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SUSTAINABLE COMPOSTING: SOME REALITIES – EXPERIENCES FROM BANGLADESH.

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Abstract

Slum-dwellers usually have no legal right to get municipal services. They are generally treated as polluters of the city environment. The composting approach in the slums[2] and squatter settlements[3] that is described here indicates that low-income communities are not the cause of environmental degradation of cities but they can maintain a clean and liveable environment if they get external support. The composting projects in slums of Dhaka City are promoted by donor agencies and there is limited scope for the community to build capacity (both management and financial) to run them independently in future. This paper discusses 'how sustainable are the projects if the external support is withdrawn?' through some indicators such as community motivation and attitude, acceptability, ownership, and contribution.

1.0 Introduction

In Dhaka city, nearly 90 percent of the slum dwellers are living in a single and very poor quality shelters and 55 percent of them have no access to sanitary latrines (World Bank 2001). These informal settlements are mostly illegal; therefore they are not entitled to get solid waste management services from the local authority. They are generally regarded as polluters of the city environment. However, the composting approach in the slums indicates that low-income communities are not the cause of environmental degradation of cities but they can maintain a clean and liveable environment if they get external support. This paper addresses the composting projects in slum areas of Dhaka city which are an attempt to involve the slum dwellers and enable them to improve their living conditions through managing their own wastes. This paper further addresses the issue 'How sustainable are the composting projects if the external support is withdrawn?' through some indicators such as community motivation and attitude, ownership, acceptability, and contribution. This paper defines sustainability in terms of 'long-term durability' of the projects: meaning that the projects would not collapse upon withdrawal of external support, but rather that local capacity and interest would be developed such that projects continue to function when external agency support is withdrawn. The paper points to both the successes and limitations of the projects and finally compares them with the community composting projects in high- and middle-income areas.

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2 Slums are substandard housing built on privately owned land where the dwellers pay monthly rent to the land owners.

3 Squatter settlements are substandard housing built illegally on public land. Some of the dwellers who live for years claim ownership rights and sometimes rent rooms to newcomers.

The aims of the composting projects in slums are to:

- provide a low-cost option of solid waste management by ensuring the participation of slum dwellers.
- create income generation opportunities for the slum dwellers through recovery of resources from waste.

2.0 Background of the projects

On obtaining financial support from UNDP's Local Initiative Facility for Environment (LIFE), Waste Concern[4], a local NGO, started its first pilot barrel composting project for the slum dwellers in Dhaka city in the year 1998. This barrel concept was adopted from the Sri Lankan NGO SEVANATHA which introduced compost bins for household waste disposal. This is a low cost, simple and environment-friendly method of waste disposal, which would not require a large space for its installation. In this method of composting, a specially designed 200 litre plastic or metal drum, perforated on the bottom and sides and fitted with a conical cover (to prevent people sitting on it), is placed on two half-round cement slabs, which allow air movement up through the bottom of the drum. One barrel is supplied for decomposing the organic waste and is normally shared by 5 to 7 families. The other barrel is for inorganic waste and is shared by 10 to 15 families to develop the habit of source segregation and waste storage. To distinguish the barrels, a green or blue colour is used for organic waste and yellow denotes inorganic waste.

Photographs 1 Barrel composting in slums

(Source: Author, 2004)

4 Waste Concern is a non-governmental research based organisation established in the year 1995. Working closely with government, private sector and local communities to improve the solid waste conditions in the cities and towns of Bangladesh, the organisation has promoted the concept of waste as a resource, stimulated behavioural changes in urban communities, encouraged the government bureaucracies in the participatory process and developed the marketing aspect of organic compost.

Getting appreciation and financial support from donors, attempts were made to replicate this model of waste disposal in other slums of Dhaka in subsequent years. Waste Concern started its first pilot project in Shah Ali Bagh slum [Box 1], and then extended it to other slums (Kolwalapara, Gulshan, Kallyanpur, and Nasimbagh [Box 2]) with support from LIFE-UNDP, OXFAM-GB and SEMP-UNDP. Unfortunately, during the survey, barrel composting was found only in Shah Ali Bagh and Nasimbagh slums. The others were either damaged by government eviction or stopped functioning due to non-cooperation of the slum dwellers. The two composting projects of Shah Ali Bagh and Nasimbagh slums are currently supported by UNDP's Sustainable Environmental Management Programme (SEMP[5]).

Box 1 Overview of the Shah Ali Bagh slum

The slum was on government land, where most of the residents had been living for more than 20 years. Of the total of 149 families were living in that slum, 120 households (more than 80 percent) were participating in the compost projects. Among them 55% were owners and 45% tenants. The residents who had lived there for more than 10 years claimed themselves as owners of their houses. The makeshift houses were made of bamboo and some of the houses were vertically extended for renting to others. The room sizes were approximately 80 ft^2 to120 ft^2 (7 to 11m^2) . The average rent of the houses was Tk.500[6] (US$ 7.5). The average size of the family was 5. Most of the males worked as rickshaw pullers (human pedalled tri-cycle), daily labourers, and hawkers and the women worked in garment factories or as domestic helpers. Their monthly income was on average Tk. 1500 to Tk. 2000 (US$22 to 30). In the slum, there were 10 common toilets provided by an NGO DSK (Dhusta Shasta Kendra), 2 water points provided by Water Aid. The internal passages and drainage were constructed from the UNICEF's slum improvement programme. The slum dwellers were paying TK. 200 (US$3) for electricity and Tk. 20 (US$ 0.30) for water on a monthly basis to the bill collector of the NGO. One sweeper of Dhaka City Corporation, who was living in that slum, used to clean the drains and for this service he was exempted from payment for water and electricity. The slum dwellers had applied for gas connections but this was refused due to their illegal occupancy status. The slum was ideal for barrel composting. 20 organic barrels (each shared by 5 to 7 families) were placed in consultation with the leaders of the slum. The bins were placed very close to the houses around 5 to 10 ft (1.5 to 3 m), placed over the drains and even in front of the houses. The households had been carrying out barrel composting for more than 5 years.

(Source: Field survey 2004)

3. Activities of the projects

The barrel composting projects followed several steps such as mobilisation, awareness, practical demonstration, group formation, barrel installation, monitoring and evaluation, and finally compost collection and sale. This was supplemented by socio-economic, health and physical surveys.

- As part of the mobilisation and awareness programme, social mobilisers visited every household in the slums and explained about the waste segregation and the benefits of waste

5 SEMP- Sustainable Environmental Management Programme is UNDP funded (US$ 26 million) environmental management programme under Ministry of Environment and Forest involving 22 sub-implementing agencies. It supports community capacities for sustainable management of environmental resources, strengthen capacity of the public sector to develop new framework for policy development, and promoting sustainable development through advocacy and awareness.

6 Tk.(Taka), a Bangladeshi currency. 1 US$ = Tk. 65 on 08-05-2005

recycling and recovery. Very simple visual aids such as posters, video-films and photographs were used to acquaint the community members with the project.

- Formal and informal discussions and meetings were held with the slum leaders and dwellers as part of the awareness programme.
- Routine health check-ups and medicines were provided to the slum people as an incentive for participation and for building awareness of the adverse impact (disease and illness) of indiscriminate disposal of waste.
- Socio-economic surveys were conducted among the slum people to ascertain their opinion and willingness to participate as well as their perception of improved solid waste management.
- Practical demonstrations were given to the housewives to teach them how to segregate and dispose of organic waste into the specially designed barrels.
- Groups were formed into 5 to 7 households with a group leader for sharing the bins.
- Before installation of the barrels, a ground map containing the houses, passages and other utility services were prepared to facilitate the slum dwellers and the NGO to select suitable locations for barrels.
- Monitoring was a crucial part of the project. Community mobilisers often supervised source-segregation and operation of the barrels.

Box 2 Overview of the Nasimbagh Slum

In Nasimbagh out of 150 households, 60 households participated in the barrel composting project. The slum was in a privately owned property. All the houses were rented out by the owner of that property. Rent of the houses (80 to 100 ft^2 – 7 to 9 m^2.) was Tk. 600 to 700 (US$ 9 to 10.5) including water and electricity bill. There was no intervention from other NGOs in that slum. Slum dwellers had been living there for an average of 5 to 10 years. The drainage system was poor; water logging was very common, and this disrupted the operation of barrel composting in the rainy seasons if the barrels were not raised. 80 percent of the slum dwellers were rickshaw pullers and 15 percent were daily labourers. 60 percent of the females worked as domestic helpers. 14 organic and 2 inorganic barrels were installed at 10 to 20 ft (3 to 6 m) distance. There was no committee or association in the slum. Waste Concern had permission from the landlords to carry out the activity. The locations of the barrels were selected by Waste Concern in consultation with the landlord. 6 households shared one organic and 24 families shared one inorganic barrel. The project had been running for more than 4 years. Previously, the programme was supported by OXFAM-GB; the new barrels were replaced by the SEMP-UNDP programme.

(Source: Field survey 2004)

4.0 Indicators for sustainability

Community-based solid waste management is a relatively new area of research. Water and sanitation projects have a long history of community participation and management. In this regard the water and sanitation literature is regarded as a basis for discovering the relevant indicators for community-based solid waste management projects. From the literature, it is found that community participation is now a pro-active process in which the beneficiaries influence the development and management of the projects rather than merely receiving project benefits. The essential elements of sustainability are:

- The community must have demand and positive attitude towards the project.
- The community must feel responsible for the project.
- The community must be willing to share the project cost.
- The community must have the management capacity needed for the project.

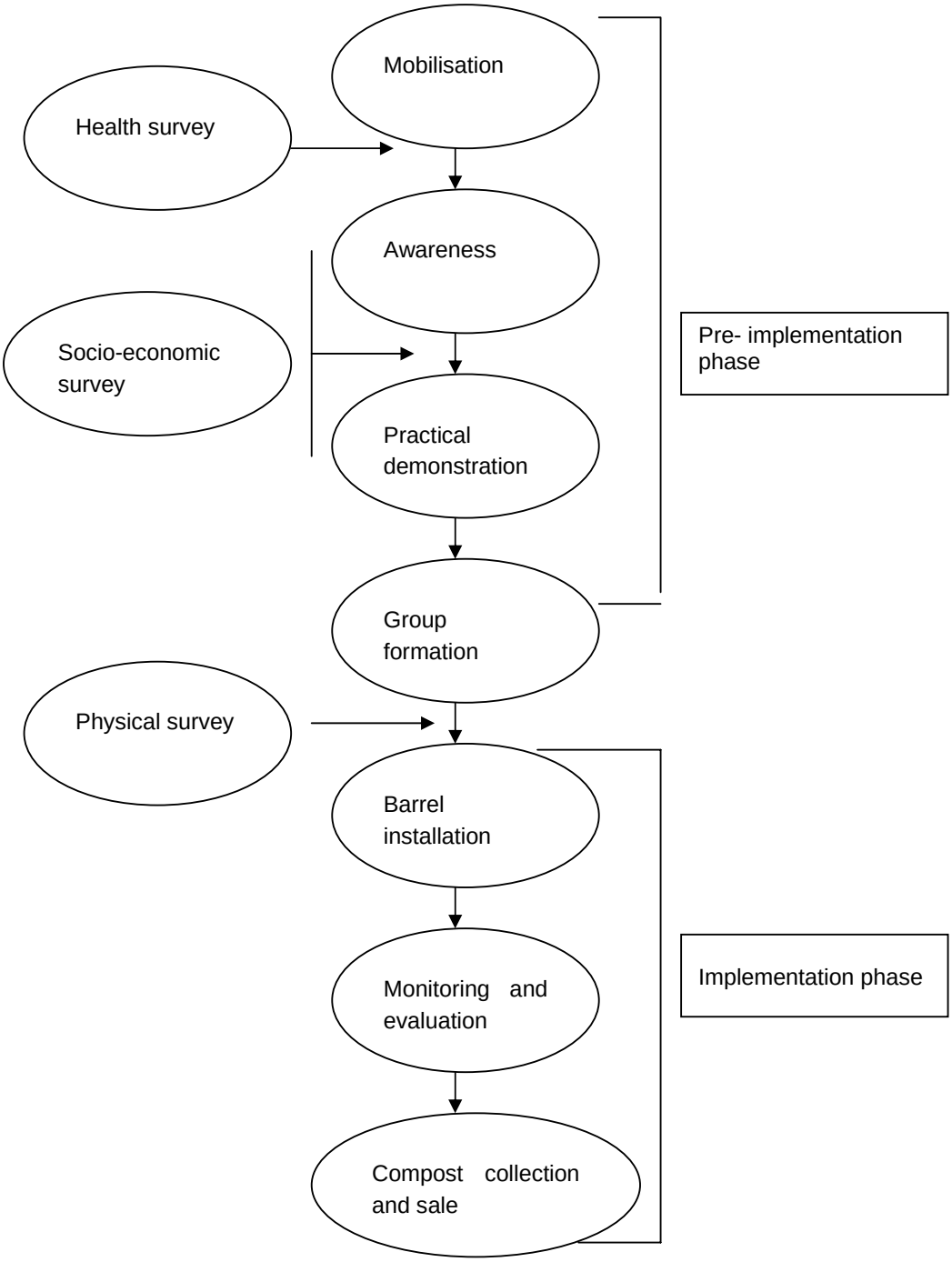

Figure 1 Different steps of barrel composting process in slums

Four indicators are considered to assess the sustainability of the barrel type composting projects in the slums. These include:

Indicators	Purpose
Community motivation and attitude	To look into the behavioural changes of community members from the " just throw" attitude to co-operation and participation in waste segregation, storage and disposal of waste.
Community acceptability	To observe the concern and attitude of community members for siting a composting facility close to community.
Community ownership	To measure the responsiveness and level of participation of the community members.
Community contribution	To express the support of the community members by willingness to pay for composting project.

5.0 Findings from the composting projects

5.1 Solid waste management is the lowest priority of the slum dwellers. They are interested in doing barrel composting motivated by health improvement and income generation. They are less interested to invest money in barrel composting.

In a survey, the slum dwellers identified water supply and sanitation as higher priorities than solid waste management, probably because water and sanitation facilities were poorly developed in the slums (Table-1). The slum dwellers mentioned that they were participating in the composting projects for their health improvement first and then for income generation (Table-2). This was because the slum dwellers had received health and hygiene education from a number of NGOs. In addition they were earning a small amount of money from the sale of compost produced in the organic barrels at an interval of 3 to 4 months.

Table-1: Priority problem of different services

(Scale 1 to 5, 1= Highest problem area, 5 = Least problem area)

Priority → / Problem areas ↓	1	2	3	4	5	Index number	Ranking
Poor drainage			18	25	17	3.98	4
Poor sanitation	32	28				1.47	1
Lack of solid waste disposal			16	17	27	4.183	5
Space constraints			26	18	16	3.83	3
Water shortage	28	32				1.53	2

The projects were supported by donors from the beginning. From the survey, it was found that only 28 percent of the respondents were willing to share the project costs. The low level of willingness to share project cost was due to the fact that the slum dwellers were not motivated to pay for the barrel. In interviews with the slum dwellers, it was found that the lack of willingness to invest in barrels was due to uncertainty of settlement (22 percent), the possibility of having the barrels stolen (33 percent) and dependency on donor/NGO fund provision for the waste management facility (17 percent). However, it was noticed that the slum dwellers were regularly paying water and electricity bills. In the composting

projects of high and middle income areas, it was found that the residents were more motivated for the cleanliness of their own premises, not for the ultimate disposal of their waste.

Table-2: Motivation behind participation in barrel composting in frequency (N=60)
(Scale 1 to 4 , 1= Highest priority 4 = Lowest priority)

Priority → / Aspects ↓	1	2	3	4	Index number	Ranking
Health	35	18		7	1.65	1
Environment		11	34	15	3.06	3
Income	25	18	8	9	2.02	2
Lack of waste management service		14	15	31	3.28	4

It can be concluded that, in addition to the fear of losing barrels by sudden eviction by the government, the slum dwellers expressed their dependency on external support which indicated that the slum dwellers might not continue the projects, if the external supports were withdrawn. This highlights the importance of developing mechanisms to motivate the slum dwellers for sharing the costs. It is learned from the Sri Lanka example of Artacharya Fondation project that the communities were provided with bins free of charge for the first time and later obtained them via a micro-credit system (Rouse 2004). In another project in Sri Lanka, the NGO SEVANATHA tried to make the composting project a people's programme rather than involving external interventions (Chularathna and Ratnayake 2000). White (1987) and McCommon et al. (1990) clearly indicated that the key factors for sustainability of community-based projects are that community should have a felt need or demand for the project and a willingness to share the project cost.

5.2 Economic incentive has an influence on the attitude of households towards source segregation.

The long success of urban waste composting seems to be reliant on source segregation of waste as it improves the quality of the compost. Source segregation requires the co-operation and motivation of the waste generators. In the barrel composting project, the slum-dwellers were extensively participating in source segregation, as they used to get some money out of it. On the other hand, in other composting projects in middle- and high-income areas, the residents lacked enthusiasm to put extra effort and time into source segregation. However, they were keeping the dry and clean materials (newspaper, bottles, plastic containers, old cloths etc.) separately because they had a direct resale value.

It can be learned that economic incentives could influence household behaviour. This is supported by the following literature:

- In the Philippines households were encouraged to segregate at source because they were provided with the proceeds from the sale of recycled materials as an incentive (Camacho 1993).
- In the SIDRO recycling project at Mexico, it was seen that economic benefits had an influence on the proper behaviour of household level segregation (Lardinois and Klundert 1993).
- In Indonesia, a household level waste segregation programme for composting failed because most of the households felt discouraged as there was no financial incentive for participation in waste segregation (Mockler 1998).

5.3 Selection of site with a consensus view of the users, communication with the community residents and incentives could bring support to the composting projects.

The barrel composting projects were operated by the slum dwellers. The location of the barrels was selected in consultation with the slum leaders and slum dwellers. Some barrels created inconvenience

to the movement of slum dwellers. But the slum dwellers had accepted such problems and had been participating in the project for more than 7 years. Barrel composting was also an income-generating project for the slum dwellers. They got financial benefits which inspired them to participate in the project. No community is perfectly homogeneous. In the slums, the living standards of the slum-dwellers are more or less same. None of them is a landlord, they are illegal occupants. But those who live there for a long time, claim themselves as owners and sometimes they rent a portion of their dwellings. The barrels are positioned in a public area with the consensus of the slum dwellers. The barrel composting project is a source of income of the slum-dwellers, which at present overlooks odours and fly problems. Waite (1995) supported the view that community acceptance and participation could be ensured by providing a share of the proceeds from the sale of compost to participating residents.

The compost facility needs to be sited reasonably close to the input stream to save waste transportation costs but it must be compatible with the desires of the nearby community (UNEP-IETC 1996). However, composting facilities are associated with some environmental and social concerns such as odour, the presence of flies and other nuisances. To increase acceptance or tolerance level of the community residents, consultation or involvement of the community during planning and implementation of the project is essential. In other composting projects in middle- and high-income areas, both acceptance and rejection were experienced. In the Mirpur, Green Road and Dhalpur areas of Dhaka city, the communities accepted the composting projects and perceived composting as good for their community environment. However, in the Baily Road area, the composting activity ceased after four months due to objections raised by the residents. Better access to information and better communication and with community residents might have increased the credibility and acceptability of the project. In Sao Paulo, Brazil, the mayor gave a piece of land to a waste pickers' co-operative for sorting and recycling. In the beginning, the neighbouring communities objected but after an open day and several meetings they were convinced (Klundert and Lardinois 1995). Rahardyan et al. (2004) felt that to avoid public complaints about nuisance (movement of vehicles in the community) and odour, special attention is needed to minimise such complaints, and local residents should be consulted and provided with appropriate knowledge about the activity. Waite (1995) further confirmed that community acceptance can be adopted by (i) keeping the site tidy and (ii) publicising the facility locally.

5.4 Slum dwellers had positive feelings for the composting project as they were involved in selection of barrel locations and composting process. Unless they have both the financial and management authority over the project, they will feel less responsible for the project.

In the barrel composting project, a participatory process and consensus view was adopted both in site selection and composting, which was effective in creating community ownership. However, the slum dwellers were not involved in the construction of barrel and in selling the compost. Unless the slum dwellers get both the financial and the management authority, they do not feel responsible for the project or develop any sense of ownership (Peters 1998). In Karachi, Pakistan, a local NGO – Association for Protection of the Environment (APE) – trained a few community members to manage and run the project on an independent basis, and this empowered the communities to develop their own services in the absence of external support (Ahmed 2003). Another notable observation was that slum dwellers demanded lockable covers from the NGO to prevent others from dumping unwanted wastes in their barrels. vThis showed the feelings of ownership in the slum dwellers, in their desire, to some extent, to protect the composting process from unauthorised intervention.

In other composting projects, community participation was limited to handing over waste to collection workers and paying service charges; such an arrangement gave no scope for the community to be involved in any phases (planning to implementation) of the project. McCommon et al. (1990) clearly indicated that when the community plays only a marginal role in project development and operation, and an external agency is almost in charge of development, such a level of participation is seldom

sufficient for the community to develop a sense of ownership and responsibility. From the experience of Patan Conservation and Development Project in Kathmandu, Nepal, it was reiterated that for sustaining the operation of the project, the community has to build capacity and develop greater access to authority (UWEP 1996). In a Karachi solid waste management project, sustainability was achieved as the community became involved in all phases of the project, including assessment of the existing situation, design, implementation and management of the project (Ahmed 2003).

It can be concluded that a low level of involvement or empowering of the community residents in project activities does not develop a sense of responsibility or a feeling of ownership feeling. In Cipinang Besar, a neighbourhood in East Jakarta, the control of the composting project empowered the community to meet their own social and environmental needs, and thus created a sense of responsibility (Perla 1997).

5.5 Slum dwellers were not motivated to pay or share the cost of barrel composting.

In the barrel composting project, the slum dwellers were not motivated or interested to pay for the barrel composting, but they were paying water and electricity bills regularly. They believed that donors would pay for the waste management facility. This donor dependency was discouraging for the project continuation. White (1987) supported the view that dependence on external support may be a threat to the sustainability of the community-based initiatives. He added that community-based projects may benefit from the initial support of external agencies but there is a risk that if they become dependent on external support.

It is commonly believed that it is the responsibility of the municipality to collect and dispose of waste. This belief may accommodate a high participation of the community residents in paying a waste collection fees, but they are likely to be unwilling to share the cost of composting. They believed waste recycling or disposal to be the responsibility of the municipality and that they were paying municipal taxes for the waste management services. Zurbrugg (2002) has the same opinion that many people are paying only for the removal of waste from their immediate environment and under the present municipal tax system they are not concerned with its ultimate disposal or management. This view is also reflected by Nunan (2000, p-351) ‘Many people believe that it is the municipality’s responsibility to collect waste and do not want to make additional payments’. In a case study in Patan, Kathmandu UWEP (1996) identified three factors for willingness to pay for a service: if the community finds it reliable, beneficial and is generated from the demand of the community. Salequzzaman et al. (2000) asserted that if the community is aware of benefits from the service, then they may agree to support the programme by paying higher charges.

6.0 Conclusions

This paper highlights the successes and limitations of the community-based composting projects at their present stage of development. The study discourages the dependence on long-term donor financing, which could inhibit the transition of projects towards self-sustainability.

Until recently, in the planning and implementation of the community-based composting projects, there was little participation of the local community. Most of the community-based solid waste management projects are donor supported. They are implemented by the NGOs who are committed to demonstrating successful pilot projects for fulfilling the donor’s agenda for socio-economic and environmental improvement. For demonstrating the success of the pilot projects, there is limited scope for the community to build capacity (both management and financial) or to develop any transferring mechanism to run the projects independently in future. Donor financing and NGO support are very important at the initial stage of the pilot projects, but long-term dependency due to lack of self-financing and self-management capacity are impediments to sustainability. From the point of sustainability such projects are likely to disappear after the donor support ends. Involving the community in project

planning, decision making, implementation and monitoring can ensure sustainability, since it empowers the local community, encourages them to contribute and gives them a sense of responsibility and commitment.

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