A STUDY ON SOLID WASTE MANAGEMENT THROUGH COMMUNITY BASED ORGANIZATIONS (CBOs) IN UTTARA, KALABAGAN AND MOHAMMADPUR AREAS OF DHAKA CITY

MORSHEDA BANU

DEPARTMENT OF URBAN AND REGIONAL PLANNING
BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY (BUET)
DHAKA

NOVEMBER, 2000

A STUDY ON SOLID WASTE MANAGEMENT THROUGH COMMUNITY BASED ORGANIZATIONS (CBOs) IN UTTARA, KALABAGAN AND MOHAMMADPUR AREAS OF DHAKA CITY

By

MORSHEDA BANU

Thesis approved as to the style and content by:

M.A.Mohit 19 Nov. 2010

(Dr. M. A. Mohit) — Chairman (Supervisor)
Professor, Department of Urban and Regional Planning
BUET, Dhaka

Member (Ex-Officio)

Head, Department of Urban and Regional Planning
BUET, Dhaka

(Dr. Sarwar Jahan) — Member
Professor, Department of Urban and Regional Planning
BUET, Dhaka

(Dr. Roxana Hafiz) — Member
Assistant Professor, Department of Urban and Regional Planning
BUET, Dhaka

(Dr. M. Feroze Ahmed) — Member (External)
Professor, Department of Civil Engineering, BUET, Dhaka

ABSTRACT

Dhaka city has been experiencing rapid population growth due to rural urban migration after the liberation of Bangladesh as an independent nation in 1971. Increase in population is, obviously, creating quick rise in generation of solid waste of the city. Waste generation during 1985-91 period has increased at an average annual rate of 4.33% per capita per year, while the capability of DCC's solid waste management and its hygienic disposal is miserably lagging behind. More than half of the city's daily generated solid waste remains uncollected and is disposed of locally, making the environmental scenario of the metropolis quite dismal and unhealthy. Dhaka City Corporation bears the responsibility of providing solid waste management. But it is difficult for DCC to cope with the rising demand with its limited budget and its present planning process. In this situation, the residents of Uttara, Kalabagan and Mohammadpur area have developed several local community based organizations to manage their wastes. However for the study purpose out of several committees only three namely "Uttara Kallyan Samities", "Kalabagan Samaj Kallyan Parisads" and "Environment Cleaning Project of Mohammadpur Area" has been chosen.

Realizing the gravity of the situation, this study has been undertaken with the expectation that it would help prepare a sound and effective action plan for solid waste management. In other words, this study aim at environmental improvement of the capital city through community based organizations (CBOs).

This study finds that there is an urgent need and scope to improve solid waste management system of Dhaka city and recommends both macro and micro level measures to improve it for eventual betterment of the environment. At macro level, the national government can play the role of a 'facilitator' to improve overall management system; while at the micro level, DCC can improve their institutional, financial and technical capabilities and can take the help of CBOs to improve the present waste disposal condition of different residential areas of the city.

This study, however, comes to the conclusion that improvement of solid waste management of the city can be achieved through joint involvement of the community and the DCC. Finally, the study suggests a community participation process through community based organizations that will be helpful for involving people effectively for the development of solid waste management in the absence of required governmental resources.

ACKNOWLEDGMENT

At first all praises belong to Almighty Allah, the most merciful, benevolent to man and his action.

I wish to convey my sincere thanks to my supervisor Dr. M. A. Mohit, Professor and Head, Department of Urban and Regional Planning, Bangladesh University of Engineering and Technology (BUET), for his valuable guidance at different stages of my research work. It was a great pleasure for me to work under him. It would have been quite impossible to carry with this research work and give it a final shape without his advice and sympathetic encouragement.

I also express my sincere acknowledgement to Dr. A.S.M. Abdul Quium, Professor, Department of Urban and Regional Planning, Bangladesh University of Engineering and Technology (BUET), Dhaka, for his thoughtful advice, inspiration and providing facilities with necessary suppert to undertake and successfully complete the research work.

I wish to express my deep sense of gratitude to all teachers of this department for their benevolent cooperation and encouragement during the course of research.

I also thank the people of the study areas in general and persons in particular including Mr. Dulal, (General Secretary, Kalabagan Samaj Kallyan Parisad), Mr. Bikram (President, Environment Cleaning Project of Mohammadpur Area), Mr. Niamul Haque and Mr. Belal Ahmed (President and Vice-President of Central Body, Uttara Kallyan Samities); with all of whom I had detailed discussion about community based organization and solid waste management of the localities.

I am also grateful to Mr. Iftekhar Enayetullah and my friend Awal Mollah, who helped me a lot during varions stages of my research work.

Finally, I extend my indebtedness to my mother , brothers-sister and husband for their continuous inspiration and support to complete this research work.

November, 2000 MORSHEDA BANU

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF PLATES

LIST OF ABBREVIATIONS

CBs	:	Community Bins
CBOs	:	Community Based Organizations
DCC	:	Dhaka City Corporation
DENR	:	Department of the Environment and Natural Resources
DMDP	:	Dhaka Metropolitan Development Planning
FAP	:	Flood Action Plan
MMWBM	:	Metro Manila Council of Women Balikatan Movement
MRC	:	Materials Recovery Centre, Philippines
NGO	:	Non Governmental Organization
PEDP	:	Payatas Environmental Development Program
SW	:	Solid Waste
SWM	:	Solid Waste Management
UAP	:	Urban Area Plan
UNCHS	:	United Nations Centre for Human Settlements
UNDP	:	United Nations Development Programme

CHAPTER 1

INTRODUCTION AND METHODOLOGY

1.1 BACKGROUND

Solid Waste Management (SWM), is today considered to be one of the most immediate and serious environmental problems confronting urban local governments in developing countries. This is mainly due to rapid urbanization taking place on an enormous scale in the cities of Asia, Africa, and Latin America. Cities currently account for two-thirds of population growth in the developing world (Bhide, 1983, p.6). By the year 2000 close to two billion people will live in sprawling urban areas such as Mexico City, Bombay and Cairo.

Cities are the major contributors to the economic output, employment and income of developing countries. Rapid population growth and uncontrolled urban expansion, severely degrade urban environment, place serious strain on natural resources and consequently undermine equitable and sustainable development. Inadequate management and disposal of solid waste is an obvious cause for the degradation of the environment in most of the cities in developing countries (Schertenleib, et. al., 1992). Most of the cities in the developing world are unable to cope with the vast amount of solid waste due to its uncollected domestic waste on streets and public areas, which also clogged urban drainage system and contaminate the water resources. In many developing countries less than half of the urban population is served by sewage and solid waste disposal system. A study (Lohani, 1986) had shown that solid waste management problems would significantly increase in South Asian countries during the last two decades of this century (1980-2000) and would be a major environmental issue for some time to come

1.2 STATEMENT OF THE PROBLEM

Dhaka, the capital of Bangladesh, has grown at a rapid rate after liberation of the country in 1971. Today, the population of the metropolitan area exceeds seven million (RAJUK, DMDP, 1995, p.3), with another 1.5 million or so daily commuters during daytime. The annual growth rate in DCC area is 4.75% (UNDP, 1993, p.9). According to a study (Islam, et., al., 1990) the projected population of Dhaka city by the year 2001 would be around 8.9 and 7.9 million considering high and low growth rate respectively. The quantity of solid waste generated in Dhaka city is increasing according to its population but the increase in service facility is lagging far behind. As a result, there is a disequilibrium between demand and supply of services and infrastructure and the backlog is increasing at a rate faster than urban population growth. The social fabric of Dhaka has been complicated by the city's onique problems of wide spread poverty and physical vulnerability. Inadequate coverage of the population to urban services and operational inefficiencies are some of the major problems observed in municipal solid waste collection programme. Based on Dhaka City Corporation (DCC) estimate, solid waste generated in the city per day is 3,5000 to 4,5000 tons. The average per capita generation is 0.5kg per day (DMDP, 1992). Only 50% of Dhaka city's garbage is estimated to be collected by the DCC. The rest 50% are discarded in the streets, drains, ditches, canals and open spaces. Therefore, a huge volume of solid wastes accumulate in the city.

Recently, the role of authority in metropolitan management is being shared with private enterprise or CBOs due to resource and other limitations. Now a days CBOs are playing a partnership role in city management. From the perspective of effectiveness and environmental improvement, the CBO approach has been considered as an alternative one in domestic Solid Waste Collection (Mohit, 1995). People's Participation in Solid Waste Management have been practiced and developed in many cities (Akhter, 1992, p.3).

1.3 RATIONALE OF THE STUDY

Community Participation is an approach by which community can keep their own areas clean with the support from Government/NGO. However, if the neighbourhood level communities are encouraged to form CBOs to organize the work of domestic solid waste services, the services will be better and it will be highly cost-effective on the part of authorities. Moreover, local community participation can be utilized for other development purposes. In order to tackle the domestic waste disposal problem, a house to house collection of domestic waste was started in 1987 in the Kalabagan area of Dhaka city. The CBO approach of Solid Waste Collection has been extended gradually to Mohammadpur, Mirpur, and very recently to Uttara area. The population density of these areas are— Mohammadpur: 109.68/acre, Kalabagan: 83.69/acre, Mirpur: 44.26/acre, and Uttara: 12.13/acre (BBS, 1991). The experience of these CBO approach has been reported differently in some studies (Enuyetullah and Sinha, 1999, p.3). Although some CBOs have been successful to improve the local environment, yet they seem to have some external problems (The Daily Star, 1995; Mohit, 1995). So the main purpose of this research is to investigate into the different CBO activities related to solid waste collection and develop some policy framework.

1.4 NEED FOR PARTICIPATION PRACTICE

Considering the present unhealthy situation of solid waste management, community participation can play a dominant role in community development activities and it is also needed for the following societal values (Frank, 1979).

a) One of the societal values of citizen participation is that it allows each citizen the right to influence governmental decision making. Citizen participation is viewed as revitalising democratic practice in general by giving opportunities for local for self government to the average citizen – an urban return to grass roots.

b) Another societal value of citizen participation is that it can help maintain the stability of society. Varying degrees of citizen control are proposed for implementing this value. The most conservative approach views citizen participation as strictly supportive of existing government officials, their representatives, and their programmes; in this approach citizen's groups have no innovative or decision making functions. Thus, a limited form of citizen participation is encouraged as supportive of the system. Others have suggested that citizens should be encouraged to participate but only in a traditional political structure such as a ward format. Citizen participation iu this case would be limited to advising and generally supporting their ward politician. This would give citizens access to the power of the political structure.

c) Yet another societal value of citizen participation is that it guards the public interest. As government grows more complex, active citizen participation is necessary to ensure that the bureaucracies are responsive to the public and to combat special interest groups. Citizens groups are characterized as watchdogs of society and are seen as filling the role of general ombudsman

d) A final societal value of citizen participation is its capacity to reduce the alienation of the individuals. Maintaining the complex organization of modern society requires that individuals have a clear understanding of their roles and their importance. A lack of such understanding and its accompanying feeling of political helplessness, combined with a general distrust of power, are the personal situation known as alienation. Participation in the governmental decision making process can have the psychological benefits of increasing the individual's confidence in his ability to control his own life and environment. Thus citizen participation iu governing has been seen as a positive force for reducing or eliminating alienation.

1.5 OBJECTIVES OF THE STUDY

The following objectives have been set for the study:

1) To identify problems and methods of solid waste disposal at the household level within Kalabagan, Mohammadpur and Uttara areas.

2) To identify types and capability of community participation in solid waste collection system.

3) To find out problems related to waste management by the community based organizations (CBOs) within their control area.

4) To formulate appropriate policies for improvement of community participation in Solid Waste Collection Programme of Dhaka.

1.6 RESEARCH METHODOLOGY

In order to attain the above-mentioned objectives, the methodology of the study consists of three parts:

1) Information collection;

2) Analysis of collected information and

3) Formulation of a guideline for planning and designing of solid waste management through community involvement.

Information Collection

a) **Collection of information from Secondary Sources:** Information and data were collected from literature and available secondary sources like books, journals, governments documents, research works, newspapers and other printed materials to gain a general understanding the problem stated in this report.

b) **Collection of information from Primary Sources:** To gain understanding of the study areas primary sources information were required. For obtaining information the following methods were used.

1) **Reconnaissance survey:** A reconnaissance survey was conducted through observation and interviewing the local people in order to gain general impression regarding the study areas to asses the followings:

a) Existing garbage collection system.
b) The nature and degree of community participation.
c) An evaluation of the SWM in the light of South and Southeast Asian cities.

2) **Questionnaire survey:** A detail survey of community participation for the study areas was conducted to find out the nature and type of community involvement to overcome the solid waste collection problems. The survey of the study areas was conducted by using predesigned questionnaire for collection of data on social status, economic, and environmental conditions, present waste disposal system and nature and extent of community participation in collection and disposal of solid waste through CBOs.

3) **Sampling:** A systematic random sampling procedure was followed for this purpose.

4) **Opinion Survey:** Interview and discussions with civic authorities, community leaders, ward commissioners and active social workers.

5) **Map preparation:** Several area maps were prepared for projecting CBO operation area, environmental conditions etc.

Analysis and Formulation of Guidelines

The collected information from primary and secondary sources were analyzed with the help of available computer software. The findings of the study were presented in tabular form which were prepared to show the dynamics of the community at different stages of the development process through community participation

1.7 DATA COLLECTION PROCEDURE

In the period of survey, interview was conducted at the home of the dwellers. The interview schedule for household information, information on community participation and information on solid waste collection etc , were prepared. Heads of the families were interviewed. In the absence of the head of the household, the next most responsible member of the family was interviewed. After requisite training, six university students were divided into three groups, each with 2 students and they carried out the questionnaire survey through door to door visits. The survey covered 230 households.

1.8 ORGANIZATION OF TIIE THESIS

The thesis is divided into eight chapters.

a) The chapter 1 sets out the research objectives and the methodology to fulfil these objectives. b) The chapter 2 firstly discusses about the present solid waste management system of Dhaka city, and secondly evaluates the existing SWM system. c) The chapter 3 is concerned with the discussion about concepts and techniques of community participation, its effect and its problems. Also this chapter deals with the recent development in solid waste management in some Asian cities for better environment. d) The chapter 4 is devoted to a profile of the study areas on physical and socio-economic condition. e) Chapter 5 discusses the present solid waste collection system and the growth of CBOs in the study areas (Kalabagan, Mohammadpur, and Uttara) of Dhaka city. f) Chapter 6 deals with the current practices of waste disposal of household, problems faced by the household, CBOs during waste collection and disposal and their views for improvement of the waste management system. g) Chapter 7 deals with the comparison and evaluation of CBOs operation in the study areas h) Lastly chapter 8 presents a summary of the study and some recommendations.

CHAPTER 2
SOLID WASTE MANAGEMENT IN DHAKA CITY

2.1 INTRODUCTION

Solid Waste Management in Dhaka is a big problem from several points of view. Rapid growth of the city is imposing a lot of urban problems in terms of inadequate housing and settlements, employment opportunities and the basic urban services like water supply, sanitation, sewage disposal and solid waste management. More than 50% people of the city are poor and some 40% people live in slums, squatter settlements and on pavement. The urban facilities are not sufficient with the growth of population and expansion of the city. As a result, the urban condition in many respect has already reached a crisis level that needs immediate attention. Solid waste disposal in Dhaka is one of such problems.

Dhaka generates a huge quantity of solid wastes everyday from various sources. The major sources of municipal solid waste in Dhaka are households, streets, market places, industrial/ commercial establishments and clinics and hospitals. The quantity of waste generation increases during wet season, when many vegetables and fruits, especially mango and jackfruit are harvested and sold in the market. Solid waste in Dhaka is mainly composed of food, grass and plants, bricks and dirts and paper and polythene materials.

Based on these sources, the wastes are mainly classified as domestic, commercial and industrial. Some waste are non-hazardous and some are toxic discarded either in liquid, semi-solid form and some are very hazardous. There are over 1,000 small to large industries in Dhaka area which are disposing a significant amount of toxic and hazardous wastes contributing environmental degradation in and around Dhaka. These industries mainly include chemicals, textiles, dyeing and printing, tannery, iron and steel, metal, plastic and rubber and tobacco.

In addition to the industrial waste, the municipal solid waste is also augmented by hospital wastes generated from about 500 small to large diagnostic centres, laboratories, clinics and hospitals in Dhaka and make the situation worse. Twenty percent of this total waste is infectious and hazardous. There are also 149 tannery industries in Hazaribag area in Dhaka producing 1800 litres of liquid waste and 115 tons of solid waste during the peak time and 75 tons during off time per day. All types of waste are detrimental to environment if these are not properly managed (Bangladesh Centre For Advanced Studies, 1998, p.2).

Table 2.1: Waste Stream Fractions Of Dhaka City

Types of waste	Percentage
Domestic waste	46.8%
Street sweeping	22.6%
Commercial waste	17.2%
Industrial waste	12.9%
Clinical	0.5%

Source: UNDP et.al., 1992, p.18

2.2 THE ROLE OF DHAKA CITY CORPORATION (DCC) IN SOLID WASTE MANAGEMENT

Dhaka City Corporation (DCC) is the only formal organization of the Government responsible for solid waste management of Dhaka. Dhaka Municipality was established in 1864 and was upgraded to DCC in 1990. According to the Urban Local Body Ordinance of 1977, the DCC is responsible for the management of solid wastes in the city.

The main aspects of solid waste management are drain cleaning, street sweeping, collection of refuse and its transportation and disposal. The DCC has the means, resources and manpower to do this job and they have a reasonable budget for this purpose.

A total of 5779 cleaners are working for cleaning purpose in 10 zones of DCC. The cleaners generally use short handled coconut leaf brooms and 5cft capacity handcarts to collect the waste. They use to dump collecting waste to the nearest dustbin. It is estimated by DCC that in narrow lanes only 25% of the residents use dustbins or enclosure, while the rest 75% use streets and drains for disposal of solid wastes (Wadood, 1993, p.17).

However, DCC has many constraints and bottlenecks and in some areas of waste management, it is not possible for DCC to provide services to the full satisfaction of the city dwellers or in other sense may be people have very high expectation from DCC regarding the conservancy service. In addition to this, there are lot of misconceptions among the people regarding the service facilities provided by the DCC. According to the Local Urban Ordinance, DCC is responsible only for collection of solid waste from corporation's bins and transportation to the landfill area. And thus DCC's involvement is only with the secondary collection and final disposal.

2.3 EXISTING SOLID WASTE MANAGEMENT OF DHAKA CITY

Present Solid Waste Management (SWM) system of Dhaka city consists of three components:

Collection
Transportation and
Disposal

2.3.1 Collection

Dhaka City Corporation (DCC) has an organized solid waste collection system which is operated through 10 zonal offices of the Conservancy Division that are responsible for the refuse collection within the zones. The community bin (CB) system of collection is being practised by DCC. In this system, house holders discharge their waste at predetermined

locations containing some form of communal storage facility, and refuse collection vehicles visit these sites at a frequent interval, usually once daily to remove accumulated waste. The principal advantage of this method of collection is that it reduces considerable number of sources from which waste has to be collected (Trivedi et., al., 1992, p.109). The community bins (CBs) are made of corrugated iron (CI) sheets and of masonry construction. While the CI bins have 1 meter dia and 1 meter high with a lid, the masonry bins are of variable sizes. At present, there are 2,450 CI bins and 1,795 masonry dustbins in DCC areas (Bangladesh Centre For Advanced Studies, 1998, p.2). There is no specific rules regarding placement of the dustbins.

Many residents of Dhaka city are now familiar with the local initiative programme: House to bin collection. Over a few years about 136 local initiatives have emerged and they are collecting waste from families on a nominal service charge of Tk.10 to Tk.20. Only household solid wastes are collected from door to door of the participating households and carried to nearest DCC bins or containers for the DCC trucks to collect them for final disposal. There is a promising future for this type of solid waste collection, if the local initiators receive adequate help and encouragement from DCC. In areas not covered by local initiatives, the house owners themselves take the responsibility, albeit, haphazardly.

2.3.2 Transportation

A variety of vehicles are available for collection and haulage of solid wastes. Manually driven handcarts are used for collection of solid waste from narrow streets. Although they are inexpensive, the distance occurred by them is very short. Bicycles, tricycles, and motorcycles can be used to transport waste-containing carts and barrows. They can travel a longer distance than the manually-driven carts, but the distance is still limited and the travelling speed is slow. Table 2.2 gives a comparison of solid waste transportation options with respect to operational parameters.

At present Dhaka City Corporation is the sole authority to carry waste from the dustbins and demountable containers to the outfall for final disposal. The traditional collection and disposal system of DCC beset with problems like inadequate manpower and modern equipment, lack of intradepartmental co-ordination, existence of strong trade union. The DCC has a fleet of carrying trucks (1.5 to 5-ton capacity), 300 containers, 3,500 wheel barrows, and a budget of TK.284.1 million (Bangladesh Centre For Advanced Studies, 1998, p 3). A good number of the listed trucks remain out of order.

Table 2.2 Solid Waste Transportation Options And Their Characteristics

Parameter	Manual Hand Cart	Bi/Tricycle Cart	Animal Cart	Tractor Trailer	Fixed Bed Truck	Tipper Truck	Compactor Truck	Hoistable Truck
Distance Travelled	<2km	< 10km	< 10km	< 15km	Unlimited	Unlimited	Unlimited	Unlimited
Applicable width of street	Narrow	Narrow	Moderate	Wide	Wide	Wide	Wide	Wide
Volume per vehicle(typical)	.5-1m^3	2-3m^3	4m^3	4m^3	8m^3	10m^3	12m^3	20m^3
Labour requirement	1 Collector	1 Driver 1 Labour	1 Driver 2 Loaders	1 Driver 2 Loaders	1 Driver 3 Loaders	1 Driver 3 Loaders	1 Driver 3 Loaders	1 Driver
Speed	Very slow	Slow	Slow	Relatively slow	Fast	Fast	Fast	Fast
Purchase Cost	Very low	Low	Low	Relatively low	Moderate high	High	Very high	Very high
Maintenance	Very low	Low	Low	Low	Moderate high	High	High	High

Source: Ogwa, 1989, p. 78

2.3.3 Disposal

There is only one official dumping site at Matuail near the Dhaka-Demra road. According to a recent study, at the present filling rate, the 52 acre site is expected to be filled in about 3 to

4 years. It has been estimated by DCC that 50% of the population of Dhaka area are using dustbins for disposal of wastes, while 20% dump them on the roads, 20% on drains and 10% on open grounds to dispose solid waste (UNDP,et., al., 1992, p.18).

Solid waste can damage the environment and affect people's health, so it should not be disposed off carelessly. One positive approach is to recycle the waste, thus turning waste to profit, as well as conserving the environment. Recycling of paper, plastic, glass, metal etc. plays a very important role in the economic sphere and a large number of poor people are dependent on it. The major component of municipal waste is organic food waste which has a potential value and can be converted into organic fertilizer is totally unexplored.

2.4 PROBLEMS IN THE EXISTING WASTE MANAGEMENT SYSTEM

a) Waste collection coverage is only 50%, uncollected wastes spread on access roads causing aesthetic and health problem.

b) Wastes are simply piled or heaped on the ground near containers, which causes offensive odours.

c) Existing ordinance describes a general guideline about the duties and responsibilities of Dhaka City Corporation. There is lack of civic sense of city dwellers to adjust with the urban life.

d) The present law does not provide any penalty for illegal disposal of wastes or littering in the streets.

e) Inter departmental co-ordination problem, duplication of efforts and resources

f) Waste management employees are not well trained, they have lack commitment and sincerity on their working atmosphere.

g) Public campaign and awareness programmes on solid waste management for educating and motivating the city dwellers are completely absent

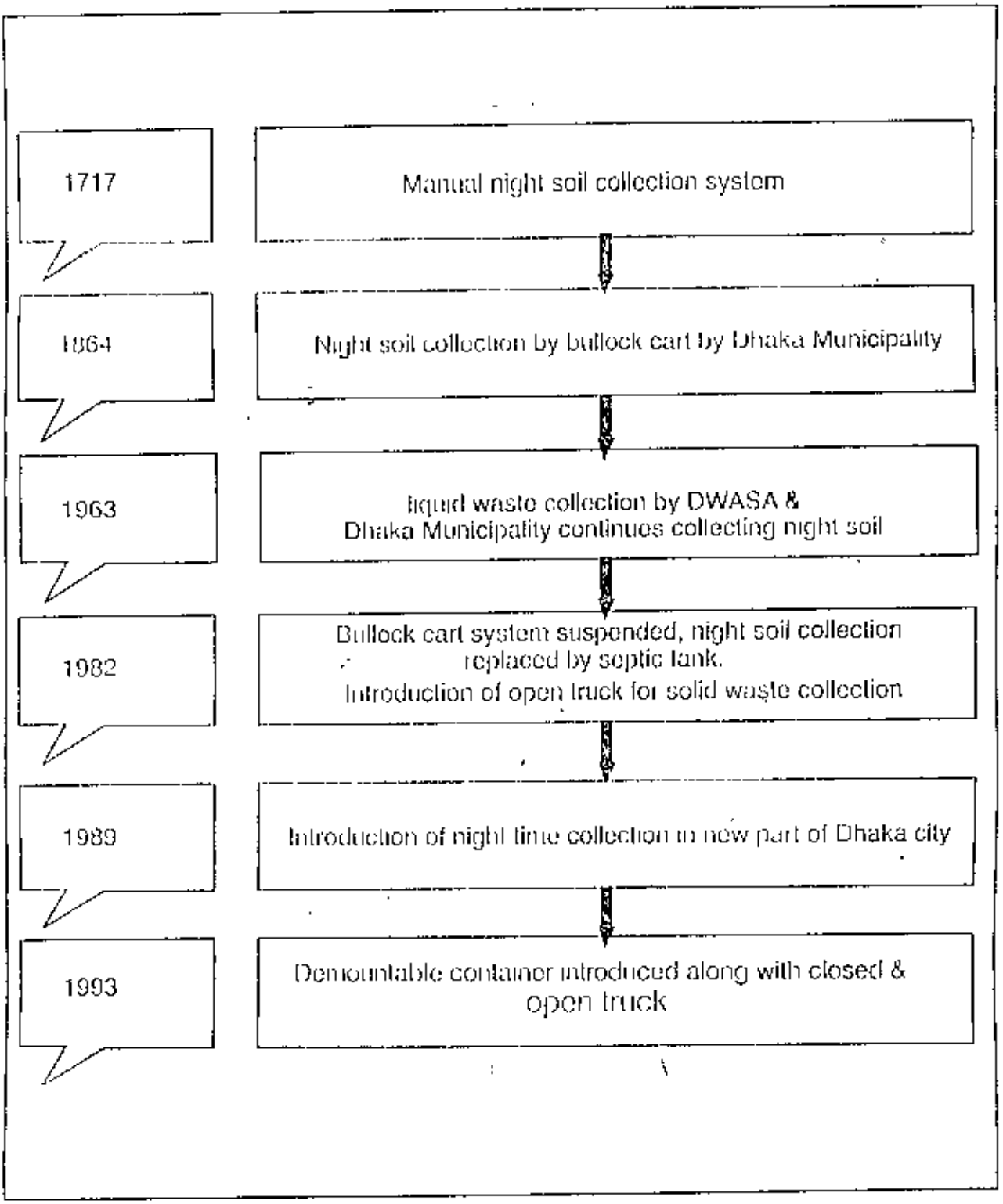

Fig 2.1 Chronological Development of Solid Waste Management System
Source : DCC, 1999

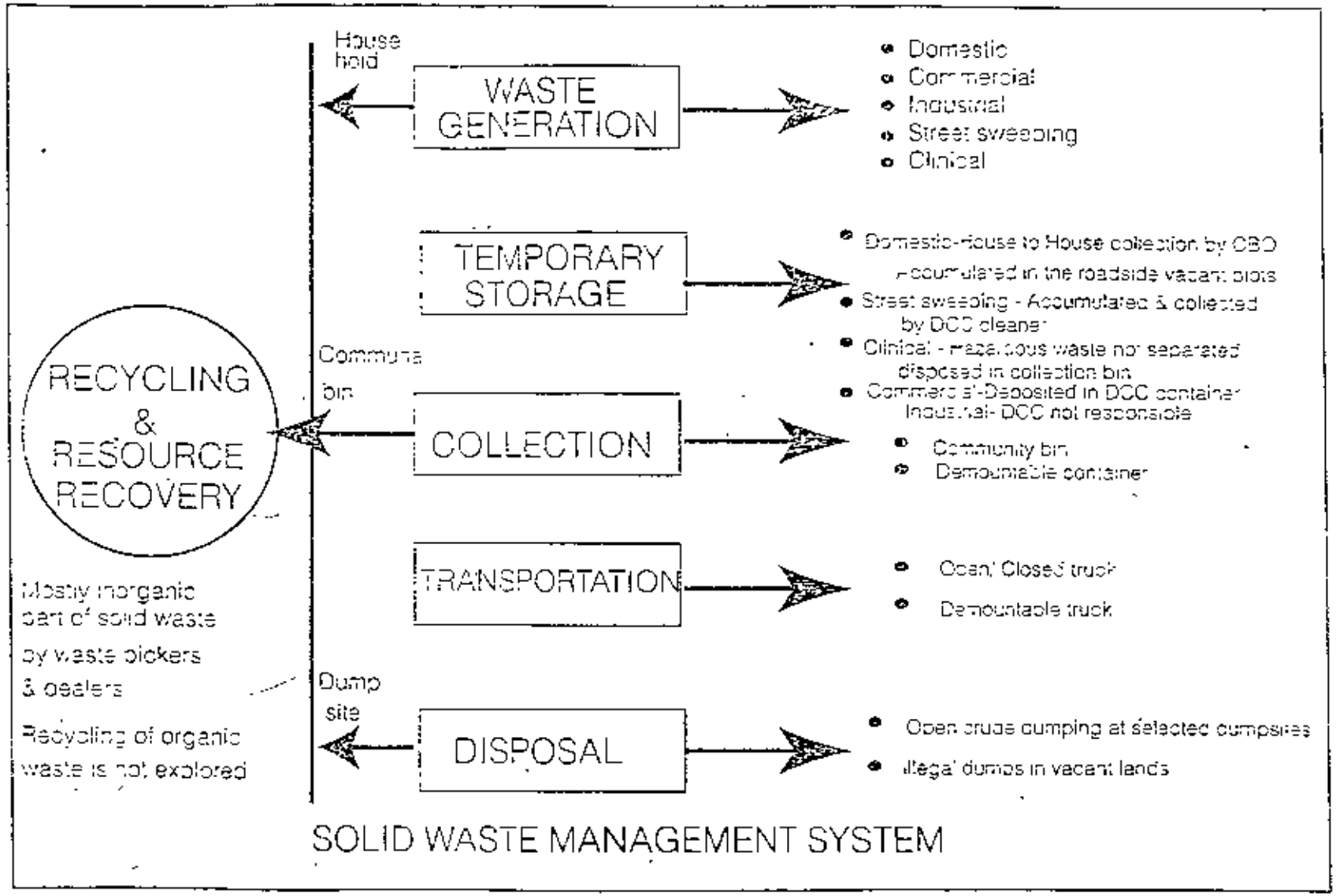

Fig 2.2 Present Status of Solid Waste Management
Source : DCC, 1999

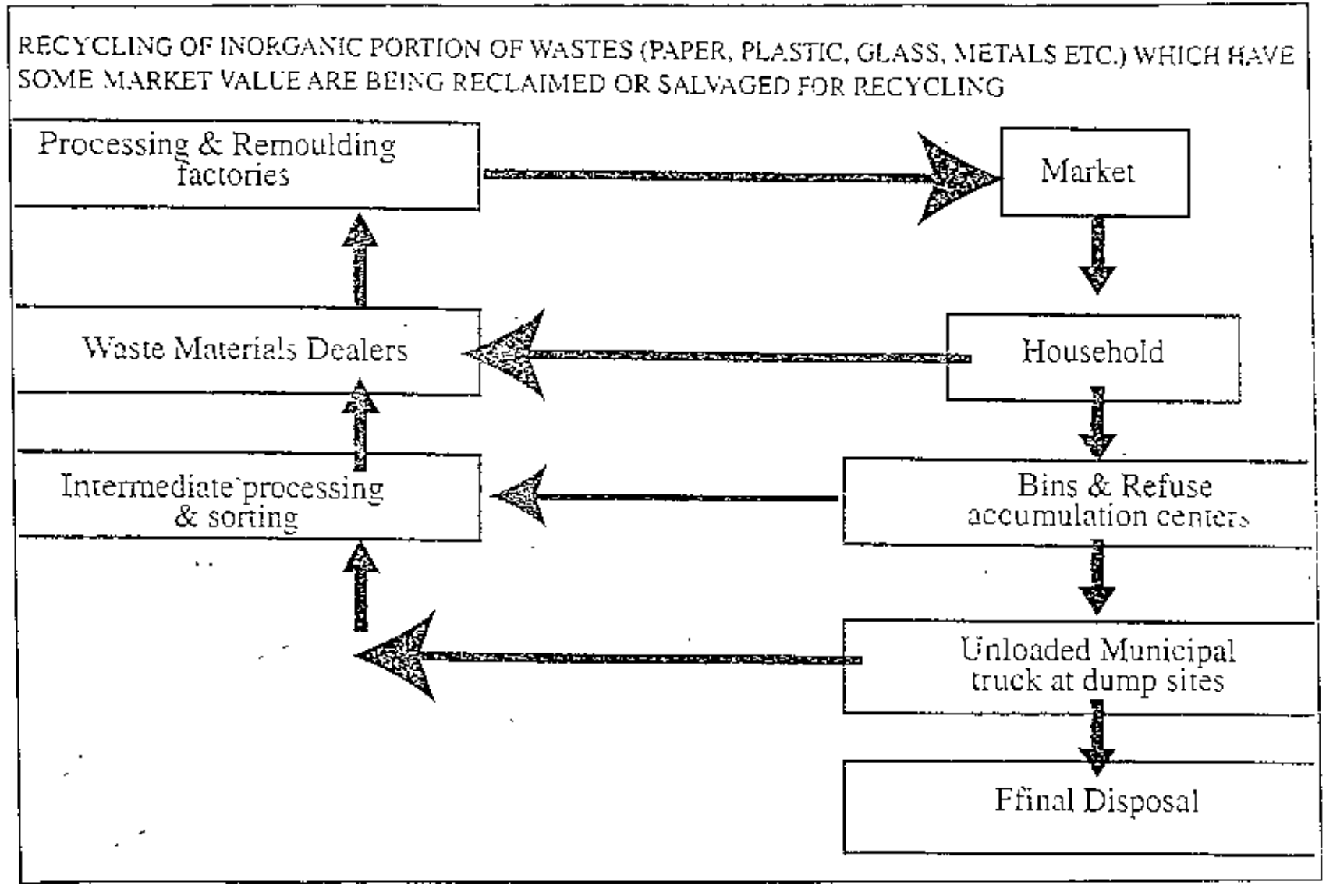

Fig 2.3 Recycling of Inorganic Wastes
Source : DCC, 1999

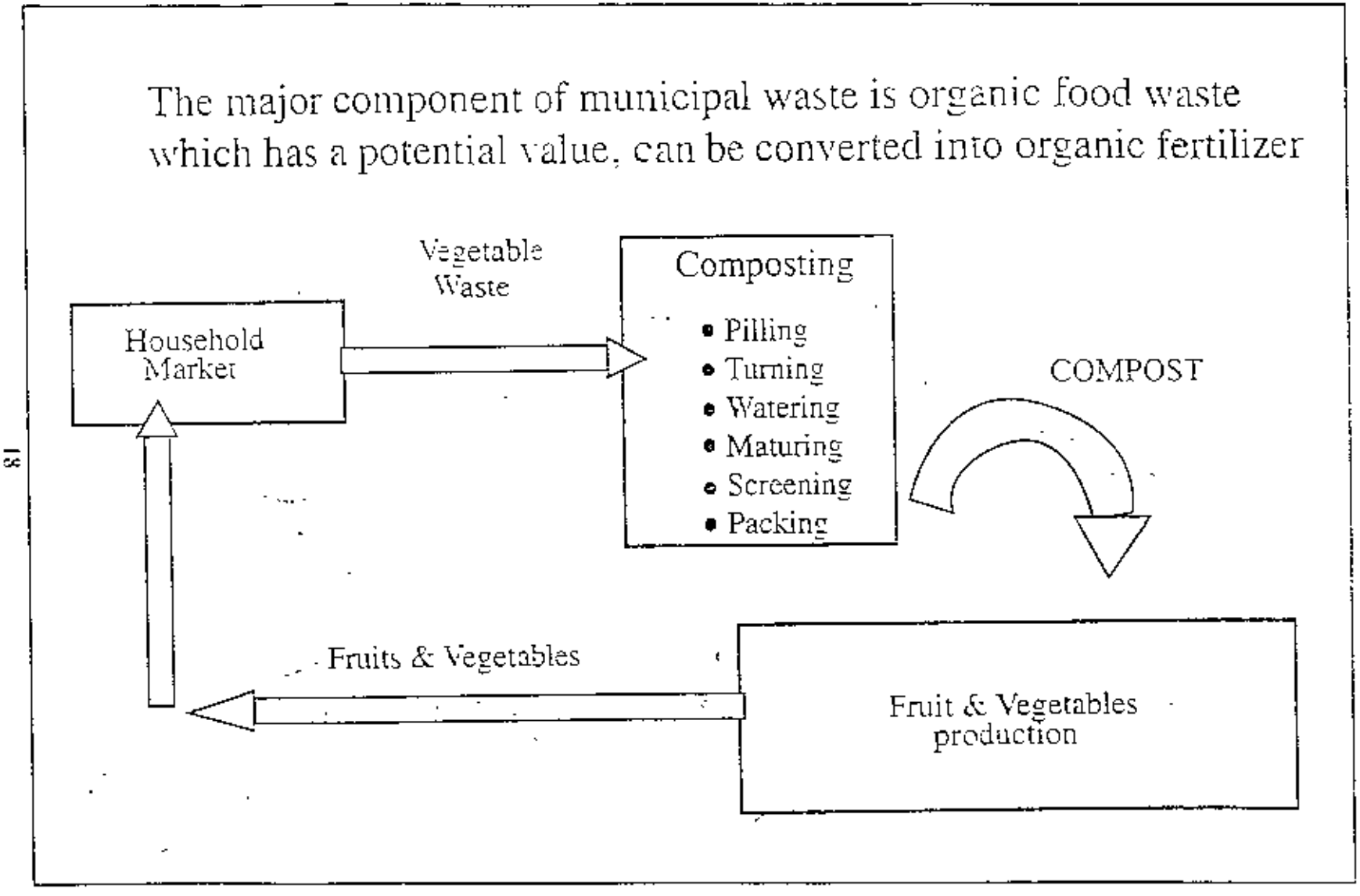

Fig 2.4 Recycling of Organic Wastes
Source : DCC, 1999

Table 2.3 Some Characteristics of Recycling Establishments in the UNCHS Study

Waste material	Recycling	Facts about waste materials	Scale of operation	Comments
Bones	Bone processing to soap	5-10 tons of bones/day	5-10 workers	
Waste paper and cardboard	Paper making	1 ton/day	12-16 workers/shift	In Jakarta, 9 factories recycle paper for producing carton boxes and paper products
	1, 000 tons/year per unit	2-3 tons waste paper processed/day	Less than 10 workers	In Karachi, about 200 small-scale units operate
Plastics	Toys, household furniture, clothing accessories, building materials and raw plastic materials			In Jakarta, 48 out of 57 plastic recycling factories are small-scale In Metro cebu, some 15 plastic users/processors need 1,000 tons/year of hard plastic and at least 500 tons/year of plastic films.
Glass	Bottles	4-12 tons of glass cullet/day, 60% of raw material from Karachi itself		In Karachi, half of the 35-40 glass-processing industries are small-scale (150-250 m2 floor area) In Metro cebu, waste pickers could only 15% of the demand for empty bottles and 3% of that of cullet.
Metals		Reprocessing a minor proportion of the scrap metal and metal wastes (broken pipes, taps, bicycle parts)	Four levels: (a) urban street dwellers, (b) small operators with very small investments, (c) small-scale factories with larger investments, and (d) large scake factories	In Kanpur, India, small operators use iron waste mainly, while some use frictions of waste iron mixed with new materials They may oe sub-contracted by large metal manufacturers In Metro cebu, waste pickers recovered 1,400 tons/vear of assorted metals; the demand lies between 2,000-3,000 tons/year (1982)

2.5 EVALUATION OF EXISTING SOLID WASTE COLLECTION SYSTEM

The present system of waste collection by DCC has been regarded as inadequate and inefficient. It has been estimated that the present truck fleet of DCC can collect 750 tons per day or 0.21 kg per capita per day (Mohit, 1995). Thus DCC collects only 42% of the total waste generated while 58% remain uncollected. In another study it has been reported that DCC collects around 683 tons of solid waste per day. As a result, accumulation of large amount of uncollected wastes produces strong offensive odour and pollutes the air. It also acts as a breeding ground for mosquitoes, flies and other insects which affect living environment. In a word, the present method of collection, transportation and disposal of solid waste by DCC is very inefficient.

2.6 ALTERNATIVE ARRANGEMENTS TO IMPROVE SOLID WASTE MANAGEMENT IN THE DHAKA CITY

In order to improve solid waste management specially for collection system, three alternative arrangements can be suggested with each arrangement having significant financial and environmental implications (Mohit,1995):

1) Increase the number of CBs, cleaners and other associated staff of Conservancy Division;
2) Involve private enterprises in the collection of solid waste; and
3) Encourage neighbourhood organization in the collection of solid waste.

An increase in the number of CBs in congested areas where narrow roads exist are unwanted by the residents because it aggravates and creats traffic congestion. Again the scattered garbages around CBs deteriorate the environment. Moreover, the additional cleaners and staff employed by the DCC would escalate per ton cost of solid waste (SW) in Dhaka. Alternatively, involving the private company in the collection of SW would also

enhance DCC expenditure on the solid waste management with no assurance that all the wastes will be collected. At present DCC allocates 17% of its budget to SWM and an enhancement of SWM budget would imply enhancing conservancy rate which City Corporation would not like to do. However, if the neighbourhood communities are encouraged to form community based organizations (CBOs) to organise the work of collection of domestic solid wastes, collection will be better and it will be highly cost-effective on the part of City Corporation. Moreover, local community participation will be enhanced which may be utilized for other development purposes. Therefore, from the perspective of cost-effectiveness and environmental improvement, among the three alternatives, the CBO approach is better suited than others

2.7 SAMMARY AND CONCLUSION

Dhaka City Corporation has an organized solid waste collection system, a variety of vehicles for waste collection and it has only one official dumping site at Matuail near the Dhaka-Demra road. DCC collects only 42% of the total waste generated while 58% remain uncollected. As a result large amount of uncollected wastes produces offensive odour and pollutes the environment. To improve the solid waste management and keep the area clean, local initiatives have been undertaken by the citizen groups in which solid wastes are being collected from households and carried upto the DCC's bins. Till today, over 140 CBOs have been identified, which are actively involved in solid waste management in 90 Wards of Dhaka city. These CBOs are providing services to about 1,30,000 households approximately (Enayetullah and Sinha, 1999). There is some success stories of the local initiatives in solid waste management in Dhaka. However, beside the success, there are lot of constraints and problems encountered by these initiatives.

CHAPTER 3

COMMUNITY PARTICIPATION CONCEPT, TECHNIQUES AND SWM APPROACHES FROM SOME ASIAN CITIES

3.1 INTRODUCTION

This chapter introduces the concepts of community participation and summarises some difficulties experienced by planning practitioners and community members. Rationales for community participation are then discussed, followed by some common problems with the practice of participation. Principles to guide best practice in participatory planning are then presented.

3.2 SOME DEFINITIONS OF COMMUNITY PARTICIPATION

Defining "the community", or the various publics, who should be involved in any planning process is a hazardous undertaking. One study which asked, " what is community" found that for most people it is a small "home area", much smaller than a local authority. Only a small portion of people in this study identified with a home area as large as a local authority (Bains, 1979, p. 79) The community can be defined in several ways, including:

- The patterns of interaction among individuals;
- Participation of community or common interest; or
- Geographical definitions, i.e., the adjoining houses, streets, neighbourhood, school, etc.

We refer to community participation, rather than consultation to indicate an active role for the community, leading to significant control over decisions. Consultation is taken to mean sharing of information but not necessarily of power. While in Australia the terms consultation and participation are often used interchangeably. According to O'Neill and

Colebatch (1989) participation is "real" when participants are able to determine the outcome In some situations, the appropriate approach will be consultation and its limitations will need to be acknowledged. It is clear from other literature that communities contain various "publics" whose needs and attitudes may vary significantly (Windy,Kelvin, 1994, p 10).

3.3 GOALS OF THE COMMUNITY PARTICIPATION PROGRAMS

1) To help community services to reach better decisions;

2) To inform the public of service activities, plans and decisions;

3) To encourage public understanding about and participation in the planning and decision process by providing information;

4) To grow public awareness as well as values and how they will be benefited from the CBOs.

5) To ensure that the service considers the needs and concerns of the public;

6) To broaden the information base upon which agency decisions are made

To accomplish these goals we need to:

a) Make public involvement an integral part of any planning, program, or project and not a separate procedure.

b) Begin public participation at the earliest possible stages to assist in: (1) identifying and resolving problems, (2) assessing needs, (3) planning strategies and developing work plans,

(4) gathering data, (5) formulating alternatives and estimating their consequences, (6) analysing, evaluating and comparing trade-offs among alternatives

c) Provide full and timely information regarding impending service decisions and give ample opportunities for the public and co-operating agencies to be involved in the service decision-making process.

d) Identify publics affected by a program or project and facilitate their participation in the planning process.

e) Respond to public recommendations in a documented and visible manner, later on which can help on decision-making process.

3.4 COMMUNITY PARTICIPATION TECHNIQUES

A variety of special techniques have been developed. The key methods are:

- Small groups,
- Public meetings,
- Search conferences,
- Workshops,
- Committees, and
- Forums

3.4.1 Small groups

Small groups are usually formed by members of the area immediately affected by a proposal. The small group, therefore, is a good method of identifying areas of conflict and extracting detailed, local information. A small group must also have the advantage of

allowing people to relax and express their views, rather than being put under pressure of a large group of people gathered at a public meeting.

3.4.2 Public meetings

A large, well advertised public meeting is an opportunity for the vocal sections of the community to express their opinions. Both the views expressed and the numbers attending the meeting can give an indication of community interest. However, often planners and designers of large projects require a deeper understanding of relevant issues. This can be obtained by a search conference.

3.4.3 Search conferences

A search conference and associated discussions produce not only an understanding of initial ideas, but also refine topics for discussion. This then leads to constructive ideas about the future direction of the area, once both planners and the community have clear ideas about what they want. The search conference attempts to gather information about general trends and issues, rather than requiring participants to work through specific tasks, which is more appropriate in a workshop situation.

3.4.4 Workshops

A workshop is most beneficial when both the community and experts have a clear idea of what they are aiming for. The workshop can expand resources of the program and allow beneficial discussions, and then can form basis of ongoing discussions.

3.4.5 Committees

Committees almost turn the full circle back to small groups. They provide an arena for ongoing discussions and monitoring of the project. Committees also provide the

community with an avenue to the experts. Ideally, committees should focus the attention of, and identify with, the community. If this is not achieved, a forum can be formed to lobby in a more "Political" arena.

3.4.6 Forums

A forum can provide an exchange of ideas between politicians and the community. The forum also provides the community with a political focal point (Sarkissian, Perlgul, 1994, p.33-34; 59-60).

Some individual techniques are:

- Individual discussions;
- Submissions;
- Surveys;
- Participant observation

Some Publicity techniques:

- Displays;
- Site offices;
- Media releases.

3.5 BENEFITS OF PARTICIPATION

Many arguments have been presented in favour of community participation. In some communities, the process of participation can be more important than the product itself

The benefits of community participation are as follows:

1) Increasing levels of trust and confidence among residents and council officials;

2) Better co-ordination among community;

3) The development of longer time horizons for all stakeholder;

4) A systematic approach for planned change.

Other benefits are:

- Ethical consideration;
- Pragmatic consideration,
- Valuing decisions that reflect the wishes of communities affected;
- Provision of information on aesthetics and other environmental grounds that have not been included in benefit-costs analyses;
- Identification of a greater range of alternatives;
- Gaining support for the implementation of wider decisions (Windy, Kelvin, 1997, p. 21).

3.6 COMMON PROBLEMS WITH COMMUNITY PARTICIPATION IN PRACTICE

For the community, the following problems are identified:

- Consultation or participation tends to favour middle-class, articulate people;
- It does not necessarily bring social change or involve the have-not; and economic interests may predominate.

Barriers to participation also include:

- Professional elitism;
- Time and money cost;

Lack of interest and skills among proponents and planners;

- Uncertainty about the results of public involvement (Windy, Kelvin, 1997, p. 23).

3.7 PRINCIPLES TO INFORM BEST PRACTICE IN PARTICIPATORY PLANNING AND DESIGN

The following general principles for guiding public involvement in environmental decision-making are:

a) Involve the public on issues of consequence for society as a whole;

b) Identify the target public;

c) Identify objectives of public involvement and develop performance criteria;

d) Seek public involvement before a decision has been reached,

e) Involve all groups affected by a decision;

f) Select appropriate approaches to obtaining involvement at various stages of the decision-making process;

g) Sustain a high level of involvement (not necessarily with the same individuals);

h) Allow adequate time to allow the public respond to an issue;

i) Consider constraints, e.g. legal mandates, economic problems, ecological issues, etc.

Australian consultation specialist, Bob Dick (Sarkissan, Wendy and Kelvin, 1997), reminds that in fashioning any participatory process we must at certain questions about the target

population that is, who we want to be involved. We must ask, first, how to address the question of breadth· how to determine levels of participation and representation Second, we must determine the depth of the process; involvement, consultation, or information exchange. Finally, we must decide on the style of the consultation, that is, whether it will be consensual, adversarial or dialectical. These concerns are represented below in table 3.1.

Table 3.1: Structures & Target Groups For Community Involvement In Planning & Decision-Making

Target group
* local stakeholder
* non-locals
* governments departments
* other bodies
Breadth
* participation
* representation
Depth
* involvement
* consultation
* information
Style
* consensual
* adversarial
* dialectical

Source: Kelvin, 1997, p 28

3.8 ROLE OF PLANNING PRACTITIONERS AND COMMUNITY PARTICIPATION

Clearly, participatory planning requires special skills Some of the basic individual skills and knowledge levels that required to undertake successful participatory processes. The required skills under the two categories shown below in Table 3.2.

Table 3.2: Basic Individual Skills And Knowledge Levels Required To Undertake Successful Participatory Processes

Communication skills
* public speaking
* writing
* knowledge of media process
* listening
* group processes and dynamics
Other required skills
* knowledge of local or affected public and communication networks
* understanding of the proposal
* through familiarity with the area to be affected by the proposal

Source: Sarkissan and Kelvin, 1997, p. 30

Community is a social unit where by 1) a group of people sharing a common geographical area; 2) these group of people are interacting within a common culture; 3) having a common need. Community Based Organizations are groupings or associations of members of the community that come together in response to a felt need. Community involvement is

essential in programmes like improving living conditions in existing urban settlements as well as in new areas. Community involvement is a fundamental democratic process which accords the community and its organization an effective form of participation in decision making, planning implementation and maintenance of shelter and urban services. Its long term benefits are self reliance, technical and organizational efficiency, environmental enhancement, generation of employment and user satisfaction. It should be noted here that the creation of strong and competent community organizations is a long-term process (usually through political empowerment and resource allocation) and often requires technical assistance from NGO and development agencies.

A community managed development scheme does not imply that Government has abandoned its responsibility for the provision of services. But it requires a change in administrative, planning and contracting procedures for shared decision making and contractual partnerships between government agencies and communities. This usually requires an enabling legislation and proper registration of community organizations as societies or co-operatives so that they can enter into contractual arrangements with public agencies and the private sector. Among the potentially wide scope for involvement of community organizations (depending on the level; of organization and technical skills) are

a) land regulation and plot allocation in existing settlements;
b) setting up building regulations for self help housing,
c) construction contracts for improvement and maintenance of on site infrastructure; road network, water supply, drainage, sanitation;
d) organization of collection of solid waste;
e) credit co-operative and community saving clubs (mainly for income generation, enterprise development and shelter improvements);
f) collection of changes and fees for services from municipalities and utility companies;
g) management of community centres;
h) participation in basic health care services;
i) management of vocational training and skills development;

j) organization of education services and

k) provision of security services and social welfare.

3.9 SOLID WASTE MANAGEMENT EXPERIENCE IN SOME ASIAN CITIES

This section deals with the recent development in solid waste management in some Asian cities for better environment.

3.9.1 Home Garbage Pick, New Delhi, India

A private company named " HOME GARBAGE PICK " was launched in August 1992 in New Delhi by a Retired Captain J.K. Verma. It is the first private venture of its kind in India for collecting garbage from households for a price and transporting it to recycling centre (Pandey, 1992).

The home garbage pick boys move from door to door from 9am to 2pm everyday. The residents keep their garbage in polythene packets provided by the company and handover these packets to the boys. The residents have to pay Rs 5/- in advance as a membership fee and a maximum of Rs. 40/-per month for garbage picking. The residents are satisfied regarding the efficiency of the company who are providing garbage collection service

3.9.2 Civic Exnora, Project, Madras, India

In Madras, an organisation called 'Civic Exnora' was founded by M.E. Nirmol, a Branch Manager for the Indian Overseas Bank in Madras. The solid waste thrust was begun through helping residents in elite and middle class areas to form Civic Exnora Units (Furedy, 1992, p 48) The units adopt roads for cleaning and other improvements, such as

tree planting. Collectors known as "street beautifiers" and who may be former waste pickers have been selected and trained to collect waste from households and either deliver them to municipal vehicles or deposit them to transfer points. They are payed by the households, through the street organisations. Households pay Rs. 15-20/-per month for this service. One street unit might collect Rs. 800/-each month; of this Rs 600/-will expense for wages; Rs. 100/- will be used to pay off bank loans. and the remainder will go into a sinking fund in case of defaults. The street units buy or rent bicycle carts for the collectors with small bank loans (Furedy, 1992, p.49). Street cleanups and regular street sweeping have also been organized in this way. There is discussion on expanding clean-ups and waste removal from slum and squatter areas, which would be financed by extra donations from well-to-do-neighbourhoods More than 60,000 people are receiving house to house waste collection services on some 500 roads in about 80 neighbourhoods organized by 150 Civic Exnora units. The goal of social advancement for waste pickers, although not an initial concern, is becoming important in some areas. Besides the regular work basic literacy classes are arranged by some of the chapters. Exnora has also begun to promote source separation in some project neighbourhoods. Experiments have begun in back yard composting.

According to Furedy (1992, p.49), the system can work effectively if most household keep up their payments. Where too many have defaulted the street unit has lapsed. In some cases, the breakdown has occurred due to Madras City Corporation's failure to pick up wastes from transfer points. As the Civic Exnora units have no means of transporting wastes to dumps, the transfer points rapidly become a nuisance without regular service from municipality.

3.9.3 Wastewise Project, Bangalore, India

In 1990, the Wastewise Project was launched by Auslem Rosario, through Mythri Trust with funding for one year from Terre Des Hommes of Switzerland, Karnataka State

Council for Science & Technology later took responsibility for finance and technical assistance. The project has some specific economic, social and environmental goals like:

1) Resource recovery by recycling of organic and dry recyclable waste and decentralization of handling waste with a view to employment generation;

2) Possibility of social mobility and articulation of poor section on SWM issues; and

3) Avoidance of illegal disposal of wastes and change the attitude and perception on waste, environmental sanitation, greening and promotion of sustainable environment for all.

According to Furedy (1992, p.44), Waste Wise initiated a project in an affluent to middle class residential area of Bangalore Jaynager Block 4. In the project area the households are given baskets to hold dry waste and told to segregate compostable materials and insanitary wastes. Former waste pickers are employed to pick the waste from the project households. They are equipped with handcarts and baskets and are trained by a supervisor paid by Waste Wise. The collectors visit each house daily, take the organic waste to compost site at a local park, donated by Bangalore City Corporation, sell the dry recyclable and dispose of residues in communal bins Households pay a small fee per month for this service (Rs. 5/-to 10/-). The collectors are paid Rs 300/- per month from the fees collected and also get payments for tea and food. The collectors also earn about Rs. 15/- per day through sale of recyclable materials.

Although the collection of wastes from door is appreciated by residents of the area, a few households refuse to pay for the convenience, since they consider their property rate should cover waste services. The Bangalore City Corporation has supported the project but the officials are taking "wait and see" attitude rather than active partnership (Furdey, 1992, p.46). Another problem which the organizers of Waste Wise faced was the orthodox Hindu families usually expect waste to be removed early in the day, which did not fit with the usual timing of the waste collectors The Wastewise has been seeking business corporations

support, liasing with other NGO's and reporting results through international network like the CITY NET group of ESCAP.

This conceptually innovative project combines a general understanding of local waste problems of Bangalore with a practical sense of what is feasible for community based waste management in better off neighbourhoods.

3.9.4 Ecovilles Project Bandung, Indonesia

A project named "ecovilles" has been undertaken by the Centre For Environmental Studies of Bandung Institute of Technology. The main concept was from Professor Hasan Poerbo and his plan was to establish co-operatives of former waste pickers and collectors in different residential neighbourhoods of a city. The primary collection of all wastes would be done by members of the ecovilles, operating through co-operatives. They would sort out recycables and compost the organic materials in their settlements, leaving only useless residues to be picked up by the municipal staff and transported to the dumps The project could not be implemented in Bandung since the municipality was not convinced of its practicality. This project was not possible in Bandung but in Surabaya it was possible with the help of funding by Ford Foundation.

3.9.5 Cash In Trash, Project, Sanjaun City, Philippines

A project of source separation of dry recyclable material in Sanjaun city was introduced by the Metro Manila Council of Women Balikatan Movement, Inc. (MMWBM), a regional women's organization. Some of the members of MMWBM were worried about increasing solid waste management problem of Manila, as city authorities could do no improvement. The "Cash in Trash" project was first proposed by Leonda Cornacho (now chairperson of MMWBM),as a pilot project in 1978. Registered "ecoaides" were equipped to buy

recyclable materials door-to-door (at set price) and to sell these to "eco-centres". The project was carried by a government centre but it was not successful.

In 1983, Leonardo Comacho initiated the Sanjaun "Linis-Gouda" (clean-beautiful) project. At first they were unsuccessful to persuade the city authority but later on after having co-operation from the households, they were successful and avoided the failures occurred previously. One most important part of this project was to execute the collection and trading through the existing waste dealers, not setting up new redemption centre. As an incentive to co-operation from the dealers and to reassure them that this project unlike the "Cash in Trash" one works through the dealers, rather than trying to by-pass them, the project organizers researched the markets for new kinds of wastes coming from households and put the dealers in touch with prospective buyers. Thus the dealers were able to expand their scope of business. About 60 percent of the 18,000 household of San Juan participated in this project and about 50 tons of recycleables were collected per month without any harassment (Furdey, 1992, p.48).

3.9.6 Payatas Environmental Development Programme: Micro-Enterprise Promotion And Involvement In Solid Waste Management, Payatas, Quezon City, The Phillippines

Barangay Payatas is a predominantly urban poor populated barangay in the Northeastern district of Quezon City. It has been the site of the City's solid waste disposal for over two decades and, currently, the main dumping ground for the city's garbage (now reaching 810 tons per day). Payatas Environmental Development Program (PEDP) which advocates an alternative waste management system to open dumping. It involves the settling up of a community based Materials Recovery Centre (MRC), harnessing the waste-picking and recycling skills of scavengers and micro-entrepreneurs and further supplementing the skills with environment-friendly technology for solid waste processing and composting. The MRC Plan is recognized as a possible alternative system to the Payatas dumpsite and the

city's garbage problem. The Plan has been approved in principle by the Department of the Environment and Natural Resources (DENR) and other government agencies and the Payatas Scavenger's Association.

The Payatas Environmental Development Program is not an isolated program but is part and parcel of an integral community development program for the Payatas slum community. Participatory baseline surveys, cross sectional study and wealth ranking were earlier conducted to define the target population of the poorest 20 percent in the community. This portion of the community are the scavenger families, particularly low income women and working children at risk, people with disabilities, elderly, PTB patients, malnourished children and infants. The Scavenger's Development Program and Micro-enterprise Promotion Program are thus complemented with the ongoing community-based rehabilitation, health care and nutrition and other support services delivery programs for these sectors in view of helping the community attain self-reliance and adequate social security. The MRC program highly respects and supports the self-acquired skills and ongoing micro-enterprise initiatives in the community, recognizing that the community is thoroughly familiar with the essential elements of the trade, from the collection, segregation and characterization to the processing and disposal of residual waste.

Looking through the eyes of the scavengers, the Payatas Environmental Development Program considers solid waste not as a problem but as a resource to be recovered and whose value lies in the work of those behind the scavenging trade. These scavengers are actually serving at least three important but underestimated functions in society. Through their self-employment initiatives, they absorb part of the otherwise state-covered social costs of "modernization' such as unemployment and underemployment Secondly, they shoulder part of the ecological costs of development by processing waste which the state would otherwise have to spend for in terms of solid waste transport and disposal. Lastly, they contribute to the efficiency of the formal sector by providing raw materials from recovered waste at comparatively low prices.

The Payatas scavengers have proven their own hard-earned capacity and potentials for further development on solid waste management. Plans are set to carry out study tours, development of, and training on, appropriate technologies for recycling and composing, and product enhancement to increase the value of their goods. The Payatas Environmental Development Program is not a blueprint solution to the garbage crisis of Quezon city. Rather, it constantly evolves in the process of gradual implementation and testing. Being a community-based program gives it an edge in terms of immediate integration and adjustment based on new learning. The official recognition of the Payatas Scavengers' Federation as the legal organization for policy dialogues and consultations concerning the Payatas dumpsite is also a significant gain in the organizing efforts. This is especially true for micro-enterprises involved in solid waste management which is not simply a business issue but a pressing community concern as well.

3.10 SUMMARY AND CONCLUSION

From the experiments of different developing countries, it is clear that both community based organizations (CBOs) and municipal authorities need to co-operate with each other in order to improve solid waste management for a better and sustainable environment. We can also observe that the organizers of CBOs faced difficulty in getting co-operation from municipal authorities. They were also handicapped by the problems like lack of access to resources and political commitment. For example, the Civic Exonora units faced problems as the municipal authorities failed to transport waste from collection points. Similarly, in Ecoville project, the organizers faced difficulty in convincing the Municipality about the projects practicality in Bandung.

CHAPTER 4

THE PROFILE OF THE STUDY AREAS

4.1 GENERAL DESCRIPTION OF THE STUDY AREAS

4.1.1. Kalabagan Residential Area

The study area Kalabagan is located at the Southern Perimeter in SPZ:2 (Central Business District North) of Dhaka city adjacent to Dhanmondi area (Fig 4.2). The total area is about 2924 acres and a population of 382,000. The density of this zone is 134 per acre. The zone comprises the following general land uses·

Table 4.1: Type of land uses in the study area

Land use classes	Area in acres	Percentage of total area
Residential	1169.6	40%
Institutional	584.8	20%
Industrial	584.8	20%
Others	584.8	20%
TOTAL	**2924**	**100%**

Source: Dhaka Metropolitan Development Plan, UNDP, Vol 2, 1995-2015, p 46.

Kalabagan Triangle (Sukrabad, Indira Road, Kathalbagan, Central Road, Bhutergoli, Kalabagan), lack adequate utility services and there are water logging problems in some areas of Kalabagan Triangle and also have poor access and internal circulation facilities. Especially Kalabagan is an unplanned area with narrow lanes and bylanes. Access of DCC Conservancy truck is difficult due to the very narrow widths of lanes and bylanes.

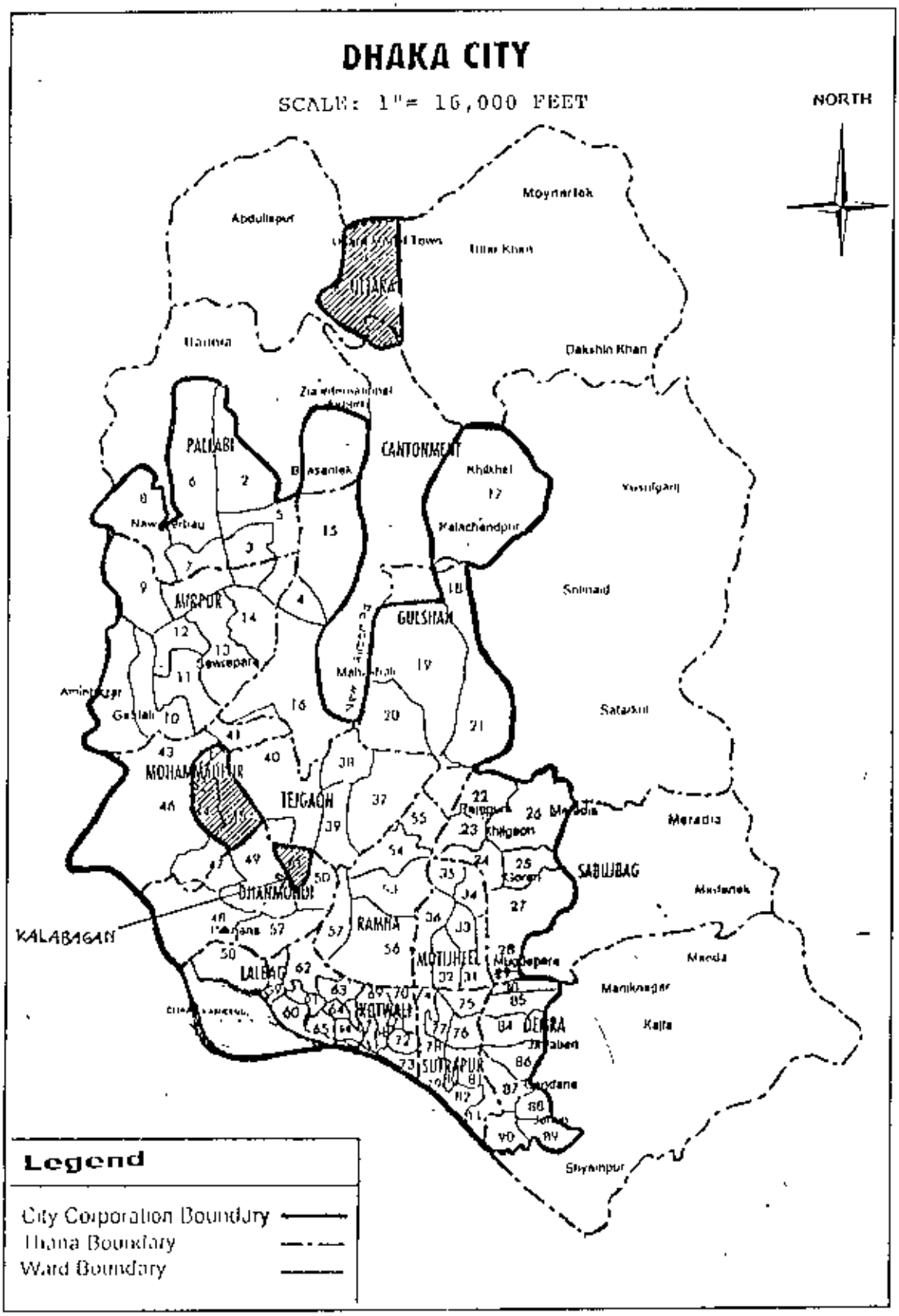

Fig 4.1 : Location of the Study Areas

Source : RAJUK

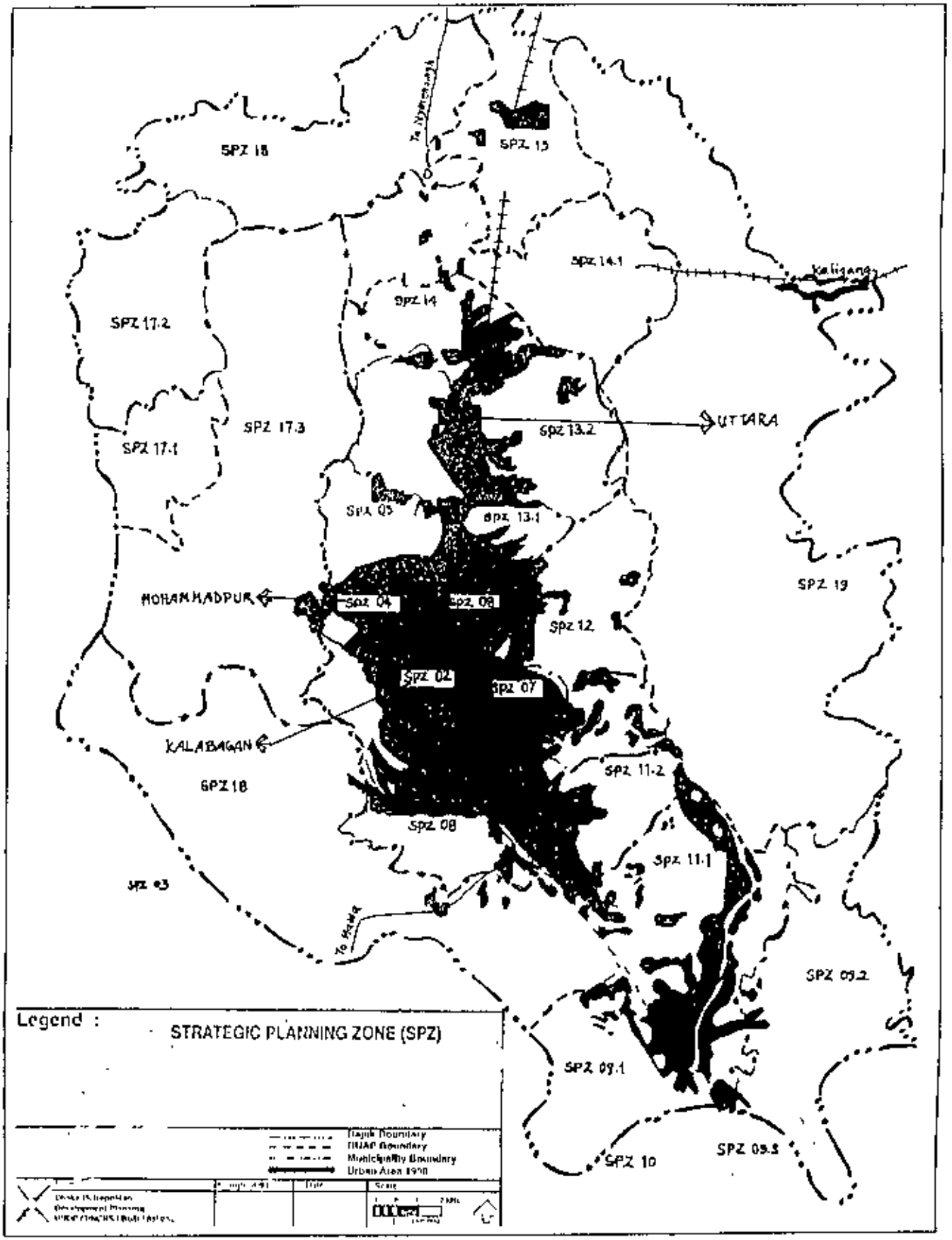

Fig 4.2 : Map showing the location of study areas (Kalabagan area at SPZ:02, Mohammadpur at SPZ: 04 and Uttara Model Town at SPZ:13.2) Within Metropolitan Area

Source : RAJUK

4.1.2. Mohammadpur Area

Mohammadpur study area is located in SPZ:4 (Fig 4.2). This zone is referred to as the Western Suburbs of urban Dhaka and is divided into several sub-zones North-east (Lalmatia and Mohammadpur) part of the zone may be considered as planned residential. The total area of western suburbs is 5270 acres and total population is 899,000 (Dhaka Metropolitan Development Plan, UNDP, Vol.2, p.50).

Mohammadpur and Kalabagan study area can be classified as "Upper middle income" area. Mohammadpur suffer from serious water logging in the rainy season. The Geneva Camps, where stranded Pakistanis live in this area, are locations of poor urban environment within planned areas. The streets of this area are wide and planned than Kalabagan area. Access of DCC conservancy trucks in this area is easy. Mohammadpur is comparatively deusely populated area (population density 251 per acre, according to 1991 census). Lalmatia, Mohammadpur areas of new development have potential for densification.

4.1.3. Uttara Model Town:

YEAR	POPULATION	DENSITY (ppa)	URBAN AREAS (acres)
1991	133,000	100	3631
2006	425,000	116	-

Source: Dhaka Metropolitan Development Plan, UNDP, Vol.2, 1995-2015, p.70

Uttara Model Town is located at the northern perimeter in SPZ:13 of Dhaka city(Fig 4.2). This is the zone which includes the planned areas of Uttara at the centre, spontaneous developing areas of Uttar Khan and Dakshin Khan in the east, low lying undeveloped areas in the west and which borders the Zia International Airport. Uttara contains a fair number of undeveloped plots and what has been developed is about half apartment, half single family units. Though rate of high income development in Uttara is slow indicating a saturation of this market, the unplanned areas for middle and low income groups are developing fairly

fast indicating that this market still has room for expansion. The low lying undevelopment areas of the west will be available for development when FAP-8B project make the area flood free, but given the distance to the city centre and labour opportunities it is expected that development will remain slow during the UAP planning period.

The planned area of Uttara is capable of densification even after undeveloped plots have been fully developed. The proposed extension of Begum Rokeya Sarani upto proposed eastern bypass through Uttara will provide the area with additional access facility. The Savar (EPZ)-Ashulia- Uttara- Eastern Bypass on Balu Embankment presently under construction will connect the area with Savar and eastern fringe. There are current projects of gas, water, electricity and sewerage development in the area.The density of Uttara area is less compared to Kalabagan and Mohammadpur area and thus area can be classified as predominantly "high income" area.

4.2 SOCIOECONOMIC CONDITION

Information on the socioeconomic characteristics of the population is important, since population of different socioeconomic background tend to have different patterns of life. Relevant and useful items of the community are presented in sub-sections

4.2.1 Demographic Characteristics

Based on Bangladesh census 1991, a six member family may generally be considered as medium sized in the context of Bangladesh. With regard to the family member of which the respondents comprised, majority family size is of 4-6 members while the second largest group consisted of 7-10 members (Table 4.2). The mean family size of Kalabagan and Mohammadpur areas, as found from the survey, stands at 5.05 and in Uttara area at 5,58. The households are usually composed of the couple (parents), their children, relatives and servants.

In the study areas, sex ratio (Male/Female) is 55.8:44:2. The population pyramid reveals that while around 21.4 percent of both male and female population are 10 years or below age, more than 68.2 percent of the population are less than 30 years of age (Fig 4.3).

Table 4.2: Distribution Of Household Size

Name of the area	Mohammadpur		Kalabagan		Uttara	
Total Household	80		80		70	
Household Size	**No.**	**%**	**No.**	**%**	**No.**	**%**
1-3 embers	5	6.25	6	7.5	3	4.28
4-6 Members	73	91.25	71	88.75	58	82.85
7-10 Members	2	2.50	1	1.25	6	8 57
More than 10 Members	Nil	Nil	2	2.5	3	4 23
Average H.H. size	5.05		5.05		5.58	

Source: Field Survey, 1999

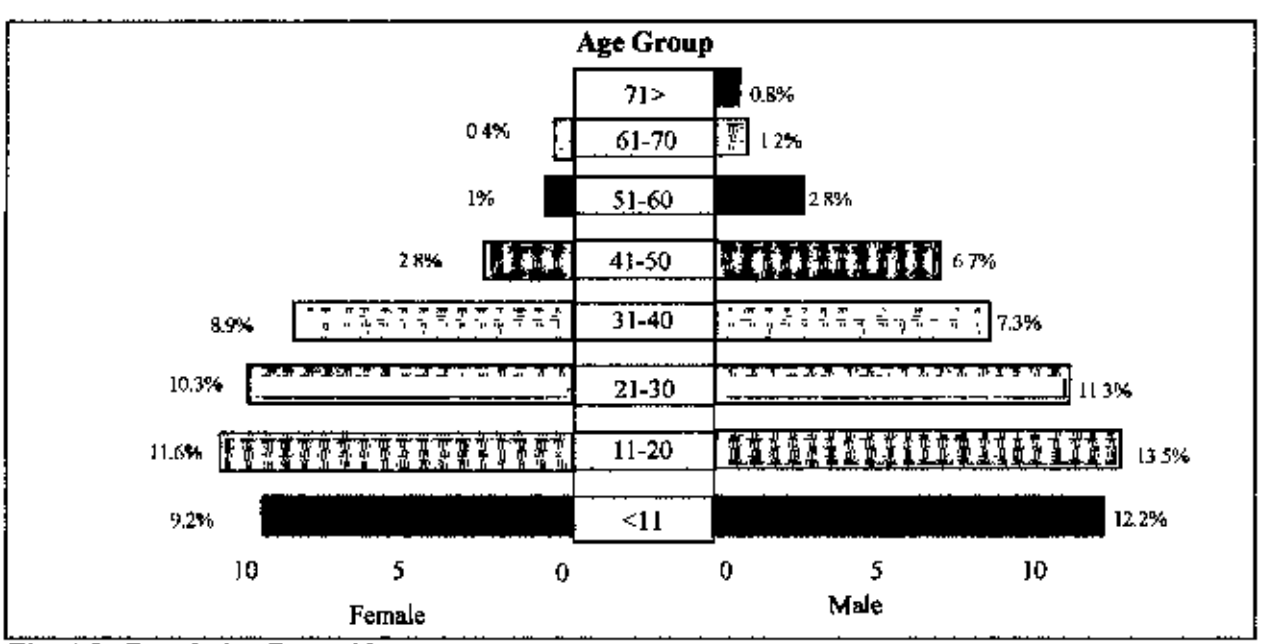

Fig. 4.3 Population Pyramid

Source: Field Survey, 1999

4.2.2 Education

The household survey has revealed (Fig 4.4) that educational attainment is quite good in Mohammadpur, Kalabagan and Uttara areas.

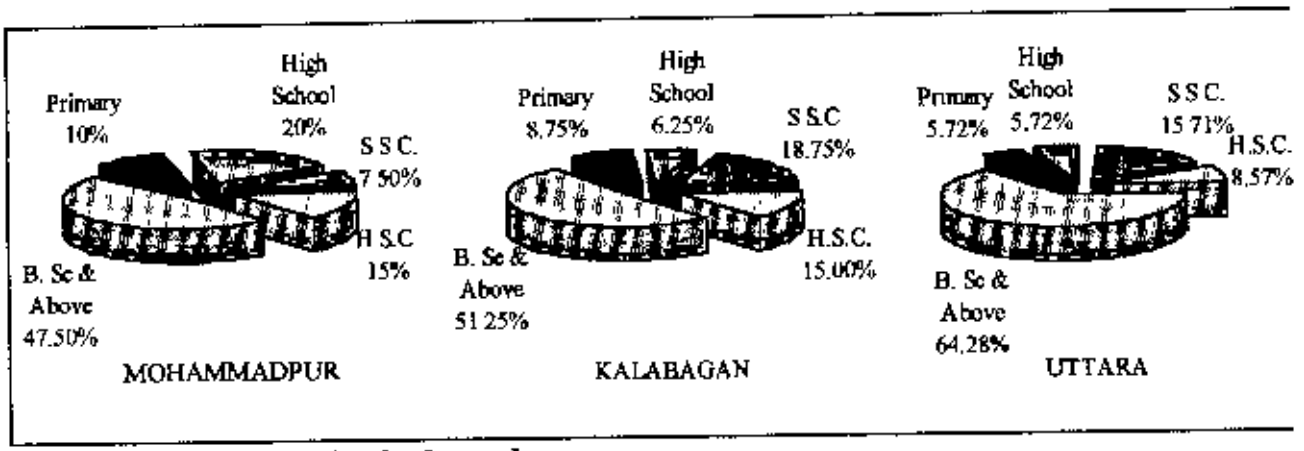

Fig 4.4: Level of education in the study areas

Source: Field Survey, 1999

From the above diagram it is revealed that in Mohammadpur area 47.50% has education upto B.Sc and above, 20% have completed education up to high school. Also in Kalabagan and Uttara areas majority of the respondents have Bachelors degree and above were followed by people with S.S.C level (Kalabagan: 18.75%; Uttara: 15.71%). At Uttara highest degree is greater than Kalabagan and Mohammadpur areas. It can be concluded that with the higher literacy level of the population of the study areas it would be easy to motivate them in developing solid waste management programme.

4.2.3 Occupation

Occupational involvement of the population gives a picture of the nature, type and distribution of the economical activities carried out in the area. Information on occupational

pattern helps in determining the current trend of the economy and the prospective economic activity that may become dominant for the future development of the area.

Respondents occupations varied as shown in Table 4.3. Majority of respondents are engaged in Business (Mohammadpur: 50%; Kalabagan: 37.50%; Uttara: 47.14%) followed by Govt. Service (20%) at Mohammadpur, private service (Kalabagan: 17.50%; Uttara: 25.71%) at Kalabagan and Uttara areas. From Table 4.3 it is also found that the earning rate at Uttara (84.28%) is higher than Mohammadpur (75%) and Kalabagan (66.25%) areas.

Table 4.3: Occupaton Of The Respondents

Name of the area	**Mohammadpur**		**Kalabagan**		**Uttara**	
Total Households	80		80		70	
Occupation	**NO.**	**%**	**No.**	**%**	**No.**	**%**
Govt. Service	16	20.00	14	17.50	4	11.43
Private Service	4	5.00	9	11.25	18	25.71
Business	40	50.00	30	37.50	33	47.14
Student	5	6.25	2	2.50	4	5.71
Housewife	11	13.75	14	17.50	2	2.86
Retired	4	5.00	11	13.75	5	7.14

Source: Field Survey, 1999

Fig 4.5 reveals that while 74.78 percent of the entire population has access to earning, 14.78 percent Govt. service. While 44.78 percent depend on business and individual occupation. On the other hand 25.22 percent are non-earning population where 4.78 percent are student, 11.74 percent are housewife and 8.70 percent are retired person

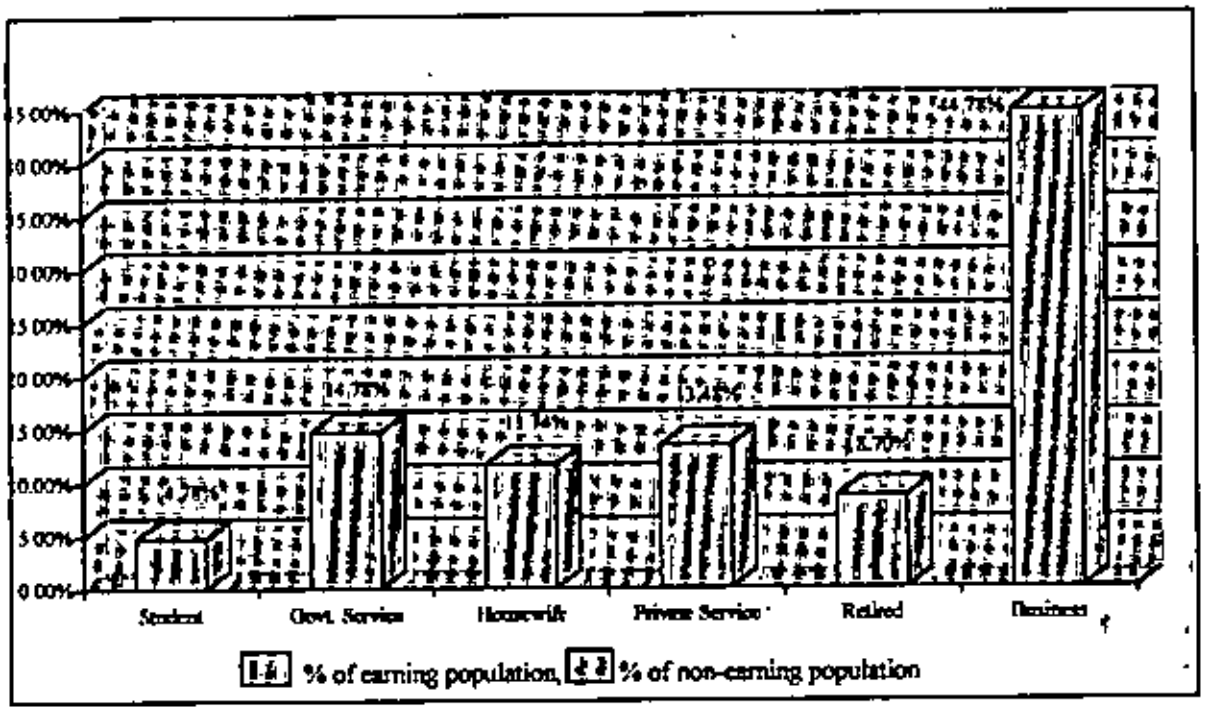

Fig. 4.5 Average occupational distribution of the head of households

Source: Field Survey, 1999

4.2.4 Income

The level of income is the primary and one of the most important indicators of the true economic condition of any population. Information regarding the income of the people helps in determining their demand and affordability for receiving the services and facilities to be provided in the area and also to assess the expected financial return from the people for the facilities.

For the determination of the general income status of the respondents five categories according to their monthly income have been used and represented in the Table 4.4. From the field survey, it is found that in the study areas people of mixed income reside, but in both the Mohammadpur and Kalabagan the majority is of upper middle income (35% and 40%)

group followed by high income (31.25 and 36.25%) respectively. In Uttara majority belongs to high income group (52.86%) followed by upper middle income (35.71%) group.

Table: 4.4: Income Level Of The Head Of Households

Name of the Area	Mohammadpur		Kalabagan		Uttara	
Total Households	80		80		70	
Income Level (Monthly)	**No.**	**%**	**No.**	**%**	**No.**	**%**
Low Income (Upto 5,000)	Nil	Nil	Nil	Nil	Nil	Nil
Lower Middle (5,000-10,000)	10	12.5	7	8.75	Nil	Nil
Middle Income (10,000-20,000)	17	21.25	12	26	8	11 43
Upper Middle (20,000- 30,000)	28	35	32	40	25	35.71
High Income (30,000 & Above)	25	31.25	29	36 25	37	52.86

Source. Field Survey, 1999

4.3 SUMMARY

Kalabagan, Mohammadpur and Uttara areas are respectively located at Southern, Western and Northern part of Dhaka city (Fig 4.1). Whereas Kalabagan is an unplanned area with narrow lanes and bylanes, Mohammadpur and Uttara areas have wide streets and planned areas. Access of conservancy trucks is difficult in Kalabagan area but easy in Mohammadpur and Uttara areas.

The density of population in Mohammadpur area is higher than Kalabagan and Uttara. In the study areas average household size is 6 persons. Educational attainment is quite good in these areas. Majority of respondents are engaged in Business followed by Govt. service. In the study areas people of different income level reside, but in both the Mohammadpur and Kalabagan, the majority of families belong to upper middle income group (Tk.20,000-30.000). In Uttara majority belongs to high income group (Tk.30,000 and above).

CHAPTER 5

COMMUNITY PARTICIPATION IN SOLID WASTE COLLECTION OF KALABAGAN, MOHAMMADPUR AND UTTARA AREA

5.1 NEIGHBOURHOOD INVOLVEMENT IN COLLECTION OF SOLID WASTE IN KALABAGAN, MOHAMMADPUR AND UTTARA AREA

At present 13 CBOs are working in Kalabagan, Mohammadpur and Uttara areas. Out of these 13 CBOs three CBOs have been chosen for study purpose considering the greater household numbers. These are the following CBOs.

- North and South of Kalabagan Samaj Kallyan Parisads
- Environment Cleaning Project of Mohammadpur Area
- Uttara Kallyan Samities

5.1.1 Kalabagan Samaj Kallyan Parisads

Kalabagan , a densely populated area with narrow roads and lanes, is located in the central part of Dhaka city Typical of many inner city areas, narrow streets, lanes and by-lanes of Kalabagan hampered the DCC's day to day garbage collection Thus, the residents remained hostage to the refuse that they themselves produced regularly. Indiscriminate littering on roads, lanes, by-lanes led to emissions of bad smells from decomposed wastes and also from drains clogged with wastes As a result, the living environment of the area deteriorated. This environmental degradation attracted the attention of one resident of the area Mr Khurram who with his friend Dulal devised a mechanism to tackle the situation.

In order to tackle the waste disposal problem, a house to house collection of domestic waste was started in 1987 and for this purpose they purchased two rickshaws and modified them into vans. With the help of local people and community participation these vans started collecting wastes from houses and disposing them at community bins (CBs) located at a far distance on the Mirpur road for collection by DCC. Each rickshaw van has been manned with three persons. Initially this operation was limited to Bashiruddin Road and North Dhanmondi Road. The success of the operation has led to the formation another CBO at south Kalabagan with 1st and 2nd lanes in1990 under the initiative of Engineer Motiur Rahman and the local residents. At present there are four community based and participated waste collection organizations working in the area (Fig-5.1). They collect the wastes between 12 noon to 5 p.m. each day by making at least three trips.

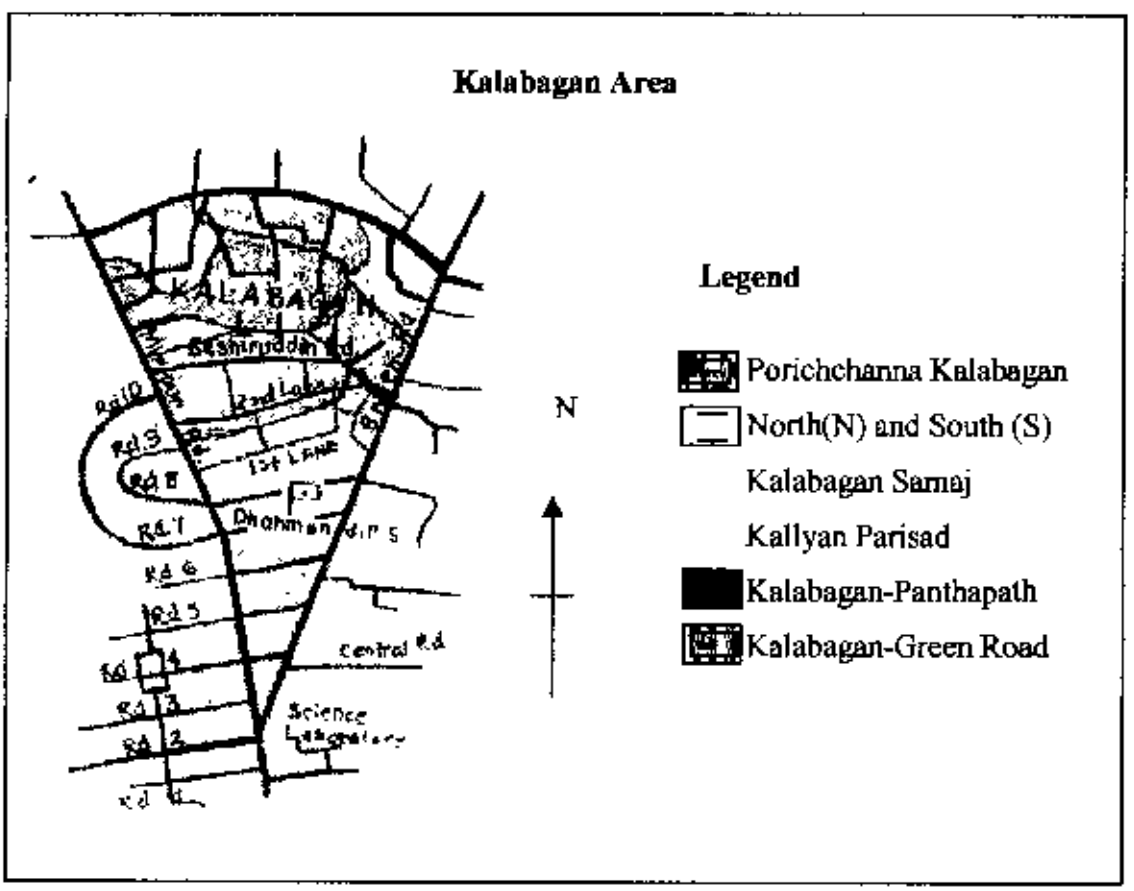

Fig 5.1 : Map showing the operation area of CBOs in Kalabagan area

Source . Field Survey, 1999

Kalabagan area

Plate 5.1 : Cleaners collect waste from door to door

Plate 5.2 : Small plastic bucket used to collect waste

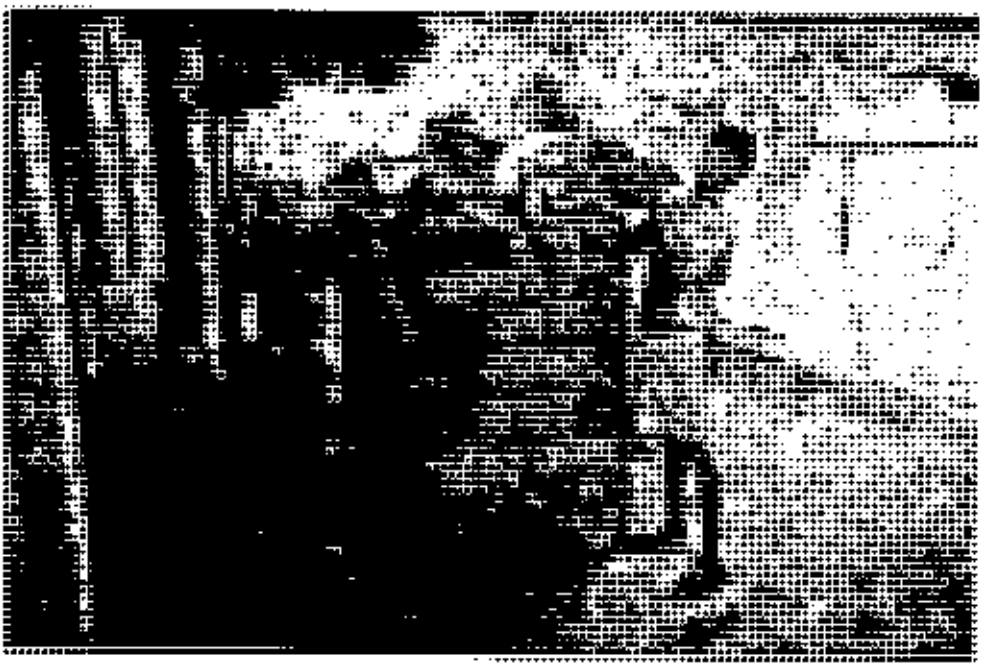

Plate 5.3 : Rickshaw van used for domestic solid waste collection

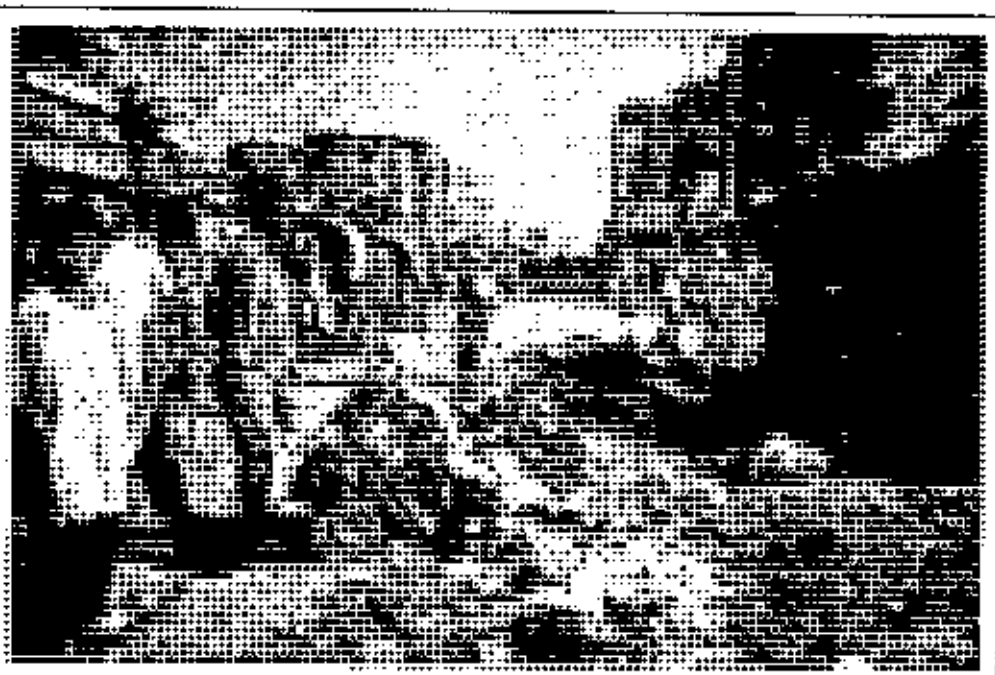

Plate 5.4 : Collected domestic waste from household at Kalabagan disposed at community bin at Mirpur Road for removal by DCC

Table 5.1 CBOs Working In The Kalabagan Area Of Dhaka City

Name of CBO	Household	Monthly Charge	Revenue	Staff Salary	Rickshaw Vans/Wheel Barrows	Staff
Porichchanna Kalabagan	800	Tk 15	Tk.9000	Tk.8,200	2	7
North (N) and South (S) Kalabagan Samaj Kallyan Parisad	700 (N) 500 (S)	Tk.15	Tk.17.500	Tk.15,000	2(N) 2(S)	12
Kalabagan Panthapath	300	Tk.20	Tk.5,500	NAV	1	3
Kalabagan-Green Road	250	Tk.20	Tk.4,500	NAV	2	3

Source: Field Survey, 1999

The experience of the Kalabagan CBO approach reveals that a house to house collection of domestic waste is very effective from the view points of cost and environmental improvement. It has been reported that the area now stands as one of the cleanest city. Garbage cannot be seen on the streets. The drains are clear and therefore the problem of water logging, once regular in the area, is now a matter of the past.

5.1.2 Environment Cleaning Project of Mohammadpur Area

In order to tackle the waste disposal problem, a house to house collection of domestic waste was started in 1996. This operation covers Sultana Razia Road, Jakir Hossain Road, Shershah Road and Tajmohal Road of Mohammadpur area. The name of this project is **Environment Cleaning Project** and one resident of the area Mr. Bikrum who with his

other five friends established this project. For this purpose they purchased two wheel barrows and one Rickshaw van with the help of local people and they engaged three cleaners to collect waste and dispose them at CBs located at a far distance for collection by DCC. The cleaners collect the wastes between 12 noon to 7 p.m. each day by making at least three trips. A total of 12 persons are employed in this operation (Fig-5.2).

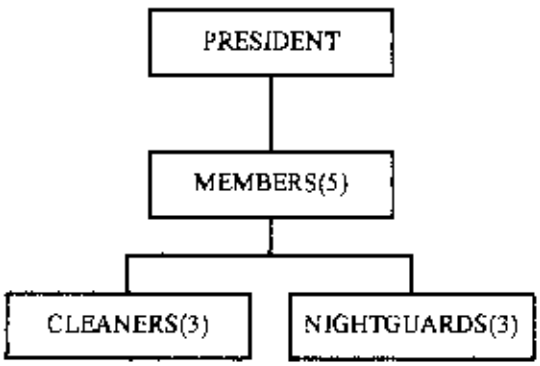

Fig- 5.2 : Staff of Environment Cleaning Project

The success of the operation had led to the formation another CBO at Sultana Razia Road , Jakir Hossain Road and Sher Shah Road At present there are three community based organizations working in the area (Fig-5.3)

Table 5.2 CBOs Working In The Mohammadpur Area Of Dhaka City

Name of CBO	Household	Monthly Charge	Revenue	Staff Salary	Rickshaw Vans/Wheel Barrows	Staf
Environment Cleaning Project	900	Tk.15	Tk.13,500	Tk.13,000	3	12
Akanto Apan	500	Tk.20	Tk.9,000	Tk.7,500	2	5
Parishkar Parichchanna	300	Tk.20	Tk.5,500	Tk.4,500	1	3

Source: Field Survey, 1999

The success of CBO approaches in the collection of waste in Mohammadpor area has been reported that the area now stands as one of the cleanest of the city.

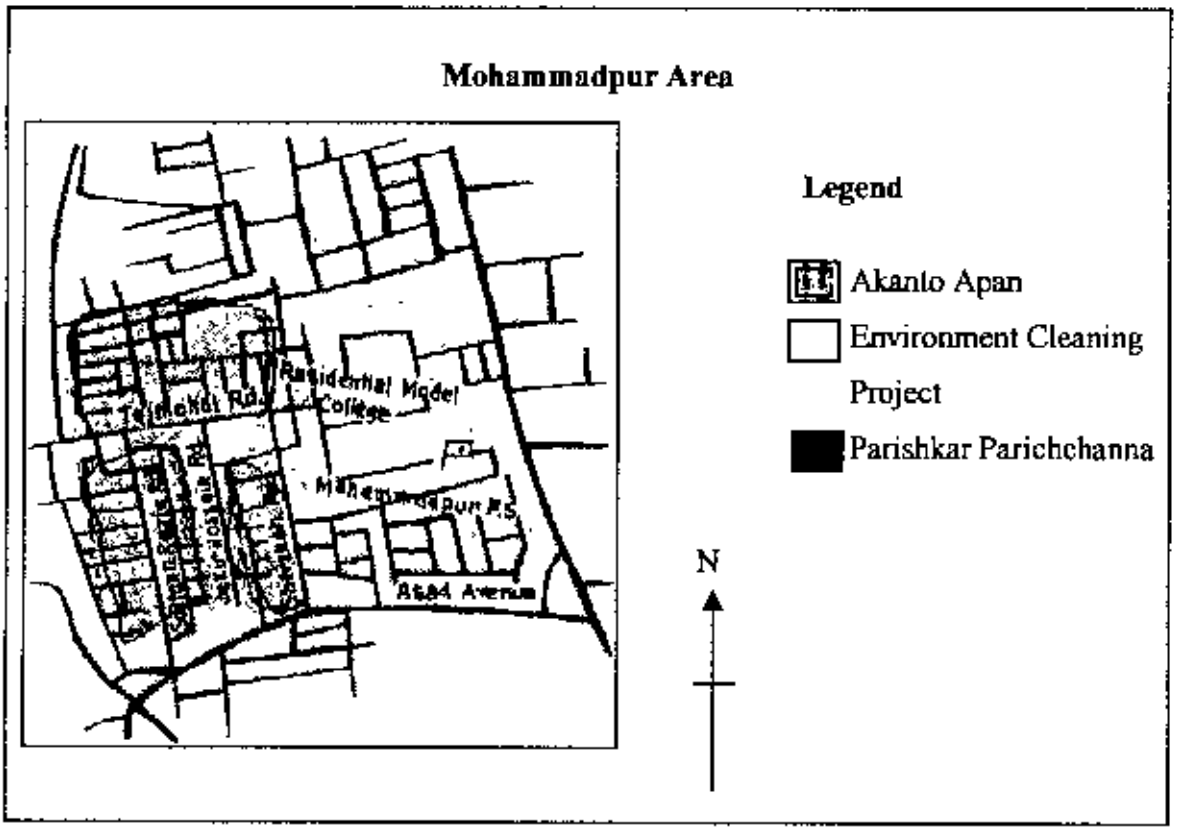

Fig 5.3 : Map showing the operation area of CBOs in Mohammadpur area

Source : Field Survey, 1999

5.1.3 Uttara Kallyan Samities

A house to house collection of domestic solid waste was started in the sector-1, 3, 4, 5, 6 and 7 of Uttara area from 3 months to one year (Fig-5.4). In each sector they purchased two wheel barrows and two rickshaws with the help of local people. For this purpose they engaged two cleaners and one cleaner supervisor and they have paid Tk.2000/per cleaner/per month. Sector Kallyan Samities of sector 3, 4 and 5 (study areas) cover 380, 450 and 420 households, respectively. Each household has to pay Tk.15/per month for waste collection and Tk.5o/ per month for night guard. They collect waste between 12 noon to 3 p.m. each day by making at least 4 trips.

Mohammadpur area

Plate 5.6 : Cleaners use whistle to collect waste

Plate 5.7 : Wheel Barrow used for domestic solid waste collection

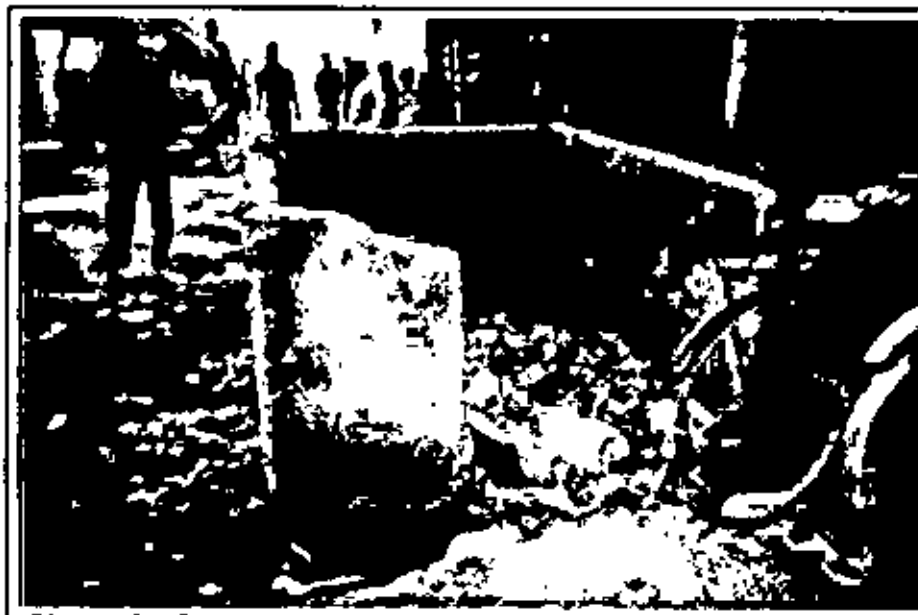

Plate 5.8 : Collected waste disposed at brick masonry garbage container (open to air) at roadside

Table 5.3 CBOs Working In The Uttara Area Of Dhaka City

Name of CBO	Household	Monthly Charge	Revenue	Staff Salary	Rickshaw Vans/Wheel Barrows	Staff
Sector- 1 Kallyan Samity	400	Tk.65	Tk.26,000	Tk.20,000	4	7
Sector- 3 Kallyan Samity	380	Tk 65	Tk.24,000	Tk.20,000	4	7
Sector- 4 Kallyan Samity	450	Tk.65	Tk.29,000	Tk.20,000	4	7
Sector- 5 Kallyan Samity	420	Tk.65	Tk.27,000	Tk.20,000	4	7
Sector- 6 Kallyan Samity	438	Tk.65	Tk.28,000	Tk.20,000	4	7
Sector- 7 Kallyan Samity	405	Tk.65	Tk.26,000	Tk.20,000	4	7

Source: Field Survey, 1999

Introduction of Uttara Association: Uttara Association established in 1983 with a chequered history initially, the Association is assuming its earnest and effective role gradually. Mr. Nizamul Haque was the founder of this association. The central body representing Six Sector Kallyan Samities in Uttara Model Town. The Sector Samities look after their intra-sectoral matters, i.e civic, social, security, etc; and some of their welfare activities.

Objectives of the Samities:

1) To promote peace and harmony among the residents of Uttara Model Town.

2) To maintain liaison with the concerned authorities for the development of water, electricity and gas supply, sewerage, road construction and repair, street lights, security etc.

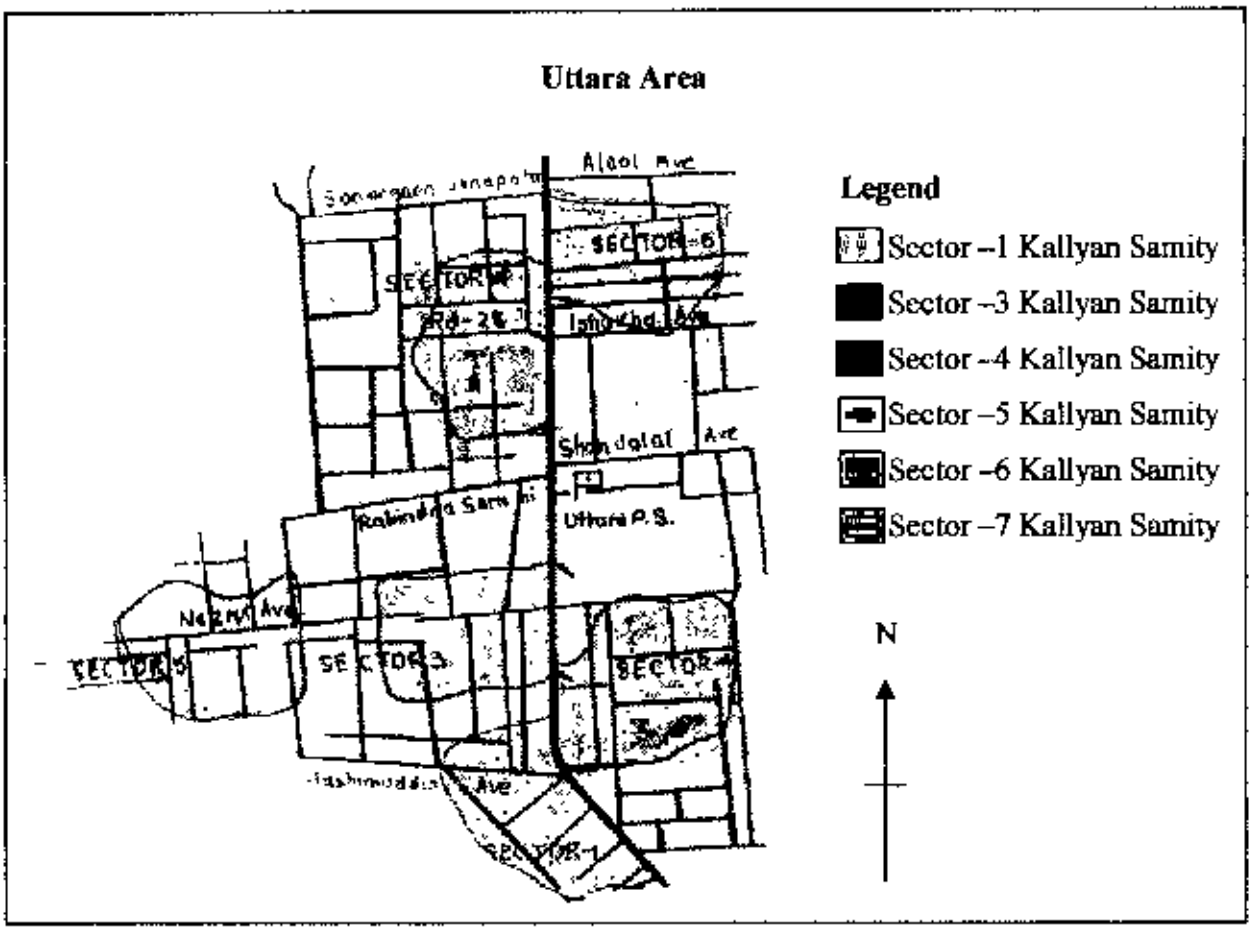

Fig 5.4 : Map showing the operation area of CBOs in Uttara Model Town

Source : Field Survey, 1999

3) To move concerned authorities to build up and maintain schools, colleges, mosques, graveyards, libraries, community centres, hospitals, bazaars, markets, playground, parks and open spaces and etc.

4) To organise socio-cultural programmes like picnic, family gatherings, sports, cultural activities etc.

5) To assist the law-enforcing agencies in preventing dacoity, extortion, etc.

6) To extend social and voluntary services in national interest.

7) To prevent growth of unauthorized shops, factories, and commercial establishment as well as slums in vacant plots.

8) To uphold the constitution, co-ordinate the inter-sectoral activities, take up necessary measures as recommended by the Sectors and to represent Uttara on behalf of all the Sectors centrally.

Structure of Central Body: The Central body of Uttara Association has formed with Seven members and Six Sector Kallyan Samities are guided by this central body (Fig-5 5)

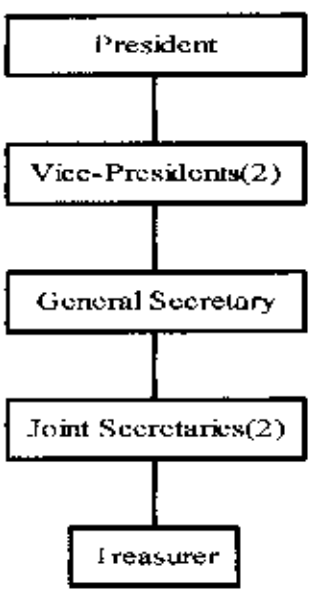

Fig- 5.5 Central Body of Uttara Associations

There are 21 members in Executive Committee of Uttara Kallyan Samities (Fig 5.6)

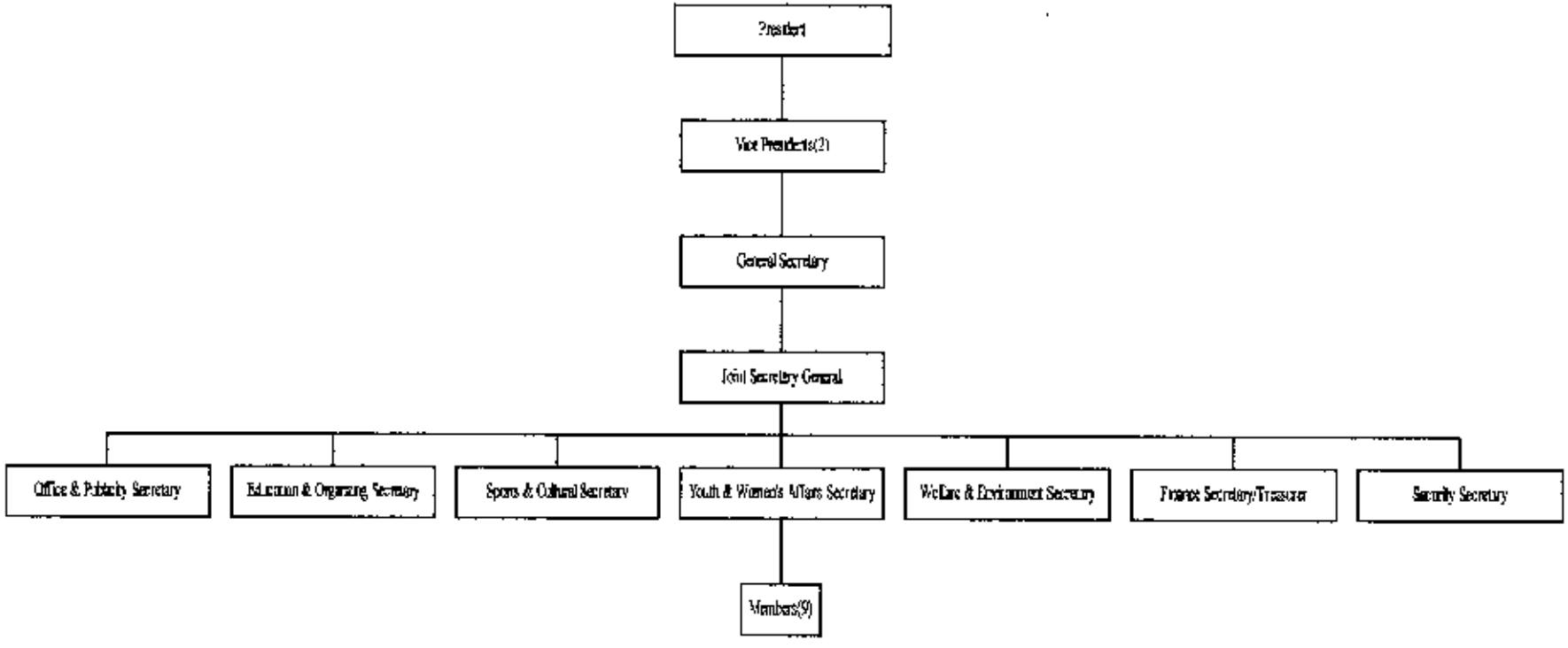

Fig- 5.6 : Structure of Executive Committee of Uttara Kallyan Samities

Plate 5.9 : Respondents store their waste at the inside corner of the building

Plate 5.11 : Wheel Barrow used for domestic solid waste collection

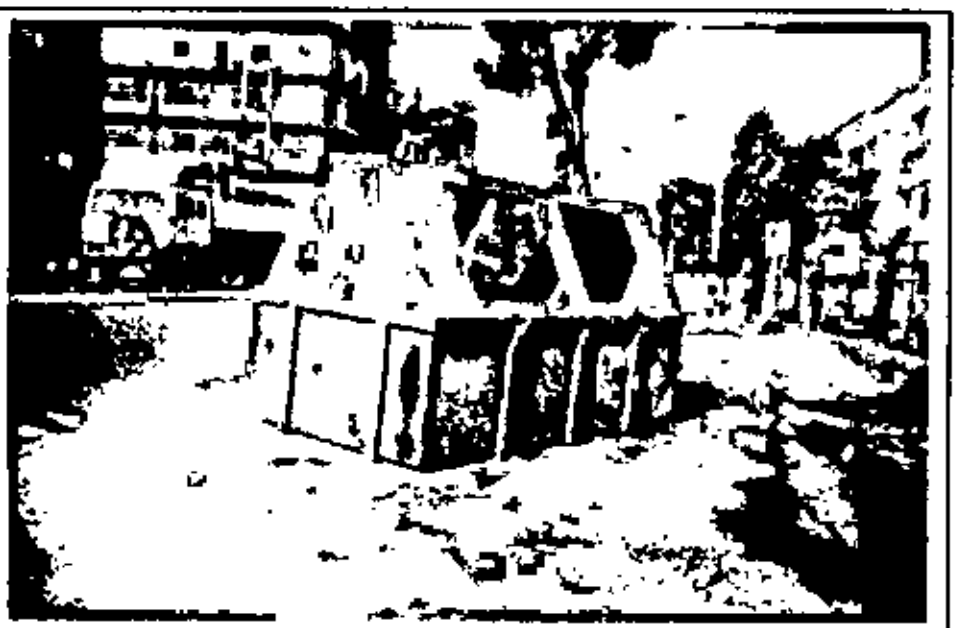

Plate 5.12 : Cleaners dispose domestic waste properly into demountable container at road side

Uttara features a wide range of distinctively homely habitational environmem. The landscape is marked by a quiet, serene, clean, and almost congestion-free and pollution-free milieu. Only wider, concerted and resolute participation of the allottees, house owners and residents alike in the activities of the Kallyan Samities and in those of the Uttara Association would make Uttara an ideal place. And, fact remains, Uttara has been comparatively a neat, clean neighbourhood so far.

5.2 SOLID WASTE COLLECTION PROCESS IN THE STUDY AREAS

CBO cleaners of Kalabagan, Mohammadpur and Uttara area use door to door collection system to collect solid waste and then dispose them in to community bins at roadside for removal by DCC.

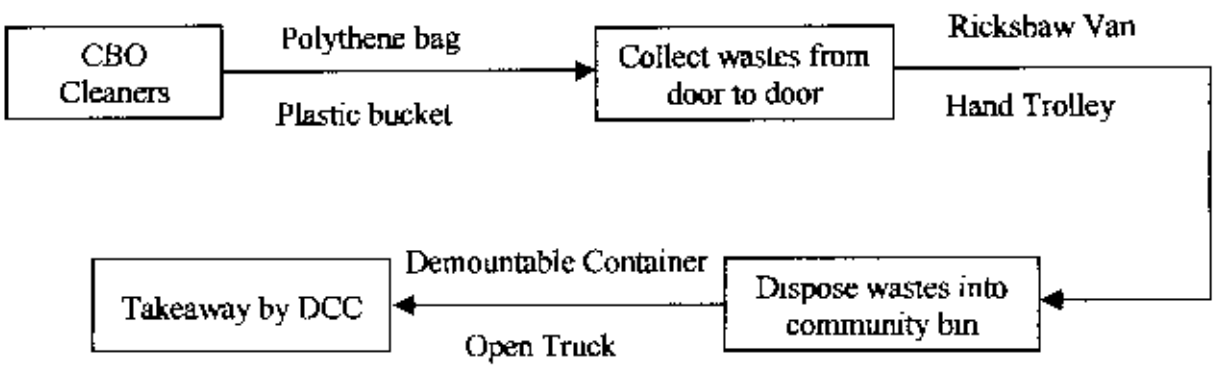

Fig- 5.7 : Solid waste collection and disposing process of CBOs

5.3 SUMMARY AND CONCLUSION

A house to house collection of domestic waste was first started at Dhaka in Kalabagan area in 1987 by Mr. Khuram. In Mohammadpur area domestic waste collection was started in

1996 and in Uttara area it was started in 1998 At present 13 CBOs are working in Kalabagan, Mohammadpur and Uttara areas. Cleaners collect the wastes between 12 noon to 7 p.m. each day by making at least three or four trips. In Kalabagan area cleaners collect waste from door to door, in Mohammadpur area they collect waste from the roadside of the house and in Uttara area cleaners collect waste from the main gate of the buildings. To collect waste they use polythene bags or small buckets. Cleaners use wheel barrows and rickshaw vans for waste collection and dispose the wastes at community bins at roadside for collection by DCC. The experience of Kalabagan, Mohammadpur and Uttara CBOs approach reveals that from the view point of cost and environmental improvement a house to house collection of domestic waste is very effective.

CHAPTER 6

SOLID WASTE DISPOSAL AND PROBLEMS FACED BY HOUSEHOLDS AND CBOs

6.1 CURRENT WASTE DISPOSAL PRACTICES AND PLACES

In this chapter the information collected through a questionnaire survey about the current waste disposal practices and problems faced by households and CBOs during waste collection and disposal. The objectives of the survey were identified basic problems associated with solid waste management, the role of public authority and CBOs in developing the solid waste management system.

6.1.1 General Characteristics Of Waste Disposed

Figure 6.1 represents the characteristics of wastes being disposed by households. The figure indicates that kitchen and vegetable wastes constitute the major portion of waste being disposed by households. In Mohammadpur and Kalabagan waste also contain paper, plastics and broken glass, while the wastes in Uttara contain paper, plastics, glass and tin items.

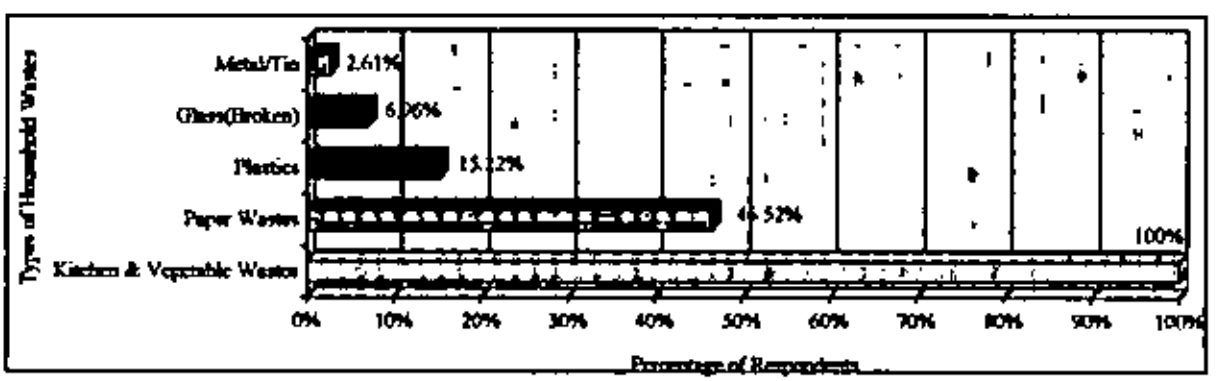

Fig 6.1: Types Of Waste Disposed By Households

Source: Field Survey, 1999.

Table 6.1 : Types Of Household Wastes

Name of the Area	Mohammadpur		Kalabagan		Uttara[1]		Total	
Total Household	80[2]		80		70		230	
Type of Items	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Kitchen & Vegetable Wastes	80	100	80	100	70	100	230	100
Paper Wastes	30	37.5	33	41.25	44	62.86	107	46.52
Plastics	7	8.75	11	13.75	17	24.29	35	15.22
Glass(Broken)	5	6.25	3	3.75	8	11.43	16	6.96
Metal/Tin	Nil	Nil	Nil	Nil	6	8.57	6	2.61

Source : Field Survey, 1999

6.1.2 Items Separated Before Disposal

When the households were asked about any kind of separation of items before disposal, more than 90% of respondents in the areas answered that they separate certain items before disposl and sell them to hawkers. Fig 6.2 shows items separated for selling. More than 90% of the household sold the items to hawker who collect them from door to door. From Fig 6.2 we can observe that major items which are sold consist of newspapers, old books, magazine, plastic materials like cans, jugs, and glass items. The percentage of rubber and metal or tin items sold in Kalabagan and Mohammadpur is less than Uttara, it is due to difference in income level as the percentage of tin food, or beverage items are mostly used in upper income areas than low income ones

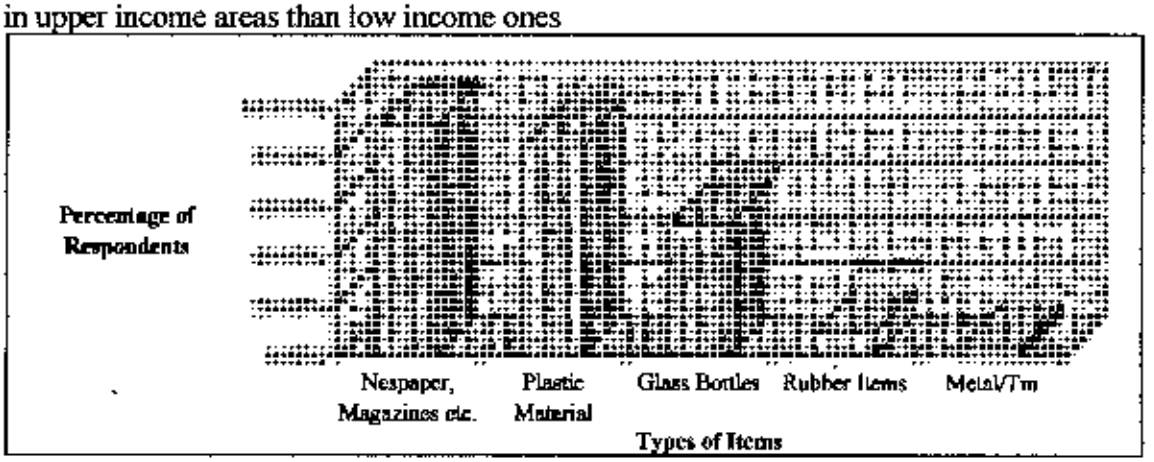

Fig 6.2: Types Of Items Separated By Household
Source: Field Survey, 1999.

Table 6.2 : Frequency Of Selling Of Separated Items

Name of the Area	Mohammadpur		Kalabagan		Uttara		Total	
Total Household	80		80		70		230	
Frequency	No.	%	No	%	No.	%	No.	%
Every month	1	1.25	3	3.75	Nil	Nil	4	1.74
Every two month	17	21 25	14	17.50	16	22.86	47	20 43
More than two month	62	77.5	63	78.75	54	77.14	179	77.83

Source. Field Survey, 1999

6.1.3 Persons Disposing Wastes And Frequency Of Disposal

It was found from the survey that servants are the person to dispose wastes. Table 6.3 indicates that the frequency of such disposal of waste is daily.

Table 6.3: Frequency Of Waste Disposal Of The Respondents

Name of the Area	Mohammadpur		Kalabagan		Uttara		Total	
Total Household	80		80		70		230	
Frequency	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Daily	70	87.50	74	92.50	68	97.14	212	92.17
Alternate day	7	8.75	5	6.25	2	2.86	14	6.09
Every Two day	3	3.75	1	1.25	Nil	Nil	4	1.74

Source: Field Survey, 1999

6.1.4 Material Used For Disposal Of Wastes

Fig 6.3 indicates that about 60% respondents uses polythene bags for disposing wastes, while 35 65% uses small bucket

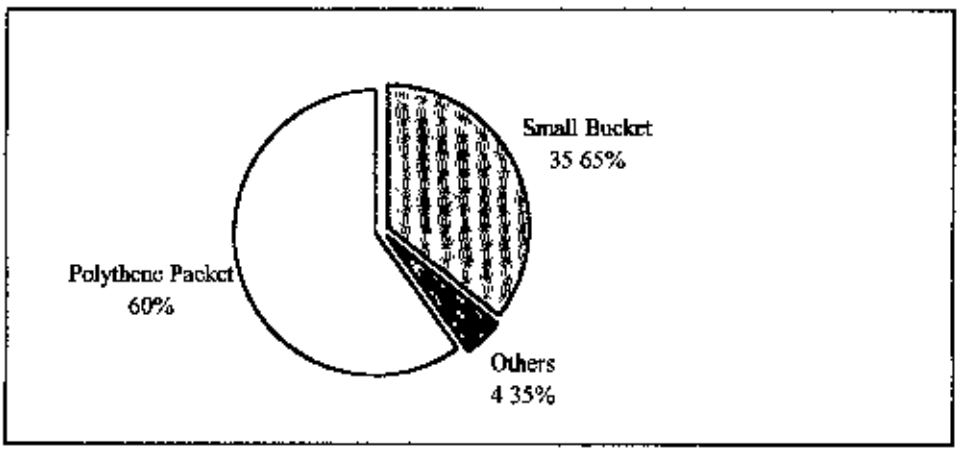

Fig 6.3: Material Used For Disposal of Wastes By Respondents

Source: Field Survey, 1999

6.2 KNOWLEDGE OF RESPONDENTS ABOUT DISEASE AND DISEASE VECTORS

Table 6.4 indicates that majority of the respondents have poor knowledge about disease that spread through or linked with solid waste pollution. It was also found from the survey that they have poor idea about disease vectors (Fig 6.4).

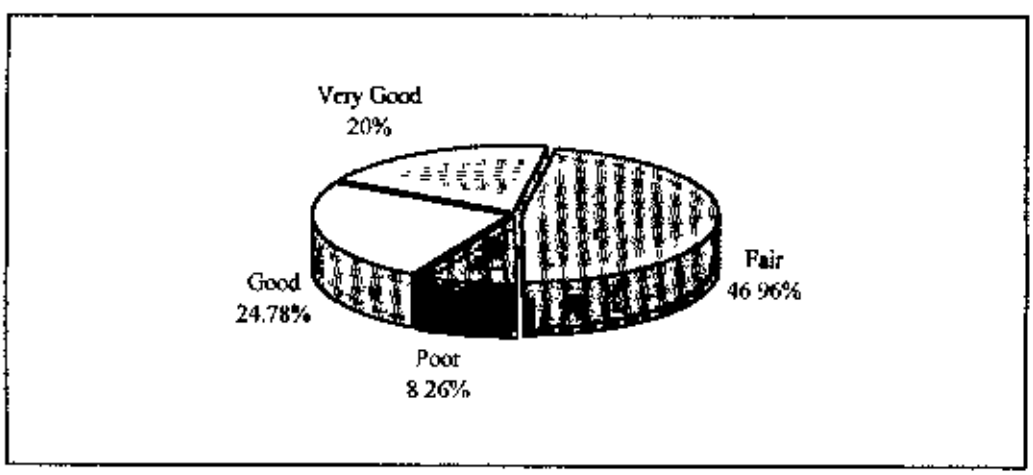

Fig 6.4: Knowledge Of Respondents About Disease Vectors

Source: Field Survey, 1999

Note: Quality of knowledge

Very Good: Those can identify the four major names of discase vectors.

Good: Those can identify the three major names of discase vectors.

Fair Those can identify two major names of disease vectors.

Poor: Those can identify one major name of disease vectors.

Table 6.4 : Knowledge Of Respondents About Diseases Spreading Through Waste

Name of the Area	Quality of Knowledge						Percentage				
	V.Good	Good	Fair	Poor	No Knowledge	Total	V.Good	Good	Fair	Poor	No Knowledge
Mohammadpur	2	5	16	52	5	80	2 5	6 25	20	65	6 25
Kalabagan	Nil	3	13	63	1	80	Nil	3.75	61 25	78 75	1 25
Uttara	5	12	23	27	3	70	7.14	17 14	32 86	38.57	4.29
Total	**7**	**20**	**52**	**142**	**9**	**230**	**3.04**	**8.70**	**22.61**	**61.74**	**3.91**

Source: Field Survey, 1999

Note Quality of knowledge:

Very Good: Those can identify the five major names of diseases.

Good: Those can identify the four major names of diseases.

Fair: Those can identify three major names of diseases.

Poor: Those can identify one or two major name of diseases.

No Knowledge: Those can not identify the name of any disease.

6.3 PROBLEMS FACED BY HOUSEHOLDS AND CBOs DURING WASTE COLLECTION AND DISPOSAL

Soild waste management system would rather be incomplete if households and CBO practises are not studied and their problems not identified. An analysis of current practices of waste disposal of household and collection of CBOs, problems faced by the households and CBOs during waste disposal and collection and their views for improvement of the waste management system have been conducted in the following sections.

6.3.1 Problems Faced By Households In Kalabagan Residential Aarea

1) Due to the lack of accountability of Kalabagan Samaj Kallyan Parisad, the cleaners used to take advantage regarding their day to day cleaning programs. Sometimes they did not collect domestic wastes from door to door and also neglect their duty to clean the neighbourhood.

2) Though CBO is a voluntary organization and the members are busy with their own profession, and as a consequence the residents face difficulties to discuss their problems with the members of CBO.

3) The roads, drains are often found not clean properly due to the absence of any supervisor post within CBO.

4) Cleaners collect waste from door to door with their own small buckets and due to their carelessness they use to destroy the environment of the households by throughing wastes from their opened-buckets.

5) Normally cleaners use the open van to carry wastes to the community bin. Due to the overloaded van, wastes generally spread on the road and generate bad smell.

6) Cleaners waste collection time is usually between 12 noon to 5 p.m. Cleaners sometimes cannot maintain this time properly and are not regular. As a result when asked about respondents view on present solid waste collection system more than 60% of them stated that it is polluting their house euvironment. The main reason for the present polluting environment is offensive odour from the uncollected household waste and presence of flies, mosquitoes.

7) CBO cleaners used to dispose the waste outside the bins. Due to their carelessness it also pollutes the environment

6.3.2 Problems Faced By Households In Mohammadpur Area

1) Households store their wastes at the roadside between 12 noon to 7 p.m. Sometimes wastes are scattered by dogs and spread offensive odour. Also cleaners don't collect the scattered wastes neatly.

2) Cleaners use whistle to inform their presence to the households. Unfortunately some households fail to response to dispose wastes at the roadside.

3) Cleaners use a open type tri-cycles and wheel barrows to carry waste to the nearest municipal bins. Therefore, those open vans are the constant source of bad smell.

4) Respondents identified offensive odour, presence of flies and mosqnitoes, encroachment of roadway by waste and overall degradation of environment as the major problems due to improper collection of waste in their areas.

5) When DCC garbage collection truck comes, CBOs cleaners dispose the wastes into the truck. But this garbage collection truck is not regular in this area. As a result before the disposal of the wastes the households are affected by bad smell.

6.3.3 Problems Faced By Households In Uttara Model Town

1) Local cleaners dispose wastes into the open demountable container and open community bins. But DCC garbage collection trucks are not available everyday in the area. As a result most of respondents identify offensive odour, presence of files and mosquitoes as the major problems due to improper collection of wastes in their respective area.

2) In sector- 3, cleaners don't clean the open drains regularly. Therefore, drains are the source for bad smell which has direct impact on environment.

3) All executive members are engaged in different professional services and usually these organizations are led by local leaders. According to the respondents it is very difficult task to make any appointment with any member of those organization for the necessary community matters

Table 6.5 : Problems Faced By Households Regarding Waste Disposal

Name of the Area	Kalabagan		Mohammadpur		Uttara	
Total Households	80		80		70	
Problems	**No.**	**%**	**No.**	**%**	**No.**	**%**
Cleaners neglect to collect domestic wastes	22	27.50	17	21.25	2	2.85
Cleaners don't clean the areas, drains, roads	45	56.25	65	82.25	25	35.71
Administrative body of the CBO is not available	42	52 50	3	3.75	53	75.71
Organizations have no cleaner's supervisor	65	81.25	72	90	Nil	Nil
Waste is scattered on roads from open overloaded rickshaw vans, hand trolleys	47	58.75	51	63.75	Nil	Nil
Cleaners do not maintain the waste collection time properly and respondents are affected by offensive odour	12	15	18	22.50	2	2.85
Presence of flies, mosquitoes, due to improper collection of wastes	10	12.50	70	87.5	15	21.42
Degradation of environment due to indiscriminate disposal of wastes into the community bins	75	93.75	61	76 25	4	5.7

Source: Field Survey, 1999

4) Due to the communication gap between the security guards of buildings and cleaners, the daily waste from different buildings were not collected properly and as a result the micro environment of that building is often polluted by bad smell.

6.3.4 Problems Faced By Kalabagan Samaj Kallyan Parisads

1) This community based organization has four rickshaw vans to collect waste from 1200 households and due to their resource constrain they do not collect waste properly.

2) There are altogether 12 cleaners in this CBO, and it is very difficult for them to clean the whole area.

3) The overhead cost of CBO is around TK.15,000. Normally 80% of households regularly pay their fee and that amount is not enough for them.

4) CBO has no other reserved fund for repairing and maintenance of their vans.

6.3.5 Problems Faced By Mohammadpur Environment Cleaning Project

1) Funding is the main problem in this area. Total fees from the area is not enough for the management system.

2) There are only 2 wheel barrows and one rickshaw van which is not sufficient enough for collection purpose.

3) The community household did not want to pay extra money for the management of CBO because the household already paid the municipality tax for this service.

6.3.6 Problems Faced By Uttara Kallyan Samities :

1) The cleaners failed to collect the waste due to the security purpose of the household. There is a communication gap between the security man and cleaners.

2) Most of the respondents use polythene bags for disposing waste. But the bags are used to open which pollute the environment.

3) Cleaners waste collection time is between 12 noon to 3 p.m. But 15% respondents do not maintain the schedule time and as a result the wastes are not collected properly.

Table 6.6 : Current Problems Of The CBOs In The Study Areas

Kalabagan Samaj Kallyan Parisads	**Mohammadpur Environmental Cleaning Project**	**Uttara Kallyan Samities**
Staff problem - Relating to availability of cleaners and supervisor	Problems associated with - Collection of charges - Standard bins	Sometimes security guards of the building don't open main gate timely.
Rickshaw vans are considered to be inadequate	Garbage carrying vans are insufficient	Most of the respondent's waste carrying polythene bags are not close properly
Budget problem - Small, frequent repairs needed	Three cleaners are insufficient for cleaning this area	15% respondents don't maintain schedule time properly
Parisad's have no office room	Secondary collection points - Trucks - Demountable containers and - Timing	–
Van takes lot of time for single trip because community bin located at a far distance in the Mirpur road.	Collected fees are not sufficient enough for CBO's management	–
20% respondents are irregular to pay service charge	Sometimes respondents neglect to dispose their waste at the appropriate place	–

Source: Field survey, 1999

6.4 SUGGESTIONS FROM HOUSEHOLDS FOR IMPROVEMENT OF SOLID WASTE MANAGEMENT SYSTEM

6.4.1 Type Of Collection System Preferred

When the respondents were asked about the type of system they preferred for waste disposal, majority of them liked that waste be collected from their houses. It is interesting to note that only 5.22% of the total respondents preferred to dispose their waste in community dustbins (Fig 6.5).

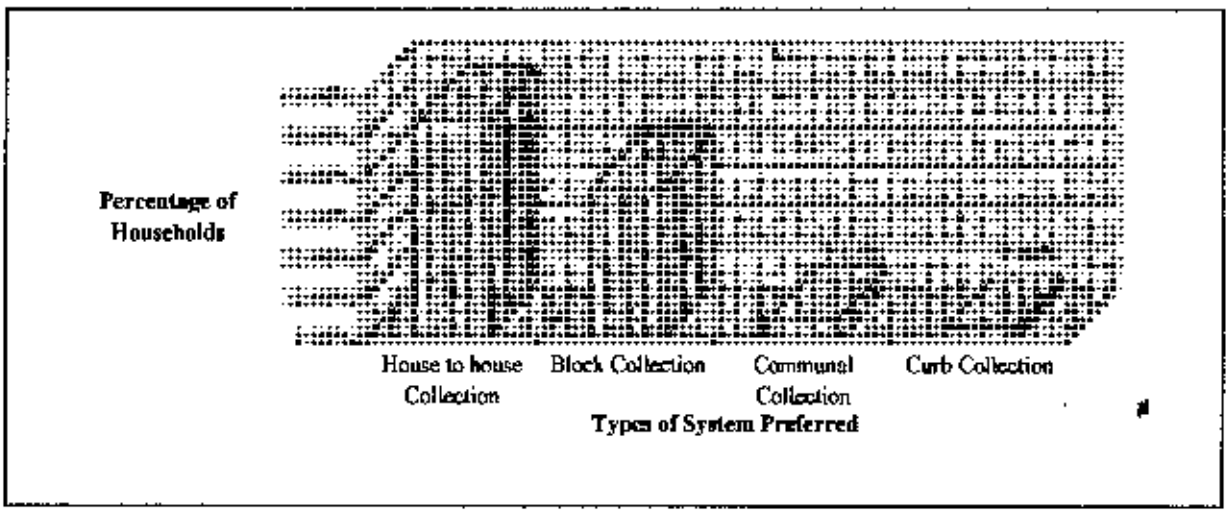

Fig 6.5 : Households Preference Of Waste Disposal System

Source. Field Survey, 1999

6.4.2 Preference Regarding Frequency And Time Of Collection

Majority of the respondents in Mohammadpur and 91.25% in Kalabagan and 97.14% in Uttara wanted that the waste from their premises be collected daily (Table 6.7). It was also found from the survey that majority of them desired that waste be collected between afternoon and evening hours.

Table 6.7: Frequency Of Collection Desired

Name of the Area	Mohammadpur		Kalabagan		Uttara		Total	
Total Households	80		80		70		230	
Frequency	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Daily	76	95	73	91 25	68	97.14	217	94.35
Alternate Day	4	5	6	7.5	2	2 86	12	5.22
Every two days	Nil	Nil	1	1.25	Nil	Nil	1	.43

Source: Field Survey, 1999

6.4.3 Financial Contribution For Improvement Of The Waste Disposal System Of The Area

Table 6.8 indicates the households willingness to contribute for improvement of present waste disposal system. It was found from the survey that more than 90% of respondent are willing to pay for improvement of the garbage disposal situation. It can be seen from the Table 6.8 that in Mohammadpur majority (38.75%) are willing to pay Tk. 30/-per month followed by Tk. 25/-per month (33.75%) and in Kalabagan majority (40%) are willing to pay Tk. 20/ per month for it if the waste is directly collected from their houses followed by Tk 30/ per month (18.75%). The amount of contribution is larger in Uttara area; as majority of households (32.86%) are willing to pay Tk.40/ per month followed by Tk 50/per month (28.57%). Even 8.57% of the respondents are willing to pay Tk. 100/per month for direct removal of waste from their premises. The amount is greater in Uttara area for the obvious reason that it happens to be an upper income residential area.

Table 6.8: Households Ability To Contribute Financially

Name of the Area	Mohammadpur		Kalabagan		Uttara	
Total Households	80		80		70	
Amount of Contribution	**No.**	**%**	**No.**	**%**	**No.**	**%**
Tk. 20/-	12	15	32	40	3	4.29
Tk. 25/-	27	33.75	15	18.75	7	10
Tk. 30/-	31	38.75	15	18.75	11	15 71
Tk.40/-	8	10	12	15	23	32.86
Tk. 50/-	2	2.5	4	5	20	28.57
Tk. 100/-	Nil	Nil	2	2.5	6	8.57

Source: Field Survey, 1999.

6.4.4 Response Regarding Use Of Organic Fertilizer In Garden And Flower Pots

The respondents were also asked about their knowledge of organic fertilizer which could be made from kitchen and vegetable wastes. More than 75% respondents answered that they knew about the organic fertilizer and its environmental benefits. When the respondents were asked about their willingness to use the same in the garden and flower pots, more than 80% responded favourably

6.4.5 Response Regarding Separation Of Waste At Household Level

When the respondents were asked whether they liked to separate their kitchen and vegetable waste from other household wastes, majority of them (51.4%) responded in the

negative. When the negative respondents were asked that in case they were supplied with container or plastic packet whether they would segregate their waste, majority (84.92%) responded positively.

6.4.6 Response Regarding Community Participation

About 99% of the respondents in the study areas felt that community participation was essential for improvement of waste management and overall environment of the neighbourhood. When the respondents were asked whether they had any knowledge about community based organizations (CBOs), majority (87%) answered in the positive When asked abont presence of any such organization in their respective areas, majority of them again responded positively.

6.4.7 Response Regarding Participation In Community Based Organizations (CBOs)

About 99% of the respondents expressed their willingness to participate in community based organizations and programs in order to improve the waste management as well as for environmental improvement their areas.

6.4.8 Response Regarding Present Design Of Community Bin

When the respondents were asked about their opinion about present design of community bin provided by DCC, 82% of them answered that the design is not perfect. They suggested that it should have cover and it's size should be changed.

6.4.9 Preference Of Respondents Regarding Use Of Media For Environmental Awareness

Table 6.9 indicates the preference for use of media by respondents in order to educate the people about proper waste disposal and for building environmental awareness among them.

Table 6.9: Preference Regarding Use Of Media By Respondents For Environmental Awareness

Name of the Area	Mohammadpur		Kalabagan		Uttara	
Total Households	80		80		70	
Preference	**No.**	**%**	**No.**	**%**	**No.**	**%**
News Paper	62	77.50	68	85	67	95.71
Radio	63	78.75	61	76.25	49	70
Television	68	85	65	81.25	63	90
Leaflet	35	43.75	31	38.75	19	27.14
Poster	31	38.75	28	35	33	47.14
Teaching in school and college	77	96.25	73	91.25	61	87.14

Source: Field Survey, 1999

It is evident that majority of the household preferred electronic and print media to be used for educating the people for proper waste disposal and building environmental awareness. A good number of respondents suggested that teaching in school can help to educate good environmental habits in the long run.

6.5 RECOMMENDATIONS FROM CBOs FOR IMPROVEMENT OF SOLID WASTE MANAGEMENT SYSTEM

Recommendations from CBOs for improvement of solid waste management system has been suggested. These recommendations will be helpful for involving people effectively for the development of SWM in the absence of required governmental resources. Main recommendations are:

6.5.1 Administrative

1) The necessity of public co-operation and participation is essential and it requires to be institutionalized. Formation of committees at Mahalla, Ward and Zone level with peoples representation is necessary for transparency of activities as well as participation.

2) The committees at Mahalla, Ward and Zone level are to be effectively linked up with one another to ensure quick communication of decisions and participatory implementation.

3) The three committees, particularly the Ward and the Mahalla level committees may be entrusted with the task of
   (a) Raising public awareness and participation
   (b) Exerting moral pressure on non complying households
   (c) Supervising work of the DCC scavengers and sweepers

4) For quick resolutions of local problems the authority vested in the zones will have to carefully reviewed and suitably augmented through decentralization of power

5) Use of media, as well as local government, non-government and NGO employees should be made to raise public awareness

6) The penal provision for non-compliance should be forcefully imposed.

6.5.2 Financial

1) The local initiatives require small initial fund for initial purchase and sometimes for a replacement of vans, equipments It becomes difficult for them to manage it from subscription fund. DCC may help by providing small financial assistance, or confiscated rickshaws whose chassis can be used for making vans.

2) Adoption of economically viable waste recycling project will be financially helpful.

3) DCC to give special attention to the local initiatives. To encourage the CBOs DCC may provide financial and technical support to the local initiators. Apart of DCC's conservancy tax may be utilized for the purpose.

4) DCC should make adequate provision for purchase and maintenance of its fleet of trucks and equipments

6.5.3 Technical

1) The local committees will have to work hard to make the people aware of the garbage collection and disposal system as at present there is an information gap.

2) A system will have to be developed for segregation of different types of garbage at source to ensure efficient disposal.

3) Inconvenient size and shape of the bins hamper proper placement of garbage. These will have to be properly redesigned.

4) Adequate number of bins and their systematic placement is essential as otherwise there will be overflow once the local initiatives bring total garbage to the bins.

5) Provision is to be made for protective dress and regular medical check-up of the sweepers and cleaners They may be provided with special cards for medical check-up on priority basis.

6) "Tokai" or scavenger boys often collect polythene bags and spreads out the garbage on the street. Special care will have to be taken to prevent this by the local committees.

7) Number of trips of garbage trucks will have to be correctly calculated depending on the volume of garbage, so that no garbage is left in the bins at the end of the collection time. Introduction of a system of weigh-bridge and payment of incentive on the basis weight-carried will be very helpful.
8) Decentralization of transports and placement of required numbers under the authority of zonal executive officers will increase operating efficiency.

9) A careful study of the DCC's present fleet of vehicles is essential to ascertain the number of usable vehicles for correct planning of garage caring. If required, the fleet is to be strengthened.

10) There being only one dumping ground at Matuail, collection points, particularly on the northern side of the city, are far off resulting in lesser number of trips by garbage trucks than required. More dumping ground on other side of the city is needed for resolution of the problems.

6.6 SUMMARY AND CONCLUSION

In Kalabagan, Mohammadpur and Uttara areas kitchen and vegetable wastes constitute the major portion of waste being disposed by households. Servants are the person to dispose wastes to cleaners Main problems faced by households during waste disposal in the study areas are: 1) administrative body of the CBO is not available, 2) waste is scattered on roads

from open overloaded rickshaw vans, wheel barrows, 3) presence of flies, mosquitoes due to improper collection of wastes, 4) degradation of environment due to indiscriminate disposal of wastes into the community bins. Main problems faced by CBOs during waste collection are: 1) staff problem, 2) garbage carrying vans are insufficient, 3) budget problem, 4) absence of standards bins. To improve solid waste collection system households preferred house to house collection system and majority of them desired that waste be collected daily between afternoon and evening hours. To prevent flies and mosquitoes households suggested that community bin should have cover and its size should be changes and also to avoid scattered wastes on roads the waste carrying vans must be covered According to CBOs opinion public co-operation and participation is essential for improvement of solid waste management. To encourage the CBOs, DCC may provide financial and technical support to the local initiators.

CHAPTER—7

COMPARISON AND EVALUATION OF CBO OPERATION IN THE STUDY AREAS

7.1 COMPARISON OF DIFFERENT CBOs OPERATION IN THE STUDY AREAS

We can compare the different CBO operation in the Mohammadpur, Kalabagan and Uttara areas by different aspects:

- Financial,
- Administrative
- Operation and Maintenance
- Technical

7.1.1 Financial:

Kalabagan Samaj Kallyan Parisad	Mohammadpur Environment Cleaning Project	Uttara Kallyan Samities
1) Service charge is not enough to maintain this projects properly.	1) Service charge collection is a problem as some respondents do not want to pay stating that they have already paid municipal tax.	1) There is no problem to collect service charge from the dwellers. They are always ready to increase service charge for better environment.
2) For the local initiators initial investment, particularly for the equipment, is a big problem. Even if they can manage the initial investment, replacement of equipment becomes burdensome on their scanty resources.	2) They repair and maintain all equipments, vans, rickshaws within this limited service charge	2) They have another security funds. From this fund they manage every work systematically.
3) 1075 households garbage carrying rickshaws vans are considered to be inadequate.	3) Two wheel barrows and one rickshaw van are insufficient to keep the area clean.	3) Six wheel barrows and six rickshaws are used to collect and dispose waste and these are acting in good condition for 1350 household.

7.1.2 Administrative:

Kalabagan Samaj Kallyan Parisad	Mohammadpur Environment Cleaning Project	Uttara Kallyan Samities
1) Workers of CBOs are limited to collect solid waste, clean the roads and drains.	1) Mohammadpur cleaning project also provides night guards.	1) The sector Samities look after their intra-sectoral matters, i.e. civic, social security etc., and some of their welfare activities.
2) CBO cleaners don't follow their work schedule properly. Punishment measures for CBO law/rule breakers are adequate and not forcefully imposed.	2) There is no prompt official action for negligence of cleaners duty	2) Most of all cleaners do their duties properly and nicely.
3) Executive committee members are engaged in other professions, so they are not available to discuss any community matter.	3) This project is run by six young educated employees and they are available.	3) Mainly local leaders maintain these Samities and they are always engaged in many local matters. So they are not available without appointment.
4) Parisads have no office room.	4) They maintain their office room in a local club.	4) Each sector of Kallyan Samities have an office room and also these Samities have residence facilities(i.e. land) for their workers
5) All employees meet together in every month. They don't have campaign system regarding waste management.	5) They call meeting twice a month and there is a mechanism (leaflet) for keeping the public informed of CBO initiative in waste management.	5) Each Samity calls meeting on the last day of every month. At present there is a mechanism (leaflet) for obtaining their view and participation in CBO's solid waste management.

7.1.3 Operation and Maintenance

Kalabagan Samaj Kallyan Parisad	Mohammadpur Environment Cleaning Project	Uttara Kallyan Samities
1) There are altogether 4 cleaners in the CBO, and it is very difficult for them to clean the whole area.	1) Environment cleaning project is also operated by 12 members. 900 households are served by only 3 cleaners, which is insufficient for cleaning this area properly.	1) Each Kallyan Samity is operated by 21 members. One thousand two hundred fifty households are served by 6 cleaners which is sufficient for cleaning purpose.
2) Parisads have no supervisor to operate cleaners duties regularly.	2) Members of the committee supervise the staff's duties regularly. So they are trying their best to clean the roads, drains and bins.	2) Each Samity maintain a cleaning supervisor, as a result they successfully keep the area clean.
3) They collect waste from door to door. As a result there is no chance to spread bad smell.	3) Cleaners collected waste from the roadside of the respondent's house. As a result offensive odor comes from the waste and sometimes wastes are scattered by dogs.	3) Cleaners collect waste directly from door to door.

7.1.4 Technical

Kalabagan Samaj Kallyan Parisad	Mohammadpur Environment Cleaning Project	Uttara Kallyan Samities
1) Vans are open, so when wastes carry towards the community bin, wastes are scattered on the roads and also deteriorate the environment.	1) Environment is deteriorating by bad smell coming from open rickshaw or wheel barrows.	1) Waste collection rickshaws are covered, so there is no possibility of spreading the bad smell.
2) Van takes lot of time for single trip because road widths are narrow and community bin located at a far distance.	2) The road width is much wider than Kalabagan area. So waste carrying barrows and rickshaw take short time for trip.	2) Uttara model town is a planned area. Its roads are wide. So vans and rickshaws can move freely and properly.
3) Cleaners collect waste in open small buckets, as a result there is a chance to scatter wastes and spread bad smell.	3) Cleaners collect wastes in open polythene bags, as a result environment is deteriorated by bed smell	3) Cleaners collect wastes in open polythene bags, as a result there is a chance to scatter wastes and spread bad smell.
4) Cleaners dispose the wastes at the open community bin. As a result offensive odor comes from the bins and sometimes wastes are scattered by dogs	4) Number of the demountable containers, masonry bins are not enough for this area. As a result huge garbage remains outside the containers with foul smell spreading over the area and also there is presence of flies and mosquitoes	4) Cleaners dispose the wastes into close community masonry bins and inside the demountable containers properly. But bad smell comes from open demountable container, which deteriorates environment.
5) Lack of Waste Segregation Cleaners don't collect waste categorically There is different types of household wastes- 1)Kitchen & Vegetable wastes 2)Paper 3)Plastics, 4)Glass, 5)Metal/Tin.	5) Solid waste composed of various substances is not segregated categorically.	5) Cleaners collect various categorically separated solid waste substances.

7. 2 EVALUATION OF DIFFERENT CBO OPERATION IN THE STUDY AREAS

7.2.1 Administrative Aspect

From above comparison we can say that administratively Uttara Kallyan Samities is more organized and effective than Kalabagan Samaj Kallyan Parisads and Mohammadpur Environmental Cleaning Project. There is strong coordination among different members of Samities involved in waste management particularly collection and disposal of waste. In Kalabagan and Mohammadpur area supervisor of work at cleaner level requires to be streamlined and tightened.

7.2.2 Financial Aspect

Uttara Samities have security fund. From this fund they manage every work systematically and nicely. But Kalabagan Parisads and Mohammadpur Cleaning Project maintain all wheel barrows, rickshaws and employment salary within service charge. As a result it is very difficult for them to manage these projects properly. In Kalabagan area some respondents don't pay the service charge regularly and in Mohammadpur area some respondents don't want to pay the service charge but the dwellers of Uttara area are always ready to increase service charge for better environment. Financially Uttara Samities have no problems

7.2.3 Technical Aspect

Technical advantages of Uttara Kallyan Samities are:

1) All Samities are working hard to creat the people's awareness for proper garbage collection and disposal system.

2) Cleaners collect solid waste snbstance categorically.

3) Adequate number and systematic placement of bins.

4) All waste collection nckshaw vans are covered.

There is some technical problems in Mohammadpur and Kalabagan areas :

1) Distant And Insufficient Disposal Ground: Disposal grounds at Kalabagan and Mohammadpur are far off from CBO's area. It is very difficult for open type garbage carrying vans to carry waste although the heavily congested road in Kalabagan and Mohammadpur

2) Inconvenient Demountable Container: Design of the demountable containers discourage cleaners to dispose the waste inside the container. As a result huge garbage remains outside the containers with foul smell;

3) Lack of Waste Segregation: Solid waste composed of various substances is not segregated categorize causing problem for both collection and disposal.

Kalabagan and Mohammadpur waste collection trolleys, rickshaws are open, as a result environment is deteriorated by bad smell. But the cleaners of Uttara Samities collected the waste into rickshaws cleanly and properly. Strong unity of Uttara CBO employees doesn't hamper the smooth operation of solid waste management.

So from above discussion it is clear that administratively, financially, operationally and technically Uttara Kallyan Samities are the best one than Kalabagan Parisads and Mohammadpur Environment Cleaning Project.

7.3 SUMMARY AND CONCLUSION

Financial, administrative, operation and technical problems of Kalabagan Samaj Kallyan Parisads and Environment Cleaning Project are: 1) they maintain their all charges within service charge which is inadequate for them to manage these projects properly, 2) it is very difficult for them to carry waste due to the heavily congested road with overloaded waste carrying vans to a far distance community bins, 3) these projects are not well organized, 4) there is a communication–gap between CBOs and households. Uttara Kallyan Samities are well organized but executive members are not available because they are engaged in

other profession. Financially Uttara Samities have no problem and they always maintain a security fund. Technically Uttara Samities have no problem. Their waste carrying vans are covered and adequate to carry waste properly. They collect waste categorically and they dispose waste at community bins systematically and properly. So Uttara Kallyan Samities are the best one than Kalabagasn Samaj Kallyan Parisads and Environmental Cleaning Project from the view point of cost and environmental improvement.

CHAPTER—8

SUMMARY OF FINDINGS, RECOMMENDATIONS AND GUIDELINES

This chapter consists of two major parts:

- First part provides a brief summary of overall findings; and
- The second part contains recommendations for improvement of solid waste management of Dhaka city.

8.1 REVIEW OF FINDINGS

Summary of the findings presented in the following section is based on observations, questionnaire survey and literature review.

Solid Waste Management (SWM), is today considered to be one of the most immediate and serious environmental problems confronting urban local governments in developing countries. This is mainly due to rapid urbanization taking place on an enormous scale in the cities of Asia, Africa, and Latin America. Inadequate management and disposal of solid waste is an obvious cause for the degradation of the environment in most of the cities in the developing countries. In many developing countries only half of the population is served by sewage and solid waste disposal system. Waste generation of Dhaka city is increasing with the growth of its population Dhaka city has an area of 360 sq km and today, the population of the metropolitan area exceeds seven million, the density of population is 19,445 persons per sq km

Based on Dhaka City Corporation (DCC) estimate, solid waste generated in the city per day is 3500 to 4500 tons. The average per capita generation is 0.5kg per day Only 50% of

Dhaka city's garbage is estimated to be collected by the municipal corporation. The rest 50% are discarded in the streets, drains, ditches, canals and open spaces. The main aspects of solid waste management are drain cleaning, street sweeping, collection of refuse and its transportation and disposal. The major sources of municipal solid waste in Dhaka are households, streets, market places, industrial, commercial establishments and clinics and hospitals. Solid waste in Dhaka is mainly composed of food, grass and plants, bricks and dirts and paper and polythene materials.

At present Dhaka City Corporation is the sole authority to carry waste from the dustbins and demountable containers to the outfall for final disposal. DCC traditional collection and disposal system is beset with problems like inadequate manpower and modern equipments, lack of intradepartmental co-ordination, existence of strong trade union. With 179 garbage carrying trucks (1 5 to 5 ton capacity), 300 containers, 3,500 hand carts, 5,779 cleaners and a budget of Tk 284 1 million, DCCs conservancy service is yet to be fully unsatisfactory. It has been estimated by DCC that 50% of the population of Dhaka city area are using dustbins for disposal of waste, while 20% use roads, 20% use drains, and 10% use open grounds to dispose solid waste. The present method of collection, transportation and disposal of solid waste by DCC is very inefficient.

Recently, the role of authority in metropolitan management is being taken over by private enterprise or community based organizations (CBOs) due to resource and other limitations. From the perspective of cost-effectiveness and environmental improvement, the CBO approach has been considered the best one in domestic solid waste collection. Community is a social unit whereby 1) a group of people sharing a common geographic area; 2) these group of people are interacting within a common culture; 3) having a community need Community based organizations are groupings or associations of members of the community that come together in response to a felt need. In order to tackle the domestic waste disposal problems, a house to house collection of domestic waste was started in 1987 in the Kalabagan area of Dhaka city. The CBO approach on solid waste collection has been extended gradually to Mohammadpur, Mirpur and very recently at Uttara area. Till today over 140 CBOs have been identified which are actively involved in solid waste

management system in 90 Wards of Dhaka. These CBOs are providing services to about 130,000 households approximately. It was revealed that community involvement in solid waste management is an important factor and it can improve the waste disposal system of residential areas significantly. Partnership between community and DCC is essential to improve waste disposal system & overall environment.

Kitchen and vegetable wastes constitute the major portion of waste being disposed by households. In Mohammadpur and Kalabagan waste contain paper, plastics and broken glass, while the wastes in Uttara contain paper, plastics, glass and tin items. It was revealed from the study that majority of the respondents in the study area have poor knowledge about diseases caused by solid waste pollution, It is one of the main reasons why people dispose their waste indiscriminately. This suggests the need for education on health and hygiene

From analysis it was found that in Kalabagan area the major problems faced by the households are: 1) cleaners sometimes neglect to collect and also neglect to clean building surroundings, roads and drains properly and regularly; 2) the environment of this area is deteriorated by the bad smell coming from open van and open small buckets; 3) Parisad's members are not available to the respondents; 4) more than 16% of respondents stated that present solid waste collection system is polluting their environment. The main reasons for the present polluting environment are offensive odour from the uncollected household wastes and presence of flies, mosquitoes etc. The problems faced by Kalabagan Samaj Kallyan Parisad's are: 1) three rickshaw vans and four cleaners are not sufficient for the Parisads to collect waste properly and regularly from every households; 2) households don't pay any extra money to repair and maintain the equipments, vans, rickshaws etc

The problems faced by respondents in Mohammadpur area are. 1) responderns dispose their waste at the roadside of their houses. Bad smell comes from the wastes and cleaners don't collect the scattered wastes neatly and regularly. 2) overall degradation of environment as the major problems due to improper collection of waste in their area, 3) DCC garbage collection truck is not regular in the area. As a result respondents identify

offensive odour, presence of flies and mosquitoes, encroachment of roadway by wastes. The problems faced by Mohammadpur Environment Cleaning Project are: 1) two wheel barrows and one rickshaw van are insufficient for 900 honscholds; 2) some households don't want to pay the service charge and also don't want to pay another money to repair and maintain equipments, vans, rickshaws; 3) Funding is the main problem in this area. Total fees from the area is not enough for the management system.

The problems of Uttara households are: 1) most of the respondents identified offensive odour, presence of flies and mosquitoes as the major problems due to improper collection of DCC; 2) without appointment the local leaders of these Uttara Kallyan Samities are not available to the respondents; 3) some security guards of respondents delay to open gate, as a result cleaner leave the wastes in respondent houses. The problems faced by Uttara Kallyan Samities are; 1) sometimes security guards of the buildings don't open main gate timely; 2) waste carrying polythene bags are not close properly; 3) 15% respondents don't maintain schedule time (between 12 noon to 3 p.m.) properly. It was revealed from the study that administratively, financially, operationally and technically Uttara Kallyan Samities are the best one than Kalabagan Samaj Kallyan Parisads and Mohammadpur Environmental Cleaning Project.

Majority of the respondents in the study area preferred that waste should be directly collected from their houses It is interesting to note that only 5.22% of the total respondents in the study area preferred to dispose their waste in the community bins. This reflects that the present system of DCC does not conform with the residents preference. The study also unfolded that majority of respondents (more than 90%) in the study area are willing to pay for improvement of waste management system. Majority of the households are willing to pay for house to house waste collection a sum of Tk 20-30 per month. Some households are willing to pay even Tk.50 to Tk.100 per month for waste collection. This number is more in upper income area like Uttara. It suggests that house to house collection could be Sinitiated where people are willing to pay for the service.

It has been found that in Kalabagan, Mohammadpur and Uttara area of Dhaka city house to house waste collection system introduced by CBO has solved the waste disposal problem of these area. It was found from the study that separation of waste at household level could be attained by providing container or plastic or polythene packets to the households. Majority of the households suggested that community participation should be promoted to improve the waste management system and environmental situation. It was also revealed that majority of the households of the study area would participate in CBO's in order to improve the waste management system as well as for environmental improvement. Most of the respondents suggested that electronic and print media should be used for educating the people about proper waste disposal practices and for building environmental awareness. A good number of respondents also suggested environmental education should be included in school curricula. Use of media, as well as local government, non-government and NGO employees should be made to raise public awareness.

8.2 RECOMMENDATIONS

Following section describes the recommendations for solving the solid waste management problem of Dhaka city. It is divided into two parts.

- First part discusses the role of national government and DCC as well as NGO's and CBO's for improvement of the SWM system, and
- The second part describes some specific guidelines for improvement of SWM system.

8.2.1 Role Of National Government

Policies related to solid waste management improvement by the national government are:

1) Formulation of legal guidelines regarding solid waste management.

2) Formulation of standards for collection and disposal of wastes.

3) Incentive for introduction of environmentally clean and efficient technology for waste disposal which would help to reduce the volume of waste and facilitate more recycling.
4) Introduction of environmental education specially sanitary habits in school curriculum.

5) Introduction of new taxation system for conservancy operation.

8.2.2 Role Of DCC

Micro level policy should be implemented by DCC because it is directly involved in the management of solid wastes. The following aspects should be improved:

1) Increase taxes in solid waste collection.

2) Taking measures to increase locally generated revenues to recover the cost of urban infrastructure

3) Penalties for violation of rules and regulation by public and operators.

4) Development of awareness and motivation through dissemination of information and education.

5) Research and development for low cost option for waste management.

6) Co-ordination with other agencies regarding waste management.

7) Improvement in the collection and final disposal system of solid waste.

8) Optimum utilization of manpower and infrastructure

9) Improvement in technical skill and efficiency of conservancy workers and staffs

10) Support to self help group i.e. (CBOs) in the neighbourhood.

11) Development of separate collection and disposal system of different types of wastes such as domestic, industrial and clinical.

12) Maintenance of adequate data regarding waste generation, composition and characteristic.

13) Regular monitoring of land fill sites and maintenance of record of such sites.

14) Promotion of separation and minimization of wastes at house hold level.

15) Regular maintenance of solid waste infrastructure.

16) Restriction of building or structures on or near land fill sites.

8.2.3 Role Of CBOs

The role of community based organizations (CBOs) in providing urban service is a new issue today. CBOs can play a vital role in solid waste management and overall improvement of environment.

Community involvement is essential for improving living environment in urban settlements. Community participation is a fundamental democratic process which accords the community and its organizations an effective form of participation in decision making, planning, implementation and maintenance of urban services such as solid waste disposal.

Its benefit are self-reliance, technical and organizational efficiency, environmental enhancement, generation of employment and user's satisfaction.

For example, in Chapter-5 we have seen that how community participation in Kalabagan, Mohammadpur & Uttara residential area has solved their waste disposal problem by introducing house to house waste collection process through community based organization. This waste collection process had led to the environmental improvement, while Kalabagan, Mohammadpur & Uttara area now give a cleaner look and the residents are satisfied with this service. In Chapter–3 we have seen that in Bangalore and Madras similar community participation in solving the waste disposal problem and over-all environment improvement

In Dhaka, there is a tremendous possibility of involving CBOs in solving solid waste problem CBOs can serve as linkages between government, local level and community. CBOs staffed with professional planners, engineers and social workers can provide technical advice and help in co-ordinating and implementing small scale waste management programs in different residential areas of Dhaka city

There is a very good opportunity in mobilizing CBOs to address the waste disposal problem at local level. Community involvement is very essential in waste management. Partnership between community based organization and municipal authorities is very important. For this it is required that primary and secondary infrastructure would be supplied by local authorities and tertiary infrastructure would be provided, operated and maintained by CBOs.

8.3 GUIDELINES FOR IMPROVEMENT OF SOLID WASTE MANAGEMENT OF DHAKA CITY

1) Solid waste management system should include the following provisions:

- Standards for collection and disposal of wastes;

- Types of wastes that should be land-filled and collected by municipal workers;
- Time frame work for the conservancy work;
- Penal action for illegal disposal of garbage on roads, drains and unauthorized places; and
- Penal action for negligence and unsatisfactory performance by the staff.

2) For a clean environment and prevention of transfer of infectious disease it is required that there should be adequate finance or allocation for SWM. Adequate finance could be attained by delinking conservancy tax from general property tax based on rental value and separate charge rate should be developed for commercial and industrial solid waste.

3) To reduce the health hazard among the garbage crew it is recommended that they should be provided with proper protective clothing, gloves, boots etc. when loading and unloading wastes which are generally partially decomposed.

4) It is recommended that all bins should have covered lid and have concrete bottom to prevent leakage. The best one is the portable community bin or container which can be lifted directly on the vehicle

5) It has been found that most of the staff in the conservancy division of DCC do not have proper training regarding waste management. It is recommended that senior level conservancy staffs should be trained in neighbouring countries where waste management is satisfactory.

6) Active participation of community is essential for proper waste management. Active participation can be ensured with the involvement of community based organizations (CBOs) in waste management.

7) It has been observed that disposal of wastes on roads, drain or vacant plots can be avoided by using house to house waste collection system House to house collection can be introduced in different neighbourhoods by community participation involving community

based organization. In such cases CBOs can organize house to house waste collection system within the prescribed time agreed by the households of the respective area. For this system based on community participation every household has to contribute for the service In this system the waste from the respective area would be removed from individual household and disposed to fixed or portable community bin supplied by local government. The local government would remove the waste to disposal or treatment facility from communal bin or transfer stations. For this system involvement of CBOs for motivation and technical support would be required and DCC and CBOs partnership is required. The benefit of this system is that it would reduce the litter and illegal disposal of wastes and thereby improve the environment of an area

8) In order to improve the waste transportation system, it is recommended that for shorter distance and narrow lanes non motorized vehicles such as tricycle van or modified handcart should be used and for longer distance motorized vehicles should be used.

9) Large percentage of organic material present in Dhaka's waste could be easily recycled by composting.

10) Finally, in the absence of required governmental resources a process of community participation through a community based organization has been suggested based on peoples' needs and socio-economic condition of the community, which can quicken the pace of development and promote achievement of long term goals. The objective of community participation is to raise the community's confidence and ability to improve their own socio-economic situation. community participation is a continuous process that must be carefully planned and guided. It needs cautious organization and management. Monitoring of peoples' comments is essential for the success of the program. Therefore in conclusion the following issues might be considered for community participation program:

a) All types of people in the communities should be involved in the formation of a community-based organization. This will expedite decision taking.

b) The community must be convinced that they will work for community development program in their interest. The community will directly enjoy the benefits and the program will not result in unreasonably increased fees or other charges that the population cannot afford to pay

c) Program should be designed in a manner so that target group is made active. Traditional ways of working and use of local materials can help to make the people active to participate and build the self-esteem of the community.

d) It must be prevented that the most vocal or influential people receive the benefit of improvements - as is the case at present- whereas the poorest are ignored.

e) It must be ensured that the project will not be subject to "party politics" and is intended to benefit the entire community rather that certain groups.

REFERENCES

Ahmed, M. F. (1993), **Municipal Waste Management in Bangladesh with Emphasis on Recycling**, A paper presented in the Regional Workshop on Urban Waste Management in Asian Cities, Dhaka, April, p.10-12.

Akhter, W. Ali, I. Ali, S. M. and Ali, S. A. (1992), **Solid Waste Management in Katchi Abadi**, 18th WEDC conference proceedings, Kathmandu, Nepal.

Ashraf, M. (1994), **Solid Waste Collection and Disposal in Chittagong: Problems and Prospects**, Journal of Urban Studies, vol.2, No.2.

Ahned, T. (1987), **Decentralization and Peoples Participation in Bangladesh**, BARD, Kotbari, Comilla, Bangladesh.

B. B. S. (1991), **Bangladesh Population Cencus, Community series**, Dhaka: Bangladesh Secretariate.

Begum, A. (1990), **Residential Development Through Private Land Readjustment:Acase study of Anandanagar, Dhaka,** Unpublished MURP thesis, Department of Urban and Regional Planning, Bangladesh University of Engineering and Technology, Dhaka.

Benecia, R. (1995), Systematization of Tesults, in Macracken, R and Narayan, D., **Regional Participatory Diagonstic Workshops; Beneficiaries and Intermediary Organizations**.Participation and Social Assessment Tools and Techniques,The World Bank, N.W., USA.

BCAS. (1998), **Discussion Paper for Workshop on Solid Waste Management**, Administration and Finance of Dhaka City Corporation, DCC AND Urban Management Programe (UMP). Dhaka.

Bhide, A. D. & Sundaresan, B. B. (1983), **SWM in Developing Countries**, Indian National Scientific Documentation Centre.

Carcellar, F. N. (1997), **Payatas Environmental Development Programe: Micro-Enterprise Promotion and Involvement in Solid Waste Management**, UMP- Asia occational paper No. 36, p.4-13.

Dhaka Metropolitan Development Planning (DMDP),1995, **Dhaka Structure Plan**, BGD/88/052.

Devkota, R. (1993), **Towards Special Reference to SWM Project in Katmandu**, A paper presented in the Regional Workshop on Urban Waste Management in Asian Cities, Dhaka, Bangladesh, April 10-12.

Enayetullah, I., (1995), **A Study of Solid Waste Management for Environmental Improvement of Dhaka City**, Upublished MURP thesis, Department of Urban and Regional Planning, Bangladesh University of Engineering and Technology, Dhaka

Era, M. D L. (1995), **Environmental Awareness and Behaviour Regarding Waste Management Practices Among Household in Murtinlupa Municipality**, Manila, AIT thesis, Bangkok, Thailand.

Enayetullah, I., and Sinha, A., H., M., M. (March,1999), **Abarjona O Paribash: Community Based Solid Waste Management Projects,** A newsletter on Waste Management and Recycling in Bangladesh, Inaugural Issue, p 1-4.

Fernandez, A. L.(1997), **Solid Waste Management Micro- Enterprises: Asian Regional Overview**, UMP- Asia occational paper No. 35, p.6.

Frank, S. S., Stollman, I., Beal, F. and Arnold, D. S. (1979), **The Practice of Local Government Planning**, ICMA, Municipal Management Series, USA, Ch.19.

Furedy, C. (1949), **Social Consideration in Solid Waste Management in Asia Cities**, A paper published in Regional Development Dialogue , Vol.10, No.3, UNCRD, Nagoya, Japan.

Furedy, C. (1990), **Social Aspects of Solid Waste Recovery in Asian Cities**, Environment Sanitation Review, No.30.

Furedy, C. (1992), **Garbage: Exploring Non- conventional Options in Asian Cities**, A paper published in Environment and Urbanization, Vol.4, No.2, October.

Hossain, M. S. (1997), **Urban Poverty Reduction Initiatives in Some Major Cities Proshika Experiences,** A paper presented in the workshop " Experience sharing of NGOs working with the urban poor and identifying major issues to be addressed ", Dhaka,

HRMDC (1998), **Organically Managing Garbage**, A field note, UNDP-Word Bank Water and Sanitation Program; Regional Water and Sanitation Group-South Asia.

Haque, N (1993), **Community Participation and Waste Management Dhaka City**, A paper presented in Regional Workshop on Uurban Waste Management in Asian Cities, Dhaka, Bangladesh, April 10-12.

Jahan, S , and Siddique, M. R (1995), **Neighbourhood Recreational Facilities in Dhaka City: A Study of Parks and Play-grounds**, Proceedings of the national symposiam on World Habital Day'95; Our Neighbourhood, 2nd october, Dhaka, Ministry of Housing and Public Works, Govt. of Bangladesh.

Khatun, N (1995), **Neighbourhood and Planning Standards**, Proceedings of the national symposiam on World Habital Day'95, Our Neighbourhood, 2nd october, Dhaka, Ministry of Housing and Public Works, Govt. of Bangladesh.

Mohit, M. A. (1995), **Solid Waste Management in Dhaka City: A case of Neighbourhood Involvement in Collection System**, Proceedings of the National Symposium on World Habitat Day'95, Our Neighbourhood, 2nd October, Dhaka, Ministry of Housing and Public Works, Govt. of Bangladesh

Meyer, W., Schertenleib, R. (1992), **Community Participation in Solid Waste Management**, 18th WEDC conference proceedings, Kathmandu, Nepal.

Mobarak, R (1993), **Health Problems Due to Urban Wastes in Dhaka City**, A paper presented in regional workshop on Urban Waste Management in Asian Cities, Dhaka, Bangladesh, April 10-12

Niaconsult Research Team, (1996), **Farmers Participation in National Irrigation Systems in the Philippines**, in Jennifer, Rietbergen-Mc Cracken, participation in practice, The experience of the World Bank and other stockholders, World Bank discussion paper NO. 333. World Bank, Washington, D.C., USA.

Schertenleib, R. And Meyer, W. (1992), **Synergetic Effects of Municipal Solid Waste Collection, Recycling and Disposal,** A paper published in International Reference Centre for Waste Disposal (IRCWD) News, No. 26, March 1992, Duebendrof Switzerland

Suess, M. J. (ed.) (1985), **Solid Waste Management Selected Topics**, World Health Organization (WHO), Copenhagen, Denmark.

Shukla, S. R. (1992), **Solid Waste Management- Indian Scenario**, 18th WEDC Conference Proceedings, Kathmandu, Nepal.

Sinha, A. H., Md. Maqsood and Enayetullah, I. (1995), **Recycling Potentials of Organic Waste in Dhaka**, EARTH, Winter, No 5, p.128-129.

Sarkissan, Wendy and Donald Perlgut with Kelvin Walsh and Elaine Ballard, eds (1994), **The Community Participation Handbook: Resources for Public Involvement in the Planning Process,** Second edition, Perth, Western Australia: Institute for Science and Technology Policy, Murdoch University.

Sarkissan, Wendy, and Kelvin Walsh (1994), **Community Participation in Practice: Workshop Checklist,** Perth, Western Australia: Institute for Science and Technology Policy, Murdoch Univercity.

Sarkissan, Wendy, Ardrea Cook and Kelvin Walsh (1994), **Community Participation in Practice: A Practical Guide,** Perth, Western Australia: Institute for Science and Technology Policy, Murdoch Univercity.

Sarkissan, Wendy, and Kelvin Walsh (1997), **Community Participation in Practice: Casebook,** Perth, Western Australia: Institute for Science and Technology Policy, Murdoch University.

Sewell, W. R. D. and J. T. Coppock (eds) (1985), **Public Participation in Planning,** NewYork: John Wiley and Sons.

The Daily Star (1995), **Keeping Kalabagan Cleans**, 22 September.

Trivedi, P. R. and Raj, G. (1992), **Solid Waste Pollution,** New Delhi: Akashdeep Publishing House.

UNDP, UNCHS, GOB, RAJUK (1992), **Dhaka Metropolitan Development Planning (DMDP): Waste Management Report,** Prepared by Mott MacDonald Ltd. Culpin Planning Ltd., Engineering and Planning Consultants Ltd., Development Administration Group.

Wadood, A (1993), **Effect of Urban Waste on Environment and Its Control,** A paper presented in the Regional Workshop on Urban Waste Management in Asian Cities, Dhaka, Bangaldesh, April 10-12.

APPENDICES

Appendix – A

(TABLES)

Table A-1 Fly Borne, Mosquito Borne & Rodent Borne Diseases

Fly Borne Diseases	Mosquito Borne Diseases	Rodent Borne Diseases
Typhoid	Dengue	Echinostomiasis
Bcillary dysentery	Filariasis	Plague
Amoebic dysentery	Malaria	Rat bite fever
Diarrhea	Yellow fever	Rat bite dermatitis
Asiatic cholera	Tularemia	Rat-tapeworm
Helminth infection	Melioidosis	Infestion
Myiasis	Rift valley fever	Salivary-gland virus
Loiasis	Lymphocytic	Intection
Onchocerciasis	Choriomengitis	Sporotrichosis
Ozzard's filariasis		Relapsing fever
Yaws		Tularemoa
Tularemia		Risketisial pox
Bartonellosis		Murine ryphus
Cararrhal		Bilhargziasis
Conjunctivitis		Leptospirosis
Sandfly fever		Salmanellosis

Source : Iftekhar, p. 96

Table A-2 Major land use categories of Dhaka

Type of land use	Area(hectare)	Percentage
Residential	3520	19 3
Commercial	410	1.5
Industrial	340	1.2
Institutional	1630	5 9
Roads & others	2930	10.6
Village	1110	4.0
Agricultural	12370	44.9
Water bodies	3430	12.5
Grand total	27540	100
Distribution:		
Urban use sub-total	10630	39.0
Rural use sub-total	16910	61.0
Grand total	27540	100

Source . Louis Berger, et. al. 1991, p. 1-6

Table A-3 Land Use Pattern of Privately Owned Land In And Around Dhaka City

Name of Tahsil	Industrial/ commercial (acres)	Residential land (acres)	Agricultural land (acres)	Total (acres)
Gulshan	32	2513	16378	18923
Tejgaon	260	542	29	831
Mohammadpur	26	738	1267	2031
Mirpur	258	1696	9242	11196
Demra	259	2405	10462	13126
Lalbagh	320	929	-	1249
Sutrapur	208	486	-	694
Motijheel	52	777	-	829
Kotwali	107	171	-	278
Dhanmondi	254	113	-	1407
Ramna	32	636	-	668
Grand total	1808 (3.5%)	12046 (23.5%)	37388 (73%)	51242

Source : Siddiqui, et. al. (1997) p. 25

Appendix – B

Calculation of waste collected per day by DCC

Out of DCC's total fleet of 179 open and demountable trucks for collection and transportation of solid wastes, 22 (5 nos. of 5 ton capacity, 8 nos. of 3 ton capacity, 3 nos. of 2 ton capacity and 6 nos. of 1.5 ton capacity) remained idle being out of order.

Waste collected by 147 trucks in operation :

1.5 tou × 25 trucks × 2 trips per day	=	75 tons / day
2 ton × 15 trucks × 2 trips per day	=	60 tons / day
3 ton × 35 trucks × 2 trips per day	=	210 tons / day
5 ton × 72 trucks × 2 trips per day	=	720 tons / day
Waste collected per day	=	1065 tons
	say,	1100 tons/ day
Assuming 25% overloading of trucks =		275 tons / day
Total waste collected per day by DCC =		1100 + 275
	=	1375 tons / day

Questionnaire

Department of Urban and Regional Planning, BUET, Dhaka

Thesis Title : **A Study of Solid Waste Management Through Community Based Organizations (CBOs) in Uttara, Kalabagan and Mohammadpur area of Dhaka City**

i Name of the Respondent :

ii. Address of the Respondent :

iii. Date of Interview :

iv. Name of the head of the household:

1. Total family members :
2. Information relating the family

Serial No	1	2	3	4	5	6	7	8	
Age									
Sex									
Educational Qualification									
Occupation									

Age	Sex	Educational Qualification	Occupation
1. 0-4	1. Male	1. Illiterate	1. Govt. Service
2 5-9	2. Female	2. Primary	2. Private Job
3. 10-14		3. High school	3. Business
4. 15-17		4. S. S. C	4. Student
5. 18-34		5. H. S. C.	5. Housewife
6 35-59		6 B. Sc. and above	6. Retired
7 60 and above			

3. What is your monthly income?
4. What is monthly expenditure?
5. Is present solid waste management system of your area polluting the environment?
   a) Yes b) No
6. If 'Yes', what are the three main reasons?
   a) Offensive odor from scattered solid wastes
   b) Waste is not proper removed
   c) Waste is disposed in drains
   d) Waste is scattered outside the bin
   e) Waste is disposed on roadside
7. Do you agree that in order to improve the solid waste management system and overall environment of your area, people's participation is essential?
   a) Yes b) No
8. Do you have any idea about community based organizations?
   a) Yes b) No
9. If 'Yes', please describe:

10. Do you know that how many community-based organizations are present in your area?
11. Who disposes your domestic solid waste?
    a) Servant b) Family
12. What material do you use for waste disposal?
    a) Polythene bag
    b) Bucket
    c) Others
13. What problems do you face while disposing solid waste?

14. What is the frequency of waste collection from your area by CBO?
    a) Daily
    b) Alternate day
    c) Every two days
    d) Irregular
15. what time does CBO collects wastes from your area?
    a) Morning
    b) Afternoon
    c) Evening
    d) Night
    e) No fixed time
16 What are the type of items which you generally place for disposal?
    a) Kitchen and vegetable wastes
    b) Paper wastes
    c) Plastic
    d) Glass(broken)
    e) Metal/tin items
17. Do you separate your kitchen and vegetable wastes from other wastes(old newspapers, books, etc.)?
    a) Yes b) No
18. If 'Yes' then what kind of items do you separate?
    a) Newspaper, books, magazines, khatas
    b) Plastic materials
    c) Glass bottles
    d) Rubber items
    e) Metal/tin items
19. Do you sell the separated items?
    a) Yes b) No
20. What is the frequency of selling these items?
    a) Every month

b) Every two month

c) More than two months

21. Whom do you sell these items

a) Hawkers

b) Shops

c) Others

22. Which of the following disease vectors are found in solid waste?

a) Flies

b) Mosquitoes

c) Cockroaches

d) Rodents

e) Do not know

23. Which of the following diseases are related to solid waste

a) Fever

b) Dysentery

c) Malaria

d) Viral hepatitis

e) Conjunctivitis

f) Do not know

24. Do you think the present design of waste disposal bin is satisfactory?

a) Yes b) No

25. If 'No', then, what type of communal bin should be provided?

26. What type of collection system do you prefer for disposal of your household wastes?

a) Community bin

b) House to house collection

c) Block collection

d) Curve side collection

27. How much money do you pay monthly as the service charge of waste disposal?

a) Tk. 10, b) Tk. 15, c) Tk. 20, d) Tk. 25, e) Tk 30, f) Tk. 35, g) Tk. 40, h) Tk. 50

28. What frequency would you prefer for waste disposal and why?

a) Daily

b) Alternate day

c) Every two days

d) Twice a week

29. What time do you prefer to collect waste from your house and why?

a) Morning

b) Afternoon

c) Evening

d) Night

30. Do you know that organic manure can be made from kitchen and vegetable waste, which is environmentally friendly and does not degrade the soil fertility unlike chemical fertility?

a) Yes b) No

31. Do you want to use this organic manure in your gardeu or flower pot?

a) Yes b) No

32 Do you like to separate your kitchen and vegetable waste of your house with other wastes?

a) Yes b) No

33 If 'No', then in case a container or plastic bag is supplied would you like to separate kitchen and vegetable wastes with other wastes?

a) Yes b) No

34. Which of the following media do you think can help educate people about solid waste problem, its proper disposal and environmental awareness(any four according to your preference)?

a) Newspaper

b) Radio

c) Tv

d) Leaflet

e) Poster

f) Teaching in school and colleges

35. In your opinion, how waste disposal at proper place can be achieved?

a) By enforcing proper laws

b) By community participation

c) By awarding people by DCC/CBO/NGO

36. In order to improve the waste management in your area, are you willing to spend more money?

a) Yes b) No

37. If 'Yes', the how much?

38. According to your opinion, which of the following civic services in your area should be improved (any three according to your priority)?

a) Water

b) Electricity

c) Solid waste management

d) Gas

e) Open space

39. Any suggestions regarding solid waste management of your area?

40. Any suggestions regarding solid waste management of Dhaka city?

Questionnaire

Department of Urban and Regional Planning, BUET, Dhaka

Opinion survey of local leaders, CBO/DCC officials and others

Thesis Title . **A Study of Solid Waste Management Through Community Based Organizations (CBOs) in Uttara, Kalabagan and Mohammadpur area of Dhaka City**

1. How big is your solid waste collection area?
2. What is the population of this area/
3. Do you know how much waste is generated daily by the residents? If yes how much?
4. What type of equipment do you use for collection and disposal of solid waste?
5. How many vehicles do you have for solid waste collection?
6. How many vehicles are out of order?
7. How many shifts do you work with vehicles and how many trips they make in a day?
8. How many workers are engaged in the collection and disposal of solid waste?
9. How much waste is collected and disposed daily?
10. How many days a week the collected quantity is handled?
11. What method is used for collection of wastes?
12. How many dustbins are provided by DCC in this area?
13. Is there any money spent by DCC on solid waste management? If yes, then how much?
14. Please briefly describe the duties of your organization about the solid waste management.
15. Is there any existing law for solid waste management?
16. What are the major problems which CBO is facing at present with regard to solid waste collection?
17. Any suggestions regarding solid waste management of your area?
18. Any suggestions regarding solid waste management of Dhaka city?

Particulars of the respondents

Name :

Designation: