (both included in ISO 14041), c) Impact Assessment (ISO 14042) and Improvement and Interpretation Analysis. It could thus be said that the methodologies for conducting LCA for goods and services was now well established.

In India, the LCA approach has largely been linked to the Indian Ecomark scheme. However, public awareness of the Ecomark scheme was very poor. A study conducted by the Indira Gandhi Institute of Development Research (IGIDR) established that even amongst the educated/informed population, awareness of the Ecomark scheme was only about 18%. The LCA approach was therefore in its incipient stages, but studies had been conducted for the following categories of products: Paper, Steel, Coal, Cement, Coir and Dairy products.

STIMULATING CONSUMER DEMAND: ROLE OF CONSUMER EDUCATION AND INFORMATION

Prof Manubhai Shah, *CERC*

The Consumer Education and Research Centre, Ahmedabad, was one of the two NGOs in India (the other being VOICE) which conducting the independent testing of consumer products. CERC had in fact set up an in-house testing laboratory to test food and pharmaceuticals products, electrical appliances and cosmetics/toiletries. CERC also intended to conduct tests for energy-efficiency of domestic electrical appliances. The tests were conducted from the viewpoint of build quality, performance, durability and value for money to the consumer.

The results of these tests were published in a magazine distributed to members of the Society and other subscribers and interested persons. Test results were invariably communicated to each individual manufacturer who was permitted to respond to the findings and whose response was also carried along with the published test report. CERC also conducted random tests on products bearing the quality certification mark of the Bureau of Indian Standards (BIS) and had on numerous occasions found that products carrying the mark were not meeting the standards laid down. These instances were reported to the BIS. Finally, CERC also conducted independent third-party tests on products and services on the basis of complaints from consumers.

In the absence of a functioning eco-labelling scheme in India such independent, third-part testing conducted by a not-for-profit organisation could play a vital role. Admittedly, the tests were conducted from a consumer's perspective but there was a large common ground between the consumer reports and testing for overall sustainability, as with ecolabelling.

SUSTAINABLE PUBLIC PROCUREMENT - FEASIBILITY, MERIT AND METHODS

Mr Mandar Parasnis, *E2KG*

The term Sustainable Public Procurement has superseded the previous terminology - "green" public procurement as it more aptly reflects the social as well as environmental concerns. The public procurement of sustainable goods and services is a cornerstone of SCP. Despite the declining role of the public sector, Government remains a very large

buyer, accounting for 14-16% of GDP in the EU, for instance. Since Governments buy with the taxpayers' money, they are obliged not only to purchase the best value for money but also to factor in the overall environmental and social costs when taking purchasing decisions.

There could be several approaches to sustainable public procurement (SPP): the use of existing eco-labelling schemes, application of environmental management systems such as ISO 14000, an integrated product policy which considered the life cycle of a product or a specific criteria approach which laid down standards for the purchase of individual products, e.g. lead-free soldering or recycled content of paper. Irrespective of the approach adopted, a sound SPP scheme could have a snow-balling effect triggering market demand for sustainable products even from individual consumers, stimulating innovation and overcoming trade barriers.

Internationally, the approach towards SPP varied widely. In Northern Europe in particular, there was political commitment combined with a strong policy framework and directives for SPP. In Japan, there was an elaborate legislative framework and the goal for 2010 was that all Govt procurement, 50 % of procurement by Public Sector Undertakings and 30% of private procurement would be bound by this framework. Taiwan had gone to the extent of offering 10% price preference to products and services which had been sustainably produced.

India is far behind in such initiatives and needs a national programme to enhance awareness, considerable effort in capacity-building and training, a revived and robust ecolabelling scheme, fiscal and non-fiscal incentives in place and transparency in public procurement. Perhaps the best place to start would be to rope in institutions such as the Indian Railways, the Defence Services and enlightened PSUs such as Air India to act as demonstrators.

During the related discussions, disappointment was expressed at the lack of progress made by the Indian ecolabelling scheme. One Corporate delegate stated that his Company was keen to submit its products for an Eco-mark but found that there was in fact no ecolabel for that category of products. Jt Secretary, MoEF took note of the discussions and stated that plans were underway to re-look at the Eco-mark scheme.

conclusions

No formal resolutions were adopted at the Roundtable, as this was not the intention. However, the following represent the Secretariat's view of key conclusions:

Energy:

There were examples of excellence in industrial energy efficiency whose experience could be shared amongst different industries and sectors. Sectoral task forces could be created and ideas, training and R & D expenditure shared. Useful tools for promoting energy efficiency include: national award schemes, labelling of appliances for energy efficiency, development of software which enabled right choices in equipment selection, cluster and sector-based partnerships for SMEs and fiscal measures to minimise financial risks and provide incentives for technological innovation.

Water:

The three key areas of concern in the future are a) greatly reduced per capita availability of water b) worsened water quality due to pollution and excessive use of agricultural chemicals, c) a higher rate of sedimentation resulting in reduced usable reservoir capacity. More efficient water management, greater community participation and removal of financial constraints were urgently required.

Agriculture:

India needed to re-look at the "Green Revolution" model which had admittedly resulted in food self-sufficiency but at great social and environmental cost. Adoption of 'hybrid technology' which combined traditional ecological knowledge with new technologies was probably the way forward. The role and priorities of the State also needed to be re-examined.

Waste Management with Particular Reference to E-Waste:

For the successful management of urban waste, it was essential that greater financial resources to Municipal bodies and improved technology be coupled with greater community participation. For the handling of E-waste, a stronger legislative framework coupled with more effective implementation of existing laws was needed. A successful e-waste management model would necessarily integrate the informal sector in some of the tasks, e.g. collection and segregation. The few successful e-waste management schemes had to be scaled up and replicated on a national basis.

Tools for Sustainable Consumption:

There was increasing awareness and experience of Life Cycle Analysis (LCA) within India. The Indian Eco-mark scheme, which had met with limited success and needed re-evaluation, could usefully incorporate this knowledge of LCA. While the Eco-mark scheme was being re-assessed, consumer groups within India had commenced publication of test reports of consumer products after independent testing and evaluation. Several countries had successfully implemented schemes for sustainable public procurement and such schemes could provide useful guidelines for India. Certainly, Public Sector Undertakings and Government institutions such as the Railways and the Armed Forces could make an immediate start.

Follow-up:

The Roundtable was seen by participants as an excellent and highly opportune “first round”, where India's SCP concerns had been tabled. Simultaneously, participants also felt that each of the issues discussed at the Roundtable merited in-depth, expert-level discussions as precursors for sectoral action plans. Participants noted the presence of senior Government officials at the meeting and hoped that the concerns expressed would be acted upon by the Government.

Feedback:

Analysis of the returned feedback forms is provided in Annexure III .

annexure I

India Roundtable on Sustainable Consumption and Production

29 September 2006

Board Room, Air India Building, Nariman Point, Mumbai 400 021

agenda

8:30 - 9:00 Registration of participants

9:00 - 9:30 Opening

Mr. V. Thulasidas, *Chairman, Air India (TBC)*
Dr. Prodipto Ghosh, *Secretary, Ministry of Environment and Forests*
Ms. Astrid Schomaker, *Head of International Relations, Governance & Development Unit, DG Environment, European Commission*
Mr. Bas deLeeuw, *Acting Head of Integrated Resource Management Unit, SCP Branch, United Nations Environment Programme*

9:30 - 11:00

SESSION I - INTERNATIONAL FRAMEWORK AND NATIONAL PRIORITIES

Chairman : Mr Sudhir Mital, *Jt Secretary., Ministry of Environment & Forests*

THE MARRAKECH PROCESS : Introduction, Task Forces, Results, Future Challenges

Mr. Bas deLeeuw, *Acting Head of Integrated Resource Management Unit, SCP Branch, United Nations Environment Programme*

SUSTAINABLE CONSUMPTION AND PRODUCTION POLICIES IN EU

Ms. Astrid Schomaker, *Head of International Relations, Governance & Development Unit, DG Environment, European Commission*

PRESENTATION OF THE BACKGROUND PAPER

Mr. Rajan R. Gandhi, *Director, Safety Action Group*

Questions from the floor

11:00- 11:15 Coffee/Tea break

11:15 - 13:00

SESSION II - SECTORAL ISSUES

Chairman : Dr K P Nyati, *Head, CII ITC Centre for Excellence in Sustainable Development*

INDUSTRIAL PRODUCTION AND ENERGY UTILISATION

Dr. Ajay Mathur, *Director General, Bureau of Energy Efficiency*

WATER RESOURCES - THE NEED FOR CHANGE

Mr K R Joshi, *Chief Engineer, National Water Academy*

SUSTAINABLE AGRICULTURE**Prof. P S Ramakrishnan**, *Jawaharlal Nehru University***GOVERNMENT'S ROLE IN WASTE MANAGEMENT****Ms Sharwaree Gokhale**, *Secretary, Environment, Govt of Maharashtra**Roundtable Discussion: India's priorities and further activities towards energy conservation, water resource management and sustainable agriculture.*

13:00 - 14:00 Lunch Break

14.00 - 15.30

SESSION III: SECTORAL ISSUES - WASTE MANAGEMENT**Chairman : Mr Vivek Bharati**, *FICCI***Rapporteur : Ms Silvia Ferratini**, *SCP Branch, United Nations Environment Programme***EU EXPERIENCE WITH WASTE MANAGEMENT****Ms. Astrid Schomaker**, *Head of International Relations, Governance & Development Unit, DG Environment, European Commission***ELECTRONIC PRODUCTS AND E-WASTE MANAGEMENT IN INDIA : CHALLENGES AND OPPORTUNITIES****Mr Satish Sinha**, *Toxics Link***INITIATIVES TOWARDS SUSTAINABLE E-WASTE MANAGEMENT IN INDIA****Ms. Deepali Sinha Khetriwal**, *E-Waste Project Coordinator, EMPA**Roundtable discussions on waste management issues confronting India*

15:30 - 15: 45 Coffee/Tea Break

15:45 - 17:00

SESSION IV: TOOLS FOR SUSTAINABLE CONSUMPTION**Chairman : Mr P Durai Singam**, *Chairman, Consumer Coordination Council***Rapporteur : Mr Rajan R Gandhi**, *Director, Safety Action Group***LIFE CYCLE APPROACHES FOR APPRAISING SUSTAINABILITY****Prof Vinod K Sharma**, *(IGIDR) / Ms Sangeeta Thakore* *(IIT Bombay)***STIMULATING SUSTAINABLE DEMAND: CONSUMER INFORMATION AND EDUCATION****Prof Manubhai Shah**, *Chairman Consumer Education & Research Society***SUSTAINABLE PUBLIC PROCUREMENT - FEASIBILITY, MERIT AND METHODS****Mr. Mandar Parasnis**, *Environmental Engineer & Consultant**Roundtable discussions on sustainable consumption in India*

17:00 - 17:30

PRESENTATIONS BY RAPPORTEURS**SUMMARY, CONCLUSIONS & VOTE OF THANKS:****Mr Alok Sinha**, *Adtl Secretary, Ministry of Agriculture*

annexure II

List of participants

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annexure III

Evaluation of meeting results based on participants evaluation questionnaires

Reponses:

Feedback forms were circulated at the Roundtable to all 37 participants who were reminded to fill them up and submit them to nominated representatives. 19 feedback forms were received from participants as follows:

State Government	1
Govt Bodies/PSUs	2
Industry	3
Academics	4
NGOs	6
Consultants	2
International Agencies	1

All forms were considered valid. However some questions had been misunderstood and/or were not answered by every respondent and these have not been included for analysis.

Analysis:

A) PREPARATION FOR THE MEETING:

1) preparation for the meeting:

Participants seemed highly satisfied with the preparatory work but felt that greater time should have been allotted for each subject, but this was not possible in a 1-day meeting. The loss of clarity in the meeting objectives can be largely explained by the fact that many participants were last-minute nominees of their respective organizations.

Agenda	Correct balance = 13; Too heavy/crowded = 6; Too Light = 0
Meeting Objectives	Totally clear = 7; Partially clear = 10; Not clear enough = 0
Issues at stake	Totally clear = 10; Partially clear = 6; Not clear enough = 0
Preparatory work	Good = 11; About right = 7; Inadequate = 0

2) meeting documents:

Participants clearly wanted more time to study the Background Paper, but the quality and length of the individual papers received very favourable comment.

Timing	Too late = 6; Insufficient time = 7; Too early = 2
Length of Documents	Too long = 0; About right = 15; Too short = 0
Quality of Documents	Most/all were good = 12; Average = 2; Many were poor = 0

B) ASSESSMENT OF THE WORKSHOP

1) expectations and whether they were met:

Expectation varied quite significantly. Whilst many saw an educational role (wanting to learn about SCP), some others expected solutions to sectoral problems. In aggregate, 11 persons found the Roundtable “Very useful” or “Useful” whilst 7 respondents found it “Somewhat Useful”. The relative absence of representatives from Industry was noted.

2) structure of the meeting

Format	12 respondents said that the balance was correct; 4 stated that there were too many issues/speeches
Interactivity	11 respondents found adequate time allotted for discussion whilst 4 felt there was not enough time for discussions
Atmosphere	11 participants reported a “casual/balanced” atmosphere, while 4 found it formal

3) additional issues for discussion

There was no standard set of responses; each participant suggested a different set of issues for inclusion so that there were 13 different suggestions. However, further discussions on waste, particularly hazardous waste and sewerage were common to 3 respondents.

4) suggestions for improvement

Whilst there was considerable variance in the responses, a recurring theme was that it was necessary to have in-depth, sectoral discussions by experts on each of the 5 issues tabled. This would yield suggestions and action plans for each sector for consideration by policy-makers. Thus this Roundtable was seen as an excellent staging point but sharper, sectoral focus was necessary.

annexure IV

Background Paper

This paper was prepared by Safety Action Group in collaboration with the United Nation Environment Programme (UNEP), Division of Technology, Industry and Economics (DTIE) and the European Commission (EC), Directorate General Environment.

It was compiled and edited by Rajan R Gandhi, Safety Action Group with contributions from Bas de Leeuw, Adriana Zacarias, Silvia Ferratini and Tuan Vu Anh from UNEP, Marjo Nummelin from the EC, Prof P S Ramkrishnan of Jawaharlal Nehru University, Mr Mandar Parasnis, Mr P U Asnani and Mr Satish Sinha of Toxics Link.

Disclaimer

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introduction

Sustainable consumption and production can be seen as the two faces of a same coin related to the "the use of goods and services that respond to basic needs and bring a better quality of life, while minimizing the use of natural resources, toxic materials and emissions of waste and pollutants over the life cycle, so as not to jeopardize the needs of future generations."¹

If sustainable production concerns the supply side, focusing on the economic, social and environmental impacts of production processes, sustainable consumption addresses the demand side, focusing on consumers' choices of goods and services, such as food, shelter, clothing, mobility and leisure, to fulfil basic needs and improve the quality of life.

Both in developed and developing countries the way goods and services are consumed and produced have become unsustainable, under different aspects. Developed and rapidly developing countries are characterized by a rate of use of natural resources that in many cases has gone far beyond the carrying capacities of ecosystems, causing a continued deterioration of the global environment that poses concrete and severe hazards to our planet and to humanity as a whole. Poor countries not only face the environmental consequences of global impacts caused by industrial development occurred more often outside their borders, but also face the domestic pollution generated by obsolete technologies, and also suffer profound social disparities and inequalities that have prevented them from real development.

At global level, it can be said that in the last decades we assisted to a sort of consumption revolution that is transforming the world. As stated in the 'State of the World 2004 report' issued by the World Watch institute, by virtually any measure - household expenditure, number of consumers, extraction of raw materials- consumption of goods and services has risen steadily in industrial nations for decades, and it is growing rapidly in many developing countries. Private consumption expenditures - the amount of goods and services at the household level- increased fourfold between 1960 and 2000, partially due to the increase of population, but much due to advancing prosperity in many parts of the globe.²

In a big part of the world we are assisting at emergence of a "global consumer class" (middle class, urban, well-educated, young consumers increasingly sharing similar consumption patterns around the world). This global consumer class encounters now more than 1.7 billion members increasingly oriented on material satisfaction of their needs (partly influenced by advertising and new information technologies) but also increasingly worried about impacts of their consumption on environmental and social issues (pollution, poverty, equity).

De-materialization of consumption (better products and services, doing more with less, leading to "more units of happiness" per input) is often quoted as a strategy to achieve sustainable consumption patterns without sacrificing - perceived - quality of life. Business has a key role in this area, to be achieved by eco-design, marketing of product service systems and using mainstream advertising techniques. Governments have a role to play as well, in particular (apart from implementing legal and economic instruments targeted at business) to contribute to awareness raising and involvement campaigns on SCP which engage, seduce and empower consumers, in particular youth. Among this "global consumer class", communication, awareness raising and information can in fact contribute to strengthen consumer demand for sustainable products and services, which then, through the market, will create stronger incentives for industry to design and market sustainable options.

Actually the vast majority of the world's population is not part of the global consumer class. For all the world's poor, consumption expenditures are focused almost entirely on meeting the basic needs. Poor people struggle to survive on a daily basis, lack access to clean drinking water and other basic services.

SCP aims at assuring to this group the fulfilment of the basic needs, the access to basic services: it could represent a way contribute through the market to achieve a better quality of life coupled with economic, social and environmental benefits and thus could represent a means to reduce poverty.

¹Symposium: Sustainable Consumption. Oslo, Norway; 19-20 January 1994.

²The Worldwatch Institute, 2004, *State of the World 2004 - Special focus: the Consumer Society*

i. the marrakech process

Changing the unsustainable patterns of consumption and production has been one of the major commitments of the World Summit on Sustainable Development held in Johannesburg in 2002 that dedicated to SCP Chapter 3 of the Johannesburg Plan of Implementation (JPOI). Stating that 'Fundamental changes in the way societies produce and consume are indispensable for achieving global sustainable development', the JPOI has called for the development³ of a 10-Year Framework of Programmes (10YFP) on SCP in support of regional and national initiatives.

UNEP, together with UN DESA, has been very active in promoting and supporting the development of regional and national strategies on SCP and coordinating the international cooperation of the 10YFP, so called Marrakech Process. The development of the framework consists of the following phases:

- a) Organizing regional consultations to promote awareness and identify priorities and needs for SCP;
- b) Building regional strategies and implementation mechanisms with regional and national ownership;
- c) Implementing concrete projects and programmes on the regional, national and local levels;
- d) Monitoring and evaluating progress.

The Commission on Sustainable Development (CSD) will review progress on the 10YFP during its 2010/11 two-year cycle. Two side events have been organized at the CSD14, highlighting SCP contributions for energy efficiency and industrial development.

In the years 2003-2005 nine regional consultations (in Latin America and the Caribbean, Asia-Pacific Region, Africa and Europe) were held, where each region identified its needs and priorities in terms of SCP.

Europe is currently in the process to develop its Action Plan on SCP and has moreover expressed interest in supporting countries from other regions to promote SCP patterns. The EC is supporting the organization of National Roundtable on SCP in China, India, Brazil and South Africa.

Asia-Pacific region: The Asia-Pacific meetings⁴ on the 10YFP were held in Indonesia (May 2003) and the Republic of Korea (November 2003). During these meetings preliminary ideas on a regional strategy for the Asia-Pacific region were developed, identifying the regional needs and priorities. The outcome of the meeting in the Republic of Korea was endorsed by the ESCAP Committee on Managing Globalisation, which incorporated work on a regional 10YFP in its medium-term work plan. The Asia Region has come up with the idea to develop a "Help Desk on SCP" and to explore the concept of Green Growth.

Marrakech International Expert Meetings: Within the Marrakech Process, two international meetings⁵ have been organized by UNEP and UNDESA to report back and further develop the process. The first meeting was held in Marrakech, Morocco (June 2003) and the second one in San José, Costa Rica (September 2005). In the Costa Rica meeting the consultation phase was closed, and it was agreed to move towards the implementation of the regional strategies or concrete projects on SCP. The third international review meeting will be organized in Stockholm, Sweden, 27-29 June 2007.

Marrakech Task Forces: In order to support the implementation of concrete projects, and to focus on a specific themes of SCP, Task Forces have been created with participation of experts from developing and developed countries. The Marrakech Task Forces are voluntary initiatives lead by countries that - in co-operation with other partners -commit themselves to carrying out a set of activities that support the implementation of specific projects of the Marrakech Process. So far, 7 Task Forces have been formed⁶: Cooperation with Africa (Germany), Sustainable Products (United Kingdom), Sustainable Lifestyles (Sweden), Sustainable Procurement (Switzerland), Sustainable Tourism (France), Sustainable Building and Construction (Finland), Education for sustainable consumption (Italy).

³United Nations, 2002, Johannesburg Plan of Implementation

⁴Regional reports are available at: <http://www.unep.fr/pc/sustain/10year/regional.htm>

⁵Reports on International meetings are available at: <http://www.unep.fr/pc/sustain/10year/international.htm>

⁶ For further information please refer to <http://www.unep.fr/pc/sustain/10year/taskforce.htm>

Cooperation Dialogue with Development Agencies: Recognizing the important role of development agencies and regional banks, a **Marrakech Cooperation Dialogue** has been initiated between development agencies and SCP experts. Its main objective is to build better cooperation in implementing development projects that simultaneously contribute to reduce poverty reduction and promote SCP. The Cooperation Dialogue was launched through a special session at the “Marrakech +2” meeting held in Costa Rica, September 2005 when it was recognized that the aspects of sustainable development and/or environmental sustainability are often included in national development plans, but there are generally no specific references to SCP. It is usually referred to in other terms and generally included in sectoral approaches (energy efficiency, waste management, etc).

A survey with development agencies conducted by UNEP with the main objectives to identify their SCP-related projects, find mechanisms for cooperation and better integrate SCP in their programmes provided encouraging results: 76% of the agencies responded to the survey. It reveals that development agencies carry out activities linked to SCP, even if they are not always labelled as such. Most of the agencies are supporting projects on energy and resource efficiency, waste management and water and sanitation. One third of the agencies support activities related to organic agriculture and fair trade (review available at: www.unep.fr/sustain/10year/Cooperation%20Dialogue.htm).

SCP and poverty reduction: Another important issue raised by the Marrakech Process is the link and the potential synergies in the implementation of SCP patterns, the reduction of poverty and the achievement of the Millennium Development Goals (MDGs). As SCP represents a way to contribute through the market to poverty eradication, it is fundamental that this link is formally recognized with the integration of SCP objectives and policies into national planning and programmatic instruments, such as the National Sustainable Development Strategies and the Poverty Reduction Strategy Papers (PRSPs). UNEP is currently developing a Manual on the integration of SCP into the PRSPs.

ii. european scp trends

The European model of wealth, like that of all industrialized countries, has been based on a high level of resource consumption, including energy and materials. Current total material consumption in industrialized countries is between 31 and 74 tonnes/person/year, and environmentally most significant is the consumption of materials for housing, food and mobility.

Important progress has been made in promoting cleaner production, not only in the EU, but also - often at a slower pace - in the wider European region. Progress has also been made in improving eco-efficiency and reducing the environmental impacts of consumption. However, progress towards changing consumers' behaviour has been rather limited. In Western Europe, absolute de-coupling of the environmental effects from growing material use and waste generation remains an important challenge.

Direct Material Consumption (DMC) has increased slightly in 2000 compared with early 1980 levels. It remained more or less constant during the second half of the 1990s. Non-renewable materials dominate DMC, with construction materials accounting for the largest share, more than 40%.

There has been an increase in generation of municipal waste per capita in western European whilst in Central and Eastern Europe, the volume of municipal waste has remained stable. There has been a 7% increase of total packaging waste in the EU15 between 1997 and 2001. However, the EU target to recycle 25% of packaging waste in 2001 has been significantly exceeded. In 2002 the recycling rate in the EU-15 was 54 %⁷.

⁷ The European Environment, State and Outlook: http://reports.eea.europa.eu/state_of_environment_report_2005_1/en/SOER2005_all.pdf

The EU15 has made considerable progress regarding sulphur dioxide emissions - reducing them by over 60% since 1990 - and nitrogen oxides - by 25%. However, CO₂ emissions continue to rise and NO_x levels continue to pose major environmental problems. In 2000, the energy sector continued to be the largest contributor to total EU greenhouse gas emissions, accounting for 27% of total EU15 emissions⁸. Total energy consumption in the EU has been rising since the mid-1990s - although more slowly than GDP.

Many fish stocks in European waters are over fished or fully exploited, due to over fishing, but also because of coastal and marine pollution, and changes in ecosystems. , Forest on the other hand is an example of a relatively well managed natural resource. The area covered by forests in Europe is around 36 %, and on average, has been increasing by half a million hectares a year in recent years.

iii. overview of european union scp tools and strategies

The ongoing EU enlargement is a driving force for political and economic changes in Europe. Currently there are 25 Member States in the European Union, and two more are likely to join next year. Through this process, the EU is extending its environmental standards and policies across the wider European region. Moreover, Europe is the world's largest trader, with the EU accounting for about a fifth of the world exports and imports. Trade policy has an important impact on global sustainable development. Europe is also a major player in the development process, with the EU providing approximately half of all public aid to the developing countries. These global interactions have a multiplier effect on approaches promoted by Europe.

The EU is fully committed to the SCP goals of the Johannesburg Plan of Implementation (JPOI). EU action in this field inscribes itself in the broader strategic framework of the Lisbon Strategy⁹ on Growth and Jobs, and the EU Sustainable Development Strategy (SDS).

The **Lisbon Strategy** aims at making the EU, by 2010, “the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion”. This strategy sets out the ambitious goal of achieving an economic growth rate of 3% per annum, which would roughly double GDP in 25 years¹⁰ , and it also aims to boost research and innovation. Accelerating progress in achieving the goals of the Lisbon strategy is now at the top of the EU agenda.

The European Social Policy Agenda¹¹ for the period 2000-2005 provides concrete measures for implementing the Lisbon Strategy's economic and social renewal objectives. The Commission Communication “The social dimension of globalization -the EU's contribution on extending the benefits to all”¹² acknowledges its key external role linking economic and social progress, proposing concrete measures.

The **EU Sustainable Development Strategy (SDS)**¹³ was adopted in 2001. It was revised in June 2006, to better respond to the current sustainability challenges and the EU's international commitments. The original six priority areas remain valid: combating climate change, public health, poverty and exclusion, ageing society, mobility and transport and management of natural resources¹⁴. But in the revised strategy, sustainable consumption and production is added as a priority area for action. The Commission is requested to develop an EU Action Plan on SCP by 2007, improving synergies between the existing policies and tools and addressing the potential gaps. Furthermore, some of the EU Member States have already developed national SCP strategies or action plans.

⁸Source: The World Energy, Technology and Climate Policy Outlook (WETO), published by the European Commission on 12 May 2003

⁹ Lisbon European Council, 23 and 24 March 2000

¹⁰ See the Communication “2003 Environmental Policy Review. Consolidating the environmental pillar of sustainable development”. Brussels, 3.12.2003, COM(2003) 745 final.

¹¹ COM(2000) 379 final

¹² Published in May 2004

¹³ Gothenburg European Council, 15 and 16 June 2001

¹⁴ “A sustainable Europe for a better world. A European Union Strategy for Sustainable Development”, Brussels, 15.5.2001, COM(2001)264 final

Monitoring the implementation of commitments is important. The European Commission will continue reporting at regular intervals to the European Council, i.e. the meeting of the heads of state and government, on progress implementing the SDS, using a number of headline performance indicators.

The Sixth Community Environment Action Programme¹⁵ (6EAP) identifies the EU's environmental goals to be attained from 2002 to 2012. It aims at ensuring a high level of environmental protection and de-coupling environmental pressures and economic growth. To achieve this, it focuses on enhancing information, integration and implementation. Key areas to be tackled are climate change; nature and biodiversity; environmental and health and quality of life; and natural resources and waste. The programme states as one of its aims better resource efficiency and resources and waste management to bring about more sustainable consumption and production patterns.

The 6EAP is complemented by **seven thematic strategies** with concrete targets in the areas of air quality, soil protection, sustainable use of pesticides, protection and conservation of the marine environment, waste prevention and recycling, sustainable use and management of natural resources and urban environment. Especially the waste and resource strategies are key ingredients of the EU's efforts to move towards sustainable consumption and production patterns.

The Thematic Strategy on the Sustainable Use of Natural Resources¹⁷ (December 2005) aims to reduce the environmental impacts associated with resource use and to do so in a growing economy. The strategy is focusing on improving knowledge, developing monitoring tools and fostering strategic approaches in specific economic sectors in the EU and internationally.

One key initiative under the Thematic Strategy on the Sustainable Use of Natural Resources is the proposal to set up an **International Panel on Natural Resources** to examine and provide information on the global aspects of natural resource use and its environmental impacts. This kind of information is crucial for improving EU policies, but it can also give useful input to international processes such as the Marrakech process. The Panel will be set up jointly by the European Commission and UNEP.

The Thematic Strategy on the prevention and recycling of waste (December 2005) seeks to make Europe a recycling society that seeks to prevent waste and, where waste cannot be prevented, uses it as a resource. It aims at reducing the environmental impacts of waste by focusing waste policy on the key environmental impacts, taking account of the life-cycle of resources and products; promoting the prevention of waste policies must reach out to the individuals and businesses whose decisions influence the generation of waste, strengthening recycling activities by setting standards, modernizing and simplifying the EU waste legislation, and improving implementation.

To achieve the environment policy objectives, the EU uses a blend of policies and instruments, including market based and economic instruments as well as information and communication tools. It also active seeks to involve all government levels and relevant actors (business, citizens, NGOs and consumer organizations and other social partners). Integration of environmental considerations into sectoral policies remains crucial. The so called Cardiff process¹⁸ has been partly successful in doing this at the EU level and in some sectors. However, the pace of progress towards further environmental integration needs to be further boosted.

The EU's **Integrated Product Policy (IPP)**, seeks to minimise the environmental impacts of products by looking at all phases of a products' life-cycle and taking action where it is most effective. The life-cycle of a product is often long and complicated, covering all the areas from the extraction of natural resources, through their design, manufacture, assembly, marketing, distribution, sale and use to their eventual disposal as waste. At the same time it also involves many different actors such as designers, industry, marketing people, retailers and consumers. IPP attempts to stimulate each part of these individual phases to improve their environmental performance.

¹⁵ Decision No 1600/2002/EC of the European Parliament and of the Council of 22 July laying down the Sixth Environment Action Programme.

¹⁶ Commission Communication "Towards a thematic strategy on the urban environment". COM(2004) 60

¹⁷ Commission Communication "Thematic Strategy on the sustainable use of natural resources" COM(2005) 670 final, Brussels, 21.12.2005

¹⁸ "Integrating environmental considerations into other policy areas -a stocktaking of the Cardiff process. Brussels, 01.06.2004, COM (2004) 394 final.

Implementation of the IPP is well under way, with two pilot projects with European companies going on to demonstrate how IPP can work in practice, on mobile phones and teak furniture. Research has been conducted on environmental impacts of products in order to identify and stimulate action on those products with the greatest environmental impact and room for environmental improvement, which is the key goal of IPP. The fields with most potential are food, transport and housing.

Information tools are crucial to enable consumers make informed choices. The **EU eco-label scheme**, launched in 1992, is a voluntary scheme designed to encourage businesses to market products and services that are kinder to the environment and for European consumers - including public and private purchasers - to easily identify them. The Flower logo is used across different product groups and Member States, making it easier to recognize products with a superior environmental performance. Criteria are established for individual product groups, such as paper products, textiles, detergents, paints and appliances such as refrigerators or dishwashers, but also service sectors such as tourism.

The EU's **Environmental Technology Action Plan (ETAP, 2004)** aims to stimulate the development and uptake of environmental technologies in order to protect the environment and boost competitiveness. It focuses on getting environmental technologies from research to markets; improving market conditions; and global action. More priority and funding have been given to environmental technologies and eco-innovation in the new research and development programme. Technology platforms have been established for areas relevant such as water supply and sanitation and hydrogen and fuel cells.

The EU is also actively promoting green public procurement. The volume of public procurement in the EU is c. 16 % of EU wide GDP - making it important vehicle to create markets for sustainable products and services in order to help achieve environmental goals. In some product and service groups the impact could be greater still, as public purchasers are particularly significant in the market (computers, energy efficient buildings, public transport...). A **Handbook on Green Public Procurement** was published in all EU languages in 2005, to give public authorities at all levels concrete information on how they can integrate environmental considerations into their purchasing policies. The Sustainable Development Strategy sets the aim of by 2010 having the average figure for green public purchasing in the EU as high as it is now in the best performing member states.

One example of **regulatory tools** promoting SCP is the EU's recent '**Eco-design directive to energy-using products**' adopted in June 2005. It represents an important step in setting environmental design standards for appliances such as lightning, heating equipment or consumer electronics.

Some initiatives have also been taken by the business sector that contribute to SCP through **Corporate Social Responsibility (CSR)**, the **Environmental Management and Audit Scheme (EMAS)**, green supply chain, among other voluntary agreements. The European Commission focuses on promoting CSR practices by Europe's 25 million SMEs which are recognized as the most important drivers of economic growth and employment, and represent over 95% of European businesses. The programme aims at ensuring that SMEs have a good understanding of the drivers, success factors and pitfalls related to CSR. The programme has offered SMEs a tailored, user-friendly CSR toolkit.

The EU's Environmental Management and Auditing Scheme (EMAS) offers companies in the manufacturing sector a voluntary instrument to improve their environmental performance. EMAS covers companies and organizations from all economic sectors, including public authorities. The European Commission is also aiming to stimulate and co-ordinate voluntary actions by business with regard to sustainable production.

EU Main challenges

While legislation and technological progress has enabled major environmental gains, the increasing demand means that pressures on the environment from consumption and production remain high. The key challenge is to address the economic, social and environmental dimensions of consumption and production in an integrated way, taking into account impacts on 3rd countries.

The European Regional Stakeholder meeting on SCP (November 2004) identified the following key SCP challenges for further work:

- De-coupling economic growth from environmental degradation by addressing both supply and demand, with a focus on the most serious environmental challenges (promoting eco-efficiency in sectoral policies);
- Taking a holistic approach that considers whole life-cycles of products and services, intervening to tackle problems as early as practicable in the resource/waste flow;
- Developing coherent and integrated national and regional strategies on SCP, with a sectoral and cross-sectoral approach and including all the relevant stakeholders;
- Enhancing framework conditions for sustainable markets;
- Major innovation to enable the shift to cleaner and more resource-efficient systems and processes for delivering improved quality of life for all;
- Capacity building and integration of sustainable development considerations into all policy sectors;
- Developing a set of indicators for measuring progress, and adopting targets and timelines where appropriate;
- Addressing the international environmental impacts of EU consumption patterns, ensuring that basic needs are covered for all.

For more information please refer to the comprehensive overview provided in the *Inventory on Sustainable Consumption and production in the EU*¹⁹ developed by the European Commission and EU Member States' experts, and to the European Commission website: <http://ec.europa.eu/environment/>.

¹⁹ EC, Sustainable consumption and production in the European Union, November 2004.

iv. consumption and production priorities in india

At the planning stage of the India Roundtable on Sustainable Production and Consumption (SCP), it was realised that for a country as diverse as India, it would be unwise to present the views of a single 'authority'; instead, the organisers and hosts felt that it would be prudent to identify some of India's most pressing SCP issues and obtain the views of recognised experts in the respective fields, throwing the issues open to debate by other experts and concerned stakeholders.

From a numerous list of issues demanding priority, four were short-listed:

Energy: Since India is nearing a crisis situation with the needs of a booming economy and rapid urbanisation having to be tempered by dwindling fossil fuel resources, a high crude oil import bill and the need to reduce greenhouse gas emissions. On the production side, India appears to be faced with the problems of inadequate capacity, low technology and huge transmission and distribution losses. On the consumption side, India faces not only the demands of an growing and increasingly affluent population, but energy inefficiencies inherent in the end products offered to consumers. The paper herein merely outlines some of the 'live' issues before India. A detailed presentation will be made by Dr Ajay Mathur, the Director General of the Bureau of Energy Efficiency at the Roundtable which will address these and other issues.

Agriculture: Farming supports over two-thirds of India's population and no debate on sustainable development is meaningful without reference to agriculture. India's chosen path to food self-sufficiency has been the "Green Revolution" model - one which relied heavily on intensive agriculture using synthetic fertilizers and chemical pesticides and providing assured irrigation to selected areas. This model has invited a degree of criticism. At the bio-physical level, the Green Revolution model is believed to have been responsible for increased soil salinity, chemical pollution of the soil and ground water, and organic carbon depletion. It is also held responsible for causing social tensions since it favours a few selected areas and marginalizes the bulk of the farming community. The spate of suicides by indebted farmers in parts of India has attracted widespread and critical comment. Prof P S Ramakrishnan of the School of Environmental Sciences, Jawaharlal Nehru University, is the author of the paper which follows - Knowledge Systems as the Basis for Sustainable Agriculture. He will also be speaking on Sustainable Agriculture at the Roundtable.

Waste Management is becoming an alarming problem in today's India. Increasing disposable incomes and an exponentially growing urban population combined with near-primitive methods of waste collection, transportation and disposal lie at the root of the problem. Adding to the already strained mechanisms is the relatively new issue of E-waste, generated not merely by increased wealth (and therefore discarding of consumer durables), but also by changing lifestyles (e.g. mobile phones) and - alarmingly - imports of used electronic discards from more developed countries. Two papers are included in this Background Note. One is on the management of Urban Solid Waste from Mr P U Asnani, Consultant to several waste management projects including World Bank sponsored studies. Another - on E-Waste - is by Satish Sinha of Toxics Link, one of India's leading NGOs focussing on electronic waste; Mr Sinha will also be speaking on the challenges and opportunities posed by E-waste in India.

The **Sustainability of Consumer Demand** is the fourth issue for discussion. India's legendary “consuming/middle class” of over 200 million has invited the attention of virtually every major consumer goods manufacturer in the world. The post 1991 liberalization of the Indian economy has meant that imports of consumer goods are now more or less freely permitted and indigenous production of consumer durables as well as FMCG is booming. Whilst it is understood that a vibrant consumer demand fuels the economy, the real issue is not curbing consumerism but diverting consumer preferences towards products which are made, used and may be discarded in a sustainable manner, i.e. goods and services which meet their needs in an efficient and effective way with minimal environmental, social and economic impact. This diversion requires that the consumer be informed and given the tools to make the correct purchasing decision, e.g. by means of “eco-labels”, comparative test reports etc. Mr Mandar Parasnis, who has widespread experience in eco-labelling in India and abroad, has submitted the paper on Stimulating Demand for Sustainable Goods and Services. He is also making a presentation at the Roundtable.

Water: It was hoped to include a paper on water - another major issue confronting India. The focus of emphasis was to have been the way India utilises water, a commodity where water wars have been predicted by many. Regrettably, for operational reasons, it has not been possible to include this paper here but this does not in any way detract from the importance of the issue.

For the sake of brevity, some of the papers presented herein have been edited with the full knowledge of the authors. However the E-Mail addresses of each author has been provided so that those interested may directly contact them for the full paper or for other details. The guidance and assistance from the Division of Technology, Industry and Economics, UNEP and the Ministry of Environment & Forests, Govt of India, in preparing this document is gratefully acknowledged.

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Energy Challenges in India

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introduction

In preparation for the World Summit on Sustainable Development in Johannesburg, 2002, the Working Group on WEHAB (Water, Energy, Health, Agriculture and Biodiversity) had prepared a paper which clearly and simply outlined the key energy issues facing the world. Much of the paper relates to India even today. The authors stated that *“at the local and national levels, a reliable energy supply is essential to economic stability and growth, jobs and improved living standards.”*¹ The key issues and challenges were:

- Some 1.7 - 2.0 billion people in the world, mostly in rural areas, have no access to electricity; a further 2 billion are severely undersupplied.
- One-third of the world relies on traditional fuels - wood, dung and agricultural residues - to meet their daily heating and cooking needs.
- The world's billion poorest people use only 0.2 tonnes of oil-equivalent energy per capita annually, while the billion richest - those earning on average over US \$ 20,000 a year - use nearly 25 times as much.
- World energy systems are responsible for more than half the greenhouse gas emissions due to human activities; most of these emissions are due to fossil fuel use.

These issues are applicable to India even today. Indeed, some would say that India's energy situation is nearing crisis levels, demanding immediate remedial action.

ENERGY CONSUMPTION IN INDIA

Per capita energy consumption in India is amongst the lowest in the world. At the turn of the century, the Centre for Monitoring the Indian Economy had estimated the following comparative consumption of energy as kilograms of oil equivalent (kgoe)

India	290	kgoe
Pakistan	293	kgoe
China	597	kgoe
Germany	4017	kgoe
Japan	4026	kgoe
USA	8080	kgoe

Current estimates (2004-05) of Indian energy consumption are 350 Kgoe. This pertains to commercial energy; consumption of non-commercial energy (from firewood, dung, agricultural residues etc) is currently estimated at 100 million tonnes of oil equivalent².

Industry consumes approx 52% of commercial energy (transportation accounting for just over 25%) and this raises an interesting issue. Energy efficiency has been remarkably low. Energy intensity (energy consumption per unit of GDP) is one of the highest in the world - 3.7 times that of Japan, 1.55 times that of the USA and 1.47 times the rest of Asia³. This means that significant savings can come out of improved efficiency in energy utilisation.

¹ A Framework for Action on Energy, WEHAB Working Group, Aug 2002

² Raghuraman, V and Ghosh, S for CII; Indo-US Cooperation in Energy - Indian Perspectives, March 2003

³ Thakral, K et al for the World Bank(DRAFT, May2006). Developing financial Intermediation for Energy Efficient Projects in Brazil, China& India. (India Country Report)

A World Bank survey found that Indian industry could potentially save 20-30% of total energy consumption - amounting to about 30,000 MW. This has to be seen in the context of a nation which is struggling to balance its resources and where additions in generating capacity are of the order of U.S.\$ 1.0 million per MW.

projections

India's energy challenges will not merely arise due to its growth rate. There are other demographic factors which come into play. The first is the rapid urbanisation that India is witnessing. Whereas rural areas are large consumers of non-commercial energy from sources such as biomass, agricultural residues and dung, these sources are simply unavailable in urban areas.

Secondly, India will witness a dramatic rise in the so-called “consuming class” not only due to increased wealth, but also the age distribution of its population. By 2025, more than 50% of its population will be 20 years old or less - 600 million people. Thirdly, India's growth in the last decade or so has come from the services sector, which is relatively less dependent on energy. In the foreseeable future, the manufacturing sector appears likely to contribute more significantly to growth rates, and this sector is more energy-hungry.

ACCESS TO ENERGY

Although India claims that over 86% of its villages are electrified, the actual supply of electricity to rural areas is erratic and often appears to be a mere token. Providing high quality power to rural areas on a 24 x 7 basis remains a distant dream. (Indeed, even urban areas are routinely deprived of this). Also, it must be remembered that even if only 14% of villages remain to be electrified, this still translates to a figure of 80,000 villages².

ENERGY PRODUCTION

Conventional Energy Sources

India has very small hydrocarbon reserves, about 0.4% of the world's reserves and thus imports more than 25% of its primary energy needs as gas and crude oil². The country is thus the 4th largest oil consumer in the Asia-Pacific Region, after Japan, China and S. Korea and imports over 20% of its requirements. India's hydrocarbon reserves were believed to be⁵:

Oil Reserves: 5.70 BBL (billion bulk barrels)

Gas Reserves: 853.5 billion cu.m

Proven coal reserves, in contrast are believed to range from 84 billion tonnes⁶ to 92 billion tonnes³, with another 154 billion tonnes as unproven reserves, considered adequate for the next 100 years. Indian coal, however, suffers from high ash content which requires special washeries. Coal reserves are predominantly found in Eastern India and thus require inefficient transportation. As is well known, the combustion of coal - particularly high ash content coal - adds significantly to GHG emissions and contamination of the atmosphere by particulates.

⁵ CIA World Factbook. See www.cia.gov/cia/publications/factbook

⁶ Sarma, EAS, Magoo, J N & Sachdeva, A S: India's Energy Scenario in 2020, World Energy Council

Renewable Energy Sources

Hydroelectric power constitutes about 25% of India's current power generation, half of what it was in the sixties. There is considerable apprehension about the impact of large dams but the potential for Hydel power generation has been estimated by Sarma et al (See Ref 6) as follows:

Gross Theoretical Potential: 2638 TWh/year
 Theoretically feasible: 660 TWh/year
 (TWh = Terra Watt Hours)

This is amongst the highest in the world.

NON-CONVENTIONAL ENERGY:

Sarma et al have also estimated the potential for Wind Energy at 45,000 MW. States such as Gujarat, Tamil Nadu, Orissa, Maharashtra as well as Lakshadweep and the Andaman & Nicobar islands provide the greatest potential.

India is blessed with plenty of sunshine and the daily incidence of solar radiation ranges between 4 - 7 KWh/m² - huge potential for Solar Photovoltaic (SPV) electricity which could be generated '*in situ*'. But since the capital costs of SPV generation are prohibitive, solar energy has successfully been harnessed for heating and a large number of solar cookers and solar hot water geysers have been installed throughout India. The modularity and decentralized nature of renewable energy technologies make them particularly well suited for rural energy development.

There is also believed to be considerable scope for harnessing tidal energy, particularly in the Gulf of Kutch, the Gulf of Khambat and the Sunderbans area. The technology, however, has not been proven in India on any large scale.

GENERATING COSTS:

No discussion on electricity generation could be complete without a consideration of the costs involved. Sarma et al have estimated the following costs (U.S. cents/KWh)

Coal:	6.43
Hydel:	9.33
Oil:	8.82
Wind:	14.01
Solar:	59.89

Whilst these figures are about 7 years old, the order of difference is likely to remain more or less similar. The costs were arrived at after giving due consideration to life cycles.

GREENHOUSE GAS (GHG) EMISSIONS

Greenhouse gas emissions are closely associated with energy production and consumption. In 1994, 743.8 out of a total 1222.8 million tonnes of CO₂-equivalent were attributable to the energy sector in India.⁷

As reported by Sharma, Bhattacharya and Garg⁸, the GHG intensity of the Indian economy in the year 2000, in terms of the purchasing power parity, is estimated to be little above 0.4 ton CO₂ equivalent per 1000 US dollars, which is lower than that of the USA and the global average. The Indian Government has targeted an 8% GDP growth rate per annum for 2002-07 to achieve its development priorities.

⁷ UNFCCC, Sixth compilation and synthesis of initial national communications from Parties not included in Annex I to the Convention, 2005.

⁸ Subodh Sharma, Sumana Bhattacharya and Amir Garg, Greenhouse gas emissions from India: A perspective, Current Science, Vol. 90, No.3, 10 February 2006.

In order to achieve these developmental aspirations, substantial additional energy consumption will be necessary and coal, being the abundant domestic energy resource, would continue to play a dominant role. Since GHG emissions are directly linked to economic growth, India's economic activities will necessarily involve increase in GHG emissions from the current levels. The CO₂ equivalent emissions from India are set to increase up to 3000 million tons by 2020.

ENERGY EFFICIENCY AND GHG EMISSIONS REDUCTION

Although it is difficult to estimate the impact of energy efficiency improvements in reducing the GHG emissions in the coming years, it is important to recognize the significant impact that the energy efficiency measures can collectively have towards reducing GHG emissions. As mentioned earlier, Raghuraman & Ghosh (See Ref 2) quoting a World Bank Survey found that about 30,000 MW could potentially be saved by efficiency increases. A study conducted by the Confederation of Indian Industry lists the following energy savings potential, by sector of industry:

Pulp & Paper:	25%
Textile:	25%
Glass & ceramics:	20%
Sugar:	20%
Cement:	15%
Fertilizers:	15%
Petrochemicals:	15%
Aluminum:	10%
Iron & Steel:	10%
Refineries:	10%

The Planning Commission had in the '90s estimated that savings from improved efficiency could accrue as follows:

From Agriculture:	up to 30%
Industry:	up to 25%
Commercial:	up to 20%
Residential:	up to 20%
Transport:	up to 20%

The figures speak for themselves. Organisations such as the Bureau of Energy Efficiency (BEE), established by the Energy Conservation Act in 2001, and the Petroleum Conservation Research Association have now become increasingly active. In particular the BEE is mandate to work on enhancing awareness (for energy efficiency) as well as programs such as standard and labelling, building codes (that incorporate energy efficiency), energy auditor and energy manager certification for designated consumers⁹, etc. Several initiatives such as the wide-ranging reforms in the past decade have accelerated the economic growth and lowered the barriers to efficiency.

Energy and power sector reforms, for instance, have helped to enhance the technical and economic efficiency of energy use. Policies adopted by India for a sustainable development, such as energy efficiency, improvement measures in various sectors, increasing penetration of cleaner fuels. And a thrust for renewable energy technologies have all contributed towards GHG emission reduction since the last decade.

The earlier reluctance to use fiscal measures to penalise energy profligacy seems to have been overcome, with automobiles of over 1300 cc capacity being taxed at a higher rate from 2006. Large public sector Companies are now required to include a section on energy conservation measures. The sheer cost of energy has made manufacturers more conservation and efficiency conscious. Yet in the Small & Medium Sector of industry, it is largely business as usual. Lack of awareness of improved technologies, lack of access to credit facilities, marginal profitability and reluctance to change all contribute to the inertia. This is one area which needs to be addressed with urgency.

⁹Designated consumers include include energy intensive industries and other establishments

Knowledge systems as the basis for sustainable agriculture

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introduction

In India so far, the emphasis has so far been on the 'green revolution', as the basis for national level food security; this is the context in which there is an increasing concern on agricultural, social and ecological grounds. On the social side, the benefits have largely gone to a small section of the Indian agricultural society; the vast majority of those still following traditional agricultural practices have been marginalized. The increasing incidence of farmer suicides in recent times is indicative of the level of frustrations setting in. Because of the emphasis on modern agricultural practices and for a variety of other reasons, multi-purpose tree cover, which traditionally had been the basis for sustainable soil fertility is rapidly declining. Arising from this loss of tree cover, even small farmers outside the 'green revolution' agricultural areas too have become more and more dependant on inorganic fertilizers, pesticides, etc. for sustaining their already marginalized agriculture. Alternate technologies that are based on the value system of the given rural community are the need of the hour. It is in this context that one has to look at 'knowledge systems' as the basis for sustainability at an affordable price for the small marginalized farmers.

Arising from excessive use of inorganic fertilizers in 'green revolution' agricultural areas, and because of rapid land degradation, crop yield decline has already started. Excessive use of sub-surface water brought up for irrigation has already had its impact not only in terms of rapidly declining water table, but also in terms of increasing salinity and the consequent site desertification is extensive. The emphasis here has to be towards improvement in : (i) soil chemical quality through organic residue management, not only for sustainable nutrient management; (ii) physical structure of the soil in order to ensure sustainable use of the conserved soil moisture; and (iii) halting the marginalization of the small-farmers, even under 'green revolution' agriculture regions.

Sustainable agriculture, therefore, is linked with sustainable management of natural resources in a much broader sense. In a developing country like India, the issue of sustainable agriculture is complex, with a large number of ethnic societies living under diverse ecological situations and at varied stages of economic empowerment. Besides, the natural resources on which these ethnic societies are dependant upon for sustainability of their diverse agricultural activities are also at varied levels of conservation/degradation. Therefore, to arrive at a standardized pathway for economic well being is difficult. We have to deal with each broad typology of the socio-ecological situation differently.

This is the context in which the role of knowledge systems becomes significant for arriving at generalizations in the area of conservation of natural resources and the linked food security.

THE CONTEXT

In India in particular, agricultural system management and development has been rather patchy. We have to deal with three broad typologies of socio-ecological systems: (i) on one extreme in the rural plains largely devoid of tree cover, we have energy-subsidized modern 'green revolution' agriculture, and recently the productivity from this land use has shown declining tendencies due to land degradation arising from excessive use of chemicals and groundwater resources; (ii) on the other extreme are a range of 'traditional' multi-species complex agricultural system typologies that are managed casually or under low intensities levels operated by traditional societies which remain neglected and marginalized; and (iii) falling in between are a range of agro-forestry models, operating under middle intensity levels of management that are rapidly breaking down due to loss of tree cover.

THE ISSUE OF FOOD SECURITY

With food self-sufficiency under threat, and increased marginalization of a large sector of the farming community living under famine conditions with little access to food and nutrition, we need to re-look at agricultural developmental policies geared towards the affluent farmer, and make it broad-based, particularly since we have a much larger chunk of the human population still dependant upon agriculture. With women forming a substantially more vulnerable sector dependant on agriculture, gender-linked and poverty concerns also become major issues.

KNOWLEDGE SYSTEMS IN AN ECOLOGICAL CONTEXT

Agricultural development and natural resource management so far has largely been based on text-book centred 'formal knowledge'. There is an increasing realization today that applying formal knowledge based technologies alone have often failed to address issues linked with natural resource management effectively. It is in this context there is an increasing realization about the role of traditional ecological knowledge (TEK). There is an increasing interest in using an appropriate mix of the 'traditional' with the 'formal' for 'hybrid' technologies that would contribute towards long-term land use sustainability and food security too. In the area of natural resource management, we are particularly concerned with traditional knowledge that modulates ecological processes, both at the natural and human-managed ecosystem levels.

WHAT IS SUSTAINABLE AGRICULTURE?

Classifying complex agricultural systems and relating them to a gradient in management intensification is a difficult task. However, a grouping based loosely on the intensity of land use and management provides a useful framework of discussing the relationship between agro-ecosystem complexity and function.

It is increasingly felt that biodiversity within agricultural systems plays an increasing role in determining agro-ecosystem stability and resilience. Therefore, one key for sustainable agriculture would be through ensuring some feasible levels of biodiversity, both at the above- and below-ground levels, along with attendant TEK inputs which will also vary. What we do in this direction will differ depending upon the kind of agricultural system that we deal with. In the case of traditional societies, we should be aiming to go for an 'incremental pathway' for redeveloped agricultural systems, building step by step on the available rich TEK base as the starting point.

POSSIBLE PATHWAYS FOR AGRICULTURAL DEVELOPMENT

If we consider high input modern agriculture as only one of the possible pathways for agricultural development one could suggest at least two additional pathways for sustainable agriculture: (a) evolution by incremental change, where in we build models step by step with community participation, based on their TEK itself, bring in formal knowledge only to the extent required; (b) restoration through the contour pathway, where we create agro-forestry based models which fit into the given socio-ecological contours of industrialized agriculture, which symbolises modern agriculture. These are given below as three sets of case studies.

Incremental pathway

Many traditional agricultural systems need to be redeveloped through incremental, rather than quantum change, based on traditional ecological knowledge; anything drastic may not find acceptance by the local communities. Thus, one may have to consider a short-term compromise that may be constrained because of ecological, economic, social and/or cultural reasons, apart from a more ideal and desirable long-term strategy. The most comprehensive study on the 'incremental pathway', as a route for agricultural development is available through the case study on the shifting agricultural system from north-eastern India. The integrated analysis of the land use dynamics in north-east India, done by this author, happens to be a unique community participatory research in the interface area of natural and

social sciences. This has set the scene for a possible solution to the vexed issue of jhum, (shifting agriculture) which has defied solution over the last over 100 yrs, in spite of repeated governmental attempts.

Case Study 1: Redevelopment of Jhum (shifting agriculture) system in north-east India:

To elaborate one of the components in this developmental pathway, a socially valued ecologically significant keystone species such as the Nepalese alder (*Alnus nepalensis*) is extensively used by tribal societies for soil fertility management, being a good nitrogen-fixing species. This early successional tree species in the north-eastern hill region, which is traditionally conserved in the slash and burn plots conserves up to about 120 kg. Nitrogen ha⁻¹ yr⁻¹. Many socially valued bamboo species of the forest fallow phase too contribute towards concentration and conservation of nitrogen, phosphorus and/or potassium within the jhum system.

Amongst traditional crop species, a species such as *Flemingia vestita* that can fix up to 250 kg. nitrogen ha⁻¹ yr⁻¹, and is valued socially being a food item of value during lean winter months for local communities was introduced. Such socially valued tree species could be used for fallow management with community participation, since people can identify themselves with a value system that they understand and appreciate, and therefore participate in the process of development.

Such considerations formed the basis for a decentralized village development plan in one of the north-eastern hill States of India. The basis for execution of the NEPED project funded by the India-Canada Environmental Facility and executed by the Nagaland Government is that it is based on TEK available with local communities - traditional value systems that have ensured the integrity of the cultural landscape. From the point of view of the local communities, it is for redeveloped jhum based on sustainable fallow management and for diversified and increased economic benefits; from the point of view of environmental concerns it is seen as a step to increase forest cover that can be sustainably harvested; from the point of the funding agency, it is perhaps viewed as carbon sequestration.

Contour pathway

A whole variety of agro-forestry and alley cropping systems come under the 'contour pathway'. Depending upon whether we are dealing with hill agriculture or in the plains of India within the context of 'green revolution' agriculture or otherwise, a variety of agro-forestry system models fits into this scheme of things. The Case study 2 is a possible pathway for many hill agro-ecosystems, and was initially started off by the Mindano Baptist Rural Life Centre in the southern part of the Phillipines, for mountain agriculture.

Case study 2: Sloping Agricultural Land Technology (SALT):

This is based on the planting of annual and perennial crops in 3-5 bands between double rows of nitrogen fixing trees and shrubs planted on contours for soil conservation. The objective here was to establish a stable ecosystem that would check soil erosion, ameliorate the chemical and physical properties of the soil and lead to increase in the income of the farmers. Whilst these objectives were realized in the initial experimental phase, attempts are now being made to introduce this technology in other situations in Asia.

However, the initial reaction to this extension has been disappointing, primarily for two reasons: (i) TEK, unfortunately is not the primary basis for selection of species, whether they be crop or tree species; (ii) farmers with uncertain land tenure were unable to accept the technology, a common problem with tree planting in many parts of the tropics; (iii) the land holdings are so small and fragmented that this technology becomes a spatial misfit; (iv) few farmers could afford the heavy investment involved in site preparation and management.

Because of these considerations, a variety of attempts are now being emphasized to develop agro-forestry models that take on board the social dimensions of the problem. The solution to these impediments lies in not universalizing land use development but giving due consideration to socio-ecological system specificities.

Case study 3: Agroforestry system models for the plains of India

For the plains there are many agro-forestry models developed by the ICAR in India, which may or may not be linked with local value systems. On the other hand, a range of agro-forestry models based on traditional value systems at of crop organization, and of introduction of tree species as part of agro-forestry models, can ensure community acceptance. Many of the ICAR models largely tend to be based on 'formal knowledge' based identification of agro-forestry trees. Therefore, there is great scope to introduce agro-forestry models incorporating where socially valued, ecologically significant keystone species based on TEK.

Sectoral approach for creating buffering mechanisms in the context of industrialized agriculture

Case study 4: Biological management of soil fertility in tea plantations (effort to have buffering mechanisms through sustainable soil fertility, against soil degradation):

Soil organic matter and the linked biological activities as part of soil ecosystem processes are poorly understood and managed in most agro-ecosystems. The South Asian Network (SARNet) has been aiming at understanding sustainable soil fertility management centred around two basic principles: (a) that the capacity to manage soil fertility is dependent on the understanding of the biological processes regulating nutrient flux, organic matter dynamics and soil physical properties, and (b) that the sustainable management of soil fertility must be based on ecosystem/landscape level understanding of processes, integrating the soil management concerns of the farmer, his objectives and decisions. In recent times, in the tea growing areas of the Western Ghats, serious problems of soil exhaustion had become evident due to intensification of land use. Therefore, the aim here is to bring back soil ecosystem resilience arising from the already depleted soil biodiversity because of excessive dependence on inorganic fertilizers.

The use of earthworms species as ecosystem engineers, which directly or indirectly control the availability of resources to other organisms by causing changes in the physical state of the biotic and/or abiotic materials is the basis for this technology based on TEK available with communities. At the heart of the concept, lies the earthworm's ability to move through soil and to build organo-mineral structures as macro-aggregates. Because of the diversity of interactions between the mineral soil on the one hand, and organic matter and other soil organisms on the other, under conditions of adequate soil moisture level, earthworms bring about fundamental transformations of the work already done by the soil microbes and other soil organisms.

Traditional vermiculture technology uses mostly surface-living earthworms or garbage worms to prepare compost from high quality organic matter like animal dung or from an amendment of waste biomass. Though this technology allows quick transformation of high quality substrate into mineral-rich compost that could readily be used in the field, the end results are not often satisfactory under field situations because: (a) being low in C:N ratio, the system demands repeated inputs; (b) it creates limited niches not very suitable for organisms that have major activities in the soil profile at different depths, particularly closer to plant roots; (c) one-time application of nutrients are more susceptible to be volatilised, washed out or leached; (d) surface application may decrease plant resistance for pest attack if not managed properly; (e) earthworms with limited capacity to penetrate deeper into the soil are often unable to thrive in agricultural systems under conditions of intense surface activities,. However, vermi-composting is good for systems that cannot be managed with sufficient quantities of localized organic residues being readily available. It is in this context, the macro-fauna network coordinated by a set of Indian and European scientists with participation from the tea garden managers in standardizing an in situ technology towards rehabilitation of degraded soils under intensive tea cultivation in the Western Ghats of southern India.

The result of this interaction between academic institutions at the national and international levels with agro-industries, was the development of a patent entitled as 'Bio-organic Fertilization for Plantations' or in short as 'FBO', as part of the of SARNet/TSBF programme. This opened up possibilities for sustainable land use management under a variety of situations, involving natural and human-managed ecosystems. This sectoral approach to issues of sustainability could have a cascading effect from plot levels right up to ecosystem/landscape levels, since soil fertility is often a critical limiting factor for land use development.

conclusions

What then are the emerging issues and solutions to the problem of sustainable agriculture?

On the one extreme, when dealing with 'green revolution' agriculture, we need to drastically cut down all subsidies that promote excessive use of water, fertilizers, pesticides and insecticides, and compensate for this through bringing back tree species as part of appropriately designed agro-forestry models, so as to create appropriate buffering mechanisms to counter the ill-effects from energy-subsidized agriculture; also, one needs to have a closer look at the unsuitability of 'rice-wheat rotation systems now operating in these areas of intensified agriculture because of the additive adverse impacts arising from this cropping pattern; through appropriately designed agro-forestry models, there is an urgent need to increase tree cover in the rest of the rural landscape in the plains, along with judicious use of fertilizers linked with the organics in the rest of the marginalized rural plains outside the 'green revolution' belt; we need to have 'hybrid technologies' that are derived through appropriate linkages made between traditional and formal knowledge systems. In the ultimate analysis, sustainable development is to be seen as a series of compromises, with clearly identified objectives. Interventions may be sectoral in nature (eg, FBO technology for soil fertility management) or integrative (eg, jhum redevelopment plan). What is required is making a series of measures through an adaptive management pathway, where pathways are adjusted on the basis of interaction with stakeholders; this well may be part of a short-term strategy that is immediately feasible, leaving long-term strategic planning to an empowered society. What we can at best do is to improve the quality of life of the rural poor in the short-term based on a value system that they understand and appreciate and therefore feel sufficiently empowered to take decisions for longer term land use planning. Land use management and developmental policies have to consider a socio-ecological system approach with knowledge systems as the basis for food security for such a highly heterogeneous human population that we have in the Indian sub-continent.

Status of solid waste management in India and strategies to improve the services

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introduction

In India solid waste management - the waste generated by households and commercial establishments within urban limits - is a State Government function and it is obligatory for municipal authorities in the country to keep cities/towns clean and provide a good quality of life to the citizen. However, the services provided by the municipal authorities are outdated, unscientific and inefficient. Domestic, trade and institutional waste comprising of food waste, paper, plastic, packaging material, metal, glass, rags, wood, etc., is generally disposed of by the citizens on the streets, drains, open spaces, water bodies, etc., which create in-sanitary conditions. The problems of solid waste management are growing with rapid urbanization, population growth and change in the lifestyle of the people. The situation is becoming critical with the passage of time. The urban population in India has gone up five times in the last six decades. As per 2001 census, 285.35 million people live in urban areas and this figure is going up in the range of 25 to 35% every decade

.WASTE GENERATION RATE

Waste generation in Indian cities/towns ranges between 0.2 kg/capita/day in small towns and 0.6 kg/capita/day in mega cities amounting to over 115000 MT of waste per day and over 42 million MT annually. The Energy & Resource Institute (TERI) has estimated that waste generation will exceed 260 million tones per year by 2047 - more than five times the present level. Quantities of waste are increasing by 1.4% every year on account of increase in consumption per capita and by about 3 to 3.5% per year on account of population growth in urban sector. The average increase is about 5% per year.

India has 4378 cities and towns as per 2001 census. Out of these, 423 cities having a population of over 1,000,000 people, generate 72.5% of the total waste generated in the urban areas. Remaining towns produce only 17.5% of the total waste. Ministry of Urban Development has estimated Waste generation in class-1 cities (cities above 1,000,000 population) as under:

Types of cities	Tonnes/day	% of total garbage
The 7 mega cities	21100	18.35
The 28 metro cities	19643	17.08
The 388 class-1 towns	42635	37.07
Total	83378	72.50

Table 1.Total waste generation in class -1 cities

PHYSICAL AND CHEMICAL CHARACTERISTICS OF WASTE

Physical and chemical characteristics of solid waste is changing with time on account of increasing use of packaging material, paper and plastics, etc. Indian waste has a large proportion of organic matter as well as inert material as compared to developed countries where paper, plastic and packaging material is found to be in much larger proportion. Further, there has been a significant change in the waste composition over the last decade, as seen from the table below:

Year	Compo stable matter	Paper rubber, leather	Plastic,	Metal	Glass	Rags	Others	Inert
1996 (<i>NEER's study</i>)	42.21	3.63	0.6	0.490	0.6	-	-	45.13
2005 (<i>CPCB's study</i>)	47.43	8.13	9.22	0.496	1.01	4.49	4.016	25.16

Table 2. Physical composition of waste in percentage (%)

In one decade paper waste has increased by 224%, plastic and rubber waste by 1537%.

STATUS OF SOLID WASTE MANAGEMENT SERVICE IN INDIA

In India, municipal solid waste is collected by the municipal authorities principally through sweeping of streets as there is no system of door to door collection. Municipal authorities engage sanitation workers, provide them with necessary tools and equipment such as brooms and handcarts and transfer the waste collected from the street sweepings to temporary waste storage depots established in various parts of the city. Most of these sites are open spaces earmarked for waste storage on the road side or have cylindrical bins or uncovered masonry bins. The waste is generally seen littered around causing unsanitary conditions. The waste so stored is transported by a separate set of staff who manually loads the waste in open tractor trolleys or open trucks and take the waste to the disposal site which is within or outside the city. There are no engineered landfills in operation in the country. Therefore, all the waste transported is disposed of at open dumping grounds where waste is neither spread nor covered giving rise to serious problems of health and environment. Municipal authorities are supposed to collect all domestic, institutional and trade waste, treat the same and dispose of the rejects at the engineered landfills. But in absence of treatment facilities, most of the waste directly lands at the dumping grounds for final disposal.

Generally, 50% to 90% waste is collected on a day to day basis by different levels of cities and only a very small proportion is treated in the few cities where aerobic compost plants or refused-derived fuel based power plants are situated.

There is no system of segregation of recyclable waste at source. Therefore, recyclable material also comes on the streets along with the domestic waste/trade waste and picked up by rag pickers and sold to a middle man who passes on the waste to recycling industry. The municipal waste contains 15% to 20% of recyclable material, out of which about 50% recyclable material is collected by rag pickers and the rest reaches landfill site.

REASONS FOR INEFFICIENT SWM SERVICES

The Supreme Court appointed expert committee had observed the reasons of inefficient SWM services in India and identified principal deficiencies in the system as under.

Apathy of Municipal Authorities: Political leadership as well as the municipal officers responsible for SWM gives low priority to SWM, passing on the responsibility of managing municipal solid waste (MSW) to junior sanitary inspectors who continue with outdated and inefficient systems. No serious efforts are made to improve the systems and adopt latest technologies of waste management. A labour intensive system is adopted which expends a large

portion of the municipal budget on the wages of sanitation workers whose productivity is very low. Strong labour unions having political patronage, indiscipline among the workforce, inept handling of labour issues by lower level of municipal officers and total lack of supervision and control make the situation worse.

Lack of Community Participation: Community participation is the key to an efficient and cost effective SWM services. Yet, the municipal authorities have failed to educate citizens not to litter and adopt a practice of storing the waste at source in their own bins, handing over the waste to the municipal authority for appropriate disposal. In the absence of any facility of collection of waste from source, citizens have formed a habit of throwing the waste on the streets, open spaces, etc., creating unsanitary conditions.

Lack of human and financial resources: Most of the municipal authorities do not have qualified technical staff to handle solid waste management services. Except in a few large cities, no city has environmental or public health engineers to handle this service. Health officers or sanitary inspectors are put in charge of this service who are not technically competent to handle this subject.

Municipal authorities do not raise adequate financial resources through taxation or user fees. The recovery mechanism is inefficient and many properties escape the tax net. The financial resources are, therefore, limited and they are not used judiciously. The available resources are very often utilized for non-essential services ignoring the financial requirement of SWM services.

PRINCIPAL DEFICIENCIES IN SWM SERVICE

No storage of waste at source: In the absence of any system of Primary Collection from the doorstep by the municipal authorities, citizens have not formed a habit of storing the waste at source. They throw their waste on the streets, open spaces, drains, water bodies, etc., causing unsanitary conditions.

Irregular street sweeping: Though citizens discharge their waste on the streets, street sweeping is not carried out on a day-to-day basis. Only commercial streets and few other important areas are prioritised and the rest of the streets are swept irregularly. Slums and informal settlements are by and large neglected.

Unhygienic waste storage depots: Waste Storage Depots are created in the cities for temporary storage of waste for its onward transportation. They are an eyesore as they are generally open sites, round cement concrete bins or masonry bins where waste is always seen overflowing. These sites are unsightly as well as unhygienic.

Irregular transportation in open trucks: Transportation of waste is carried out manually in open tractors, and/or trucks. The fleet is generally inadequate and does not synchronise with the system of primary collection and secondary waste storage.

No processing of waste: Generally no processing of municipal solid waste is done in the country. Only a few cities have been practicing de-centralised or centralised composting on a limited scale using vermi-composting or aerobic systems of composting. In about 35 large cities aerobic compost plants of 100 MT to 700 MT capacities have been set up but they are functioning much below their installed capacity. A few cities have attempted to set up waste to energy plants but results are not encouraging. The first incineration plant set up in Delhi in 1986 and first large bio-methanation plant in Lucknow have recently failed and closed down. Two RDF plants of 6.5 MW, however, are operational in Andhra Pradesh for last three years but there is a doubt raised about their claim of generating power from municipal solid waste. It is alleged that they use more of agro waste than municipal solid waste.

Crude dumping of waste: Disposal of waste is the most neglected area of SWM services. Almost all municipal authorities unscientifically deposit solid waste at open dump-yards situated within or outside their city. They do not bother to spread and cover the waste with inert material. These sites become breeding grounds for flies, rodent, pests and emanate a foul smell. They pollute underground water resources through leachate and pose a serious threat to public health. Only six engineered landfills have been constructed so far in India at Surat, Pune, Ahmedabad, Navi Mumbai, Karwar and Puttur. They are yet to become fully operational

INTERVENTION OF THE SUPREME COURT OF INDIA

A public interest litigation was filed in The Supreme Court of India in 1996 against the Government of India, all State Governments and several Municipal authorities in the country alleging that they failed to manage municipal solid waste appropriately. The Supreme Court appointed an Expert Committee, to look into all aspects of solid waste management and make recommendations to improve the situation. The committee submitted its report in March, 1999 making detailed recommendations for class-1 cities, which were circulated to all states for implementation.

Soon after this report, the Ministry of Environment and Forest, Government of India, notified Municipal Solid Waste (Management and Handling) Rules 2000 in September, 2000 and made it mandatory for all cities and towns of the country to take certain measures to improve SWM services.

MUNICIPAL SOLID WASTE (MANAGEMENT AND HANDLING) RULES 2000

The Municipal Solid Waste (Management and Handling) Rules 2000 mandate following seven steps:

1. Prohibit littering on the streets by ensuring storage of waste at source in two bins; one for biodegradable waste and another for recyclable material.
2. Primary collection of biodegradable and non-biodegradable waste from the doorstep, (including slums and squatter areas,) at pre-informed timings on a day-to-day basis using containerised tricycle/handcarts/pick up vans.
3. Street sweeping covering all the residential and commercial areas on all the days of the year irrespective of Sundays and public holidays.
4. Abolition of open waste storage depots and provision of covered containers or closed body waste storage depots.
5. Transportation of waste in covered vehicles on a day to day basis.
6. Treatment of biodegradable waste using composting or waste to energy technologies meeting the standards laid down.
7. Minimise the waste going to the land fill and dispose of only rejects from the treatment plants and inert material at the landfills as per the standards laid down in the rules.

Time Frame for the implementation of the Rules:

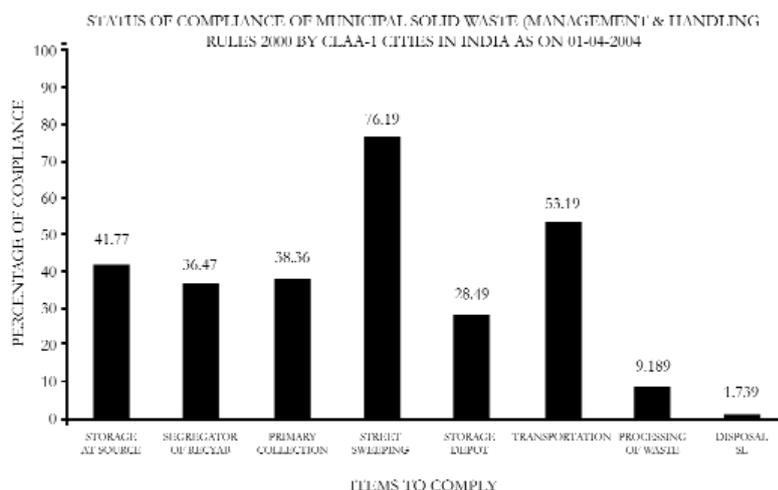
Compliance criteria	Schedule
Setting up of waste processing and disposal facilities	By 31.12.2003 or earlier
Monitoring the performance of waste processing and disposal facilities	Once in six months
Improvement of existing landfill sites as per provisions of these rules	By 31.12.2001 or earlier
Identification of landfill sites for future use and making site(s) ready for operation	By 31.12.2002 or earlier

Responsibility for Implementation

The entire responsibility of implementation is put on municipal authorities. The Secretary, Urban Development Department of the respective state government is made responsible for the enforcement of the provisions in metropolitan cities. A District Magistrate or a Deputy Commissioner of the concerned district is responsible for the enforcement of these provisions within the territorial limit of his jurisdiction. The state pollution control boards are expected to monitor the compliance of standards regarding ground water, ambient air, leachate quality and the compost quality including incineration standards as specified in the rules. Each municipal authority is expected to take authorization from state pollution control board for setting up treatment and disposal facility.

STATUS OF COMPLIANCE OF MSW RULES 2000

A study was conducted by the author of this paper through a questionnaire sent to municipal commissioners of all class-1 cities of India to ascertain the status of compliance of MSW Rules 2000 by class-1 cities of India as on 1.4.2004. 128 class-1 cities of India responded and the status of compliance shows that there is an insignificant progress in the matter of construction of processing plants and sanitary landfills, and much remains to be done in other areas of waste management as could be seen from the table below.



Source: P. U. Asnani (2004)

Reasons for Non-Compliance reported:

- lack of public awareness, motivation;
- non cooperation from households, trade and commerce;
- lack of financial resources for procurement of tools and modern vehicles.
- lack of technical know-how and skilled manpower for treatment and disposal non-availability of appropriate and for treatment and disposal
- lack of powers to levy spot fines

Suggestions to better comply with MSW Rules 2000:

Municipal authorities should undertake massive awareness campaigns to educate the citizen not to litter and store the waste in two separate bins one for biodegradable waste and another for recyclable waste. Domestic hazardous waste, toxic waste, etc., to be kept separate when generated.

Municipal authorities to introduce door to door collection of waste using containerised handcarts/tricycles with a bell-ringing system through resident welfare associations, CBOs, NGOs, and/or private sector by engaging part time waste collectors on a cost recovery basis. User fees should be introduced to cover the cost and make the operation sustainable. The 'polluter pays' principle should be introduced and waste generators may be made to pay according to the quantity of waste they generate. Hotels, restaurants and bulk waste generators should be made to pay a larger amount keeping in view the quantities of waste generated by them.

Street sweeping should cover all residential and commercial areas including informal settlements on a daily basis.

Open waste storage depots, round cylindrical concrete bins, masonry bins, should be abolished and replaced by neat mobile containers or cities may be made bin-less by arranging direct transfer of waste from handcarts/tricycles into collection vehicles.

Transportation of waste should be carried out in covered vehicles using containerised system. Dumper placers or tractors with container lifting devices may be used for transportation of waste. Transfer stations should be established when the distance of the treatment plant/disposal site is more than 15 KM.

Aerobic composting may be adopted in large cities and vermi-composting in small towns. Waste to energy projects may be considered by large cities after careful analysis of the technology offered.

Regional Engineered landfills may be constructed for a group of cities to economize in the cost of construction and professional management of the disposal site in a cost effective manner.

NEED TO FIND "OUT OF THE BOX" SOLUTIONS TO IMPLEMENT THE RULES EXPEDITIOUSLY

Looking to the poor performance by the Urban Local Bodies (ULBs) in India during last six years, authorities now need to find 'out of the box' solutions. On account of the lack of in-house capability of municipal authorities and paucity of financial resources, it is desirable to outsource certain services and resort to private sector/NGO participation in providing SWM services.

Private sector participation can be easily attempted in door to door collection of waste, secondary storage of waste, transportation of waste, composting of waste or power generation from waste and final disposal of waste at the engineered landfill.

SOME EXAMPLES OF PUBLIC PRIVATE PARTNERSHIP

Bangalore

Bangalore has entered into two kinds of contracts. One for the primary waste collection from the doorstep and direct transportation to the disposal site through 61 small contractors and another for integrated treatment and disposal of waste.

For the purpose of primary collection and transportation of waste, 2/3rd of the city has been divided over 60 contracts. This work is being done at 50% of the cost which the municipal corporation incurred.

Chennai

Chennai was the first city to go for large scale contract for waste collection and transportation from nearly 1/3rd of the city (2 million population). A seven year contract has been awarded to the private operator through a competitive bidding process for primary collection, street sweeping, secondary storage at a transfer station and transportation of waste to the disposal site. The private agency has engaged its own manpower, tools, equipment and fleet of vehicles. The company is paid an annual increase of 5% in the rate fixed. This service is available to the city at about 50% of the Municipal Corporation cost.

Hyderabad

Hyderabad has adopted a unique method of Public Private Partnership (PPP). Nearly 75% of its street sweeping operations are privatised applying a unit area method. Each unit comprising 8 km road length and allotted to a team of 16 female and 3 male workers for street sweeping and waste transfer to the secondary storage depot. The unit cost has been worked out on the basis of the need for manpower, the minimum wage payable, the tools and equipment required, etc. About Rs. 60000/- per month per team is paid. Contracts are given through a draw of lots. 161 such contracts are given. The system is in operation for more than five years and is working satisfactorily.

Selco International, Hyderabad has set up 700 MT/day waste to energy plant generating 6.5 MW power using RDF technology. Solid waste is provided by the municipal corporation free of charge. Besides, corporation has provided 10 acres land on 30 years lease to Selco with an annual lease rent of 5% of the registered value of the land.

Ahmedabad

Ahmedabad city has adopted several models of PPPs. PPPs in Ahmedabad started with the setting up of a 500 MT capacity compost plant by Excel Industries, Mumbai. This was followed by private contracting of 50% of secondary storage sites and transportation of 350 containers. For Door-to-door collection, 3900 units of 200 households each have been formed. This work is entrusted to RWAs, associations of sanitation workers, etc. The municipal corporation gives them monthly grants for door-to-door waste collection and supervision. It has met with reasonable success.

The municipal corporation has also awarded a contract to a private firm for setting up a plant to produce refuse derived fuel (RDF) from 500 MT/day waste.

Surat

Surat has introduced several measures of privatisation in solid waste management. Surat has contracted out night brushing and scraping of roads. Primary waste collection is promoted by giving grant in aid at the rate of 40 paise per sq. mtr. per month for cleaning their own area. Transportation of waste from the primary collection points to transfer stations has been contracted to two agencies and contracts for transportation of waste from transfer station to final disposal site have been awarded. 5 transfer stations have been set up and the entire quantity of 1000 MT of MSW is transported by the private agencies.

For final waste disposal Surat is the first city in India which has constructed the large size engineered landfill with a capacity of 12, 5000 cmt at a cost of only Rs. 105 per cmt. The cell will last for six years. Provision of seven more cells is made for future.

TECHNOLOGIES AVAILABLE FOR PROCESSING, TREATMENT, AND DISPOSAL OF SOLID WASTE

The main technological options available for processing/ treatment of MSW are microbial composting, vermi-composting, Biomethanation, production of Refuse Derived Fuel (RDF), (pellatization). Sanitary landfilling is the only viable option for final disposal of residual waste. Each technology has advantages and limitations.

Sanitary landfills

Landfill sites are meant for final disposal of waste in a scientific manner. In India disposal of organic waste at the landfill is prohibited and it is made mandatory to treat the organic fraction of municipal solid waste before disposal of waste.

Until recently there was not a single sanitary landfill site in India. As construction of sanitary landfills is quite expensive and need professional management, construction of regional facilities for a group of cities is being actively considered by a few states in India such as Gujarat, West Bengal and Rajasthan.

SOURCES OF FUNDS

The 12th Finance Commission Grants

In 2005-06, the 12th Finance Commission of India has allotted Rs. 5,000 crores (Rs.50 billion) over a period of five years (2005-10) to State Governments for supplementing the resources of the ULBs in the country 50% of which are to be spent on solid waste management only.

Subsidy for Compost Plants and waste to energy Projects

The Ministry of Agriculture and the Ministry of Non-conventional Energy Sources have been actively promoting waste compost and waste to energy projects. The Ministry of Agriculture has introduced a centrally sponsored scheme since 1969 (modified in 1974) under which support is given to local bodies and private sector for setting up compost plants using MSW. This grant is available for building, plant, and machinery up to one-third of the project cost subject to a maximum of Rs. 5 million per project for a treatment capacity of 50 to 100 TPD.

The Ministry of Non-Conventional Energy Sources has notified an accelerated program providing financial assistance for projects on energy recovery from urban waste during the year 2005-6. The incentives offered vary from scheme to scheme.

Investment by Private Sector

Private sector is now entering the area of treatment and disposal of waste. They are willing to invest if they are given an assured supply of waste free, land at a nominal lease rent, and some tipping fee to cover the gap in the cost of providing service.

Funds from Sale of Carbon Credits

Major initiatives are underway to mitigate greenhouse gas emission from MSW. As reduction of emission is seen as more difficult for developed nations, a system is evolved wherein developed nations can reduce emissions in any part of the world and earn carbon credits to count towards their effort to reduce greenhouse gas emissions globally.

Cities can take up waste treatment and disposal projects under this mechanism and avail of the benefits through sale of certified emission reduction credits at the prevailing market price which is around US\$ 10 of per ton of carbon equivalent to developed countries. The MoEF has a nodal officer handling these matters. Landfills generate biogas consisting of 50% methane. A ton of methane is equivalent to 21 tones of carbon dioxide and poses a serious threat to the cause of GHG reduction. Appropriately management of landfills, compost plants or WTE plants can earn municipal authorities in large cities substantial carbon credits which can be sold not only to recover cost of system installation and up-gradation of operations but also generate surplus funds invaluable for the cash starved urban local bodies (ULBs). Smaller cities can pool resources together and make a combined case for availing of carbon credits.

SUSTAINABILITY OF SWM SERVICE

Even though State Governments may construct treatment and disposal facilities at government cost or give capital grants for creating those facilities, the operation and maintenance will have to be done by the respective urban local bodies or collectively by the group of ULBs in cases where regional facilities have been created or are to be created.

The ULBs will, therefore, have to create sources of fund to sustain the operation and maintenance of the services. The answer lies in having adequate taxation and imposition of user charges.

Conservancy Tax: Generally, ULBs use a percentage of the property tax to provide the solid waste management services which is inadequate and does not cover the cost of primary collection and scientific disposal of waste. This needs to be increased for the protection of health and environment and sustainability of the services.

User charges: For sustainability of operations and maintenance of SWM services, with the gradual introduction of door to door collection systems, elements of cost recovery need to be introduced by municipalities to cover the cost of this additional service by levying a monthly charge ranging between Rs. 10 and 30 per month from residential areas and a higher charge from commercial establishments. The user fees should be introduced with a firm determination by local bodies to sustain the services.

conclusion

Efforts made by the Government of India, state governments, various regulatory agencies to improve the systems of waste management in the country have not yielded the desired results in spite of the Supreme Court's intervention and monitoring. A very few States have taken major initiatives whereas a large number of States are lagging seriously behind. Very few cities and towns in India have taken initiatives and implemented the directions contained in Municipal Solid Waste (Management & Handling) Rules 2000 and none have so far implemented all the seven steps effectively. Many cities have not even initiated the implementation of the rules even though the time frame prescribed in the rules is over.

This situation, therefore, calls for a strategy to expedite the implementation of the rules in a time bound manner. This can best be done on a mission mode using judiciously and expeditiously the allocation of Rs. 2500 crores made by Government of India to various states specifically for improving solid waste management services on the recommendations of 12th Finance Commission and other funds that are likely to be made available under Jawaharlal Nehru Urban Renewal Mission (JNURM) and Urban Infrastructure Development Scheme for small and medium towns (UIDSSMT). The Central and State governments need to create a SWM mission at least for a period of five years to facilitate implementation of MSW Rules 2000 in the country pooling all available financial resources with various ministries and 12th Finance Commission grants, JNURM & UIDSSMT grants for implementation of MSW Rules in a time bound manner.

The mission may motivate the political leadership and the bureaucracy in the municipal authorities to make their cities liveable by giving priority to the subject. The mission may avail of national and international expertise, identify appropriate technologies suitable under Indian conditions, identify technology providers, develop standard designs and specifications for tools, equipment, vehicles suitable in different levels of cities, standard contracting mechanism, and terms and conditions for involving private sector, NGO and community groups and take measures for training and capacity building of municipal officials for managing the contracts effectively and supervise the services provided departmentally or through contractual arrangements. The mission may also do handholding of small municipal authorities in implementing the improved systems of waste management.

The States must, however, ensure that the municipal authorities responsible for managing municipal solid waste in their areas stand committed for the operation and maintenance of the facilities that get created in their cities in a mission mode and ensure sustainability of the facilities created through levy of appropriate taxes and user charges.

E-waste: time to act

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introduction

India aims to be in the league of developed nation by 2020 and is going through a phase of accelerated industrial activities, the process having got a boost in the last decade.. The accelerated production process has also fuelled a very high consumption pattern as both these are intricately linked. The last decade also witnessed a revolution in the Information Technology industry which is regarded as a catalyst in fueling this growth rate. This phenomenal growth in both consumption and production processes has led to substantial rise in the quantum of waste generation in India. Various new kinds of waste and new materials are being added to the current waste stream. Electronic and electrical waste (E-waste) is one such waste, which is growing in volumes and is a result of rapid urbanization and changing lifestyles of citizens. This waste is currently being handled in the informal sector and is being recycled without any consideration towards environmental or human health.

E- waste broadly means waste from all electronic and electrical appliances such as computers, mobile phones, audio-visual entertainment devices, refrigerators, washing machines, and many other household/consumer goods. All such electronic and electric items on completion of their useful life are discarded. Large quantities of e-waste are being generated from homes as well as offices and have spawned a new industry. Electronic-waste consists of valuable metals including platinum, gold and copper which can be recovered. Where labour costs are low, recovery could be lucrative business.

GROWTH OF E-WASTE

Information technology and telecom are amongst the two fast growing industries in this country. India is expected to achieve a PC penetration rate of 65 per one thousand as against the existing rate of 14 per one thousand people by the year 2008 (Source MAIT).

India at present has 15 million computers, which is likely to go up to 75 million by the year 2010, an almost five times growth over just four years. This phenomenal growth rate is going to add large volumes of electronic wastes as we move ahead. As per the estimates available, there are two million PCs, which are ready for disposal. These are all of 286, 386 and 486 vintages rendered obsolete.

Every two years a new computer model is available in the market rendering the previous one obsolete. In India, however, the trend has been to prolong the use of such gadgets by passing on the old items to friends and relatives thus enhancing the total useful life by another few years.

The telephone industry has also witnessed a phenomenal growth in the recent past and the sector today has 75 million cell phone users, likely to grow to 200 million by 2007. High obsolescence rate and consumer preference have accelerated the waste process. This is another indication of the quantum of electronic goods that are likely to add to the volume of e-waste in the coming years.

At a rough estimate, we have approximately 150,000 tons of e-waste being generated in India annually, which finds its way into the informal sector for recycling. This trend is likely to increase manifold.

E-WASTE: MAIN SOURCES

The main sources of electronic waste in India happen to be government, public and private sector discards, which account for almost 70 per cent of the total waste. The contribution of individual households is relatively small at about 15 per cent. Other sources are the computer manufacturers.

Another major source of e-waste is the imports of such material, brought in illegally. This adds to the volume of waste being handled within the country. Accurate data on such imports is not available largely owing to the nature of trade. However estimates suggest that the imports accounts for an almost an equal amount to what is being generated in the country. The current regulation on imports for charity/donation permits import of up to ten-year-old computers (almost the end of useable life) thus adding to the waste volume. This channel is most often misused to bring in electronic waste into the country.

On tracking some consignments and trade document it becomes amply clear that most of these consignments are from Western countries and the rationale for such imports is purely economic. As per available data, the cost to recycle a single computer in the United States is \$20 while the same could be recycled in India for only \$2, a gross saving of \$18 if the computer is exported to India.

HAZARDS FROM E-WASTE

A computer contains highly toxic chemicals like lead, cadmium, mercury, beryllium, Brominated Flame Retardants (BFRs), PVC and phosphorus compounds. Though some of these materials are used in small quantities in each computer the net volumes being recycled are very significant and have a huge impact on both environment and human health. An average computer, weighing approximately 31.5 Kg could contain:

Element	Quantity
Plastics	7.24 kg
Lead	1.98 kg
Mercury	0.693 g
Arsenic	0.4095 g
Cadmium	2.961 g
Chromium	1.98 g
Barium	9.92 g
Beryllium	4.94 g

Most recycling operations in E- waste are being done in the informal sector and the process and technology adopted is crude. There are pockets in bigger cities where such activities are concentrated, and though the process is rudimentary and operated in informal sectors some of the skills demonstrated are of very high order. The activities of recycling include physical breaking and segregation of hazardous components, burning of PVC wires to retrieve copper, melting of lead and heating mercury-laden components. The process of extraction of gold and copper is also intricate and complex and the components are processed through acid baths and physical handling. The plastic, which contains BFRs, is also broken down to small pieces and then recycled to be used for making toys and the like. These processes release toxics fumes into the environment and the liquid residues are released in the sewer leading to water and soil contamination. Most workers in this recycling sector are the urban poor with very low literacy levels and hence very little awareness of the hazards of e-waste toxics. There is a sizeable number of women and children who are engaged in these activities and are particularly vulnerable to the hazards of this waste.

The other important aspect of this issue is the wide dispersal of these elements into the environment due to the highly dispersed locations of these recycling units across the country. To elucidate, a simple calculation of an element such as mercury in computers reveals that for 200,000 computers, the total quantum of mercury being handled is almost 1,386 kg. This is a cause of major concern as even a tiny amount of mercury can be extremely harmful.

EXISTING LEGAL FRAMEWORK

In India, there is no law, which specifically deals with the issue of e-waste and lays down the process for collection and its disposal. The country is still struggling with the issue of e-waste and needs to understand it in totality and initiate appropriate measures.

The current National Rules on Hazardous Waste Substances cover various aspects including the generation, storage, transportation and disposal of hazardous waste. This is more intended to handle the issue of large industrial houses generating waste, traders of these hazardous waste and the facility managers of such waste. However, given the nature of generation of e-waste, this regulation completely falls short of addressing the issue in totality.

The import and export of hazardous substances is also dealt with under the same regulation as reflected in Schedule 3. The rule deals with individual components but not with Electronics gadgets as waste scrap. This is a big loophole, which permits the import of computers in the country. The import of such waste is also allowed for the purpose of material recovery but only after obtaining prior permission from the concerned authority, in this case the Central Pollution Control Board (CPCB). Quite interestingly, till date no such permission has been granted for importing e-waste.

The Basel Convention on Trans-boundary Movement of Hazardous Waste, to which India is a signatory, addresses the issue of import of such waste. Lists A and B of the Convention itemise such waste and the imports of these are regulated. The Convention also prohibits the import/ trans boundary movement of such waste from an OECD to a non-OECD country.

RECOMMENDATIONS FOR ACTION

In view of the magnitude of the problem and the situation that emerges from it, there is an urgent need to bring together all stakeholders on the issue and engage them in the debate to find sustainable solutions to this issue of electronic waste. One of the foremost requirements in this issue is to have suitable legislation on electronic and electric waste. The legislation should address the problems of imports as well as domestic generation of waste.

Any solution on this issue needs to be seen in the broader context of sustainable development. Some of the basic principle of the environmental justice such as 'precautionary principle' and 'polluter pays' should be the overriding factors in the design of solutions.

To promote sustainable production one also needs to bring in legislation which will focus on reduction and subsequent phase out of toxic materials and encourage use of alternate and new materials.

Extended Producers Responsibility is perceived to be the most appropriate concept that attempts to amalgamate all the enlisted principles of environmental justice. This framework shifts the responsibility of safe disposal from consumers on to the producers. It not only looks at downstream solutions but also at upstream technology. It promotes sound environment management technology and also aims at better raw material, cleaner production technology and designing for longevity. The EPR models being implemented in many developed countries need to be suitably altered to suit the localized conditions prevailing in this country.

It is also recommended that the process of legislation should be transparent, participatory and democratic to enable all stakeholders to participate and contribute to the process so that there is more effective compliance and a more comprehensive solution.

Stimulating demand for sustainable goods & services

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THE NEED

As the seeds of the 1991 economic liberalization policy bear fruit, the Indian economy is booming and a class of Indians are getting richer by the day. Naturally the “aspirations” of Indian middle-class families are growing as fast as the growth in the number of this middle-class itself. While this helps attract foreign investments into India, it is also changing India into a “*consumption oriented society*” imitating the lifestyles of the Western world. We are globally assisting to the emerging of a “global consumer class”, mainly consisting in middle class, urban, well-educated, young consumers increasingly sharing similar consumption patterns around the world.

If everyone in the world were to live like an average person in the high income countries, we would need 2.6 additional planets to support us all, according to the Ecological Footprint Sustainability Measure, an independent measurement based on UN statistics.

In recent years, there has been a growing recognition that it is not only the production sector that is responsible for the environmental perils that we face today. Rather, the modern consumption-oriented lifestyle with a use-and-throw attitude is also equally responsible for that - if not more. This led to a call for a “*sustainable lifestyle based on sustainable consumption and production*” during the 2002 WSSD in Johannesburg.

In this situation, policymakers in the developing economies like India, China, or Brazil, have to walk a tightrope and strike a delicate balance between “growing aspirations of the society” for enjoying a lifestyle similar to what was so far only seen in Hollywood movies versus the emerging notions of “*sustainable consumption & production*”.

SUSTAINABLE GOODS AND SERVICES

It would be almost impossible (*and politically incorrect!*) to tell Indian consumers not to chase a consumption-oriented lifestyle in their newfound prosperity. Indeed it is ironic that in India itself, where Mahatma Gandhi promoted a simple lifestyle just a few decades ago, this would sound a utopian concept to the present generation! But that is the reality and in such a situation, it would be prudent to let consumers enjoy their shopping spree - which is also a major stimulus for a robust economic growth - but the emphasis should be on **sustainable goods and services**. The key issue is not the need of consuming less, but of consuming differently. De-materialization of consumption (better products and services, doing more with less, leading to “more units of happiness” per input) is often quoted as a strategy to achieve sustainable consumption patterns without sacrificing - perceived - quality of life. This way, the engines of economic growth can keep rolling on the sustainability route, while opening newer avenues for innovation!

“What can qualify as sustainable goods and services”? A common-sense answer could be “*any product and service that results in a) a lesser environmental impact while performing a similar function as its comparable product b) while demonstrating social responsibility and ethics at c) a competitive price*”. Basically, the effort here is to align sustainability with its three pillars of economics, environment and Society.

EXTERNAL STIMULUS TO GENERATE DEMAND

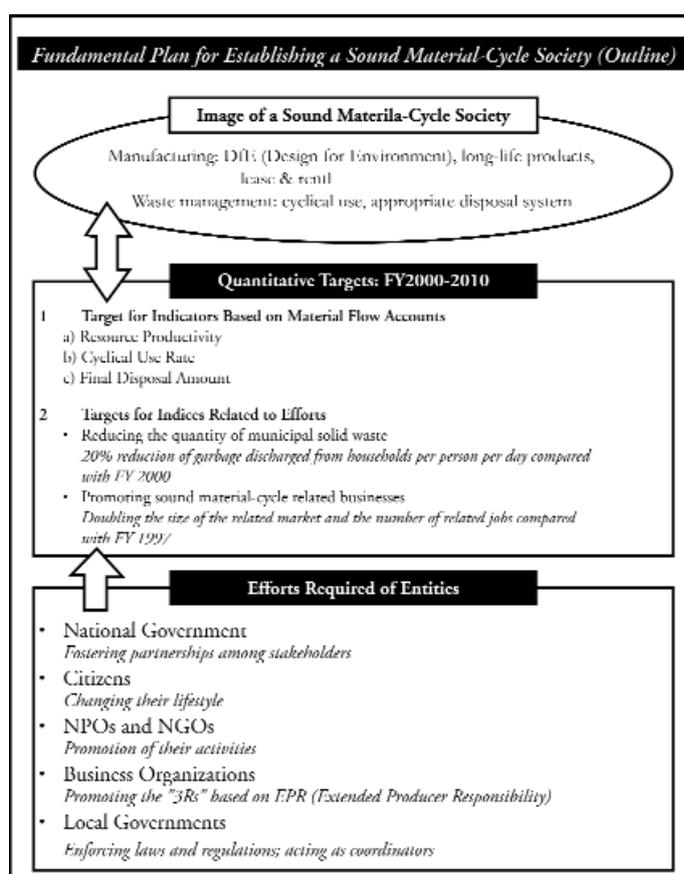
In the Indian economic boom, demand for products and services from the new emerging global consumer class, increasingly oriented on material satisfaction of their needs, is at a high. However, environmental or social considerations hardly feature in the purchasing decisions of Indian purchasers. Overall demand and supply equations are predominantly governed by factors like cost, quality, brand value and marketing strategies - the last one being probably becoming the most influential for Indians - where children & young adults dominate the demographics. In such an environment, it would be na_ve to imagine that a shift to sustainable goods and services would occur naturally. Instead **there is a need for a strong external stimulus and a concerted promotion effort** to generate and sustain the demand (and supply) of such products and services.

On demand side, the external stimulus is essential to influence market patterns and create a level-playing field for sustainable products and services to enable them to compete with others in terms of cost, quality, performance and overall value for money for the consumers. On the other hand, there is also a need for a stimulus to facilitate the development of new innovative products and services to ensure a constant and sufficient supply to meet this stimulated demand.

INTERNATIONAL EXAMPLES:

While contemplating a suitable approach for India, it would be relevant to look at some international examples where countries have been successfully promoting sustainable products and services under the broader umbrella of SCP.

Japan¹⁰ seeks to create a **Recycling-based Society** where the consumption of natural resources will be restrained or limited and the environmental load reduced to the maximum extent. Products are not to become waste and appropriate recycling processes are promoted. To achieve the establishment of the recycling-based system is a long-range target of the environmental policy of Japan and its aim is not to damage the closed system of the earth. This is a national goal and there are quantitative targets to be met by the year 2010. Accordingly, an elaborate legislative and institutional framework has been put in place in the past few years including a Basic Law for Promoting the Recycling Society; The Law for Promotion of Efficient Utilization of Resources; (2001); The recycling of packaging materials, (2000); The recycling of home appliances (1998); Legislation on the re-utilization of construction materials (2000); Resources and re-utilization of End of Life Automobiles (2002); and the Law for the Promotion of National Procurement of Environmentally Friendly Products (2001).



¹⁰ <http://www.env.go.jp/recycle/3r/en/approach/01.pdf>,
<http://www.env.go.jp/en/recycle/smcs/outline.pdf>

A European study¹¹ highlighted 7 countries amongst the EU (Austria, Denmark, Finland, Germany, Netherlands, Sweden and UK, termed as the Green-7) exhibiting some or all of the following traits:

- Strong political drivers and/or national guidelines on Green Purchasing & Procurement (GPP) for the promotion of sustainable goods and services
- National programs on GPP for a number of years
- Information resources such as websites and information resources concerning GPP (often containing product related criteria and specifications)
- Innovative procurement tools such as life cycle thinking, functional specifications or contract variants compared with 45% from other countries
- Promotion of management systems

THE APPROACH

For India, efforts for stimulating demand for sustainable goods and services should be made in a concerted manner rather than ad-hoc individual efforts. As is evident from numerous international examples, a holistic and integrated approach involving both the production and the consumption phases of the use of goods and services with multi-stakeholder participation is sure to yield success. A typical approach therefore should include i) Policy level interventions, and ii) Programmatic interventions / activities on the ground - involving both public as well as private sectors.

Policy Level Interventions:

An umbrella national policy with necessary legislative/institutional frameworks is the essential first step in the efforts to promote SCP and stimulating demand for sustainable goods and services. This needs to be translated into the appropriate elements of the 5-year plans. The Planning Commission could be actively involved in this effort.

Subsequently, **sectoral programs** can be designed at national as well as local levels under which numerous **projects** can be implemented. To assess the effectiveness of these programs vis-à-vis the policies and plans transparent and effective **monitoring mechanisms** should be intrinsically designed at all levels.

An active engagement of various stakeholders is essential for long-term success and sustainability of these efforts. A number of players in the entire supply chain of products and services need to play key roles here, including but not necessarily limited to: industry/manufacturers, retailers, government agencies, academia and R&D organizations, product designers, NGO's media, financial Institutions and last but not the least consumers. Each of these needs to play a significant role in this entire ballgame.

To cite another relevant international example here, Germany¹² initiated a National Dialogue Process on SCP in February 2004 which has created a high interest in all societal groups. This dialogue process had following goals: formulate a national response to WSSD requirements (and Marrakech Process) on SCP, identification of national priorities, sharing of experiences, better coordination between relevant actors, and initiation of cooperation projects (e.g. a web based shopping guide). A number of meetings/conferences on specific issues were organized such as: Community, SME_s, Retail sector, Energy efficiency in buildings, Eco-design and energy efficiency for electrical appliances.

¹¹ Bouwer M, de Jong K, Jonk M, Berman T, Bersani R, Lusser H, Nissinen A, Parikka K & Szuppinger P, 2005. Green Public Procurement in Europe 2005 - Status overview; Virage Milieu & Management bv, Korte Spaarne 31, 2011 AJ Haarlem, the Netherlands. <http://europa.eu.int/comm/environment/gpp/media.htm#state>

¹² Sustainable Consumption - The Role of the Retail Sector, Presentation by Dr. Ulf D. Jaeckel, Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, Germany. <http://www.unep.fr/pc/retail/events>

Practical Level Interventions:

Under the umbrella of national policies, plans and programs, a number of practical interventions can be made by stakeholders to stimulate the demand for sustainable goods and services - both in private as well as public sectors.

Private sector:

Private sector interventions can be at two levels: first at the corporate level for institutional purchases and secondly at individual consumer level.

Private Sector: Institutional Level

For the promotion of sustainable products and services at the corporate or institutional level, implementing green purchasing under the Greening Supply Chain initiatives has been a proven and popular approach across the world.

Here, institutional buyers make it obligatory on their suppliers to meet higher environmental and social performance standards thus leveraging their buying power. This then works as a carrot as well as stick for the supplier to go for sustainable goods and services. This is a market-based effort and it is found to work well in most cases.

This transition is further accelerated by legislative pressures. For instance, in Japan, after the Recycling Law for Home Appliances was enforced, manufacturers and their suppliers had to align their products and manufacturing processes to meet the new requirements of product take-back and recycling. In India too, for instance, the exporters of electronic components are currently grappling for compliance with the EU's ROHS and WEEE requirements.

The overall end-result for such efforts is twofold. For one, the environmental (and social) performance of the companies and their suppliers is definitely enhanced; but more importantly the end product or service available to the consumer is definitely better on the "sustainability" criteria. Such a move also encourages innovation and companies are introducing better products based on "eco-design" principles.

Such voluntary efforts by the companies can also help in branding their business and products as "sustainable" (thus adding to the bottom-line!) and many have started developing PR campaigns around this theme. UNEP's Creative Gallery on Sustainability Communications¹³ - the first international online database of corporate and public advertising campaigns specifically dedicated to sustainability issues - is excellent testimony for this!

Private Sector: Individual Level

For promotion of sustainable goods and services to individual consumers, a number of interventions can be made by different players. To understand this, one can examine and analyse the typical "process" involved in making a purchasing decision by any individual and families and accordingly think of possible interventions at each stage.

Typically, the purchasing decision is based on the following factors/steps:

<u>Need / Willingness to Buy:</u>	The person/family decide to buy something based on need
<u>Awareness:</u>	Buyer is aware about the available product/services options
<u>Information:</u>	Buyer gets more information about each of the options: its features, characteristics, reliability etc. Naturally well-known brands score better here.
<u>Availability:</u>	The product is easily available for the buyer.
<u>Affordability:</u>	The product is affordable for the buyer
<u>After Sales Service:</u>	The manufacturer should provide after-sales service to the buyer as necessary.

¹³ <http://www.unep.fr/pc/sustain/advertising/ads.htm>

Applying the above in the context of sustainable products and services vis-à-vis traditional products and services, it is possible to explore potential interventions at the practical level that can be made by various stakeholder to stimulate the demand for sustainable products and services. Again, this should be under the umbrella policies/plans.

Need / Willingness to Buy: As mentioned earlier, in present times, need and willingness to buy are probably different issues - especially for the urban Indian middle class! In any case, the decision to buy a certain product or service is greatly influenced by the aggressive marketing campaigns. In such a case, the **mass media** and particularly the **advertising industry** can adopt some responsible code of conduct with regard to sustainable products and services. Acknowledging that this indeed sounds like another utopian idea, none-the-less the important role that these players play in influencing the purchasing decisions can not be undermined and it is extremely necessary to engage them in this endeavour.

UNEP has been closely working with the advertising industry since 1999¹³ as one of several focus areas in the context of SCP. Several information resources have been published targeting notably companies, communication experts, public authorities and other stakeholders to facilitate sustainability communications.

Awareness: To promote sustainable products and services, it is a pre-requisite that the consumers are aware about the SCP issues as well as about the availability of such products and services. This in turn can influence their purchasing decisions in favour of sustainable products and services.

As such extensive and sustained awareness campaigns need to be organized at national, regional and local levels. These campaigns can be run by government agencies, local **governments**, **private sector companies including retailers**, **NGOs/consumer organizations** and **even schools!**

There could be varying approaches suitable for each individual stakeholder and local situations, but the idea is to create awareness amongst consumers about the availability of such products and services and encourage them to buy. Indeed, it could be even a better idea if more than one stakeholders can jointly implement such campaigns!

Ecological School Start - an interesting initiative in Germany is the cooperation between Environment Ministry, World Wide Fund for Nature (WWF) and a retail company Karstadt. Under the program, promotional sale of environmentally preferable (Blue Angel ecolabeled) products is organized at school start season (end of summer). This is supported by special advertisements, special submissions on the environment Ministry website to attract the general public. What's more, the President of Environmental Agency sends letters to the school directors pointing at the initiative and requesting their participation. To ensure a good visibility of the event, the Minister attends the opening up of the project season in a warehouse. The project was running for 6 years and has experienced a large increase of sale of the Blue Angel products.

Information (Ecolabelling): One important factor influencing the decision to buy a particular product is the available information about its sustainability aspects. Generally, eco-labels are considered as a prime medium to convey such information to the consumers and also to provide an edge to the sustainable products and services over others. There are numerous examples in the world, where such efforts have shown a great success.

Germany's Blue Angel label is the oldest ecolabelling scheme worldwide now in operation for 27 years. Though it is a national program, it has wide international acceptance through cooperation with other countries. Though it started as purely environmental label, it has evolved into a sustainability label over the time with wide acceptance. Currently, this ecolabel is used by 600 user companies for 4,000 products. Blue Angel Scheme is managed by independent advisory board including members of all relevant societal groups. One indicator for the success of Blue Angel can be the fact that this label is known to more than 50% of German people, as revealed by the surveys.

Thai Green Label is another significant success story among the ecolabelling programs in some developing countries in Asia. The Thai Green Label Scheme was initiated by the Thailand Business Council for Sustainable Development (TBCSD) in 1994 and is managed by the Thailand Environment Institute (TEI) in association with the Ministry of Industry. As of August 2006, ecolabel criteria for 39 product categories have been developed and study is underway for 8 more categories. A total of 148 products from 31 companies have already received Thai Green Label. The unique structure of the Thai Green Label comprising an independent administrator of ecolabel scheme from NGO sector (TEI/TBCSD) supported by government and industries has been an important success factor.

In comparison, the Indian Eco-mark projects a dismal picture. Firstly, India has the fewest product categories (only 16) comparing with the existing ecolabel programs worldwide. But more importantly, the Indian ecolabelling scheme (justifiably) attracts criticism for lack of clear thinking about the criteria for their selection.

The Indian list of product categories includes consumer products as well as products which no consumer is likely to buy in any significant quantity. It would be rare to find the Indian consumer buying products such as lubricating oils, powder coating paints (which use electrostatic spray guns) or fire extinguishers; these are clearly industrial products. The inclusion of such industrial raw material or intermediate goods for an ecolabelling scheme purportedly aimed at the consumer is thus pointless and constitutes a diversion of effort.

Further, there are issues with regard to the certification procedure which is by mandate administered by the Bureau of Indian Standards (BIS). Many manufacturers in the first place do not know about the Eco-mark and hence BIS needs to take a more proactive role to reach out to encourage industries to participate in this scheme.

Secondly, even if they know about Eco-mark, manufacturers find the certification procedure cumbersome, expensive and quite pointless - especially when the consumers do not even know that such a label exists. Again, BIS needs to proactively do some "branding" work for eco-mark here.

Overall, for manufacturers, the efforts in getting the Eco-mark versus the potential benefits through the increased sales do not make a favourable equation at the moment! Under the circumstances, it might be a better to re-look at the entire Indian ecolabelling program and subject it to major overhaul. One option could be to establish a new and independent organisation altogether to oversee the Indian Eco-mark scheme on similar lines as Germany and Thailand. The composition of this organisation could comprise techno-commercial experts, NGOs and most importantly, industry representatives. Whilst it could draw on some or all of the technical work done so far to maintain continuity, relevant skills such as LCA (which are missing right now) could be developed.

Currently a number of products are available in the Indian market with superior environmental performance compared to their earlier models. Some examples could be energy efficient lighting, washing machines with less energy and water consumption, automobiles with better fuel efficiency etc.

It must however be noted that most of these products are developed and marketed in an ad-hoc manner in response to the specific market condition/demand - e.g. shortage of electricity or rising prices of petroleum products - and the information provided to the consumers is usually in the form of self-claims without giving the right importance to the increased sustainability of the products.

While this can be a good starting point, there is a long way to go for Indian industries to come up with sustainable goods and services and provide accurate and objective information to the consumers - preferably verified by a third-party or a labelling certification agency.

In this regard, India is among the 6 rapidly emerging economies chosen by UNEP to implement a 4 year project aimed at promoting eco-labelling through capacity building and support to relevant stakeholders (business, including industrial designers and retail sector, governments, NGO's). The expected on-the-ground results including increases of number of products with an EU Eco-label or other European countries eco-label awarded.

The project, entitled 'Enabling developing countries to seize eco-label opportunities - Capacity building and technical assistance for industries and governments in developing economies, focusing on the EU and other European

eco-labels aims at leveraging on trade and specifically on developed countries demand for environmentally friendly goods to promote the environmental efficiency of target countries key export products and related industrial processes; it therefore allows their industries, including the Small and Medium Enterprises (SMEs), to benefit economically and socially from the increased opportunities for environmentally-friendly products in the international markets while preserving the quality of the environment and enhancing sustainable use of natural resources. The project has been recommended for funding by the European Commission under the Programme on Environment in Developing Countries and its implementation is foreseen to start in January 2007. Consumer Unit & Trust Society (CUTS) is the main Indian partner of the project.

Availability: For buyers to be able to select sustainable goods and services, their availability near the buyer is as essential as the awareness and information. In case such products are not readily available for the buyers, definitely they would obviously go for other readily available options. A robust nationwide distribution infrastructure for such sustainable products and services is essential which will make the products available to the buyers - right near their homes.

Moreover, there are other means of promoting such products and services through specialized exhibitions and fairs - thus creating awareness as well as making the products easily available. Industry associations, chambers of commerce, and even local governments can take lead in organizing such events.

Since 2000, Eco-Products International Fair (EPIF) is organized every December in Tokyo, which is one of the biggest exhibitions of its kind showcasing various environment-friendly products. Along the same lines the Asian Productivity Organization (APO)¹⁴ has organized similar exhibitions in South-East Asia since 2004. After the EPIF 2004 in Malaysia, the EPIF 2005 held in Bangkok, Thailand had a total of 226 booths showcasing eco-friendly products and services covering items ranging from consumer goods to materials for manufacturing set up by exhibitors from Japan, Hong Kong, Malaysia, and Thailand. More than 22,000 people visited the 3-days exhibition. An Eco-Products directory featuring more than 500 eco-products from Japan was published during the event which is also available on the APO website

Affordability: For an average Indian consumer the price is probably the most important factor in making the final purchasing decision for any products and services. Definitely, no product howsoever good it is on environmental and social aspects will be sold if it is more expensive than its traditional counterparts. In fact, it has to be cheaper for a wider acceptance.

There are two ways of making this possible. One: the manufacturer has to reduce the cost compared with other competitors (while maintaining higher environmental and social standards) with innovation. Secondly, there could be some fiscal and non-fiscal incentives to make these products cheaper.

For instance, Ministry of Finance can offer fiscal incentives such as tax holidays or rebates, or subsidies (at least in the initial period) which can effectively help sustainable products and services to become cheaper. Provision of special soft loans or other such incentives to buyers can also help increase the sales.

Non-fiscal incentives would for instance, imply preferential purchases of such products thus creating an assured market and hence better profitability for the manufacturer. One such very effective approach for this would be that of green public procurement (discussed in detail below). Other ideas could include support for R&D, centralized facilities for sustainable product design for SME clusters, which could help developing such cost-effective products and services.

Such schemes can be also tied with the existing schemes and programs. For instance, currently SMEs can avail of subsidy for the ISO9000/14000 certification. This and such fiscal instruments could be slightly modified to ensure the uptake of sustainable products and services by the beneficiary industry. Many such avenues could be explored.

¹⁴ <http://www.apo-tokyo.org/jp>

Public sector

In most countries, government agencies are the biggest buyers. 'Greening' these purchases could contribute substantially to the promotion of sustainable products and services. Many governments around the world have therefore included environmental and social factors in their purchasing criteria thus favouring sustainable products and services.

Internationally, Germany undertook structured green public procurement activity in the 1980s followed by other European countries like Denmark (1994), France (1995), UK, Austria (1997) and Sweden (1998). The US EPA developed Guidance on Environmentally Preferable Purchasing, while Japan enacted the Green Purchasing Law in May 2000 to promote green purchasing as national policy. The law requires all governmental bodies including local governments to practice green purchasing and report the summarized purchasing records to the public.

Like many other countries, preference for sustainable products and services in public procurement is not already coming in India. There is no doubt that incorporating sustainability criteria in the public procurement process can greatly facilitate the promotion of sustainable products and services.

In Taiwan, the Public Construction Commission and the Environmental Protection Administration (EPA) have jointly promulgated the Government Procurement Law in May 1999. Under the law, the government has set measures for the priority procurement of environmentally preferable products by the government agencies. Government agencies conducting procurement of environmentally preferable product with the above criteria can apply price preference within a range of 10%. Accordingly, if the supplier of non-environmentally preferable product has the lowest price while the environmentally preferable product is although higher in price, but within the price preference percentage (10%), the supplier of environmentally preferable product may be awarded the contract. The existing practice is that the supplier of an environmentally preferable product is given a chance to reduce the price if the quoted price is higher, but within 10% of the lowest price of the non-environmentally preferable product, and if agreed, the contract will be awarded to the supplier of the environmentally preferable product. Further, the law encourages the government agencies or persons who have significant contributions in the implementation of procurement of environmentally preferable products may receive an award from EPA. However, there is no penalty under the law for agencies that cannot meet the target.

With major buyers like Indian Railways, Armed Forces, PWD and other public sector undertakings such as Air India - indeed there exists an ample opportunity to make this shift.

However, in reality this is quite an uphill task. The normal purchasing process is already very complicated with intricate bureaucratic requirements. Like many countries in the world, public procurement in India will require major efforts in awareness raising, information dissemination, and training of the public officials directly involved in the purchasing choices.

