Empowering Women One Community at a Time

Recycling of the Municipal Waste through Biogas Production and Composting

Project Description

In 1990, a group of sixteen women from Lalitpur, Nepal started collecting waste from the neighboring 50 households. This initiative lead to the establishment of the organization called Women Environment Protection Committee (WEPCO). By 2004, waste collection expanded to 1000 households, wherein WEPCO had to manage 4-5 tonnes of waste daily. The main guiding principles of the project are 'polluters must pay' and 'waste is resource'.

With financing from SGP, the initiative was able to adopt a strategy in managing waste at source (within households) and further increase the number of households involved. WEPCO demonstrated that the conversion of waste to biogas is an innovative way to reduce waste and generate energy, thereby reducing demand. This community-based project has not only provided environmental benefits but socio-economic as well: awareness-raising and training, particularly young people and generation of income, improving the livelihood of the members of the community.

Background

Traditionally, the Newar people, an indigenous group living in the Kathmandu Valley, had their own waste management system – household waste and manure was used as fertilizer for crop production. In 1987, the Solid Waste Management and Resource Mobilisation Act was passed, authorizing the Solid Waste Management and Resource Mobilisation Centre (SWMRMC) as the responsible body for reorganizing waste management in Kathmandu Valley. With assistance from the German Technical Cooperation (GTZ), the following activities took place: establishment of the communal container collection system and Teku Transfer Station & Composting; and management of the waste at the Gokarna landfill. [1]

This landfill was closed in 1993 because of disputes as the municipalities took over. Waste was dumped in the riverbanks and the city suffered the effects caused by the failure to manage solid waste. In 2004, it was estimated that nearly 1.1 million people lived in Kathmandu valley. Rapid urbanization, increased volume of waste and lack of alternative sites were the main challenges faced

Implementing Organization: Women Environment Preservation Committee (WEPCO)

Location: Lalitpur, Nepal

SGP Contribution: US$ 36,000

In-cash cofinancing: US$ 20,000

In-kind cofinancing: US$ 48,651

Number of Beneficiaries: 1861 households and an awareness raising event to over 5000 students annually

Duration: September 2005 – August 2007

Awards and Recognition:
Ministry of Environment, Science and Technology - Women Environment Conservation Award 2010

by the municipality. According to a study performed by the Clean Kathmandu Valley (CKV), nearly 435 tonnes per day of solid waste was generated in the Kathmandu valley.[2] The average household waste generation rate of Nepal was .25 kg per person per day, with 15% of Nepal's population living in municipalities generating around 500,000 tonnes of waste per year. Of the waste generated, around 72% are biodegradable and can be converted to biogas.[3]

The WEPCO project comes timely, responding to the challenges faced by the municipality and finding an innovative source to leverage resources.

Implementation

Key project activities undertaken can be summarized below:

1. Environmental education and awareness raising activities - 47 schools in the area have organized Eco Clubs where students gather, receive environment-related training and participate in awareness raising campaigns.

2. Green Circle Initiative - Members collect paper from banks, hotels and other public institutions for recycling purposes. An estimated 72 tonnes of paper are collected annually, of which 70% is recyclable.

3. Waste collection - WEPCO collects waste from 1,096 houses, comprising 1,861 families. The organization hired seven waste collectors and charges each household a small amount per month. Around 7 tonnes of waste are collected daily. The women in 400 households segregate their own waste at home, producing their own compost and selling non-biodegradable or recyclable items such as plastic or metal.

4. Biogas demonstration – A 6 cubic meter biogas plant has been constructed in the WEPCO premises while a 50 cubic meter plan has be constructed in the Budhanikantha School for demonstration of biogas conversion.

5. Establishment of Gangeswor Saving and Credit Cooperative – The establishment of this cooperative has produced 496 women members and mobilized an amount of US$123,924 as loan to 150 women members.

The successful demonstration of biogas production from waste and participation of major stakeholders such as students, private sector (through green circle) and households resulted to a daily reduction of 3 tonnes of waste, making WEPCO the lead training and resource centre for solid waste management which receives 5000 visitors annually.

Environmental Impact

WEPCO collected 6.5 tonnes of waste daily where as 0.5 tonnes of waste is managed at household level. Out of 6.5 tonnes, 4 tonnes of waste are dumped in the municipal container and 2 tonnes of waste are used to produce compost. The remaining 500 Kg of waste, which is plastic (300 Kg) and metal (200 Kg), are recycled. Thus, each year the project recycles 912.5 tonnes of solid waste. Aside from that WEPCO also collected 72 tonnes of waste papers per year of which 70% are recycled. Therefore, the project has being able to manage 962.9 tonnes of waste per annum which would otherwise go to the landfill sites.

Considering the bench mark of CKV (2005) Kathmandu valley was generating nearly 435 tonnes per day of solid waste. Given that WEPCO is able to reduce 962.9 tonnes of waste annually, the organization is processing the equivalent of nearly two days waste.

Socio-Economic Impacts

WEPCO has also established a cooperative consisting of 496 female members, collected USD 85,954 from microloans and mobilized USD123,924 benefiting 150 women members.

The project led to the job generation as it employed 27 full time staff and 9 part time staff, including 3 full time and 5 part time experts in solid waste management and biogas construction. WEPCO generates a monthly average income of US$3,000 taken from membership fees; sales from recycling and composting; and renting the training premises. This amount is used for personnel and other operations.

The municipality spends an amount of NRs 2100 to manage 1 ton of solid waste.[4] As WEPCO manages 2.5 tonnes per day, it has earned the organization nearly US$25,756 per annum.

Prior to using biogas, the Shenchen Monastery, used firewood to cook food and spent nearly US$1000 per month. The firewood was later replaced by LP gas, diesel and kerosene boilers and biogas, of which the monastery was able to save 50% of its expenditure. Calculating the amount invested on the biogas plant vis-a-visa the cost of LP gas, a return of investment on the biogas plant is received within a span of 9 months. Thus, the benefits exceed the cost.

Policy Impacts

The Government of Nepal (GoN), through it's Biogas Subsidy Programme (BSP), provides subsidy for individual biogas plants which uses cow dung. However, there is no subsidy for institutional biogas from municipal waste. With the initial success in WEPCO and in Budhanilkanth School, GoN has provided subsidy for a number of institutional biogas plants from household waste to pilot this initiative.

WEPCO is advocating for subsidy or developing an innovative compensation mechanism to institutions who are embarking in similar solid waste programmes.

Gender Equality and Women's Empowerment

This project is innovative as it is entirely run by women: as a project proponent, implementer and beneficiary. The majority of people living in Lalitpur come from the indigenous group Newar. At inception, this project was run by a Newar woman, then later succeeded by Thakali woman- another indigenous group. The cooperative has 496 female members, of which seven are solid waste experts.

SGP's effort in developing WEPCO as a resource centre has been successful. The general public, not only women, visit the premises to learn and know more about this women-led initiative: how it works and financially sustain the project through waste collection, compost sales and waste paper recycling.

Sustainability

The initiatives under the WEPCO waste management programme have been designed to generate income as a way of sustaining them: membership fees, collection fees, income generated from recycling, etc. WEPCO also generates income by renting out its training facilities and providing technical expertise in solid waste management and biogas plant construction.

In terms of sustainability of the equipment itself, the life span of a biogas plant is 25 years, if properly maintained.

Lastly, the community awareness and participation programmes

are also helping sustain the project in the sense that the whole community, particularly its young people/students are involved in waste segration. The students are given an incentive by the school by getting additional marks in their grades.

Replication and Upscaling

Replication of this project is very easy. Land for composting and permission from the government to manage the waste are prerequisites for the project, in addition to sensitizing local communities to segregate waste at household level. Once these basic requirements are fulfilled, it is possible to replicate the project in different context and country.

An additional component necessary in successful replication is the planning for construction of the biogas plant: size should be considered depending on the amount of waste, purpose of cooking (commercial or household only), and user expectation.

The biogas model in WEPCO premises has been seen due to the large number of visitors that WEPCO receives annually: study tour, training, Eco Clubs, etc. So far, the biogas plant from solid waste has been replicated in 20 other sites. Further, WEPCO was able to mobilize participation from 892 women in 30 groups in various parts of the country.

Lessons Learned

A number of lessons have been learnt which can be very helpful in replication of this project:

- During the design of the biogas plant, it is necessary to undertake feasibility analysis, taking into consideration the following: who is using the plant, purpose (commercial or household use only), size of plant vs. size of waste being fed to the digester, etc. The Budhanilka School has 1200 students living in the dormitory. The canteen is leased to a private caterer prefers to use LP gas than biogas. The caterer also sells the leftover food (estimated 500 kg per day) to pig rearers instead of feeding it to the biogas digester as they earn additional money from it. Because of this, the biogas plant in the school has not been used. There are also problems in the construction as the digester is leaking.
- Promotion and related awareness raising activities on the use of biogas needs to ensure that the public is fully aware of what it can and cannot do. In this project, the local community presumed that biogas works as effectively as LP gas. Thus, they are disappointed when they realize that the use of biogas means lower pressure and longer cooking time.
- Having knowledgeable people to maintain and ensure the cleanliness of the biogas plant is necessary as it can be harmful to the health. Users should be well-informed and updated, should additional advisory/information be available.

Sources Consulted

1 http://www.mld.gov.np/swm/aboutus.htm

2 NipponKoei Co. Ltd; Yachiyo Engineering Co. Ltd. 2005. The Study on the Solid Waste Management for the Kathmandu Valley, Final Report (Clean Kathmandu Valley – CKV Study)". Kathmandu: Ministry of Local Development, His Majesty's Government of Nepal; Japan International Cooperation Agency (JICA).

3 UN Habitat Presentation to UNDP Nepal CO on Solid Waste Management and Local Initiatives,04 June 2009.

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Contribution to the MDGs

- Training of young people which may result to job creation in the future.
- Income generation for 496 womenmembers of the Gangeswor Saving and Credit Cooperative, mobilizing US$123,924 and using it to provide loans to 150 members

- The project came about through the leadership of women in the Lalitpur district. They are the project proponent, implementer and beneficiary of the project
- 496 women members in one initiative alone (Gangeswor Saving and Credit Cooperative)
- Total of 892 women in 30 groups mobilize and currently replicate the project

- Waste management undertaken in 1861 households through segregation, conversion to biogas energy and recycling
- Innovative reduction of waste through conversion to an alternative mode of energy resource
- Environmental education to 47 schools/1400 students
- Awareness raising to over 5000 visitors at the WEPCO demonstration site
- Implementation of the Biogas Subsidy Programme by the government
- Replication in 20 other sites in the country

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Community Global Impact

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