

32nd WEDC International Conference, Colombo, Sri Lanka, 2006

SUSTAINABLE DEVELOPMENT OF WATER RESOURCES, WATER SUPPLY AND ENVIRONMENTAL SANITATION

**Integrated water resource and solid waste management:  
Alappuzha, Kerala, S. India**

Jessy Saji, India

*The combination of safe drinking water and hygienic environmental sanitation conditions are preconditions for a healthy life of people. This case study shows the success story of a small peri urban coastal village of Kerala in achieving sound environmental sanitation conditions through community managed and decentralized solid waste management and integrated water resource management. The cost involved in the process of this programme is very less compared to the outputs. The role of the community in informed decision of their technology option and implementation resulted an improved state of ownership and level of maintenance. The small research project implemented in a village now extended to 25 other wards with the acceptance and support of municipal authorities and government. The project becomes a model for decentralized SWM practice, Community actions thorough capacity building and empowerment of local people for better environment and health.*

**Introduction**

The combination of safe drinking water and hygienic environmental sanitation facilities are preconditions for a healthy life of people. Water resources are increasingly under pressure from population growth, economic activities and intensifying competition for the water among users; pollution is further enhancing water scarcity by reducing water usability downstream. Shortcomings in the management of existing water sources, a focus on developing new sources rather than managing existing ones better and the neglecting of traditional sources for new schemes, results the deterioration of them and extreme vulnerable situation in water availability.

Alappuzha is the smallest coastal district in Kerala, southern part of India having highest density of population. Alappuzha is known as Venice of East is gifted with immense natural beauty with Arabian Sea, network of backwaters, ponds and lagoons. Alappuzha municipality having an area of 47sq. km with 50,000 households and a population of 1.77lakhs includes 25000 slum dwellers. Increasing density and poor waste management facilities are creating serious problems in these areas. The waste dumped along the shores of canals, ponds and sides of roads. The collection system of municipality is insufficient to remove the waste piles. This led to contamination of water, creation of ample breeding place of rodent, flies and mosquitoes along with ensuing public nuisance due to noxious smell. The situation becomes worse during the rainy season when the water level rises. The decayed wastes cause epidemics like dengue fever, leptospirosis, cholera, diarrhea and the like.

Socio Economic Unit Foundation is a professional or-

ganization working with communities to promote sustainable socio economic development, with a focus on water and environment sanitation and empowerment of deprived groups with special attention to women. In 2003 January SEUF initiated an action research Women, well being, work waste and sanitation (4WS) with the support of EU and IRC, at 400 selected households at Thumpoli in Alappuzha municipality. The action research is on alternative strategies of environmental sanitation and waste management for health and socio-economic development in peri-urban coastal communities in South Asia. The duration of the project is 36 months.

The project area, Thumpoli is situated 4 km from, Alappuzha city on the west coast of the Arabian Sea, having an area of 1.37 sq.km. 25% of the area consists of water, which includes backwaters and around 150 ponds. The number of household is 1100. Almost 70% of the men work as fishermen and coir workers. Majority of the people had been depended the public water taps for their drinking purpose. The soil type is coarse sand transported by sea- it is almost pure beach sand. From the agricultural point of view, this soil can not be fertile as such since it has very low humus content, very low water holding capacity and low capacity to bind fertilizers. This soil is easily blown away by wind and carried by rainwater it can be seen to be very sensitive towards erosion.

**Objectives of the project.**

The main objectives of the project includes,

- Measure the cost effectiveness of technically, socio-economically and environmentally innovative and replicable approaches to solid waste management and excreta in

low-income per-urban settlements in a part of Asia that has lagged behind in sanitation

- Measurably improve sanitation conditions and practices in six pilot areas.
- Scale up the tested approaches
- Strengthen the stake holders

### Short term objectives

- Demonstrate a Decentralized Solid waste management system- financially viable, technically feasible, operationally suitable and socially acceptable
- Curtailing the use of plastic bags and substituting them with bags made of bio degradable materials
- Improve the environmental sanitation condition of the area.
- Creating awareness ,cleaning, protection, and rejuvenation of traditional water sources
- Creating awareness among the public on environmental sanitation, hygiene.

### Strategies

- Segregation of waste at source
- Reduction of waste at source
- Collection and sale of material that could be recycled
- Decentralization and community participation
- Promote cloth bag and paper bag
- Promote bio degradable in to compost
- Reuse and refuse the use of plastic items.
- Ensuring the participation of existing agencies and community organizations.

### Foot Steps to the activities

- Baseline study
- Formation of institutional setup
- IEC programmes
- Capacity building programmes – Trainings, Demonstrations, exposure visits
- Identification of problem areas through of social mapping
- Choosing of Technology options on solid waste management and sanitation
- Training on micro enterprises
- House visits and evaluations
- Training in Skill development & Micro entrepreneurship.
- Water quality testing
- Composting Units at house hold, group and community levels
- Periodical evaluation
- Cleaning and up keep of traditional water sources

### Situation analysis

Initially the area divided into 4 sub divisions and the situation analysis conducted with the involvement of the community using participatory tools. The following problems identified- Waste duping areas, accumulation of stagnant

water, Ponds and canals filled with waste, households and institutions without sanitation facilities etc.

### Technology options in solid waste management

Through a participatory process women brought out the merits and demerits of the present practices among them related to water & sanitation. The process helped the community to get an idea about the dangers of throw away culture, indiscriminate use of plastics, deterioration of soil fertility, and water source contamination. The facilitators helped to introduce different types of sold waste management practices, like aerobic-anaerobic composting, vermi composting and bio gas technology. The role in choosing the technology option and informed decision making created a new feeling of ownership and enthusiasm among the community. The need for cost effective and eco-friendly methods emerged from this.

### Decentralized solid waste management

As a demonstration, 10 women started vermi composting in their households. Then it has been extended to 275 household in the project area and started one community level vermi composting unit. By this time, people from out side the project area, realized the changes in the area and came forward to extend these activities to their area. Another 300 households started vermi composting and 2 community level vermi composting units also started.

Kitchen garden promoted in all households, those who have started vermi composting. 50 % households started kitchen garden. By the project 68% of households have a good income from waste. Income from waste was received not only in terms of money but al eco-friendly method of waste management was practiced. The concept of “Wealth from waste” was effectively inculcated and practiced.

### Reduce, reuse and replacement of plastic carry bags

Increased awareness in environmental aspects created an atmosphere to a campaign against usage of plastics. Around 350 households came forward to join this campaign. Non-availability of other material bags instead of plastic carry bags, easy to use are some of the reasons pointed out by community members. Thoughts on replacing plastic with other materials like paper bags and cloth bags came at that stage. With a view to reduce the use of plastic carry bags and promote an eco-friendly way of life, training was given to five ladies and screen printing training was given to a male and female. Tool kits were given. One paper Carry bag training unit was established in the leadership of trained members.

### Use of urine in vegetable garden

Two households in the area started using urine in their vegetable garden. They collect the urine of male children in

small mugs and dilute with water and pour to the plants. The result of this is very exciting and found it very productive for the plants like lettuce, green chilies and ladies finger. The women here claimed that the plants flowered sooner than ordinary time.

### **Water resource management**

In Thumpoli area 26 public taps are provided by the Kerala Water Authority (KWA). Apart from KWA public taps around 100 private shallow tube wells and some household wells are in the area. Kerala has the highest density of well i.e. 250 wells/sq. km, but the water in wells of Thumpoli area is not potable as it is yellow in color with bad smell. 81 % of the people are depending on public taps for their drinking water needs. Water comes in this public taps one or two hours in a day and women have to wait long hours for getting water. For other water needs they are depending on shallow tube wells provided with hand pumps. There were many traditional ponds in the area used for drinking purposes, which are abandoned and now used as dumping sites of solid waste. The quality of drinking water in Alappuzha is greatly affected by environmental pollution, solid waste disposal and saline water intrusion, chemical contamination etc. H<sub>2</sub>S strip were distributed to 100 households to test the water by the community themselves from their existing drinking water source. 97 houses showed the presence of E.coli bacteria. The volunteers conducted follow up programmes in the community. This initiated a need for chlorination and boiling of water as well as awareness on proper handling of drinking water. Community becomes aware of water quality and new initiatives emerged in conservation of existing sources. A massive programme was conducted by the community with the support of municipality & SEUF. 8 traditional ponds, which were not in use turned into clean water sources. The community planted medicinal herbs, vegetables, flowering plant on the banks. One pond turned to fish cultivation.

### **Sanitation**

There is an increase in the ownership of latrine in the area. Twenty eight new two pit latrines were constructed from the support from fisheries department and municipal authorities during the project period, Twenty two latrines were renovated with the help of trained local masons. 5 latrines constructed with the support of SEUF as an experimental alternative method for pit lining i.e. ferro-cement tank, waste tires and dry ecological sanitation. The other 31 households have constructed latrine with their own expense. Proper use and maintenance ensured.

### **Hand washing practice**

The post survey showed a massive improvement in the use of both hands along with soap as the washing pattern 91.3% from 62.8% in the base survey. The frequency of washing hands before eating improved drastically in the post survey from 2.3 % from the pilot study to about 70%, while washing hands after defecation improved from 1.5% to 72.3%,

washing hands after cutting fish also recorded a good high from 4.8% in the pilot study to 69.5%

### **Gender sensitivity**

Women were capacitated through various training programmes. Increased access to clean water and sanitation facilities lightened the burden. New leadership emerged from the community. Many of them earned descent income from various activities i.e. working as resource person like, paper bag making, vermi composting, latrine constructions and ferro-cement technology and as facilitators for solid waste management. The women trained under skill development programme got employment opportunities. In the post survey, the adult male doing the cleaning job was 11.8% as against the previous 1.8% in the base line survey - an increase of 10% this is taken as an indicator of growth in gender sensitivity.

### **Achievements**

Awareness was given on the concept of wealth from waste, and therefore, a clean surrounding developed and alternative income generated through the solid waste management. Selected ponds and canal were rejuvenated; this helped to improve the water quality. Entries in to other fields like organic farming, kitchen gardening etc. made the women engaged in their saved time, and it helped for an additional income. Ownership of latrine too increased. Women were trained as paid resource persons in various other villages.

### **Skill development and earnings**

Though women in the area have primary education, most of them are unemployed. As this is a fishing community and peri-urban area, the women are not used to do hard manual labour even though they are doing all the household work and looking after children. As part of income generation initiatives, a large number of skill development trainings given to the women members of the area and support many of them to acquire decent earnings and livelihood (Table 3)

### **Sustainability**

Later in 2004 Alappuzha Municipality decided to extend the programme in 6 more wards of the municipality by decision making in the municipal council and allocating services of its staff. After successful implementation of the project, now the clean Kerala Mission of government of Kerala recommended to extend the programme to 25 wards of the municipality. Altogether 387 Women trained in various trades and 310 of them getting considerable income.

### **Conclusion**

Solid waste management is very crucial for any healthy society, Experiment and pilot programmes indicate that a decentralized solid waste management system with full community participation is feasible and eco friendly. The success of 4WS project lies in the fact that it involved very little money as an investment. The project started as an

individual initiative where each household was encouraged to convert the biodegradable waste in to useful commodity. The project area becomes a model for decentralized SWM practice, vermi composting sanitation, Community actions through capacity building and empowerment of local people. The Alappuzha municipality decided to scale up decentralized solid waste management in 25 wards through this lesson learning experience this is viewed as a replicable model in state.

**Table 1.** Details of physical achievements

Type of physical achievement	Quantity	No of HH benefited
Pond Rejuvenation	9	85
Canal Rejuvenation	600 meter	75
Drainage cleaning	150 meter	30
Road side gardening	200 meter	25
Latrine Construction	87	87
Organic Vegetable Farming	181	181
HH Vermi Units	275	275
Community Vermi Units	3	30
Paper bag making units	1	15

**Table 2.** Improvement in sanitation conditions

Sanitation conditions	Before project	Post project	Increase in %
Latrine ownership	78%	99%	21%
Hand washing practice after defecation	1.5%	72.3%	70.8%
No of HH getting Income from waste	24%	68%	44%

**Table 3.** Skill development and earnings

Skill training given	No of persons trained	No of people employed	Average Monthly income (Rs)
Latrine construction	5	3	1250
Water supply (RWH)	3	2	*
Compost barrel making	3	3	1500
Paper/fiber bag making	5	5	300
Paper bag trg. centre	15	15	250
Screen printing	2	2	*
Vermi composting	350	275	1250
Community vermi unit	15	15	250
Plant nursery	2	2	300

\*Not started to earn.

## Reference

Annual Report of 4WS (2005) - socio Economic Unit Foundation.

## Contact addresses

Jessy Saji  
 Research Officer  
 Socio Economic Unit Foundation,  
 Easwaravilasam Road, Thycaud P.O  
 Trivandrum, Kerala, S.India  
 Phone: 91 471 2325907  
 Email: seufhq@sify.com, jesssaji@gmail.com