Waste Management

The 9th Governing Council of SACEP held in August 2005 at Thimphu, Bhutan identified the waste management as one of the key areas concerned in the region. Subsequently, the 10th Governing Council of SACEP held in January, 2007 in Kathmandu, Nepal recommended carrying forward the work programme recommended by the 9th GC.

In order to take forward the decision of the Governing Council, following activities have been carried out;

1. Project Proposal on Solid Waste Management in South Asia

SACEP Secretariat has prepared a detailed project proposal on solid waste management in South Asia and sent to the UNEP-ROAP for their comments (Annex I). We request the 11th Meeting of the Governing Council of SACEP to endorse this proposal.

2. National 3R Workshop

A national 3R workshop for Bangladesh organized by the Department of Environment/Ministry of Environment and Forest-Bangladesh, United Nations Centre for Regional Development (UNCRD), Waste Concern Bangladesh was held from 27 to 28 February 2007 in Dhaka. South Asia Co-operative Environment Programme (SACEP), Ministry of Environment-Japan, Institute for Global Environmental Strategies (IGES), and United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) extended the necessary support to conduct this two day workshop. The objectives of the workshop was to increase awareness and foster knowledge of 3R related principles, policies, tools and technologies among key government agencies and other stakeholders in Bangladesh, and to facilitate discussion on the possible formulation of a National 3 R strategy for Bangladesh through a participatory process involving all stakeholders concerned.

3. Project Proposal on Urban Waste Management

SACEP prepared a project proposal to address the growing problems of urban waste management in the region. The proposal proposes to address three areas viz a) capacity building and awareness raising through involvement of NGOs within the region, b) initiate the process in collaboration with a local agency to address the issue of separation and disposal and c) paper recycling project managed by local community. The proposal has been sent to the Swedish International Development Cooperation Agency (Sida) for funding.

4. International Coastal Cleanup Day 2007 (ICC Day 2007)

The International Coastal Cleanup Day 2007 (ICC Day 2007) jointly organized by the SACEP/SAS, Indian Coast Guard and National Institute of Ocean Technology, Chennai was successfully conducted in all coastal areas of India. As part of the programme, the message of the coastal cleanup campaign was communicated through email, letter, pamphlet, banner, radio, television, and

through official orders issued by the government to their regional/district offices.

A large representation of volunteers / participants from the Indian Army, Navy, Coast Guard, Air Force, Central Industrial Security Force, Police, various government organizations, non-governmental organizations, large number of corporate companies and educational institutions participated on that day. Representatives from two major ports - Chennai Port and Ennore Port, actively participated in this event. A detailed report is given in Annex 2.

SOLID WASTE MANAGEMENT IN THE SOUTH ASIA

1.0. INTRODUCTION

Rapid population growth and uncontrolled industrial development are seriously degrading the urban environment in many countries in the South Asia. One of the most serious environmental consequences of the process of urbanization is the ever- growing amount of solid and liquid wastes generated by cities in the countries of South Asia.

In many cities in the South Asia solid waste collection is inadequate and poor. Significant amount of the solid waste generated in urban centers is left uncollected in streets, dumped in vacant lands, drains, surface water, and marshy areas and burnt in the open air. Waste that is collected is mainly disposed off in open dump sites, many of which are not properly operated & maintained, there by posing a serious threat to public health. Inadequate sanitation is also quite common in low-income urban rural areas in the South Asia, posing threats to public health.

The major types of MSW are food wastes, paper, plastic, metal and glass, with some hazardous household wastes such as electric light bulbs, batteries, discarded medicines and automotive parts.

2.0 WASTE MANAGEMENT IN AGENDA 21

Waste is an underlying issue throughout most of the Chapters of Agenda 21 - either as a cause of a number of environmental problems, or a result/output of human activities. While Chapters 20, 21 and 22 deals specifically and directly with waste issues, other chapters deal with the impact and effect of waste on other environmental issues.

Solid wastes, as defined in the Chapter 21, includes all domestic refuse and non-hazardous wastes such as commercial and institutional wastes, street sweepings and construction debris. In some countries, the solid wastes management system also handles human wastes such as

night-soil, ashes from incinerators, septic tank sludge and sludge from sewage treatment plants.

It also mention that evironmentally sound waste management must go beyond the mere safe disposal or recovery of wastes that are generated and seek to address the root cause of the problem by attempting to change unsustainable patterns of production and consumption. This implies the application of the integrated life cycle management concept, which presents a unique opportunity to reconcile development with environmental protection.

3.0 PRIORITY

The 9th Governing council of SACEP held in August 2005 at Thimphu , Bhtan and the 10th Governing Councils of SACEP held in January 2007 in Kathmandu, Nepal identified "Waste Management" as one of the priority thematic areas and currently SACEP is focusing on achieving regional strategy for Solid Waste Management and addresses, in particular, municipal, medical, industrial, hazardous and e-waste.

The region-wide studies indicate an effective, efficient and sustainable waste management System is still lacking in the region's urban areas.

Thus a programme needs to be designed to identify to prioritize waste avoidance over recycling, over the other forms of environmentally sound disposal methods; reduce non-avoidable wastes as far as possible; maintain the content of hazardous substances in wastes as low a level as possible; guarantee environmentally sound residual waste treatment and disposal as basic requirements for human existence; etc.
The programme would need to consider draft generic guidelines to the waste management already prepared by UNEP to adopt the regional status addressing issues under urban waste, solid waste, hospital waste, industrial waste and specifically the fast emerging issue e-waste.

4.0 SOLID WASTE PROBLEM IN SOUTH ASIA

INDUSTRIAL SOLID WASTE

The non-toxic or non-hazardous waste generated by various industries is normally not identified as different from municipal solid waste coming from domestic and commercial activities. In many South Asian countries, it has been included as part of municipal solid waste. As a result, there is an absence of a systematic database on industrial solid waste and the exact rates of industrial waste generation are not known. The lack of information on industrial solid waste is lamentable because it can actually include a wide range of materials that may have different levels of impact on the environment.

The types of industrial solid waste would include packaging materials, paper, housekeeping wastes, food wastes, scrap materials such as glass and ceramics, resins, plastics, metal and plastic scraps, stones, cloth, rubber, straw, wood waste, products which are off-specification and a variety of materials not officially specified as or are known to be hazardous/toxic.

Nevertheless; most hazardous wastes are recognized as coming from industrial, agricultural and manufacturing processes, as well as from hospital and health-care facilities. The high volume generators are the chemical, petrochemical, petroleum, metals, wood treatment, pulp & paper, leather, textiles and energy production industries.

HAZARDOUS WASTE

About 98% of the world's hazardous wastes are produced in the industrialized countries, and for years, international waste traders have been able to send industrial waste from the developed countries to the developing countries.

Today, because of increasing restrictions elsewhere, South Asia has become the favorite dumping ground for the waste exporters. And as a result Plastic waste exports to South Asia have skyrocketed in the last two years. Bangladesh, India, and Pakistan received 53% of the total US plastic waste in January, 1993, excluding waste sent to China.
In many developing countries, including Bhutan, Bangladesh, Nepal, and India, increased economic activity has negative impacts on the environment. Economic activities associated with industry, agriculture, health services, and other service sectors generate chemical and

hazardous wastes, which if left unmanaged, can lead to serious environmental problems that threaten public health and endanger economic sustainability.

At the regional, international and national level, the Multilateral Environmental Agreements, namely the Basel Convention on the Control of the Trans boundary Movement of Hazardous Wastes and their Disposal; the Stockholm Convention on Persistent Organic Pollutants; the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, and the Montreal Protocol on Substances that Deplete the Ozone Layer have addressed the issue under various different aspects

MEDICAL WASTE

The improper management of bio-medical waste causes serious environmental problems in terms of air, water and land pollution. The nature of pollutants can be classified into biological, chemical and radioactive.

A study conducted by the WHO in 1996, reveals that more than 50,000 people die everyday from infectious diseases. One of the causes for the increase in infectious diseases is improper waste management. Blood, body fluids and body secretions which are constituents of bio-medical waste harbour most of the viruses, bacteria and parasites that cause infection.

Occupational health hazards: The health hazards due to improper medical waste management can not only affect the occupants in institutions, but also spread in the vicinity of the institutions. Occupational health concerns exist for janitorial and laundry workers, nurses, emergency medical personnel, and refuse workers. Injuries from sharps and exposure to harmful chemical waste and radioactive waste also causes health hazards to employees in institutions generating bio-medical waste. Proper management of waste can solve the problem of occupational hazards to a large extent.

Hazards to the general public: The general public's health can also be adversely affected by bio-medical waste. Improper practices such as dumping of bio-medical waste in municipal dustbins, open spaces, water bodies etc leads to the spread of diseases.

Many hospitals in developing countries dump all waste streams together, from reception-area trash to operating-room waste, and burn them in incinerators. There are even reports of body parts being dumped on the streets because some hospitals do not have disposal facilities. This way of simply discarding their medical waste with regular trash risks the spread of diseases among scavenger populations.Emissions from incinerators and open burning also leads to exposure to harmful gases which can cause cancer and respiratory diseases. Street children and women are especially vulnerable because they go through the waste with their bare hands in the hope of finding needles, syringes and other equipment they can re-sell.

E-WASTE

Computers and electronic equipment which are discarded in the west have started arriving in India and the entire South Asian market in huge quantities and, following China's ban on imported electronic waste last year, India has emerged as the largest dumping ground of e-waste for the developed world.

It isn't difficult to gauge the increasing magnitude of the electronic-waste problem threatening South Asia. In many South Asian countries people tear apart personal computers, monitors and other electronic hardware with their bare hands, sifting through the components. Here the reusable parts are segregated, and the rest is sent for extraction.

The remaining waste is broken down and incinerated. Whatever can't be incinerated is broken down with chisels and hammers and dumped into the nearest sewer or garbage bins, from where it goes to the landfills. Unlike the developed countries, there are no set norms for handling of electronic waste, and secondly cheap labor not only makes disposal cost-effective and profitable for local traders but also encourages the developed countries to push electronic wastes to the countries

Other than the Computers, televisions, mobile phones, refrigerators etc too contains many hazardous constituents. The hazardous substances found in electronic waste have been linked to human health effects like cancer, birth defects, and hormone disruption.

5.0 CONSTRAINTS FACED BY SOUTH ASIAN COUNTRIES

(a) Technical Constraints

In most developing countries, there typically is a lack of human resources at both the national and local levels with technical expertise necessary for solid waste management planning and operation. Many officers in charge of solid waste management, particularly at the local level, have little or no technical background or training in engineering or management. Without adequately trained personnel, a project initiated by external consultants could not be continued. Therefore, the development of human resources in the recipient country of external support is essential for the sustainability of the collaborative project.

Another technical constraint in developing countries is the lack of overall plans for solid waste management at the local and national levels. As a result, a solid waste technology is often selected without due consideration to its appropriateness in the overall solid waste management system. In some cases, foreign assistance is given to a component of a solid waste management system for which the use of resources may not be most cost-effective.

Research and development activities in solid waste management are often a low priority in developing countries. The lack of research and development activities in developing countries leads to the selection of inappropriate technology in terms of the local climatic and physical conditions, financial and human resource capabilities, and social or cultural acceptability. As a result, the technology selected can never be used, wasting the resources spent and making the project unsustainable. Several guides/manuals on appropriate solid waste management technologies in developing countries are available in the literature, and the selection of technology could be made sometimes based on these guides/manuals. However, in most cases, these guides/manuals must be modified to the local conditions prevailing in the country, and therefore local studies are normally still needed. Such studies can be relatively easily incorporated into a collaborative project and, to the extent possible, should involve local research institutions.

(b) Financial Constraints

In general, solid waste management is given a very low priority in developing countries, except perhaps in capital and large cities. As a result, very limited funds are provided to the solid waste management sector by the governments, and the levels of services required for protection of public health and the environment are not attained.

The problem is acute at the local government level where the local taxation system is inadequately developed and, therefore, the financial basis for public services, including solid waste management, is weak. This weak financial basis of local governments can be supplemented by the collection of user service charges. However, users' ability to pay for the services is very limited in poorer developing countries, and their willingness to pay for the services which are irregular and ineffective is not high either. An effective strategy for raising funds needs to be searched in any collaborative project to ensure its sustainability.

In addition to the limited funds, many local governments in developing countries lack good financial management and planning. For instance, in a town in a developing country, over 90% of the annual budget provided for solid waste management was used up within the first six months. The lack of financial management and planning, particularly cost accounting, depletes the limited resources available for the sector even more quickly, and causes the solid waste management services to halt for some periods, thus losing the trust of service users.

(c) Institutional Constraints

Several agencies at the national level are usually involved at least partially in solid waste management. However, there are often no clear roles/functions of the various national agencies defined in relation to solid waste management and also no single agency or committee designated to coordinate their projects and activities. The lack of coordination among the relevant agencies often results in different agencies becoming the national counterpart to different external support agencies for different solid waste management collaborative projects without being aware of what other national agencies are doing. This leads to duplication of efforts, wasting of resources, and unsustainability of overall solid waste management programmes.

The lack of effective legislation for solid waste management, which is a norm in most developing countries, is partially responsible for the roles/functions of the relevant national agencies not being clearly defined and the lack of coordination among them. Legislation related to solid waste management in developing countries is usually fragmented, and several laws (e.g., Public Health Act, Local Government Act, Environmental Protection Act, etc.) include some clauses on rules/regulations regarding solid waste management. The rules and regulations are enforced by the different agencies. However, there are often duplication of responsibilities of the agencies involved and gaps/missing elements in the regulatory provisions for the development of effective solid waste management systems. It should be also noted that legislation is only effective if it is enforced. Therefore, comprehensive legislation, which avoids the duplication of responsibilities, fills in the gaps of important regulatory functions, and is enforceable is required for sustainable development of solid waste management systems.

Because of a low priority given to the sector, the institutional capacity of local government agencies involved in solid waste management is generally weak, particularly in small cities and towns. Local ordinance/by-laws on solid waste management is not also well developed. These weak local government institutions are not provided with clear mandates and sufficient resources to fulfill the mandates. In large metropolitan areas where there are more than one local government, coordination among the local governments is critical to achieve the most cost-effective alternatives for solid waste management in the area. For instance, the siting of a solid waste transfer station or disposal facility for use by more than one local governments is cost-effective due to its economy of scale. However, as these facilities are usually considered unwanted installations and create not-in-my-backyard (NIMBY) syndromes among the residents, no local government is willing to locate them within its boundary. The lack of a coordinating body among the local governments often leads to disintegrated and unsustainable programmes for solid waste management.

(d) Economic Constraints

Economic and industrial development plays key roles in solid waste management. Obviously, an enhanced economy enables more funds to be allocated for solid waste management, providing a more sustainable financial basis. However, by definition, developing countries have weak economic bases and, hence, insufficient funds for sustainable development of solid waste management systems.

Local industry which produces relatively inexpensive solid waste equipment and vehicles will reduce, or in some cases could eliminate totally, the need for importing expensive foreign equipment/vehicles and therefore foreign exchange. Such local industry can also supply associated spare parts, lack of which is often responsible for irregular and insufficient solid waste collection and disposal services. However, the lack of industry manufacturing solid waste equipment and spare parts and a limited foreign exchange for importing such equipment/spare parts are the rule rather than exception in developing countries.

Also in small developing countries, waste recycling activities are affected by the availability of industry to receive and process recycled materials. For instance, the recycling of waste paper is possible only when there is a paper mill within a distance for which the transportation of waste paper is economical. The weak industry base for recycling activities is a common constraint for the improvement of solid waste management in developing countries, such as those in the Pacific region where a large volume of package waste is generated.

(e) Social Constraints

The social status of solid waste management workers is generally low in both developed and developing countries, but more so in developing countries then developed countries. This owes much to a negative perception of people regarding the work which involves the handling of waste or unwanted material. Such people's perception leads to the disrespect for the work and in turn produces low working ethics of laborers and poor quality of their work.

Because of insufficient resources available in the government sector, collaborative projects often have attempted to mobilize community resources and develop community self-help

activities. Results are a mixture of success and failures. Failed projects with inactive communities usually did not provide people in the community with economic as well as social incentives to participate in activities. The social incentive is based on the responsibility of individuals as part of the community for the improvement of the community, and is created by public awareness and school education programmes. The lack of public awareness and school education about the importance of proper solid waste management for health and well-being of people severely restricts the use of community-based approaches in developing countries.

At dump sites, transfer stations, and street refuse bins, waste picking or scavenging activities are common scenes in developing countries. People involved have not received school education and vocational training to obtain knowledge and skills required for other jobs. They are also affected by limited employment opportunity available in the formal sector. The existence of waste pickers/scavengers creates often an obstacle to the operation of solid waste collection and disposal services. However, if organized properly, their activities can be effectively incorporated into a waste recycling system. Such an opportunistic approach is required for sustainable development of solid waste management programmes in developing countries.

6.0 PROGRAMME FOCUS AND OBJECTIVES

The Work Programme for SACEP will focus on achieving a regional strategy for Solid Waste Management and addresses, in particular, municipal, medical, industrial, hazardous, and e-waste.

The programme objectives will consider to achieve a regional strategy to assist, enable, and facilitate the South Asian Countries to address the waste issues; bring together all major stakeholders; networking, institutional linkages, identification of the Centers of Excellence and Collaborating Centers to link Science and Policy issues through related research; thus

ensuring policy intervention through timely briefs to the policy makers and the leadership within the region.

- Long-term Objectives
    - To set up a highly effective MSW management system and information system and select the technologies and equipment that meet the Region's circumstances to properly treat MSW, so as to improve environmental quality and to promote the construction and sustainable development of society in urban and rural areas.
- Immediate Objectives
    - Establish MSW expert and decision-making systems for the efficient use of manpower, material and financial resources
    - Set up management systems and information systems at different levels and the technical standards and specifications systems regarding the production, collection, transportation and treatment of MSW

6.1 PROGRAMME IMPLEMENTATION

Programme implementation thus will ensure to establish a network of experts and institutions ; strengthen the collaborating centers and the civil society organizations; bring together all major stakeholders; establish institutional linkages, identification of the Centers of Excellence and Collaborating Centers to link Science and Policy issues through related research and outreach operations. A regional consensus to the waste management policies and strategies will also be addressed.

The programme implementation is proposed to be done in Phases, with the initial phase Identifying the regional status and development of an implementation plan through a Participatory approach.

7.0 PROPOSED SOLUTIONS

Technological Dimension

- National government should provide a policy framework conducive to technology development and effective project implementation.
- Raise the awareness of local governments to technological options for waste management and build a supporting local-level institutional framework.
- Establish channels for exchange of information from existing users in the region.
- Establish local level multi-stakeholders groups for advising and monitoring local government Performance

Economic and Financial Dimension

- National level policy is needed to support recycling technology (possibly subsidizing it but only in the short-run), encouraging private sector investment, and transforming the informal sector to safe and stable employment.
- Entrepreneurship in waste management should be developed and supported. Financing mechanisms are needed,
- Government should provide policy support for financing the entrepreneurs, research and development (R&D) from government institutions, and access to public land for composting and sorting.
- Establish deposit refund systems on reusable items like bottle containers of beverages.
- Establish "green customs charges" on items which will have high disposal costs, especially used products.
- Compost and other recycling products need to be marketed through well-established commercial, private-sector marketing channels.
- Government must regulate, but, may also subsidize costs of separation and proper disposal for the hazardous components of wastes.

Social Dimension -

- The informal sector, sweepers, waste collectors, and pickers provide important employment and handle a significant portion of municipal waste, However they are generally not integrated into the mainstream economic benefit system. They need access to various benefits and support such as loans, health protection,
- Community-based recycling of household wastes is a multi-stakeholder process that can benefit the community as a whole and formalizes involvement of the informal sector while reducing demand on the municipality.
- Informal waste workers are often children, and child labor should be eliminated or reduced and in order to achieve this education opportunities should be provided for children in the informal waste management sector.
- Formalizing relationships and access to micro-loans can help women maintain access to employment in the waste management and recycling sector.
- Municipalities should promote community composting or biogas generation for local income, or methane production from landfill.
- Town planning and municipal resources should be committed to provide land for composting and separation.
- Source separation and proper disposal of medical wastes and hazardous post consumer wastes is needed.
- Enforcement of transboundary regulations and standardized labeling of wastes and used products can help protect recyclers in developing countries.
- Some form of environmental reporting should be required to make the community aware of the risks they incur from industrial and medical wastes. NGOs can play a key role in enforcing reporting requirements.
- Public-private partnership relationships should be developed between industry and community for better understanding of respective problems and possibilities for cooperation.

8.0 PROGRAMME DEVELOPMENT

The initial stage of the programme development would establish a strong network of all the stakeholders through a participatory process in reviewing the status and adopting the guidelines for the region. Conduct and follow up to the pilot projects with observations to the cases of success status from the other regions would establish the programme's continuity and provide policy guidance through fact sheets, etc.

THE PROGRAMME IMPLEMENTATION

STEP 1 - MOBILIZING THE PLANNING PROCESS

Waste management involves a wide range of stakeholders, each with their own professional backgrounds and priorities. Therefore it is important for the Strategic Planning initiative to be as inclusive as possible, involving all those likely to be involved in securing real improvements to waste management practices.

1.1 Establishing the Steering Committee

A Steering Committee should be assembled for the strategic planning process, comprising members who have the position, experience and authority to direct the overall initiative. The Committee should include the authorities and institutions involved in decision-making for MSWM, together with a selection of other key stakeholders. Members can include:

- A senior political figure as chair
- Representatives of participating municipalities
- Local government department officials
- Municipal waste managers
- Representatives of community organisations
- Women leaders in MSWM
- Private sector representatives
- Selected specialists

Preparing a Workplan

The final stage of the mobilization process is to develop a Work plan

STEP 2- Defining the Baseline

A Baseline study should be carried out to identify waste quantities and composition, and understand existing waste management practices. This Baseline Study needs to address comprehensively the range of areas of importance to waste management services, including institutional, operational and financial aspects.

Outline Contents of a Baseline Study should contain **Data and Information on**

- Waste quantities and composition
- Existing MSWM Operations
- Institutional/financial framework
- Prediction of future waste quantities
- Analysis of shortfalls and constraints

Data Collection

Data and information will need to be collected in a broad range of areas: covering socio economic, housing, health, land use, environmental and political/institutional issues.

Community organizers should visit the area for a series of time till they have to consult about community people's interest regarding the program, their felt need and problems in the community. The mass meeting should be held where decision should be made on whether or not to implement the program. Ward level office person , municipality representatives, youths of the community and other influential persons of the community who are interested about the programme should present at the meeting

Preparing the Baseline Study

A report on the Baseline Study should be prepared at an early stage in the planning process to feed into early decision-making on key issues and strategic priorities. The objective should

be present an initial understanding of existing MSWM practices and shortfalls and constraints and, where possible, provide this study as a briefing document (or summary) at the Inception Workshop.
A summary of the report should be prepared and be used as a briefing document for the Inception Workshop.

STEP 3 - ESTABLISHING THE STRATEGIC PLANNING FRAMEWORK

An Inception Workshop involving all key stakeholders provides a valuable opportunity for open discussion and debate of all aspects of waste management, define key issues and establish the strategic planning framework.

Workgroup leaders should be given the responsibility of ensuring that all members have their say. Rapporteurs can be assigned the role of presenting findings of each Workgroup to all participants. A briefing meeting in advance of the Workshop can provide a valuable opportunity for discussing objectives and structure, as well as their key responsibilities. Workgroup leaders and rapporteurs can be retained through later planning stages to ensure consistency and direction.

Defining the Scope of the Plan
The boundaries of the plan need to clearly define. This will involve making decisions on the planning area, period and types of waste to be covered by the plan The planning area needs to be broad enough to capture both the major centers of waste generation and the area of search for disposal sites. A time horizon of 5 years can be established for the Action Plan, with an Immediate Action Plan detailing requirements over the first 1-2 years. Planners will also have to decide which types of waste to include in their Plan

STEP 4 - IDENTIFYING AND EVALUATING OPTIONS
This includes Identifying and evaluating the practical *options* available for addressing each of the component parts of the overall MSWM system.

4.1 Waste Collection and Recycling

A successful and sustainable operation for waste collection and street sweeping requires close liaison and cooperation between the responsible management, the supervisors and the local community. This is particularly the case if community based organizations (CBOs) are to be involved in some parts of the service. For this reason, waste collection is often best organized at the lowest institutional level, probably districts and zones within a city or municipality.

In many countries an informal (or semi-formal) materials recovery and recycling system operates alongside the waste collection service, driven by the market demand for materials extracted from the waste stream, and managed by an interconnected chain of suppliers, dealers and re-processors. Therefore care needs to be taken to ensure that the growth of the existing recycling system is not hindered. The aim should be to play a supporting role, devising ways of working with the informal sector so that it is able to achieve higher rates of recycling and receive a fair share of the economic benefits, while at the same time improving occupational health and safety conditions of waste pickers and recyclers.

a) Reduce the quantity of waste generated at source.
b) Explore the potential for the reuse of waste.

The public are the major customers of the MSWM service. In implementing new waste collection methods, the community to be served should first be consulted about the type of system planned to be introduced. This can be carried out using a `willingness to pay survey' designed to reflect the preferences of the community in terms of service type, level and cost. Willingness to pay surveys

c) Remove solid waste accumulations at main informal dumping locations.

Many of the most effective primary collection systems have been developed by communities themselves with limited or no involvement from municipal authorities. In these cases it is often beneficial for the linkage between the community-organised primary collection system

and municipality-organised secondary collection system to be clearly set out. A well-located and designed transfer station will allow service coverage areas to be increased and reduce traffic congestion along haulage routes

d) Design a continuous removal system managed at the community level.
e) Mobilize local administrations, community leaders, and residents to act on the solid waste problem.
f) Establishment of networks at various levels (government, NGO, business, stakeholders)

h) Developing a Public Awareness & Education Programme

Public awareness and education campaigns are tools used to increase public support and participation for a particular course of action. The main objectives of a PA&E campaign are to provide information, gain public support, build the profile of SWM and reduce quantities of waste. There are a wide range of media available around which to develop a campaign. The impact will be dependent on how well the campaign is targeted and the promotional messages adopted.

i) Finalizing the Strategy

A Strategy Workshop should be held to provide an opportunity for full discussion of the draft Strategy amongst the wider consultative group. The Workshop can be structured round a similar format to the Inception Workshop, with the aim being to maximise the time for discussion, debate and refinement of strategy proposals.

J) Finalizing the Strategic MSWM Plan

Further consultations and participatory workshops will need to be held during the Action Planning stage to ensure continued consensus and ownership of the Strategic MSWM Plan.

9.0 PARTNERS AND THE KEY PLAYERS

While the mandate and implementation strategies will be considered in close collaboration with the UNEP, the main key players and the partners in the programme implementation would include the Governments, expert institutions, private sector, NGO, CBO and the youth forums. The programme will heavily draw upon the networks, knowledge and procedures that are already existing and seek support from various other support agencies like FAO, WHO, ADB, WB, SIDA, CIDA, etc.

COMMUNITY BASED INTEGRATED SOLID WASTE MANAGEMENT PILOT PROJECT
COSTING SHEDULE

TASK DESCRIPTION	YEAR 1 (US$)	YEAR 2 (US$)	YEAR 3 (US$)
1. Mobilizing the Planning Process & Establishing the strategic planning framework			
➢ Organizing " inception Work shops" - Baseline study and Data Survey - Travel - Reports and Communication - Administrative and support cost	15,000	-	-
2. Public Awareness Campaign			
➢ Training programmes for the Environmental health officers, Community health nurses, Teachers etc.	10,000	10,000	10,000
➢ training on separation and waste reduction to the female members of the households	5,000	5,000	5,000
➢ Conduct house to house visit by the community facilitator of the NGO	5,000	5,000	5,000
➢ Organize Area cleaning programmes, Photographic Exhibitions	10,000	10,000	10,000
➢ Establish distributor network of shop retailers of & alternatives to plastic bags	5,000	5,000	5,000
3. Implementing the Strategic Plan			
➢ Distribution four colored bags	5,000	10,000	10,000
➢ Establish Door to Door primary Collection of non bio degradable waste	5,000	5,000	5,000
➢ Distribution of compost bins.	2,000	2,000	2,000
➢ Cost for the compost bins	10,000	10,000	10,000
➢ Establish Community drop off centers at Curbsides or other convenient places	20,000	20,000	20,000
➢ Establishment of Community sorting center	20,000	10,000	10,000
➢ Training of community leader	5,000	5,000	5,000
6. others	10,000	10,000	10,000
TOTAL	**117,000**	**107,000**	**107,000**
Grand total for three years	331,000		

INTEGRATED SOLID WASTE MANAGEMENT PROJECT
Time frame

TASK NO	TASK DESCRIPTION	Year 1						Year 2						Year 3					
1. Mobilizing the Planning Process																			
1.1	Establishment of Steering Committee																		
1.2	Preparing a work Plan																		
2. Defining the Baseline																			
2.1	Data Collection																		
2.2	Baseline Report Preparation																		
3. Establishing the strategic Planning framework																			
3.1	Inception work shop																		
4. Public Awareness Campaign																			
4.1	Training programmes for the Environmental health officers, Community health nurses, Councillors, Teachers, Hotel owners, street vendors																		
	training on separation and waste reduction should be given to the female members of the households																		

4.1	Preparation of the Action Plan																		
5. Implementing the Strategic Plan																			
5.1	Establishment of Community recycling center																		
5.2	Training of community leader																		
5.3	Establish Community drop off centers at Curbsides or other convenient places																		
5.4	Hand over four colored bags properly labeled to the households																		
5.5	Establish Door to Door primary Collection of non bio degradable waste																		
5.6	Distribution of compost bins.																		
5.7	Monitoring and Follow-up activities																		

REPORT ON

INTERNATIONAL COASTAL CLEANUP DAY (SEPTEMBER 16, 2007)

JOINTLY ORGANISED BY

SOUTH ASIA COOPERATIVE ENVIRONMENT PROGRAMME / SOUTH ASIAN SEAS,

INDIAN COAST GUARD & NATIONAL INSTITUTE OF OCEAN TECHNOLOGY CHENNAI

The International Coastal Cleanup Day 2007 (ICC Day 2007) was successfully organized in all coastal areas of India. The event was a grand success.

The Government of India has appointed Dr. R. Venkatesan, Group Head, Ocean Science and Technology for Islands, National Institute of Ocean Technology, Chennai, as the national consultant for the UNEP-SACEP/SAS. The Ministry of Defence on the other hand has appointed the Indian Coast Guard as the coordinating agency for the event since environment protection is one of the statutory duties of the Coast Guard. These two agencies coordinated the programme at the national level. At the local level, Prof. D. Sudarsanam of Loyola College, Chennai coordinated the educational institutions in the coastal cleanup and other related activities. The Tree Foundation is the other coordinating organisation in Chennai, which is actively involved in the protection and conservation of marine mammals and turtles along the south Chennai beaches. The four organizations have been active in the conduct of the programme.

The SACEP Indian consultant had sent nearly 7000 letters and emails to many central and state governmental departments and non-governmental organizations to support this event in their respective coastal areas. The Indian Coast Guard organized a national level coordination meeting at Chennai on 6 September wherein the national level coordination of the ICC day activities were finalized.

In addition, Indian Coast Guard communicated to various governmental departments to issue official circulars asking the respective coastal district administration to organize this event. Hence, complete micro level planning and initiatives were taken. The press and media covered this event and requested the public to come together for this national and international cause. This has motivated many citizens to come forward on their own to join hands with the coordinating agencies.

As part of the programme, the message of the coastal cleanup campaign was communicated through email, letter, pamphlet, banner, radio, television, and through official orders issued by the government to their regional/district offices.

A large representation of volunteers / participants from the Indian Army, Navy, Coast Guard, Air Force, Central Industrial Security Force, Police, various government organizations, non-governmental organizations, large number of corporate companies and educational institutions participated on that day. Representatives from two major ports - Chennai Port and Ennore Port, actively participated in this event.

The details of the participants and the particulars of debris collected by the participants are pouring in from various locations of the country.

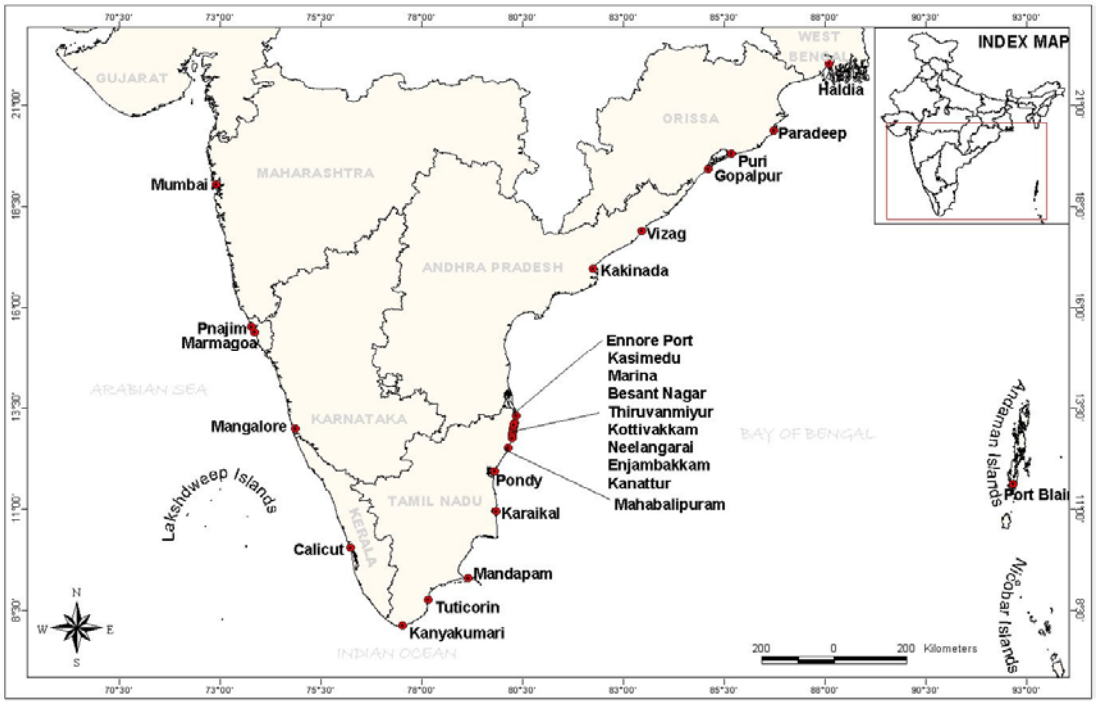

Fig.: Map showing locations of coastal cleanup activity along the coast of India

Chennai:

According to the available data, about 7000 participants were on the beaches clearing and segregating the litter. About 68 tonnes of garbage was picked up.

In addition an inter village cleanup competition was also held in the three fishing villages along the East Coast Road - Injambakkam, Pannaiyur and Nainar Kuppam. Over 200 children and 45 youth from these fishing communities worked together to collect 125 bags of trash from the local beaches. The judges for the competition were Mr. Ashish, Mr. K. Srivastav, IFS – Wildlife

Warden, Ms. Rebecca Green – Roots & Shoots Member (University 0f California Berkeley), Mr. S. Govind, Technology Lead (Up Star Technologies) and Mr. Arun Krishnamurthy – Advertising Lead (Google India - Hyderabad). The children separated the trash into waste nets, rope, plastics, slippers, thermocol, etc., and learned why it is important to keep their beaches litter-free. A documentary film on the hazards of marine debris and their impact on the life forms in the ocean were played in all these fishing villages in and around Chennai on 22nd and 23rd September 2007.

The participants were educated on the need of the cleanup which has to be taken up as a daily event and not just a one-day act, since they live by the ocean and their livelihoods depend on it.

Royapuram Fishing Harbour

At Kasimedu - Royapuram Fishing Harbour, the Chennai Port Trust in collaboration with NIOT, Coast Guard and Tree foundation arranged a massive cleanup. Using earthmovers and trucks, tonnes of debris accumulated over the years - mainly decaying organic matter, fish waste, broken fishing gears, old plastic items, etc. were removed. The local fishers joined them in this exercise and an awareness initiative was made to educate them on the need of a clean marine environment.

In addition, the Fishery Survey of India also conducted a cleanup campaign in the same harbour with 50 participants and distributed pamphlets on the importance of keeping the harbour clean to the local fishermen.

Volunteers involved in the cleanup activity at Royapuram Fishing Harbour reported that the situation at the site (adjoining the fishing harbour) is so worse that some urgent measures has to be taken to avoid dumping of waste fish and packing material at the site. Some of the observations made by them are:

1. Fish waste like heads and tails of large fishes are being dumped along with plastic bags, sheets, fishing nets, broken pieces of FRP boats, etc.
2. The dumped waste fishes were in decaying state and the entire area was covered by wriggling maggots.
3. Added to this, as there was continues drizzling for the last one month the entire area became unapproachable due to foul smell.
4. As the entire area was wet and surrounded by plastic sheets and rocks it formed an ideal breeding ground for scorpions – plenty of scorpions were observed while clearing the garbage.
5. The most pathetic situation is that the dried fish are stored amongst this waste dump and fisher folk were found drying fish just bordering this polluted area.
6. The seawater in the fishing harbour area was turbid and lots of fish-waste is being thrown into it.

7. Sunken fishing vessels were found in the waters and discarded boats were seen on the shore.

Ennore Port

The Ennore Port Trust had taken the initiative to organize cleanup of the port premises and 145 people including schoolchildren participated in the 16th morning cleanup exercise. The Port Trust officials have reported the data collected in the prescribed format.

Mahabalipuram

A NGO called SOHES (East Coast Open Scouts & Guides Group) took the initiative at Mahabalipuram, which has seashore temples and is one of the important tourist destinations of the country. Since tourism is the main activity of this small town, accumulation of plastic and other tourism related debris is found to be more along this beach. More than 100 people participated in the exercise.

Student Competitions

An inter-school and inter-college contest on "cleanup" was conducted. About 1500 students participated in the event. The inter-school contest was judged by Ms. Jaya, Collector of Chennai and Deputy Inspector General Abu Thala, Commander CG District No. 5 (TN) and the inter-college contest was adjudged by Dr. S. Kathiroli, Director, NIOT, Dr P. Iyyamperumal, Director, Birla Planetarium and Deputy Inspector General B. K. Pattashani of CG RHQ (East).

In the inter-school contest, Sishya School Team-1 bagged the first prize with the second by the Hindu Higher Secondary School and the third by Sishya School Team-2. In the inter-college contest, the first prize went to Guru Nanak College Rotaract club, with a tie for the second place between Vaishnava College and New College.

Flipper Fest 2007

As a prelude to the International Coastal Cleanup Day, the TREE Foundation, Chennai, organized the "Flipper Fest 2007" at Loyola College in Chennai. The program consisted of painting, poster, quiz and junk art competitions, which were held on 8th and 9th of September 2007. During the two-day sessions, about 7 documentary movies, viz., Blue Planet – Open Ocean, Ambassadors of the Ocean, Last Journey of Leatherback, Frozen World, Dolphins, Ocean World and Declining Coral Reefs of India, were played to create awareness to the public especially to the student community on the wealth, importance and the dangers faced by the marine environment.

An 18 min documentary on the International Coastal Cleanup Day 2007 has been prepared, which focuses attention on the state of the coastal areas and the measures that can be taken by each individual, both at the government and public level.

Mandapam:

The India Coast Guard along with district administration and officials from Gulf of Mannar Trust, GEF and Ministry of Environment and Forests jointly organised this event. A human chain was formed in the religious tourist destination on the importance of marine debris and protection biodiversity. The Gulf of Mannar is one of the important marine bio reserves and this awareness has kindled the minds of people on the importance of rich marine biodiversity unique to this area.

Tuticorin:

The Indian Coast Guard with support of governmental and nongovernmental organizations worked together for organising the cleanup. Thousand people – mainly school and college students participated in the cleanup and the data collected was reported.

Kanyakumari:

The Manonmaniam Sundaranar University played a key role in organizing the event in Kanyakumari on the request of SACEP and students volunteered to clean up the coastal areas.

Karaikal:

The staff and students of Annamalai University along with other organisations joined to organize this event in different places along the seashore of Karaikal. More than 1000 students participated along with local fishers on this day. The data collected were properly recorded and reported.

Town Panchayat Department, Govt. of Tamilnadu:

The Town Panchayat Department, Govt. of Tamilnadu on the request of SACEP, requested many coastal town panchayats to organize this event in the respective coastal areas. This is one of the important initiatives, as these activities are very much required to bring awareness to the rural coastal villages, in particular fishers. More than 600 people participated in town panchayats of Kanyakumari, Nagapattinam and Kanchipuram districts.

Pondicherry:

The Indian Coast Guard took major efforts to bring awareness among the people with support of local administration and 1000 people gathered along the beaches. This coastal city is one of the hotspots of tourism and hence may be considered for long term efforts on coastal cleanup activity. On 16th September, 1000 people including school and college students joined hands with governmental and nongovernmental organizations to clean the beaches. Also in villages, fisher folk took part in this activity very enthusiastically.

Visakhapatnam:

The initiative was taken by the Indian Coast Guard with participation of governmental and nongovernmental organisations at the Visakhapatnam Beach. Nearly 1000 people joined to bring awareness among the public and involved in this cleanup exercise.

In addition, the Regional Centre of the National Institute of Oceanography led by Dr. K. S. R. Murthy, Scientist-in-charge, led a scientific team to bring awareness on the marine litter and their effects on the marine environment. 1500 people gathered on the beach that morning to participate in the international coastal cleanup day.

The Hindustan Shipyard Ltd. at Visakhapatnam organised the international coastal cleanup day in their premises both on land and underwater.

Kakinada:

This industrial town witnessed a gathering of 500 people in their coast with participation of college and schoolchildren and collected data on marine debris.

Kozhikode:

In Kozhikode (Calicut), Kerala the Coast Guard organised this campaign with the participation of 1000 volunteers comprising of Coast Guard staff and 600 schoolchildren. They cleaned the coastal area and collected information of marine debris in this region. Since the coast has a scenic view with coconut tress being its specialty, it is obvious that marine debris consisted mainly of coconut shells and fibres along with other debris.

Orissa:

The Action for Food Production (AFPRO), a socio-technical non-governmental organization, in collaboration with United Artists' Association (UAA), a part of Orissa Marine Resources Conservation Consortium (OMRCC) network had successfully carried out the coastal

cleanup Day programme on September 16 at Gopalpur beach, by generating local resources through the network. Water aid, Greenpeace, local government, educational institutions have supported for the greater cause. About 1000 people participated in this event. As Ganjam District being one of the poorer districts in terms of Sanitation, a Hand Wash Campaign was also conducted/clubbed along with the thematic workshop for keeping up the personal hygiene of the community and to make them aware of and to safeguard them from diarrhoeal diseases to at least 47% by the mere act of hand washing.

The clean up at the Puri Beach was covered by the WWF-India foundation, which organised the coastal cleanup campaign with other volunteers on 16-09-2007.

Paradip Port Trust organised the International Coastal Cleanup Day in their port premises with 15 of their staff and collected marine litter.

Gujarat:

The Gujarat Ecological Society on request from the SACEP organised the international coastal cleanup day on 19 September 2007 at Sakriyapura Village, the confluence of River Mahi with the Gulf of Khambat. Twenty students participated in the cleanup and collected 1272 pieces of debris. These students were also educated on the problems of marine and coastal pollution during an interactive session on the same day.

Daman:

In Daman, situated in the west coast of India, the Indian Coast Guard organized to bring together people from different occupations to clean up the Daman beach and collect data on marine litter. Nearly 1000 people including 300 children participated in this exercise.

Mumbai:

The Indian Coast Guard organised the international coastal cleanup day campaign on 29-09-2007 in Mumbai along with people from different occupations and students. Over 2000 people participated in the campaign and collected data on marine litter.

The Mumbai Port Trust organised the cleanup in their port premises using the contractors regularly cleaning the port and submitted the data on marine litter.

Mangalore and Suratkal:

In the areas of Mangalore and Suratkal, Karnataka, Indian Coast Guard along with participation from the public and students organised the event on 29-09-2007. Nearly 1000 people participated in this exercise.

Ratnagiri:

Ratnagiri, situated in Maharashtra has a long coastline and convenient harbours and is an integral part of the Konkan Coast. The Indian Coast Guard organised this event in Ratnagiri and Dabhole with the participation of public and students. Over 100 people participated and cleaned the beach as part of the campaign.

Lakshadweep and Andaman & Nicobar Islands:

In the tropical coral islands of Lakshadweep, around 50 people participated in the cleanup organised by the Indian Coast Guard. Most of the debris collected consisted of coconuts and plastics.

In Port Blair, Andaman Islands, 1000 people participated in the coastal cleanup organised by the Indian Coast Guard. In the other parts of the island archipelago over 500 people participated in the cleanup campaign and cleared the beaches of debris.

Marine Litter Data:

The data on marine litter received so far from different parts of Chennai and other adjoining areas shows that the major part (more than 50%) of the debris is related to the activities of shoreline and recreation, followed by ocean/waterway, smoking-related, dumping and medical /personal hygiene related. The total number of litter collected on International Coastal Cleanup Day 2007 in these areas amount to more than 1.4 lakhs.

ICC Day 2007 Highlights - India

No. of participants = 19,398

No. of litter collected = 1,49,730*

(*The total weight of this litter along with the non-segregated marine litter was estimated to be about 71 tonnes)

Sources of Debris (in percentage)

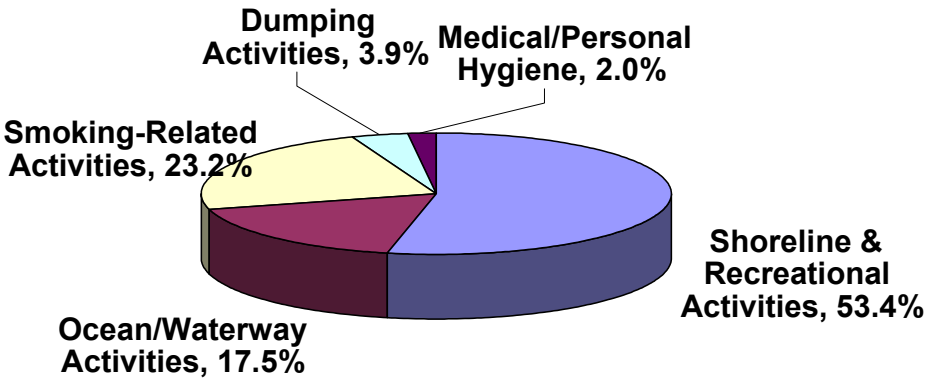

Fig.: Pie chart showing the sources of debris

Table: Top ten items collected during the International Coastal Cleanup Day 2007

Top Ten List - 10/11/2007		
Debris Item	Amount	Percent of Total
1. Bags	22,877	15.3%
2. Tobacco Packaging/Wrappers	12,935	8.6%
3. Cigar Tips	11,081	7.4%
4. Cups/Plates/Forks/Knives/Spoons	10,353	6.9%
5. Food Wrappers and Containers	9,167	6.1%
6. Balloons	8,103	5.4%
7. Cigarettes/Cigarette Filters	6,368	4.3%
8. Rope	5,354	3.6%
9. Straws/Stirrers	5,262	3.5%
10. Caps/Lids	4,974	3.3%
Totals	**96,474**	**64.4%**

LIST OF SPONSORS

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20. BROWN STAR
21. SOUTHERN CREST HOTEL
22. LR INFRASTRUCTURE

Table 1: DATA ON LITTER COLLECTED

S. No.	Date	Place	No. of people participated	Approx. weight of marine litter collected (kg)	Approx. number of items collected
Gujarat					
1.	16-09-2007	Jakhau	800		
2.	19-09-2007	Sakriyapura Village	20		1272
Goa					
3.	16-09-2007	Goa	1500		
Maharashtra					
4.	18-09-2007	FSI, Sassoon Dock, Mumbai	16	250	695
5.	16-09-2007	J N Port, Mumbai	15		44
6.	16.09.2007	Mumbai Port Trust	-		147
7.	29-09-2007	Mumbai Beaches	2000	4000	
Daman					
8.	29-09-2007	Daman	1000		
Karnataka					
9.	16-09-2007	Mangalore, Suratkal	1000	3000	
10.	16-09-2007	New Mangalore Port Trust	20		174
Kerala					
11.	16-09-2007	Thiruvananthapuram	20	100	517
12.	16-09-2007	Kozhikode	1000		
Lakshadweep Islands					
13.	16-09-2007	Kavaratti beach	30		
Pondicherry					
14.	16-09-2007	Pondicherry	1000		
Tamilnadu					
15.	16-09-2007	Tuticorin	1100		
16.	16-09-2007	Mandapam	1000		
17.	16-09-2007	Karaikal	1000		
18.	16-09-2007	Kollemcode Town Panchayat	10	2000	
19.	16-09-2007	Edaikkazhinadu Town Panchayat	20	2	675
20.	16-09-2007	Mahabalipuram	100		
21.	16-09-2007	Injambakkam Beach, Chennai	10	112	4420

S. No.	Date	Place	No. of people participated	Approx. weight of marine litter collected (kg)	Approx. number of items collected
22.	16-09-2007	Nainarkuppam Beach, Chennai	36	797	
23.	16-09-2007	Panaiyur Beach, Chennai	280	2263	
24.	16-09-2007	Kottivakkam Beach, Chennai	84	448	8666
25.	16-09-2007	Thiruvanmiyur Beach, Chennai	430	1430.2	14596
26.	16-09-2007	Besant Nagar Beach, Chennai	910	1294	54824
27.	02-10-2007	Besant Nagar Beach, Chennai	750	4000	
28.	16-09-2007	Marina Beach, Chennai	953	3311	56917
29.	16-09-2007	Indian Coast Guard, RHQ Beach	1500		
30.	16-09-2007	Ennore Port, Chennai	75	50	130
31.	16-09-2007	FSI, Royapuram Fishing Harbour, Chennai	50		175
32.	16-09-2007	Kasimedu, Chennai	289	44000	
Andhra Pradesh					
33.	16-09-2007	Visakhapatnam	1500	4000	5608
34.	16-09-2007	Hindustan Shipyard Ltd., Visakhapatnam	50		164
35.	16-09-2007	Kakinada	500		
Orissa					
36.	16-09-2007	Gopalpur Beach	350	100	
37.	16-09-2007	Puri Beach	50		143
38.	16-09-2007	Paradip Port Trust			77
Andaman & Nicobar Islands					
39.	16-09-2007	Andaman & Nicobar Islands	500		
40.	16-09-2007	Corbyns Cove, Port Blair	1000		
41.	16-09-2007	FSI, Mazar Pahar, Port Blair	20		486
		TOTAL	**19398**	**71157.2**	**149730**