



WWF - Pakistan

SAAF MAHOOL
Solid Waste Management Project Gujranwala

FINAL REPORT
October.2002-September.2003

SPONSORS

WWF-Pakistan
Tehsil Council Committee Gujranwala (TCCG)

Working Organization**ORGANIZATION PAN ENVIRONMENT (OPE)**

Head Office: Skindar Street # 40/A, Qabaristan Road, Popular Nursery, Gujranwala.

Field Office: 30-Foot Bazaar, St. # 6, P/O Climaxabad Sahaeenabad Gujranwala.

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INTRODUCTION

Solid Waste Management (SWM) has been a burning issue for the human beings since the dawn of civilization. The situation is further aggravated due to rapid increase in population and industrialization. Gujranwala is historical City of Punjab. It is located along Grand Trunk Road at a distance of 63 kilometers from Lahore. It is famous for cultural, sports (wrestling) and food. Gujranwala has a population of 1.133 million according to Census 1998 and it generates waste at the rate of 500 tons/day. TCCG with his all efforts can only lift very small fraction of this waste just from filth depot. Uncollected waste remains in streets, which creates environmental problems, like blockage of drains, uncontrolled growth of pathogens in waste piles, open burning and uncontrolled degradation of the organic material produce methane (green house gas) at Land fills sites.

Gujranwala city is facing acute solid waste problem causing the environmental pollution. The combined effect of this pollution is degradation in the soil, water and air quality, which ultimately affect the civic health in these areas especially in slum areas of city like shaheenabad. So there was a need to start such type of project.

FINAL REPORT

1. Project Number: 500 346 01

2. Project Title: “SAAF MAHOL”

3. Project Executant

3.1 Name : Yasir Ilyas

3.2 Title : Project Manager

Organization : ORGANIZATION PAN ENVIRONMENT (OPE)

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4. Project Duration (in months) : 12 months from October-2002 to September-2003

a) Starting Date : 1st October-2002

b) Ending Date : 30 September-2003

5. Project Cost : Rs. 179,000

(Rupees One Hundred seventy Nine Thousand

Only)

6. Project Summary

Saaf Mahool project was started in shaheenabad Gujranwala and its surrounding areas from October 2002. This project was funded by scientific committee of WWF Lahore Pakistan. Land for composting of organic waste was provided by Tehsil city Government Gujranwala, and working organization was Organization Pan Environment Gujranwala.

The main objective to launch this project was to resolve the problem of solid waste management in target abadies. Saaf Mahool area is comprises of four abadies with total population of 23816 and near about 11 Ton daily solid waste.

Target Abades of Saaf Mahool Project Area

Sr No	Name of Target Abadi	First 4 months	Middle 4 months	Last 4 months
1	Shaheenabad, Mirza Colony	Oct.02-Jan.03		
2	Mujahid Colony, Rasool Pura		Feb.03-May.03	
3	Climax Abad, Samnabad).			June.03-Sept.03

Above table shows that time period of 4 months (quarter) was given to each two abadies for completion of project activities. Awareness and motivation about the hazards of solid waste was created in the first two months and hireing of private sanitary workers to collect the waste and identification of the activists was also done in the same time period to sustain the project. Trainings of community (included layman and school students) and sanitary workers were completed in the second month of quarter.

Door to door collection, transportation of solid waste to final treatment and composting of solid waste at recycling unit was started just after the establishment of infra structure.

7. Project Objectives

Objects of Saaf Mahool Project :

- * To solve the problem of municipal solid waste on self help basis because the involvement of private sector can be helpful to the municipality to achieve the desirable standards of solid waste management with the reduced cost due to their efficiency and management.

- * To improve the Sanitation and Environmental conditions of poor community of the Katchi Abades and Slums areas of the Gujranwala.

* To reduce the volume of solid waste disposed off at the landfill sites in the Gujranwala

* Minimizations of land fill sites because composting of the waste can minimize the amount of the waste which is subjected to dispose off.

* To provide environmental education & awareness to the community (To raise the campaign in schools, colleges, community and other institution of the project area so that they may become aware of environmental problems and their protection through workshop, seminars, training's, site visits, publications, audio & video shows, and door to door contact to the individuals)

* To reduce/decrease pollution (air, water, solid waste) especially by the disposal/management of solid waste through the recycling methodologies.

* To convert the organic waste in to the organic fertilizer with help of BM technology.

8. Methodology Used

Our strategy based on the following lines of waste hierarchy

Reduction

The most effective environmental solution is to reduce the amount of waste produced in the first place.

Re-use

Many products and materials can be used again for the same or different purposes.

Recovery (Recycling - Composting)

Near about 11 tones of municipal waste produced in our target area daily and it contain about 69% organic waste. Keeping in view the importance of percentage of the organic contents composting methods was employed because.

- is cheap and requires very small capital and operating costs.

- requires minimal equipment and infrastructure, much of which may already be owned by municipalities
- produces high-quality compost
- promotes environmentally sound practices such as the reduction of methane generation at landfills.
- can reduce waste transportation requirements.
- is flexible for implementation at different levels, from household efforts to large-scale centralized facilities.
- can integrate existing informal sectors involved in the collection, separation and recycling of wastes.
- handles a large volume of material.

Solid waste management system has four basic elements.

1. Awareness & Motivation.
2. collection
3. Transportation
4. Recycling.

Steps/Activities

First of all data collection was done on the following things:

Total population of the area

Per capita generation of sold waste

Average composition of solid waste

Basic problems of the community relevant to the environment

1) Awareness & Motivation:

We have created awareness through social organizers on the following lines:

- What is environment?
- What is waste?
- What is solid waste management system?

- Why it is necessary?
- If it was not present before why it is necessary now?
- How solid waste is polluting environment?
- What are the hazards of solid waste?
- What is degradable and what is not?

Under Saaf mahool project we have conducted 97 combined meetings. The basic purpose of these meetings was to make the community conscious about the hazards of solid waste and to identified the activists to sustain the project, these activists were also responsible for proper collection of waste and monthly charges of private sanitary workers.

OPE has conducted 44 total trainings throughout the year to educate the community and sanitary workers about the latest techniques in the solid waste management and their impacts on environment.

The others objects of these trainings were:

- * To develop effective working relationships to deliver comprehensive Municipal Waste Management Strategies.
- * To raise awareness locally of the costs of dealing with waste and the part which individuals can play in reducing the amount of waste.
- * To involve local people in decisions making on waste management and work with community based schemes to promote reuse and recycling.
- * To aware the activist, sweepers about their responsibility for the collection of the waste.
- * To develop sense of self help among the community.
- * To aware the future of Pakistan (children's) about the degradation of our Environment day by day.

2) Collection of the waste

The collection process of solid waste was started in the first month of each quarter. Private sanitary workers were responsible for door to door separate collection of organic and inorganic waste. Income from the sale of plastic, paper, metal was used for the welfare of the sanitary workers.

3) Transportation of solid waste

Different collection spots along the GT road were selected to transfer the waste from inside the target area to out side for the final treatment. Two sanitary workers were responsible to transfer the all organic waste to the recycling unit, while the TCCG was responsible for the lifting of the remaining waste.

4) Recycling

Activities at recycling unit

(Land for composting is provided by the area nazam according to the MOU)

Segregation of waste

Although the waste is separated at household level but two workers again segregate it into organic and inorganic. Because some time people mixed (organic and inorganic waste) with each other.

Inorganic waste

At recycling unit sanitary worker collects the saleable products like glass, rubber, metal and paper in their separate boxes to sale them.

BM-Composting

After again segregation of the waste, **BM technology** is utilize for making compost out of organic component of solid waste because climate conditions are highly favorable for such process.

Why we are using BM technology:

Tests conducted in more than thirty countries have shown that BM can induce a number of beneficial effects including the following:

- It accelerates the decomposition of organic waste

- Enhances soil fertility and reduce chemical fertilizer use

- Suppress growth and activity of harmful microorganisms including plant pathogens.

9. Results and their significance

The Study conducted by the staff of “**SAFF MAHOOL PROJECT**” shows the following Data.

- Total population of the SAFF MAHOOL Project Area is **23816**.
- Per person waste generation in Project area is **0.5 kg/person/day** (Technique of direct sampling, sorting and weighting is used for determining quantity and composition of solid waste)
- Total weight of solid waste which is generating in **Saaf Mahool** project area is near about **11908Kg/d**

Table 1 Composition of municipal solid waste of Gujranwala

Item	Percent (%) by weight
1) Paper	18
2) Animal manure	5
3) Kitchen waste + yard waste	64
4) Glass	3
5) Metal	4
6) Rages	3
7) Soil	1
8) Plastic material	2

Data shows that why compost is made from this waste and nothing else.

Composting technology is gaining popularity all over the world because the resultant soil conditioner is expression of excellent resource recovery situation. According to mode of operation various methods of the composting are being practiced, for present study the method of composting was adopted because,

Waste of Gujranwala is ideally suited for composting since it contains about **55-69% organic matter**, in this percentage of organic matter **75** is the kitchen waste, **20** is yard waste and **5% animal waste**.

Table 2 C/N ratio of raw MSW of Gujranwala and final compost

Windrow	Composition (%)					
	Raw matter			Final compost		
	C	N	C/N ratio	C	N	C/N ratio
1	82	2.53	38 : 1	22.2	1.2	21.6 : 1
2	-	-	-	24.6	1.79	16 : 1

Laboratory test revealed that it has moisture content of 40-50%, C/N Ratio of 38 : 1 and PH of 6.5.

Table 3 Volume & Weight reduction in compost

Windrow	Volume reduction (%)	Weight reduction (%)
1	56.3	44
2	58.9	46

Above table shows that average 58% in volume and 45% in weight reduction occurred in compost.

(To determine the chemical characteristics the samples were tested in the Pakistan Standards and quality control Authority Lab)

10. Targets not achieved and their reasons

We are very pleased to achieve more than 90% of our targets like awareness raising about the hazards of the solid waste in the community through trainings and meetings,

collection of garbage on self help basis, Environment education and awareness in schools, establishment of composting unit, Production and sale of compost.

But to achieve the remaining 10% targets such as 100% collection of waste and cleanness in streets and satisfactory sale of compost. We are still facing some problems like:

- (1) Irregular timing of the waste displacement by some houses and some shop keepers. A demand to collect waste twice a day by the community.
- (2) Some people are not willing to give reasonable money per month to the sanitary worker hired by the community because they think it is the only responsibility of the Municipal Corporation and Union council.
- (3) Shortage of the social organizers because our area is big and peoples are habitual of reminders so 4 social organizers are insufficient.
- (4) Some time improper collection and gapes by the TCCG sanitary workers creates big problem to achieve our targets.
- (5) Inconvenient disposal of baby pampers plastic bags and hazardous wastes like shaving blades, bleaches, acids and etc.

These are the genuine problems and cannot be compensate without community cooperation so we are convincing them to over come these problems.

Marketing problems of Compost

We are also facing some problem in marketing of green power compost such as slow response from farmers side, In our view the reason of this unsatisfactory response is high price and low N,P,K value in the compost. These problems can be over come by co-composting with nitrogen rich materials and with strong publicity campaign through mass media.

11. Conclusions & Recommendations

Following conclusions and recommendation are drawn from the Saaf mahool project.

- Composting is a viable potential resource recovery technique and disposal method under local conditions both on the basis of technical and financial considerations because MSW of Gujranwala city has 69% (by weight) organic waste with 42% moisture content and 38:1 C/N ratio. In developing countries, like Pakistan, the fully mechanized plant does not seem to be an appropriate option. The manually turned windrow or semi-mechanized windrow method of composting seems to be cost-effective option.
- Through composting of organic contents of MSW of Gujranwala a 55-58% in volume and 45% reduction in weight can be achieved. It can be concluded that if all the organic waste were to be composted, the reduction in solid waste that would need to be finally disposed of would be over 58%. So we can say that, composting can avail a reduction in land fill space exhaustion rate.
- Government and other Organizations should support such type of projects by
 - (1) Providing financial and technical support on composting technique
 - (2) Allocating land for compost facilities on a long term lease basis
 - (3) Promoting the use of compost through public awareness campaigns
 - (4) Using compost in its own departments.
 - (5) Educate all stakeholders about the benefits of composting
- Compost marketing and sales department should be separate from MSW management system.
- Saaf Mahool project should be replicate in next slum areas like bypass kachi abadi.

In the last it is recommended that WWF Pakistan should extend this project for next coming year 2004.

12. Outputs: Reports, media, articles, slides, photographs etc.

Benefits

The progress of project implementation can be monitored on the basis of the following indicators:

1. Reduction of waste generation per capita by near about 3-5%
2. Reduction in the incidence of diarrhea & cholera by 10%
3. Gradually increasing consciousness about environmental degradation
4. Conversion of organic components of the solid waste into the valuable compost
5. Improvement in esthetic condition of the streets
6. Reduction in the expenditure of the Municipal Corporation spent on transportation of the waste

13. Equipment status Report

In Saaf Mahool project OPE has just purchased hand carts. These hand carts are in control and use of private sanitary workers of the community.