Capacity Building for the Urban Environment:
A Comparative Research, Training and Experience Exchange

Project Paper No. 6

Integrated Low Cost Sanitation: Indian Experience

by

Sulabh International Institute of Technical Research and Training

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Capacity Building for the Urban Environment: A Comparative Research, Training and Experience Exchange

A project implemented by the

Institute for Housing and Urban Development Studies (IHS), Rotterdam

In co-operation with the

Instituto de Desarrollo Urbano (CIUDAD), Lima
Institut Africain de Gestion Urbaine (IAGU), Dakar
Instituto para la Democracia Local (IPADEL), Lima
Human Settlements Management Institute (HSMI), New Delhi
Centro de Servicios para el Desarrollo Urbano (PROA), La Paz

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Introduction to the Project

Focus and Outline of the Project

Capacity Building for the Urban Environment is a comparative research, training and experience exchange project that was launched in October 1994 with the support of the Dutch government. It provides an inventory and review of the experiences of relevant bilateral and multilateral organisations and of Best Practices in urban environmental management. For the countries of India, Peru and Bolivia, it identifies, communicates and extends the application of Best Practices in environmental management for cities. In May 1995, the project was expanded to include Senegal/West Africa with the support of the Swiss government.

The focus of the project is on learning from experiences in urban environmental management at the city level and on developing strategies for capacity building in order to replicate and scale up the best of these experiences elsewhere. The overall co-ordination of the project is the responsibility of the Institute for Housing and Urban Development Studies in Rotterdam, while co-ordination in the participating countries is the responsibility of the following partner organisations:

- Human Settlements Management Institute (HSMI), New Delhi, India;
- Instituto para la Democracia Local (IPADEL), Lima, Peru;
- Instituto de Desarrollo Urbano (CIUDAD), Lima, Peru (since January 1997);
- Centro de Servicios para el Desarrollo Urbano, (PROA), La Paz, Bolivia, and
- Institut Africain de Gestion Urbaine, (IAGU), Dakar, Senegal.

Project Activities

Support to cities in the form of applied research and development activities in the area of urban environmental management has been, and continues to be, provided by the co-ordinating partner organisations through the following set of activities:

Research

Within the applied research programme undertaken in the project, Best Practices in urban environmental management in Bolivia, India, Peru and, to some extent, Senegal were identified, and their lessons and experiences reviewed. An analysis and review of the identified Best Practices then took place involving a large number of individual research groups and professionals. In a process of on-going monitoring and review, guidance and support were provided by IHS and its partner organisations. The results of both the individual studies of Best Practices and their review are being published in several books and papers in both English and Spanish. These and their publication dates are listed in the *Introduction to the Project Papers*, which follows this note.

Networking

In identifying the research priorities of the project, during the conduct of the research studies, and throughout the review of research findings, a structure was developed and utilised to ensure the participation of all interested and concerned individuals and institutions through a consultative process. Expert group meetings and consultative seminars were organised for this purpose.

Capacity Building Strategies

After the Best Practices research, analysis and review were completed for all countries, outline capacity building strategies were developed for each based on what was learned from these local experiences and practices. These strategies were developed through a broad-based consultation process involving a large number of research institutions, individual professionals and academics, city representatives, NGOs and local representatives. They are currently being modified based on the outcome and findings of Habitat II, which was held in Istanbul in June 1996, and the emphasis has now shifted to applying a number of Best Practices to selected cities.

Best Practices Documentation

Concurrent to and co-ordinated with this project, IHS served as the secretariat of and contributed to the review of the Best Practices that were submitted to the United Nations Centre for Human Settlements (UNCHS) for the *Global Best Practice Initiative for Improving the Living Environment* in preparation for Habitat II. HSMI, PROA, IAGU and IPADEL were also involved and contributed to the national preparatory processes that took place in their own countries. An overview of the Best Practice submissions to UNCHS, as well as summaries of the additional case studies received by IHS, are being made available on the Internet through the IHS Home Page.

Databases

Two databases are also under preparation: an institutional database and a literature database. The institutional database is being developed in co-operation with the International Institute for Environment and Development (IIED) in London. It contains entries on relevant organisations, some of which are documented in extensive profiles, while others are included as shorter reference information entries. IHS is developing the second database, which provides references in the literature on experiences with urban environmental management.

Rotterdam Seminar

The Rotterdam Seminar, which took place in May 1996 during the two weeks preceding Habitat II, brought together all principal researchers, as well as city representatives and other professionals involved in the project for a period of intensive discussions. The seminar resulted in a document that provided a comparative analysis of practices and experiences in the field of urban environmental management. This analysis included the project process and network building, governance, job creation and poverty alleviation and gender. This was published as a book in February 1997 and is listed later in the *Introduction to the Project Papers*.

The Rotterdam seminar also discussed *city-level capacity building strategies* for the cities of Calcutta, India; Ilo, Peru; Santa Cruz, Bolivia and Dakar, Senegal. Experiences in *urban environmental management* were reviewed for the cities of Tilburg, The Netherlands and Nairobi, Kenya.

Habitat II

At Habitat II the project was presented in the Special Meeting on Implementing the Urban Environment, organised by UNEP and UNCHS, as well as in other fora.

Capacity Building Strategies for Peru, Bolivia, India and Senegal

The outline capacity building strategies which were developed in preparation for Habitat II (i.e., by CIUDAD, PROA, HSMI and IAGU with the support of IHS). They are being modified for implementation, which is expected to begin late in 1997.

Outline Training Program for Local Officials, CBO Workers, and other Partners for Peru, Bolivia and India

These training materials are to be developed over the next few months and will comprise curricula for short courses related to the most directly applicable Best Practices identified for each country in view of its national strategy for capacity building in urban environmental management.

The Development of a Medium-Term Capacity Building Strategy for Senegal and West Africa

This activity is in progress and addresses the building of individual and institutional capacities at the local level for urban environmental management in both Senegal and throughout West Africa.

Ed Frank, Project Manager
Rotterdam, February 1997

Introduction to the Project Papers

A number of publications have appeared under the Capacity Building for the Urban Environment project. These are listed below and can be ordered from IHS or its partner organisations respectively:

- *Capacity Building for the Urban Environment,* edited by David J. Edelman and Harry Mengers, summarises the research findings of the project and the conclusions of tile Rotterdam Seminar. It was published by the Institute for Housing and Urban Development Studies (IHS) in Rotterdam in February 1997;
- *Urban Environmental Management: The Indian Experience,* edited by B.N. Singh, Shipa Maitra and Rajiv Sharma, reviews the Indian experience in urban environmental management and presents all the Indian Best Practice of the project in detail. It was published by the Human Settlements Management Institute (HSMI) and (IHS) in New Delhi in May 1996;
- *Problems and Issues in Urban Environmental Management: Experiences of Ten Best Practices,* also edited by B.N. Singh, Shipa Maitra and Rajiv Sharma reports on the Indian Best Practices of the project in an abridged form. It was published by HSMI and IHS in New Delhi in May 1996, and
- *Ciudades para la Vida: Experiences exitosas y propuestas para la accion,* edited by Liliana Miranda Sara, presents the Best Practices and outline capacity building strategies for Peru and Bolivia for a Spanish speaking audience. It was published as Volume 6 in the Urban Management Series of the joint UNCHS/UNDP/World Bank Urban Management Programme in Quito in May 1996.

The objective of this series of *Project Papers,* then, is to bring to an English speaking, audience the results of tile project research in Peru and Bolivia appearing in the Miranda book. In addition, the Indian research, while documented in English in the second and fourth references listed above, has not appeared as complete, individual studies. Consequently, a selection of these will also be chosen for this series. Finally, the first reference in the above list covers aspects of the research undertaken in all four countries of the project.

As a result, the selection of work appearing in the *Project Papers* includes the following:

Bolivia

- 'Urban and Environmental Reality Workshops' by Zoila Acebey;
- 'Urban Agriculture in Community Gardens' by Julio Prudencio Böhrt, and
- 'Institutional and Development Framework for Urban Environmental Management in Bolivia' edited by Gastón Mejía.

Peru

- 'Defence and Conservation of the Natural Swamp Area Pantanos de Villa, Lima' by Arnold Millet Luna, Eduardo Calvo, Elsie Guerrero Bedoya and Manuel Glave;
- 'Consultation in Urban Environmental Management: The Case of Ilo' by José Luis López Follegatti, Walter Melgar Paz and Doris Balvín Díaz;

- 'Promotion of Employment, Health and the Environment, Lima' by César Zela Fierro and Cecilia Castro Nureña
- 'Environmental Sanitation and Infrastructure: The Case of the Marginal Urban Areas of the Southern Cone of Lima' by Silvia Meléndez Kohatsu, Víctor Carrasco Cortez and Ana Granados Soldevilla, and
- 'Inter-institutional Consultation and Urban Environmental Management in San Marcos Cajamarca' by Marina Irigoyen and Russeles Machuca.

India

- 'Power to the People: The Local Government Context' by the Times Research Foundation;
- 'Carrying Capacity Based Regional Planning' by the National Institute of Urban Affairs;
- 'NGOs/Civic Societies and Urban Environmental Advocacy' by Development Associates;
- 'Integrated Low-Cost Sanitation: Indian Experience' by Sulabh International Institute of Technical Research and Training;
- 'City-Wide "Best Practices" in Solid Waste Management in Collection, Transportation and Disposal' by HSMI/WMC of UIFW;
- 'Environmental and Health Improvement in Jajmau Area, Kanpur: Lessons and Experiences for Wider Replication' by Ministry of Environment and Forests;
- 'An Approach to Pollution Prevention in Electroplating Sector' by Development Alternatives;
- 'Integrated Study on Wetlands Conservation and Urban Growth: A Case of Calcutta's Wetlands' by Institute of Wetlands Management and Ecological Design;
- 'Sustainable Urban Development: A Case of Navi Mumbai (New Bombay)' by City & Industrial Development Corporation;
- 'Community Based Sanitation and Environmental Improvement Programme: Experiences of Indore, Baroda and Ahmedabad' by Shri Himanshu Parikh, and
- 'Institutional and Development Framework for Urban Environmental Management in India' by HSMI.

It should be emphasised here that the nineteen *Project Papers* in this series reflect the views of their authors only and have been edited to varying degrees. Initial English language editing was done by, among others, B.N. Singh, S. Maitra and R. Sharma for India and by D.J. Edelman for Peru and Bolivia. In fairness to both the authors and the publishers, they should, therefore, be characterised as working papers rather than full academic papers.

David J. Edelman, Series Editor
Rotterdam, February 1997

Integrated Low-Cost Sanitation: Indian Experience

by

Sulabh International Institute of Technical Research and Training

INTRODUCTION

Mahatma Gandhi initiated a mass movement for removal of untouchability and for the uplifting of scheduled and backward caste communities, especially the scavengers at Godhra town, Gujarat in 1917. When India attained independence, provision for uplifting of the status of these communities was made in the Indian Constitution. Even then, no worthwhile special schemes were taken up by any state in any substantial manner till the early eighties; only small provisions available under the backward class sector were utilised. Among the scheduled castes, scavengers were treated as untouchables as they carried human excreta manually after cleaning dry latrines and drains as art of their traditional occupation. During the Fifth Five Year Plan period, some schemes were formulated for scavengers, but these did not have long term perspectives. After setting up various commissions and committees for scavengers from 1949 onwards, it was at the beginning of the Sixth Five Year Plan that a separate centrally sponsored scheme of liberation of scavengers was introduced by the Ministry of Home Affairs, Government of India under the Protection of Civil Rights Act, 1955. This led to the conversion of dry latrines into pour-flush latrines and construction of new pour flush toilets with a view to promoting the scheme of liberation of scavengers and their dependants from their degrading occupation. There are three NGOs, namely, Sulabh International, Safai Vidyalaya and Gandhi Smarak Nidhi, which have contributed to the success of the programme. The area of operation of the last two is limited to Gujarat and Maharashtra, whereas the scale of operation of Sulabh is not only throughout the different States in India, but also beyond national frontiers. The implementation of both the programmes, however, was taken up in a massive way by the Ministry of Welfare, Government of India. Subsequently, it was felt desirable to have a co-ordinated approach, and, thus, the Integrated Low Cost Sanitation and Scavengers Liberation Programmes were brought together from 1989-90 onwards, under the Ministry of Urban Development (now named as Ministry of Urban Affairs and Employment) as the nodal agency for implementation of the low cost sanitation programme, and the Ministry of Welfare for the liberation and rehabilitation of scavengers and their dependants. The financial pattern for the programme was also modified.

The broad objective of this study is to highlight important examples of urban environment management experiences of `best practices' followed by the Sulabh International Social Service Organisation (SISSO) and other NGOs and voluntary organisations at micro level, with people's participation, in implementation of integrated low cost sanitation-cum-scavengers liberation programme in different geo-physical and socio-economic conditions.

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1. Low Cost Sanitation: Indian Experiences

1.1 Objectives of the Study

The objectives of the study are as follows:

a) To study the status of scavengers, their liberation, rehabilitation and training programme;
b) To explain the need for an appropriate low-cost sanitation technology;
c) To study socio-economic, techno-economic and socio-cultural aspects;
d) To study gender issues : nature and extent of women's participation;
e) To spell out the implementation strategies;
f) To assess community involvement in adoption of low-cost sanitation technology;
g) To identify potential for applicability to different situations and sustainability and replicability;
h) To assess the role of Non-Governmental Organisations (NGOs)/voluntary organisations for programme implementation;
i) To study the role of government including local bodies as provider and facilitator, and
j) To assess `Capacity Building Strategies' of local bodies for promotion of integrated low cost sanitation-cum-scavengers liberation programme.

1.2 The Experience

1.2.1 Baseline Situation: An Overview

The word environment has assumed a variety of meanings in today's development scenario. It would perhaps be appropriate that one modestly clarifies what one is trying to assess in this study on integrated low-cost sanitation vis-à-vis capacity building for the urban environment. On the whole, the main components that would make a satisfactory sanitary urban environment would include latrines, sewerage, waste disposal, drinking water systems and hygiene at household level. These essentials will have to be evaluated in terms of the reality that the dominant group that is served by low-cost sanitation in respect of twin pit pour flush (PF) latrines lives in slums or almost slum-like conditions. Further, the community toilet complexes with bathing, washing and urinal facilities also cater, especially in metropolises, to the needs of a floating population represented by commuters. "Research", it has been well said, "nearly always raises more questions than it answers" (Social Change, March 92 Vol. 22 No. 1 Prodipto Roy et al. Measuring Bustee Environment in Calcutta). The present study poses an important issue, namely, whether a low-cost sanitation (LCS) programme would receive adequate attention under the present economic reform initiated by the Government of India for the social cost involved is rather high. Unless this aspect is resolved in the interests of deprived sections of the country's population, the capacity building measures for upgrading the urban environment will be seriously hampered.

It has been brought out in many studies eloquently that dry or bucket latrines constitute a threat to health and hygiene through neighbourhood environment pollution. Low cost sanitation measures of a composite nature demonstrated by certain experiments by Sulabh International in

Patna with a functional and appropriate marketing and delivery system amply support the view that LCS is an answer to improve the urban environment.

The positive role of urbanisation is often overshadowed by the evident deterioration in the physical environment and quality of life in urban areas caused by the "widening gap between demand and supply of essential services and infrastructure", laments the Eighth Five Year Plan document of the Planning Commission, Government of India. It has been officially admitted that the gap between demand and supply of infrastructure services has been continuously widening. The worst sufferers are the poor, whose access to basic services like drinking water, sanitation, education and health services is shrinking. The 1992-97 Eighth Five Year Plan document notes that the "unabated growth of urban population has made the problems of urban housing more severe resulting in proliferation of slums and squatter settlements and decay of city environment". The important schemes in operation to combat the problems are the Urban Basic Services Scheme (UBSS) and Environmental Improvement of Urban Slums (EIUS), in addition to the Low Cost Sanitation Programme.

The physical achievement envisaged at the end of the Eighth Plan (1992-97) has been projected in the plan document as :

Item	Envisaged coverage as of 31.3.92		Expected coverage during Eighth Plan	Expected cumulative coverage at the end of the Eighth Plan	
	Population (million)	Percentage	Population (million)	Population (million)	Percentage
Urban Water Supply	185.67	84.90	65.00	250.67	94.03
Urban Sanitation	104.76	47.90	80.00	184.76	69.31

Note: Percentages are with respect to total projected urban population.

Source: Table 13, p. 384, Eighth Five Year Plan, Planning Commission, Government of India.

An official report of HUDCO as of May 1995 provides details of LCS schemes sanctioned in different states in covering 996 towns. It has been indicated that a total of 23.93 lakh[1] PF latrines have been approved through conversion of 1,358,747 dry latrines to PF toilets and construction of 1,034,155 new ones. It is reported that due to various problems in implementation, physical achievements are not up to expectation. It is also indicated that (as of the end of May 1995) 84,932 scavengers are expected to be liberated enabling them to seek alternative dignified occupations.

[1] 1 lakh = One hundred thousand

1.3 National Scheme of Scavengers Liberation and Rehabilitation

The National Scheme of Scavengers Liberation and Rehabilitation was formulated by the Ministry of Welfare, Government of India in 1991-92. The scheme has the following components:

a) A time bound programme for identification of scavengers and their dependants and their aptitude for alternative trade through a survey;
b) Training in identified trades for scavengers and their dependants at the nearest local training institutions/centres of various departments of State and Central Government and NGOs, and
c) Rehabilitation of scavengers by providing a subsidy, margin money loan and bank loan.

It is stated that under the National Scheme, the responsibility for rehabilitation of municipal scavengers in the service of local bodies is that of local bodies themselves. The scheme provides training to private scavengers and dependants of scavengers and the community as a whole. In this context, an all India survey was conducted by the Ministry of Welfare, Government of India to identify scavengers and their dependants. The state governments got the survey conducted to identify the number of scavengers and their dependants for training and rehabilitation. The state wise break-up of the stage of survey, the number of scavengers identified, targets for training and rehabilitation, as well as the release of funds by the Ministry of Welfare, Government of India from 1991-92 to 1994-95, were carried out in 20 states. The survey is yet to be completed in Bihar, Gujarat, Karnataka, Uttar Pradesh and Nagaland. Till the beginning of 1994-95, about 7.20 lakhs scavengers had been identified in 20 States. The Ministry of Welfare, Government of India released Rs. 60.73 crore (1 crore = 10 million) for training and rehabilitation of 15,578 beneficiaries in 1992-93. In 1993-94, Rs. 70.993 crore and in 1994-95, Rs. 13.80 crore were released for training and rehabilitation of scavengers and their dependants.

The National Scheme has laid down a funding pattern for financial assistance for self employment. For example, for a project costing Rs. 50,000, the break-up would be Rs. 10,000 subsidy, Rs. 7,500 margin money loan from the State Scheduled Castes Development Corporation and Rs. 32,500 loan from the banks. It is estimated by the Ministry of Welfare, Government of India, that the average expenditure for providing training to each identified child/dependent might not be more than Rs. 500, which includes a stipend of Rs. 150 per month. It is further stated that identified children/ dependants of scavengers would be provided training in identified trades for one month to six months only. The entire expenditure for training would be borne by the Ministry of Welfare, Government of India.

1.4 Sewerage System

In the majority of the towns and cities in India, there exist more than 54 lakh unsanitary latrines (commonly known as dry or bucket latrines)[2]. These require the services of scavengers to clean them. This, they achieve by manually removing excreta and carrying it for disposal to far-off

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[2] Source: Report of the Task Force for tackling the problems of scavengers and suggesting measures to abolish scavenging with particular emphasis on their rehabilitation - Planning Commission, Government of India (1990-91).

sites. There are also many households in towns/cities of the country which have no access to latrines at all, and, consequently, they are compelled to defecate in open spaces thereby causing an unhygienic environment and contributing to many water borne diseases like cholera, typhoid, jaundice, polio, diarrhoea, dysentery, etc. In addition to perform degrading jobs, scavengers are poor and socially suppressed. Further, the scavengers subject themselves to many serious health hazards. In brief, dry latrines cause immense damage to the social fabric, environment and health.

The Base-cum-Issues Paper of the Ministry of Urban Affairs and Employment, Government of India (August 1994), for Habitat II, the United Nations Conference on Human Settlements, describes the sanitation status in the country:

"The data on accessibility of the entire urban population to sewerage system are not available. However, according to estimate of the Planning Commission, hardly 20 per cent of urban population have access to flush arrangement connected to sewerage system, 14 per cent have access to water borne toilets connected to septic tanks, 33 per cent have bucket or dry latrines and the remaining 33 per cent do not have access to any facility whatsoever."

The analysis of accessibility to sewerage system according to income level indicates that the beneficiaries happen to be only the upper income groups. The urban poor and low income people hardly have accessibility to a sewerage system. To quote from the report of the National Commission on Urbanisation (NCU), "If the water supply system is unequal and unjust being highly biased in favour of the rich, the sewerage system is even more unjust and even more highly biased in favour of the rich" (NCU Report 1988).

Drainage systems: The analysis of drainage systems also does not present a happy situation. The NIUA study reveals that out of 127 towns and cities which responded to the questionnaire of the study, the drainage systems covered only about 66 per cent of the urban population. Thus, a little more than one-third of the urban population in the sample towns and cities are not serviced by a drainage system (NIUA, 1989). In about one third of the urban centres, more than 40 per cent of the urban population was not being served by any drainage system.

Garbage disposal: In India, the amount of solid waste generated varies from 300 to 500 grams per person per day, and the density varies from 100 kg. per cubic meter. to 600 kg. per cubic meter. At this rate, the amount of solid waste generated in the towns and cities is tremendous. As against this, the management of solid waste disposal is far from satisfactory. The situation is grim, especially in the small and medium size towns where there are not even rudimentary hygienic disposal systems. The NIUA study reveals that in the 153 sample towns, 27.5 per cent of the total waste generated remained uncollected and scattered on the streets (NIUA 1989). It further reveals that of the 153 responding towns and cities, 41 per cent had a refuse disposal level below the sample average of 72.5 per cent. In 12 urban centres, the level of uncollected waste was 50 per cent or even more.

It is generally felt that at the planning level there is lack of understanding of what sanitation means as well as poor co-ordination. More specially, the Ministry of Urban Development, the main actor to achieve satisfactory levels of sanitation in urban areas and the crucial agency to catalyse capacity building for the urban environment looks at the issue from a narrow perspectives and is focused on sanitary latrines; the Ministry of Welfare sees the problem in terms of the rehabilitation of scavengers; the Ministry of Health looks into the health related problems of sanitation only, and the Ministry of Non-Conventional Energy Sources is

concerned with using garbage for energy augmentation. The, more or less, parallel set-up in the state governments does not treat the issue of sanitation any differently. Nevertheless, some NGOs do some useful work in tackling sanitation problems, but responsible co-ordination and monitoring attuned to achieve results is absent.

1.5 An Action Plan: Integrated Low Cost Sanitation for Liberation of Scavengers Scheme

Low cost sanitation facilities have been provided since the plan era through different schemes operated by different agencies such as the Ministry of Welfare (MOW), the Ministry of Urban Development (MOUD)[3], the Housing & Urban Development Corporation (HUDCO), Ganga Action Plans, state government and local agencies. These schemes have now largely been integrated into one scheme, namely, the **Integrated Low Cost Sanitation for Liberation of Scavengers**, as a part of the Action Plan of the Government of India for the elimination of manual scavenging by the end of Eighth Five Year Plan period. This scheme was introduced during the financial year 1988-89.

1.6 Aim of the Programme

The prime objective of the integrated programme is to eliminate manual scavenging due to dry latrines or open defecation. A whole town approach is being followed by (a) the conversion of the existing dry latrines into low cost pour flush twin pit latrines, (b) the construction of new pour flush latrines and (c) the provision of community latrine facilities for those households where the provision of sanitation units is not possible due to space constraints or difficult soils, water table conditions or other reasons.

1.7 Financial Aspects

The programme for conversion/constructionof latrines up to plinth level, is financed by the Government of India, with a subsidy component provided by MOUD and a supplementary loan component from HUDCO. The subsidy and loan rates are based on a beneficiary's income level. Subsidies are provided to Economically Weaker Sections (EWS) and Lower Income Groups (LIG) only. For construction up to plinth level, a HUDCO loan is available ranging from 50% for the EWS category to 75% for the HIG category under usual housing norms. For community latrines, 90% of the cost is made available by HUDCO as a loan to a local body, and the balance is met by the local body and state government. As the cost of construction of superstructure is not covered under the Integrated Low Cost Sanitation Programme, HUDCO has extended its normal programme of financing to cover this component as per the financing pattern for construction of houses for various categories.

[3] Now called the Ministry of Urban Affairs and Employment

1.8 Role of NGOs in Implementation of the Programme

NGOs play an important role in the implementation of the programme in a number of ways:

(a) NGOs are important in the identification of beneficiaries, motivation of the community to come forward for conversion of dry latrines/construction of new latrines, collection of beneficiaries, the education of the people to have a clean and hygienic environment and use pour flush latrines, as well as in the organisation of labour and materials for implementation of the programme;

(b) Various methods are adopted for creating awareness within the community about the programme, namely, motivation through a house-to-house approach, the printing of posters, pamphlets, cinema slides, drum beating, newspapers, etc. NGOs also print all necessary forms including agreement forms, etc.;

(c) The local bodies lay down the guidelines for execution of work, procurement of materials under the supervision of their officials, and, thereafter, release funds (i.e., the subsidy and loan components) to NGOs for implementation. The total amounts of interest and principal payable by beneficiaries are worked out on a regular basis, along with property taxes, in an appropriate manner by local bodies. Periodic progress reports are also prepared by NGOs and monitored by local bodies for higher level formulations of any corrections that might be necessary to achieve targets, and

(d) The scavengers liberated on completion of the scheme are invariably absorbed in the respective municipalities/localbodies as street sweepers, drain cleaners, gardeners, etc. For changing the designation of the scavengers, the local bodies take appropriate action to obtain approval of the competent authorities. The children/dependants of the scavengers and/or private scavengers are required to be trained/educated for alternate employment opportunities or self-employment; and, for this, NGOs/voluntary organisations may be involved to upgrade the social status of scavengers. There are three important NGOs, apart from localised smaller ones, which have contributed reasonably well in implementing low-cost sanitation-cum-scavengers liberation programmes. They are: (1) Sulabh International Social Service Organisation, Patna, Bihar (2) Safai Vidyalaya, Ahmedabad, Gujarat and (3) Gandhi Smarak Nidhi, Pune, Maharashtra.

Sulabh International Social Service Organisation (SISSO) has brought about significant change in the movement of liberation, training and rehabilitation of scavengers and their dependants by implementation of low cost sanitation schemes through technological innovations. The scale of operation originating from Patna (Bihar) has spread, not only to different states and union territories, but also beyond the nation's frontiers. Whereas, the other important NGOs, namely, Safai Vidyalaya and Gandhi Smarak Nidhi, restricted their areas of operation to Gujarat and Maharashtra respectively. Sulabh has implemented the scheme of low cost sanitation by conversion/construction of 730,430 pour flush latrines and constructing 2879 community complexes, which are being operated and maintained on a "pay and use" basis. In other words, about 10 million people every day (6 million from PF latrines and 4 million from community toilet complexes) are being benefitting from using the services and facilities provided by Sulabh International in India. It is reported that by conversion of dry latrines and construction of community complexes as many as 37,000 scavengers have been relieved of scavenging work; 240 towns have been declared as scavenging free; 61 human excreta based bio-gas plants have been installed, and 3406 liberated children/dependants of scavengers have been trained in

Sulabh Institutes at Delhi and Jambhul (Maharashtra), as well 312 children scavengers getting training in Sulabh Public School in Delhi and 96 in the Technical Training Centre of the main campus of Sulabh International, Delhi.

1.9 Methodology of the Research

The implementation of low cost sanitation schemes is being carried out by various non-government organisations (NGOs), local bodies and contractors. Sulabh has implemented the scheme of conversion/construction of PF latrines in households and is maintaining community toilet complexes in eighteen states and two union territories. So far, it has covered 1179 towns in these states and union territories. After submission of the preliminary report of this study, it was felt that all the ten towns taken up for the study were those where Sulabh International had implemented the scheme. Hence it was decided that five additional towns be taken up for the study where other NGOs had implemented schemes.

1.10 Selection of Towns/Cities

It was decided that 50 percent of the states would be covered for a household survey of individual household PF latrines and beneficiaries of community complexes. Accordingly, ten states were selected originally covering all the major zones of India - North, South, East, West and Central. From each state, one town was then selected on a purposive sampling basis. The criteria used for selection were size of population, geographic distribution, size of sanitation aspects covered, physical and socio-cultural characteristics of the areas, etc. It was decided that selection of the towns should be such as might represent very large metropolitan cities as well as relatively smaller and medium size towns. Thus, four metropolitan cities, i.e., Hyderabad, Bangalore, Bombay and Madras, each with more than 25 lakh residents, medium towns of Patna and Bhopal, each with a population of 10 lakh, and four relatively smaller towns, Mirzapur, Ajmer, Puri and Jammu, all of which have fewer than 5 lakh inhabitants, were selected. These towns/cities have a heterogeneous character, differing not only in physical characteristics, but also in socio-cultural characteristics. They belong to different linguistic, social and cultural regions. So far as physical characteristics of the towns/cities, they range from alluvial to sandy and rocky.

It was also decided that the selected towns/cities should be such as to cover both large and small scale sanitation measures. Therefore, Jammu, Puri, Ajmer and Mirzapur, each with fewer than 20 community toilet complexes; Hyderabad, Patna, Bangalore, Madras and Bhopal, all with 20 to 39 complexes, and Bombay, with a large number of complexes (201) operated by Sulabh, were selected. The main reason for selection of Bombay was to understand the various facets of management of a city having a large number of community complexes catering to the needs of commuters as well as local beneficiaries.

1.11 Sampling Procedure: Household Toilets

The sample size of beneficiaries of household toilets has been worked out on the basis of a percentage of total number of household toilets converted/ constructed by the NGO in each selected town. It was decided that one and a half percent of sample beneficiaries would be interviewed with a minimum number of 100 in each town. In case the number of beneficiaries is

less than 100 in any town, all beneficiaries would be interviewed. All these beneficiaries have been selected from east, west, north, south and central areas of each town. The total number of beneficiaries in the ten towns (excluding Bombay and Bangalore where household toilets have not been converted/constructedby Sulabh) works out to 1196. But in some towns, the number of sample beneficiaries exceeded the required sample size. Thus, the total number was marginally increased, and 1208 beneficiaries have been interviewed against the target of 1196 beneficiaries.

1.12 Sampling Procedure: Community Toilet Complexes

The selection of sample beneficiaries of community complexes has been done on the basis of purposive sampling. It was decided that the selection of community complexes in each town would be done on the basis the maximum number of visitors to the complex. Beneficiaries of community complexes were interviewed from morning till evening. It was also decided that from each community complex at least 25 beneficiaries would be selected. Eighteen community complexes, out of a total of 408, have been selected in ten towns, where the maximum number of people avail of toilet-cum-bath facilities. Out of eighteen, six community complexes have been selected from Bombay city alone, where a large number of local people and commuters are availing of the facilities every day. Thus, a total sample of 468 beneficiaries has been interviewed as against the sample size target of 450 beneficiaries. It may be added that sampling procedure adopted for additional five towns was the same, as for the ten towns studied earlier.

Thus for the second phase five towns, the total sample size for household toilet beneficiaries was 446 against which 441 schedules were administered. One community complex was selected in each of these five towns and from each complex 25 beneficiaries were selected. The total sample size for community complex beneficiaries was thus 125, and all were administered.

2. Impact Areas and Assessment: Case Study of Selected Towns

This section attempts to highlight briefly the geo-physical status, demographic characteristics, slum population, household toilets and community toilet complexes constructed by Sulabh and other NGOs, the survey findings, as well as to assess the gap in toilet facilities in fourteen selected towns.

2.1 Hyderabad (Andhra Pradesh)

The city of Hyderabad is located near 17 degrees north latitude and 78 degrees east longitude and is spread over an area of 269 sq. km. Elevated about 536 metres above sea level, its soil is sandy and granite. It receives an average rainfall of 880 mm in a year. Potable water is available at a depth of 30 metres. The water level in summer/winter varies between 15 and 40 metres. The city has a population of about 30 lakhs, out of which about nine lakh people reside in the slums which cover about 3.63 sq. km.

Before the introduction of the LCS Programme in the city, there were about 3.5 lakh households, of which about 27% or 94,395 people did not have latrines in their houses. About 27% of the houses have sewer connections, and about 46% are covered with septic tank or other water flush latrines. Under the LCS Programme, Sulabh started its operation in the city in 1986, and, by the year 1990, it constructed 7402 household latrines, all of which are currently used. Later on, other NGOs, namely the Urban Poor Society, Weaker Section Society and Urban Poor Syndicate constructed/convertedabout 7300 PF latrines.

About 1873 scavengers were identified in the city of Hyderabad; 227 of them had received training in different trades. In all, 466 scavengers had been liberated till August 1995.

There are 26 community toilet complexes located in different areas of Hyderabad city which were constructed and are being maintained by Sulabh. These complexes were constructed between 1986 and 1995. All of them have toilet facilities for both males and females, though the number of toilets for males is more than those for females. There are altogether 165 units of toilet for males as against 70 for females. As for bathing facilities, there are 79 units for males as against 26 units for females, while there are 81 urinal facilities in 16 complexes for males as against 2 for females. The average number of daily users per complex works out to 1046, with a minimum of 200 and a maximum of 2500. The number of disabled persons and children visiting these complexes accounts for about 15 per cent and 14 per cent respectively. At each complex, 4 to 6 social workers (caretakers and attendants), depending upon the size of the complex, are deputed for the maintenance of the complex. They also collect the service charge from the users. Only one complex, located at Secunderabad Railway Station, is being maintained by another NGO, the Lions Club. Apart from these, about 349 public toilets are being maintained by the Municipal Corporation.

About 1500 metric tons of solid waste are generated in the city everyday, of which only 1000 tons are sent to two land fill sites. Since only two thirds of the solid waste is cleared by the Municipal Corporation, about 500 tons are left unmanaged and cause nuisance, lack of

sanitation and environmental degradation in the city. About 522 million litres a day of waste water are being generated in the city, of which only 140 million are collected for treatment, and the rest flows through surface drains causing water pollution.

2.2 Patna (Bihar)

Patna stands on the banks of the Ganga River, covering an area of about 109.22 sq. km. Its elevation above mean sea level is 53 metres, and its soil is alluvial. Good quality underground water is available. The water table varies between 5 and 7 metres, while the water level settles between 5 and 12 metres. The city receives an average annual rainfall of 1154 mm. Patna had a population of about 9 lakhs in 1991, and about 35% of them are slum dwellers. About eight per cent of the total area of the city is occupied by slums.

Prior to introduction of the LCS Programme in the city, there were about 76,000 households, and about 22,000 of them did not have any latrines in their houses. About 10,000 septic tank latrines were there, and about 6000 households were covered by sewers.

During the period 1985-86 to 1987-88, a total of 1465 scavengers (males 1266 and females 199) which include their dependants, were liberated and imparted training in nine different trades (short hand, typing, carpentry, electrical work, mechanics, leather goods working, tailoring, canework and masonry). There were about 900 scavengers working with the corporation and all of them have been absorbed by it.

Sulabh started constructing household toilets in Patna in the year 1974, and up to the year 1987-88, 18,235 households were finished. All the latrines are currently being used. No other organisation is active in providing PF latrines in the city.

There are 39 Sulabh operated community toilet complexes located in different areas under Patna Municipal Corporation. These community complexes were constructed between 1977 and 1984. The majority of complexes were constructed before 1980. As many as 24,800 people visit these complexes per day, of which 8272 (33.4 per cent) are women, 1575 (6.4 per cent) are children, 4745 (19.1 per cent) are disabled persons and 10,208 (41.1 per cent) are adult males. All the complexes have toilet facilities, 510 units for males as against 73 units for females. Twenty complexes have 55 units of bathing facilities for males as against six for females with 18 bathing units. Twenty-five complexes have 63 units for urinal facilities for males as against two complexes for females with seven units. The number of visitors to these complexes varies from 50 to 4000 per day. Comparatively, more people are availing of the facilities of community complexes located at Patna Railway Station, Patna Bus Stand and Gandhi Maidan.

In addition, Akhil Bhartiya Paryavaran and Gramin Vikas Sansthan, an NGO, has also constructed 39 community toilet complexes in the city. Besides these, there are nearly 135 community complexes constructed and operated by the Municipal Corporation. All of them have been in a very dilapidated condition for a long time.

The management of solid waste in the city is the responsibility of the corporation, the performance of which in regard to solid waste management is not satisfactory. About 1000 tons of garbage are generated in the city every day, but only 300 tons are cleared. The participation of the local people in this activity is almost negligible.

At present Patna has two functional effluent treatment plants, where a part of the waste water of the city is managed properly. But in many parts of the city, there is no proper system of waste water management. Moreover, the low lying areas of the city get flooded during the monsoon and create environmental pollution. Out of 141 million litres of generated sewage, only 83.2 million are cleared. The 3 lakh cattle population mixes freely with the 10 lakh plus humans creating very difficult sanitary problems.

2.3 Jammu (Jammu and Kashmir)

Located near the 33rd north parallel and 75 degrees east longitude at the foothills of the Himalayas, Jammu is 450 metres above mean sea level and is spread over an area of 40 sq. km. Its thin layer of alluvial soil covers boulder conglomerate mixed with hard clay. Groundwater is available at a depth of six metres. The average annual rainfall in the city is about 1348 mm. No census was not conducted in Jammu and Kashmir in 1991. According to 1981 Census, the city had a population of about 2 lakh. Only three per cent of the people of the city reside in the slums, which comprise 1.5 sq. km.or about 3.75% of the total city area.

Prior to introduction of LCS in the city, there were 35,771 households, of which 8700 houses had septic tank latrines, 17,500 had dry or bucket latrines and 9571 houses had no latrines at all.

There were about 1054 scavengers in the city before the LCS programme started. Out of these, 371 (146 males; 225 females) have been trained. Males received training in computers and females in cutting and dress designing.

Sulabh started constructing household toilets in the city in the years 1984-85, and, by the year 1990-91, 9258 households were completed. All the households are currently using the toilets. There are eight Sulabh operated community toilet complexes in Jammu. Five of them were constructed during the last three to four years. All eight complexes have toilet facilities for females. There are 53 units of toilet facilities for males as against 15 for females. As for bathing facilities, six complexes with 21 total units are for males as against two complexes with two units each for females. As for urinals, six complexes with 18 units are for males. The number of visitors to these eight complexes per day is 2372. The number of users for individual complexes varies between 12 and 750. The disabled and children constitute a very small proportion of users - just a little over three per cent. The number of social workers attending a complex varies from two to five.

Solid waste in the city is collected and disposed of by the municipality, and waste water is disposed of through open drains.

2.4 Bangalore (Karnataka)

The city is located near the 13th parallel and the 78th east longitude, with an area of 225 sq. km. The elevation of the city is 900 meters above mean sea level. The soil is a series of black cotton, red loam rocky gravel. It receives an annual average rainfall of 780 mm. The ground water levels are seven to eight metres and five to six metres during summer and winter, respectively. Water available here is potable but hard. According to the 1991 Census, the city had a

population of 26.6 lakh. About 13% of the city population lives in the slums, which occupy 6.7% of the city area.

In Bangalore, 2501 scavengers were identified, of which 1307 were males and 1134 females. Among the liberated scavengers, 1367 (840 males and 527 females) are self employed and 421 are employed in different organisations.

There are 38 Sulabh operated community toilet complexes in different areas of Bangalore. These were constructed between 1982 and 1995. All the complexes have toilet facilities for males as well as for females. The number of units of toilet facilities for males in these complexes is 364 as against 217 for females. Out of the 38 complexes, 37 have 163 units of bathing facilities for males and 102 for females, 29 complexes have 183 units of urinals for males as against two complexes having one urinal facility each for females. The total number of persons visiting these complexes a day is around 27,320. The users of individual complex per day varies between 5 to 3500. The average number of visitors works out to 719 per complex. The number of disabled persons visiting these complexes is two percent. Children also constitute two percent of users. The number of social workers attending the complexes varies between one to eight for day to day maintenance as well as the collection of service charges.

Nearly 63% of the area of the city has sewerage facilities, and nearly 2130 tons of solid waste are generated. The responsibility for collection and disposal is vested with the Municipal Corporation, although only 1800 tons of garbage are cleared by the corporation. Out of 275 million litres of sewage generated in the city, only 250 million are cleared. It is one of India's cleaner cities, but with the fast expansion of the city and migrants pouring in, it is becoming difficult for the corporation to cope with the demand for services.

2.5 Bhopal (Madhya Pradesh)

The city is located near the intersection of 23rd north latitude and 77th east longitude. It lies on the edge of Malwa Plateau and is about 460 metres above mean sea level. The city is spread over an area of 284.9 sq. km. Soil comprises a series of red stone, black trap and murrum, clay silt, lime stone and black cotton soil. Average rainfall over the city is about 1260 mm. The ground water level varies between three to eight metres. In 1991, Bhopal had a population of 10.6 lakhs, and about 23% live in slums, which occupy 1.17 per cent area of the city. Before the LCS Programme started in 1987, there were about 2.5 lakhs households. No data of the status of latrines in the town were available. However, a rough assessment is that about 50,000 houses had dry/bucket latrines.

There were also 17,100 scavengers in the city, of whom 1624 have been rehabilitated. Of them, 1811 have been trained in different trades.

Sulabh started constructing household toilets and community toilet complexes in 1986-87. It constructed 21,558 household toilets and 38 community toilet complexes between 1987 and 1995. Other NGOs have constructed 14,240 household toilets between 1991 and 1995. There are 229 public toilets in the city, which are being operated and maintained by the Municipal Corporation.

Due to certain constraints, the entire town was not taken up for study. The universe was restricted to a concentrated locality of slums, where 605 household toilets and four community

toilet complexes exist. These household toilets and community complexes were constructed between 1986 and 1992. All four complexes have toilet facilities for both males and females. The number of units of toilet facilities for males is 41 as against 34 for females. Similarly, all the complexes have bathing facilities for both males and females. The number of bathing units for males is 22 as against 20 for females. The two complexes have urinals for both males and females. The total number of units for males is nine as against two for females. The number of persons visiting these complexes is a little over 1000 per day with an average of 250 visitors per complex. The proportion of disabled persons visiting these complexes is about four per cent and children about 19 per cent.

While part of the town has sewerage, the major part of the old town is not covered, and almost all the dry/bucket privies exist in this portion of the town. Bathroom and kitchen waste water in unsewered areas are disposed of through surface drains. About 500 tons of solid waste are generated in the town. The corporation has a fleet of vehicles and equipment for its transportation to disposal sites. A mechanical composting plant in collaboration with M.P. Agro Development Corporation has recently been installed, which takes care of 100 tons of solid waste. The remaining is disposed of by a sanitary land fill system. The bucket/dry privies are cleaned by privately employed scavengers. They carry the human excreta to collection depots from where it is transported to the trenching ground by the Municipal Corporation through tankers.

2.6 Bombay (Maharashtra)

Bombay is located at the intersection of the 19th north latitude and 71st east longitude. The city has an area of 437.7 sq. km., and the soil is predominantly black cotton. It receives an average annual rainfall of 1902 mm. The water level settles at about 7.6 metres during summer and at about six metres during winter. Water available below the ground is salty and sour. The city had nearly ten million inhabitants in 1991. Forty-five per cent of the city population resides in the congested slums, which constitute only 45 per cent of the city area. As per the survey conducted by Mahatma Phule Backward Class Development and Finance Corporation, 21,631 Safai Karmacharis have been identified. Out of them, 16 males and 10 females have received training in vocational trades such as the computer trades, beauty parlour work, photography and motor mechanics. The remaining 21,605 are reported to be employed either in the Municipal Corporation or other organisations.

It is reported that household toilets (PF latrines) have not been constructed in Bombay city at all, although there are as many as 201 community toilet complexes constructed and being maintained by Sulabh. Most of these complexes were constructed during the last five years. All complexes have toilet facilities for men with 1235 units. One hundred and ninety four complexes have toilet facilities for women with 725 units. Out of 201 community complexes, as many as 93 have bathing facilities for men with 148 units,and 29 complexes have bathing facilities for women with 36 units. All the complexes have urinal facilities for males with 703 units. The total number of visitors to these complexes is 4.28 lakhs per day with an average of over 2000 per complex. About 3.5 per cent of visitors are disabled persons, and 16 per cent are women. Five to six social workers attend to each complex.

About 5800 tons of garbage are generated in the city every day, but the Municipal Corporation manages to collect only about 5000 tons for landfill and sundry purposes. Out of 1800 million

litres of sewage generated a day, 1460 million are collected for treatment, and the rest is discharged through drains into the Arabian Sea.

2.7 Puri (Orissa)

A small city on the shores of the Bay of Bengal, Puri has an area of only 16.84 sq. km. The average elevation of the city is about 12 meters above mean sea level. The city's soil is alluvial, and it receives, on average, rainfall of 1352 mm a year. Ground water is available at a depth of 9.14 metres. The water level in summer varies between six and twelve metres, while in winter it varies between three and eight metres. Water available here is slightly saline. In 1991, the city had about one lakh of population. More than 30% of the city population is lives in slum areas, which occupy 4.45% of the city.

Before the introduction of LCS, there were 14,193 households in Puri, of which 8145 had dry latrines, and 6048 had septic tanks. In 1987, Sulabh started the work of household toilet construction, and a total of 2064 households have been covered till date. No other organisation is engaged in household toilet construction.

Prior to the introduction of LCS Programme, there were 601 scavengers in the town. About 432 of them have been liberated and are working in different organisations. However, no training has been imparted to them.

There are only five Sulabh operated community toilet complexes in Puri town. They were constructed between 1985 and 1990. All the complexes have toilet facilities for both males and females. The number of units for toilet facilities in these five complexes for males is 51 as against 32 for females. All the complexes have bathing facilities for males and females, and the number of units is seventeen and five respectively. Only in three complexes are urinal facilities available for males, while for females all complexes have this facility. The total number of visitors attending these complexes is 1875, with an average of 375 visitors per complex. A little over four per cent of the users are disabled persons and about three per cent are children. In each of these complexes, there are four to five social workers attending to the day to day maintenance and collection of service charges. Apart from Sulabh, the Municipality maintains three community complexes and the facilities can be used free of charge.

2.8 Ajmer (Rajasthan)

Ajmer is located near the 26th north parallel and the 75th east longitude, surrounded by the hills around Pushkar of the Aravalli Range. Its altitude is about 870 metres. The city receives an average rainfall of 494 mm per year, and it has sandy and rocky soil. The ground water level varies between 60 and 90 metres. The area of the city is 241.6 sq. km., and the population in 1991 was 4.03 lakh. The proportion of slum population in the total population for the city is relatively low, i.e., only 1.48 per cent. Slums occupy 0.7 per cent of the city area.

In Ajmer, there are 67455 households, of which 14,179 (21%) did not have any toilet facilities in 1991. As reported, neither the data of different types of latrines (including dry latrines) nor data on scavengers were made available by the concerned authorities prior to commencement of the LCS programme.

Sulabh started constructing household latrines in the city in 1989-90, and by 1994-95, 23,050 households were covered. There are seven Sulabh operated community toilet complexes in Ajmer town. These were constructed between 1988 and 1992. All the complexes have toilet and bathing facilities for both males and females. In these, complexes, 80 units of toilet facilities and 34 bathing units for males exist, as against 35 and 22 respectively for females. As for urinals, all the complexes have this facility for males with 24 units as against one complex with two units for females. A total of 1250 persons visit these complexes per day, with an average of 180 persons per complex. The number of social workers per complex is six to eight.

About 200 mld of waste water generated in the city directly flows through surface drains to Anna Sagar channel causing water pollution. There is no sewerage system in the town. Moreover, about 250 metric tons of solid waste are generated in the city every day, of which collection and disposal responsibility is with the municipality. There is a land fill at Makhpura near Dattavir, Vadirabad Road, and the municipality has a fleet of vehicles and equipment for its transportation to the disposal site.

2.9 Madras (Tamil Nadu)

The fourth largest city in India, Madras is located near the intersection of 13 degrees north latitude and 80 degrees east longitude and is on the Bay of Bengal. Elevation rises as the distance from the sea increases, but most of the city is at sea level. The predominant soil is alluvial with scattered patches of gravel. Due to the proximity of the sea, the ground water level is one metre to five metres, and water is saline. The city has an area of 571.93 sq. km., and the population was 38.41 lakhs in 1991. About 42 per cent of the people live in slums covering 10.14 per cent of the total area of the city.

In 1990, Sulabh constructed 28 household latrines in the city. However, one of the latrines has been demolished for reconstruction, and, in another case, the house has been demolished leaving the latrine intact. So, at present, 26 of them are being used.

As reported, a survey for the identification of scavengers was not carried out in Madras city because the Municipal Corporation took the stand that there were none, and only sanitary workers were employed by the corporation for cleaning streets, etc.

There are 86 Sulabh operated community toilet complexes in Madras city. Most of them were constructed between 1990 and 1995. Out of 86 community complexes, 76 have altogether 509 units of toilets for men, and the remaining 10 complexes have none for men. In 73 community complexes, there are 439 units of toilet facilities for women, and the remaining 13 complexes have none. As for bathing facilities, 72 complexes have bathing facilities for men as well as women. The number of bathing units in these complexes is 132 for men and 122 for women. As for urinals, 22 complexes have 78 units for men, and only three complexes with 15 units have urinal facilities for women. The total number of visitors to these complexes is about 56,000 per day, with an average of 650 per complex. About nine per cent of visitors are children. It is significant that 46 per cent of the visitors are women. The number of social workers attending each complex is three to four.

About 2675 tons of garbage are generated in the city every day, but only 2140 tons are cleared. Out of 250 million litres of sewage generated, 238 million are collected and millions of litres flow untreated into three waterways: the Covum River, the Adyar River and the Buckingham

Csanal. The stagnant channels of sewage on the river bank pose a major health hazard, exposing the slum dwellers to filariasis.

2.10 Mirzapur (Uttar Pradesh)

Mirzapur is small city situated at the conjunction of the Gangetic plain of Uttar Pradesh and the Vindhyachal Range. The soil is predominantly alluvial, but silt, sandy loam and kankar are also found. Its elevation from mean sea level is 84.84 metres. Ground water is available at a depth of about 16 metres. The water level during the summer is 16 metres, while during the winter it is about 13 metres. Water is potable. The area of the city is 38.85 sq. km. and the population was 1.69 lakhs in 1991. About 41% of its population reside in slums which constitute about 23.8% of the total town area.

Prior to the introduction of LCS, there were 20,341 households in the town. Of these, only 1020 had septic tank latrines. The city had 10,170 households with dry latrines, while the rest did not have any toilet facilities. Sulabh started constructing household toilets in the city in the year 1988-89, and by 1993-94, 2878 of them were built. No other NGO was involved.

Before the introduction of LCS, there were 446 municipal and 70 private scavengers in the town. The LCS resulted in the liberation of 115 scavengers. No training was given to them. Of the liberated, scavengers 32 are self employed, 53 are employed by the municipality, six by Sulabh, and the rest are employed by different organisations.

There are 19 Sulabh operated community toilet complexes in Mirzapur town. These were constructed between 1992 and 1995. All the complexes have toilet and bathing facilities for males and females. There are together 143 toilet units and 64 bathing units for males as against 138 and 38 respectively for females. Out of 19 complexes, only 17 have urinal facilities for males, with two units at each. The total number of people visiting these complexes per day is around 6106, with an average of 321 per complex. Among the users, eight per cent are disabled, 22 percent women and 24 per cent children. The number of social workers attending the complexes for their maintenance and the collection of the service charge varies from one to three per complex depending upon the number of units and users. No other NGO is involved in constructing and maintaining community complexes.

The town does not have a sewerage system. Almost the entire town has open roadside drains, which carry the sullage to eight big covered drains leading to the Ganga River. Solid waste is carried by sweepers through buckets or wheel barrows to the collection places from where it is carted outside the town for trenching or dumping in low lying areas for land fill.

2.11 Gopalganj (Bihar)

A small town, in the gangetic plain of Bihar, Gopalganj, has an area of about 11 sq. km. Alluvial formation in the area is about 20 metres. Good quality ground water is available at four to seven metres depth depending on the season. Average rainfall is about 1292 mm. It has a population of about 36,000 of whom about 6500 live in the slums. The slums are spread over about 1.26 sq. km., which is about 11.30% of the total area of the town.

The municipality had about 45 scavengers for servicing the dry latrines before the liberation programme started. About 36 scavengers have been liberated and absorbed in the municipality, but none of them are reported to be trained.

Prior to introduction of the low cost sanitation programme in 1984-85, there were about 4235 households. In about 1683 households, there were dry/bucket latrines; 1021 households other types of latrines, and 1531 households had no toilet facility at all.

Initially, Sulabh International was nominated to implement the LCS programme, and they converted/constructed935 pour-flush latrines during 1984-86. About three years back, the state government nominated another NGO, International Institute of Sulabh System, and it converted/ constructed 537 pour-flush latrines during 1992-95 In all, 1472 pour flush latrines have been converted/constructedin the town.

There are only two community complexes (one more is under construction). The first is of the pay and use type with eight toilets (6 males and 2 females), one bath room and two urinals for males only. On average, about 300 male adults, 200 female adults and 15 children use the complex every day. One of the complexes is being maintained by the International Institute of Sulabh System by engaging six social workers. The second community complex is used and maintained by the police force only and has no facilities for women.

Collection and disposal of solid waste is an obligatory function of the municipality. This is being done manually and disposed of through tractor/trailer. The system is reported to be far from satisfactory. Lack of finance, labour problems and the absence of a compatible management system are some of the causes for this state of affairs. The drainage system for disposal of waste is also not satisfactory. During rainy season, the low lying areas get flooded and create environmental hazards, particularly in slum areas. The participation of local people to resolve these problems is negligible.

2.12 Barwani (Madhya Pradesh)

The town is situated on the banks of the Narmada River. It has an area of 16 sq. km., and the soil is black cotton. It is about 177.5 metres in elevation with an average annual rainfall of about 507 mm. Soft and good quality ground water is available at a depth of about 15 to 20 metres. In 1991, the town had a population of 33,678 with 4862 households. About 8698 people live in slums, spread over about 7.5 sq. km. (47%) of the town area.

Prior to the LCS programme in 1991-92, out of 4862 households, 267 had water flush toilets connected to septic tanks, 1810 households had dry/bucket latrines and the remaining 2785 households did not have toilet facilities.

In 1991-92, eighty scavengers (37 male, 43 female) were identified who were servicing dry latrines. Out of them, 56 (24 male, 32 female) have been trained in different trades and rehabilitated.

Initially, Sulabh started implementation of the LCS programme and converted/constructed654 pour flush latrines in 1991-92. Later, the implementation of the LCS programme was entrusted to another NGO (Akhil Bhartiya Rachnatmak Karya Sansthan), and it converted/constructed 755 pour flush latrines during 1992-94. Thus, nearly 3200 households are yet to be reached.

There are only two community complexes; one is the pay and use type, and the other a non-pay and use type. Both of them are maintained by the municipality. The former is three seated (2 for male, one for female), and the latter is 4 seated (2 each for male and female). No bathrooms have been provided in either of them. However, a urinal facility (2 units for male and female each) exists in the latter. About 100 persons use each of the complexes daily. Both are connected to septic tanks. Water is available to the users only during municipal water supply hours, as there is no water storage facility.

Solid waste is collected by the municipality and disposed of as sanitary land fill. For disposal of town waste water, there are surface drains discharging into the river.

2.13 Ambattur (Tamil Nadu)

Ambattur is situated in the Chengalpattu MGR district close to Madras city and is spread over an area of 40.36 sq. km. It is an important industrial centre. Its elevation from mean sea level is five to six metres, its soil is clay/sandy clay, and it has an average annual rainfall of about 1200 mm. Ground water is available at a depth of two to six metres, depending on the locality and season, but its quality is not good; it is generally saline as Ambattur is near the sea. According to the 1991 census, it had a population of 215,424, of whom 138,992 (64.52%) were living in slum areas. It is really a town full of slums, since 84.12% of the total town area covering about 34 sq. km. is occupied by slums.

The LCS programme was introduced in 1991. It is not known how many dry latrines existed prior to it. However, out of 48,322 households, 3785 had no toilet facilities. The conversion/constructionof pour flush latrines was entrusted to an NGO (Kalai Selvi Karunalaya), and it converted/constructed1450 pour flush latrines during 1991-94.

Earlier, 51 scavengers (14 males, 37 females) were employed in scavenging by the municipality. They have been absorbed as sanitary sweepers after the initiation of the scavengers liberation scheme. Training has not been imparted to these scavengers. Information is not available about the number of private scavengers, who are still engaged in scavenging work.

There were 29 community complexes (out of which one has been demolished). These complexes were constructed by contractors engaged by the municipality. It is reported that five community complexes are being used and the other 23 are not in use. But of these five, two are of the pay and use type, and the other three are of the non-pay and use type. Each of these five has one person for maintenance engaged by the municipality, and the remaining 23 which are not in use have no people engaged to maintain them.

Generally, bullock carts and lorries are used for the clearance of solid waste, and surface drains spill over. Sullage stagnates here and there causing unsanitary conditions, health hazards and environmental pollution and degradation in a slum town with a large number of industrial units.

2.14 Gonda (Uttar Pradesh)

The town is located to the northeast of Lucknow near the border of Nepal. Its soil is sandy/clay, and its elevation is 95 metres above mean sea level. It has an area of 12.67 sq. km. The average

annual rainfall here is 1080 mm, and potable ground water is available at a depth of three to six metres. As of 1991, the town had a population of 106,000, 26.9% of whom resided in slums. The slums occupy about 35.52% (4.56 sq. km.) of the total area of the town.

The low cost sanitation programme was introduced in 1991-92. At that time, there were 12,223 households. About 8882 households had dry latrines, 611 households had septic tank latrines and 2730 had no latrines at all. NGOs (Sulabh International and Manav Uthan Samiti) were involved in implementing the LCS programme. A total of 2390 pour flush latrines were converted/constructed. There are 10 community complexes in the town, and all are pay and use types. These complexes were constructed by Sulabh, Manav Uthan Maha Samiti and private contractors in co-ordination with the municipality. Five complexes are being maintained by Sulabh, three by the municipality and the remaining two by private contractors. One to three social workers are engaged for maintaining these complexes. Toilet and bathing facilities are available in nine complexes for both males and females, but in one complex, toilet facilities are available and not bathing facilities. There are urinals for males in six complexes, and three complexes have urinal facilities for females. The number of visitors to a complex varies from an average of eight to 418 per day.

Prior to the introduction of the LCS programme, the municipality had 213 municipal scavengers (128 males, 85 females) and 142 private scavengers (85 males and 57 females). All of them were identified for the scavenger liberation and rehabilitation programme. None of them was given training, but all the liberated scavengers have been provided with some financial assistance (between Rs. 15000 and Rs. 25000) through banks and the SC & ST Finance Corporation to find jobs. Out of 355 identified scavengers, 90 (54 males and 36 females) are self employed as rickshaw pullers and band and loudspeaker workers during weddings and other functions.

Solid waste is disposed of by the sweepers of the municipality. Waste water from households is discharged into open drains causing acute environmental problems due to extensive waterlogging.

3. Approaches to Low Cost Sanitation Technology

Under present economic conditions, sanitation facilities can not be provided in urban areas in the foreseeable future if sewerage and septic tank are continued to be advocated due to their high capital, operation and maintenance costs and other operational problems. Therefore, an appropriate technological option which provides the most socio-culturally and environmentally acceptable level of service at the least economic cost has to be found. In India In 1930, The search for a safe and economical alternative to sewerage and septic tank systems for the disposal of night-soil suited to India's socio-cultural and economic conditions began. Various low-cost sanitation methods like khurpi, trench, dug-well, bore-hole latrine, over-hung latrine, drop-privy, aqua-privy, off-set compost latrine, etc. were tried, but they all failed. They could not function in Indian conditions.

The first pour-flush water seal system with spot disposal of human waste was developed by the All India Institute of Hygiene and Public Health (AIIH&PH), Calcutta in the mid-forties, and it was then known as the "dug well latrine". The Research-cum-Action(RCA) Project was later taken up by the Government of India through the Health Centres of Poonamallee (Tamil Nadu), Singur (West Bengal) and Najafgarh (Delhi) in the mid-fifties. Another project was taken up at Planning, Research-cum-ActionInstitute (PRAI), Lucknow (U.P.) in 1958, and the off-set double pit system evolved. These efforts were, however, restricted to rural areas.

In 1970, Sulabh International first developed and introduced low cost sanitation in urban areas in a big way. Even the city of Patna, with a population of nearly 5 lakh, was provided with this innovative system of excreta disposal in congested localities. Sustainability, replicability and affordability are the three important qualities which should be considered while choosing a technology, and the Sulabh Shauchalaya (twin pit pour flush toilet) developed by Sulabh International in 1970 fulfils these criteria fully. It is socio-culturally acceptable, affordable, easily available, and users are able to operate and maintain it conveniently. It provides all the health benefits of safe disposal of human excreta on-site. The Sulabh Shauchalaya is most appropriate to serve as an alternative to bucket privies and prevent open air defecation, and it can be constructed even in the most congested areas of cities and towns.

The Sulabh Shauchalaya is suitable to communities who use water or soft paper for anal cleansing. In India, water is used for ablution, except by a very small section of the population in the far eastern region and at very high altitude. Hence, the Sulabh toilet is highly acceptable, affordable and suits socio-cultural habits and attitudes of the people. The ventilated improved pit latrine can be an alternative for people who do not use water or thin paper for anal cleansing. The squatting pan and trap of a Sulabh Shauchalaya are of special design requiring two litres of water for flushing. Of the two pits, one pit is used at a time. The liquid infiltrates, and gases disperse into the soil through the holes in the pit lining. When one pit is full, the excreta is diverted to the second pit. In about two years, the contents of the pit already filled are digested and become safe for handling. The pit can then be conveniently emptied and is ready to be put back into use once the second pit is full. Thus, the two pits can be used alternatively and continuously. People who do not prefer pour flush oppose this low cost system. However, a two litre flushing cistern has now been developed, which can be fixed, and the pour flush toilet can be changed to cistern flush whenever desired. Thus, it has been possible to overcome one of the factors that led to the non-acceptance of low cost systems by the MIG and HIG populations.

In a Sulabh Shauchalaya, a vent pipe is not necessary as gases are dispersed into the soil. The special feature of this type of toilet is that it has two pits instead of one. The reason being that single leach pit units are appropriate only if they can be de-sludged mechanically by a vacuum tanker, since their contents are not pathogen-free. In the two-pit system, the filled pit can be cleaned manually, even by the house occupant himself, because of the long period of digestion, which makes it free of foul smell and safe for handling. In a single pit system, de-sludging has to be done immediately after the pit has been filled up to enable its re-use, and this involves handling fresh and undigested excreta which is a health risk. If a deeper and larger single pit is provided, de-sludging becomes difficult, and there are greater chances of pollution, especially where the ground water level is high.

The advantages and specialities of the Sulabh Shauchalaya System are as follows:

i) It is a permanent installation which is economical and durable and it is affordable even by the weaker sections of society;
ii) It is odourless, and there is no air pollution as the water seal prevents gases from leaking out of the pit through the pan;
iii) Only a small quantity of water (about two litres) is enough to flush the excreta from the pan into the pit, while a conventional flush latrine needs 14 litres of water for flushing;
iv) It requires less space than a septic-tank latrine. It can be constructed even in a courtyard, corridor, veranda or in the living room of a house, as it is free from foul smell and there is no mosquito, fly or insect nuisance;
v) It can be constructed in cross socio-cultural and economic set-ups, where water is used for ablution, and in varied physical, geological and hydrogeological conditions if proper precautions are taken;
vi) The technique of construction of the Sulabh Shauchalaya is simple so that an ordinarily trained mason can easily build it, and it can be constructed by using local labour and materials;
vii) It can be constructed on the upper floors of buildings as well;
viii) Since the pits are covered with air-tight and water tight R.C.C. slabs, the place can be utilised for other purposes too;
ix) It is free from all health hazards, and it does not pollute surface water, ground water or drinking water sources if proper precautions are taken at the time of construction;
x) Maintenance is easy, simple and costs little;
xi) Services of a scavenger are not needed to clean the pit. The house dweller himself or any labourer can clean it because the sludge of the pit is safe for handling after two years;
xii) Organic manure and soil conditioner of good quality become available to the householder for use in the field or garden;
xiii) It can be upgraded in that the Sulabh Shauchalaya can be connected easily to sewers when sewerage is introduced in the area, and
xiv) A low volume flushing cistern can be attached to avoid pour-flushing.

Moreover, the Sulabh Shauchalaya is cost effective. It can be designed with different specifications and different materials without compromising the basic design principles. Its variable costs ranging from Rs. 500 (US $ 15) to Rs. 5000 (US $ 150). It can therefore be afforded even by the economically weaker sections of Indian society.

The Bihar programme conceived and implemented by Sulabh International drew the attention of WHO, South Asia Region, Delhi. Greatly impressed with the Sulabh's modified design of

two pit pour flush water seal latrine with on-site sanitation, popularly known as "Sulabh Shauchalaya", and its organisational activities, in 1997 WHO decided to study in depth the actual situation on site. An expert mission of WHO visited Patna. By that time Sulabh International had already converted 10,000 bucket privies into Sulabh Shauchalayas in the most congested areas of the city of Patna and 40,000 in other towns of Bihar. The mission observed that to make the programme successful, a dedicated effort towards promotion, motivation, publicity and health education is needed to create awareness among the beneficiaries. The mission learnt from the Director of Health Services, Bihar that Shauchalayas constructed by Sulabh International had not caused any health hazard to the communities where they had been adopted.

The WHO and the Ministry of Works and Housing (now Urban Affairs and Employment), Government of India, in collaboration with Sulabh International and UNICEF, convened the first National Seminar on Conversion of Bucket Privies into Sanitary Water Seal Latrines in May, 1978 at Patna. It was attended by public health engineers, public health specialists, scientists, administrators, planners and decision makers from all the states and central government because of the multi-disciplinary nature of work. Based on the deliberations, and observing the work done by Sulabh in Bihar, the seminar concluded that the Sulabh Shauchalaya is the most appropriate low cost technology to be introduced on a large scale in the urban areas of the country.

In 1979, when the UNDP/World Bank took up the proposal for demonstrating the installation of low cost sanitation on a world wide basis, based on the experience of Sulabh International, the Government of India decided that UNDP/World Bank should take up a feasibility study on low cost sanitation in India in 211 towns spread over in 21 states and union territories. Various studies were carried out by the UNDP/World Bank of the Bihar programme, including the investigation of various technical features and the study of pollution from the existing leach pits. The convincing data based on actual work done in varied physical, hydro-geological, socio-cultural and economic situations in Bihar provided useful material to draft the feasibility report on low cost sanitation. Thus, it was Sulabh International's achievement that showed the path for the adoption of low cost sanitation systems on a large scale, which was finally accepted all over India.

The Government of India, state governments, various national, international and bilateral agencies such as UNDP, UNICEF, World Bank, WHO, UNCHS, HABITAT, etc. have acknowledged that the Sulabh Shauchalaya is the most appropriate low cost technological option to improve the environment and quality of life of the people. They have suggested its adoption in India as well as in other developing countries.

3.1 Pollution Aspects

Although Sulabh Shauchalayas are being advocated, the dangers of water pollution from the leach pits is a point often raised by authorities which are considering adopting this system. The pollution problem has been studied in great detail both in India and abroad, although further studies are underway to evolve a more economical design to prevent pollution under different hydrogeological conditions. However, it has been conclusively proved that with due precautions, the Sulabh Shauchalaya system can be safely implemented in almost all hydrogeological conditions.

To ensure that the risk of polluting group water and drinking water sources is minimal, the following safeguards should be taken while locating the pits:

i) Drinking water should be obtained from another source or from the same aquifer, but at a point beyond the reach of any faecal pollution from the leach pits;

ii) If the soil is fine (effective size 0.2 mm or less), the pits should be located at a minimum distance of three metres from the drinking water sources, provided the maximum ground water level throughout the year is two metres or more below the pit bottom (low water table). If the water table is higher, i.e., less than two metres below the pit bottom, the safe distance should be increased to 10m;

iii) If the soil is coarse (effective size more than 0.2 mm), the same safe distance as specified above can be maintained by providing a 500 mm thick sand envelope of fine sand of 0.2 mm effective size around the pit, and sealing the bottom of the pit with impervious material such as puddle clay, a plastic sheet, lean cement concrete, or cement stabilised soil, and

iv) If the pits are located under a footpath or a road, or if a water supply main is within a distance of three metres from the pits, the invert level of the pipes or drains connecting the leach pits should be kept below the level of the water main, or one metre below the ground level. If this is not possible due to site considerations, the joints of the water main should be encased in concrete.

3.2 The Rationale: Low Cost Sanitation vis-à-vis Sulabh Shauchalaya

The Eighth Plan (1992-97) document envisages the concept of "total sanitation", covering primary health care, water availability, women's welfare, immunisation and provision of sanitation facilities, all linked to cleanliness as a basic human need. It emphasises that every effort will be made to adopt a low-cost approach employing technical and scientific know-how and experience already gained by NGOs. It is against this background that the role of Sulabh and other NGOs in terms of sustainability, affordability and replicability for environmental upgrading in urban areas needs to be assessed. In a way, the country document accepts the inevitability of the low-cost approach. Also, it acknowledges the role played by NGOs like Sulabh unreservedly.

In 1985, Dr. Raja J. Chelliah, then a Member of the Planning Commission, observed that "with limited resources and an unabated rush to larger cities, search for low cost solutions, therefore, is a matter of priority. It has generally been accepted that India has two major areas for replication in this regard, namely, the urban community development programme and the low-cost sanitation project programme through the pour flush twin pit latrine as in operation in a large number of States in India". Sulabh's pioneering efforts in popularising low-cost sanitation latrines have been commended widely.

Indian planners and NGOs working with people to accelerate the pace of progress of human development have unequivocally recognised that although more than nineteen types of human excreta disposal systems have been identified the world over, only three systems are found to be suitable for adoption in India. These, in descending order of quality of performance and acceptability are (i) a high cost local government managed sewerage system, (ii) a medium cost household managed septic tank system and (iii) a Sulabh Shauchalaya. Conventional sewerage, an ideal solution for disposal of human excreta and waste water, satisfies most public health criteria and is also convenient, but it requires large quantities of water for proper functioning.

The capital cost of sewerage construction, including waste treatment, is very high. In addition, operation and maintenance costs are also quite high. Although sewerage was introduced in India about 120 year ago, and most of the plan allocations for urban sanitation have been spent on sewerage, only 232 towns and cities out of 4689 are served by sewerage. In most of them, the sewerage system does not cover the entire municipal area. The first two categories are socially more acceptable systems, and all major cities and towns exceeding one lakh in population have perspective plans for full sewerage systems, including the upgrading of septic tanks, notwithstanding their excessive construction and maintenance costs. Also, this option is exercised despite huge unrealisable targets, made difficult by a continued rush to urban areas. It has been acknowledged in various studies, which have been corroborated by the observations of the present study, that untreated or partially treated sewerage and badly maintained systems could precipitate health hazards, and septic tank are seldom free of mosquitoes.

Consequently, Sulabh Shauchalayas, available in different models and designs suited to every range of user and costing from Rs. 500 for five users with two year capacity pits to Rs. 5000 for ten users with twenty years capacity (excluding superstructure), etc. have been developed. These models have already been used by Sulabh in Bihar, Madhya Pradesh, Uttar Pradesh and Rajasthan among the economically weaker sections, low income groups and middle income groups. All these models and designs of Sulabh have been tested and used in different geophysical conditions. As these models are affordable to different jincome groups, the effective demand for Sulabh Shauchalayas has increased over the years, and they have spread to many towns/cities of 18 states and two union territories of India as a 'best practice' acceptable to the people and local bodies.

3.3 Specific Advantages of the Sulabh Shauchalaya over Septic Tanks

The other method of excreta disposal is the septic tank, which is beyond the reach of the common man; it costs two to three times more than the Sulabh Shauchalaya. In addition, there are other advantages of the Sulabh Shauchalaya over septic tanks. These are:

i) Septic tanks have to be cleaned at one-or two-year intervals, and wet sludge has to be taken out, which has fresh human excreta floating at the top and emitting an obnoxious smell. They need the services of scavengers for desludging, since the ordinary labourer will not be willing to handle it as it is mixed with fresh excreta. If desludging and disposal are not handled properly, it is a health hazard. Since the Government of India has already brought into force the Employment of Manual Scavenger and Construction of Dry Latrines (Prohibition) Act 1993 banning scavenging as such, desludging of a septic tank will pose a serious problem;

ii) Services of scavengers are not needed in the case of Sulabh Shauchalayas. The pits can be cleaned by the house dweller himself or any labourer because the excreta is completely digested and safe for handling after two years of disuse of the filled up pit;

iii) The maintenance of a Sulabh Shauchalaya is easy and simple and costs little, whereas the emptying of a septic tank costs much more. In the case of a Sulabh Shauchalaya, part of the cost of emptying can be met from the sale of sludge as direct fertiliser taken from the pit;

iv) Septic tanks have to be cleaned immediately on filling so as to allow uninterrupted use of toilets. In the case of Sulabh Shauchalayas, since one pit is used at a time, the filled up pit can be desludged at the convenience of the homeowner after a two year rest period;

v) Although the ISI code states that under no circumstances should effluent from a septic tank be allowed into an open channel, drain or body of water without adequate treatment, this is seldom done resulting in foul odours, a fly and mosquito nuisance, health hazards and environmental pollution. The municipal by-laws prohibit discharge of septic tank effluent directly into open drains or a body of water, but this provision is not strictly enforced. With a Sulabh Shauchalaya, there is no such problem because liquid infiltrates into surrounding soil through the holes the in pit lining;

vi) Every septic tank is required to be provided with a ventilating pipe so as not to cause a smell nuisance. The emission of foul smells through the vent pipes pollutes the atmosphere. With a Sulabh Shauchalaya, no vent pipe is required as gases are dispersed into the soil;

vii) There is shortage of drinking water in almost all the urban and rural areas of the country; hence water has to be conserved. A septic tank latrine usually needs 14 litres of water for flushing, whereas a Sulabh Shauchalaya needs only one and a half to two litres of water;

viii) A septic tank latrine requires more space than a pour flush toilet. The design of the Sulabh Shauchalaya has the flexibility to be designed to suit site and household requirements;

ix) A Sulabh Shauchalaya with twin pits has potential for upgrading. It can be connected to a sewerage system easily; only leaching pits will become infructuous, whereas with a septic tank latrine, the septic tank and effluent disposal system will become infructous, which costs two to three times more than the leach pits of a Sulabh Shauchalaya;

x) The sludge and effluent from a septic tank cannot be used as manure directly without causing health hazards, whereas the sludge of the leaching pit is almost dry, odourless and safe for handling after two years; hence it can be used immediately after it is taken out. It is also a very good manure and soil conditioner, and

xi) The construction of a Sulabh Shauchalaya is very simple; it can be constructed by any mason with a little training, whereas skilled mansons are needed for construction of a septic tank of proper design.

The present study also supports the statement of Shri Mulk Raj Anand (Foreword, Restoration of Human Dignity 1994) that "the Sulabh International invention of dry latrines, which are flushable with one Lota of water, is a revolution which now becomes imperative to adopt throughout the country". It has also been revealed through the findings of this study that the Sulabh flush has helped scavengers in many parts of the country free themselves from demeaning work. It is estimated that about 35,000 scavengers have been relieved of scavenging and enabled to seek alternate employment either in the local body establishment itself or elsewhere. Of the relieved scavengers, about 3,406 were trained by Sulabh itself to acquire job oriented skills. The integrated approach which the low cost sanitation programme emphasises is brought about by Sulabh through innovative initiatives. This research study based on Indian experiences went into this holistic approach in some detail.

The contribution of Sulabh International and some local NGOs in improving the urban environment has been confirmed by the study. In the task of capacity building to tackle problems of the urban environment, a co-ordinated approach is needed. The avowed objective of the Government of India to eliminate scavenging by the end of the Eighth Plan (1992-97) is the most evident sign of the feasibility of the conversion of dry latrines and the efficiency of low cost Sulabh Shauchalaya models. The ambitious Eighth Plan national scheme of Rs. 464

crores for rehabilitation of scavengers again points to the lead provided by Sulabh International to train and rehabilitate scavengers and their dependants.

To sum up, the present study has established that :

i) The Sulabh system qualifies on all counts as a 'best practice' in India to provide alternate integrated low cost sanitation facilities, thus contributing towards capacity building to tackle urban environmental problems;
ii) Urban slums need much more attention;
iii) Community toilet complexes, though acceptable to the people, need extensive promotion for installation at strategic urban centres to control pollution;
iv) Gender-specific facilities need to be augmented, and
v) Bio-gas plants based on night soil are still to be promoted in a big way as a source of non-conventional energy and as a method to utilise waste material in urban areas for environmental upgrading.

3.4 Gender Issues

Gender equality in matters of economic, social and political significance is a fundamental right guaranteed by India's Constitution to the 450 million Indian women, who form roughly one - sixth of the world's female population. However, using a Gender-related Development Index (GDI), the 1995 Human Development Report of UNDP places India in the 99th position among 130 countries in relation to the status of women. In dealing with sanitation and environmental matters, attention must be given to removal of hurdles that impede full participation of women. The present survey has revealed certain shortcomings in that implementation of low-cost sanitation programmes that adversely affect the female beneficiaries.

No doubt women were consulted in deciding the location of PF latrines. They were also informed about their usefulness before constructing them. They were made fully aware of the harmful effects of open defecation and, for that matter, about the use of dry latrines on health and the environment. Though they know about the use and maintenance of PF latrines, many of them were not using them in the absence of superstructures. They were thus compelled to go for defecation in the open. Until and unless privacy for women is ensured by constructing the superstructure for PF latrines, women will not use them.

As for community latrines, women were consulted in each locality. They were informed about the usefulness of a community complex, and it was explained as to how it would improve the environment and sanitation of the locality. But when they were asked whether the implementing agency had organised any training camp on health and hygiene and the use of the community complex, the respondents of the majority of the towns stated that such training camps had not been organised. Only in Madras, Bangalore and Puri, were such training camps organised, which were attended by 70 per cent, 35 per cent and 50 percent of the respondents respectively.

When they were asked whether the privacy and security of women were maintained in the community complex, they reported that there was no problem about security because there were women attendants in the complex. However there existed a problem of privacy. The survey reveals that there is a lack of awareness and motivation amongst the women, particularly in slum areas, as to how the effective use of household toilets and community toilet complexes could keep them and their families healthy. Women's active participation in an LCS programme

is vital because the hygiene and sanitation of the entire family depends upon their awareness and motivation.

The survey has revealed that for maximising the use of LCS facilities in general, and by women and children in particular; the following considerations need to be looked into:

i) **Accessibility:** The location of community facilities should be near to residences;
ii) **User charges:** The system of per person per use charge should be replaced by an affordable monthly payment for the entire family;
iii) **Availability of water and electricity:** There should be a 24 hour water supply. The complexes should also be electrified to allow use at night;
iv) **Separate latrine seats for children:** Each complex should have an adequate number of seats for children;
v) **Bathing facility:** Adequate bathing facilities should be provided for women, and
vi) **Adequate number of toilet units:** The number of toilet units should be provided keeping in view the number of expected female users of the locality. More seats in the complex could be arranged for women so that the waiting period would be reduced. This would facilitate women attending more efficiently to their household duties related to child care, cooking, etc. As to the timing, most, of them preferred early morning and evening.

Although community toilet complexes have separate enclosures for women, the main entry point is common for males and females. Women preferred to have a separate entry point. It was understood that if such arrangements could be made, more women would use the complexes.

4. Analysis of the Results of the Survey

The information gathered through the survey of various facets of household toilets (surveyed in twelve towns/cities) and community toilet complexes (surveyed in fourteen towns/cities) provides a vivid picture of the facilities of the low-cost sanitation programme. The analysis clearly shows that NGO efforts in awareness campaigns have had the desired effect. An important aspect relevant to the situation in urban India is the composition of the so called weaker sections in the beneficiary group since the slum population in the surveyed towns has a substantial component of these weaker groups. This observation is further corroborated in terms of economic status. While the 'poor' constitute one fifth of the total beneficiaries, it is the group in Rs. 1251 to Rs. 2500 income bracket which dominates. In fact, both Sulabh and other NGOs attend to the same proportion of 'poor', although the former caters to a larger proportion of the next category of 'less poor' (1250-2500). These two groups account for eighty percent of the low cost sanitation beneficiaries in the surveyed towns. The inference is that the package under low cost sanitation serves the target group in an undisputed manner. The three characteristics of (i) caste composition, (ii) income level and (iii) nature of habitations demonstrate the relevance of low-cost sanitation to the Indian situation.

With regard to community complexes, it has again been established that these facilities largely meet the needs of poorer sections in the society in that 70 per cent of the users are in the monthly income category not exceeding Rs. 2500/-. The conclusion is that such facilities provide much needed benefits to a substantial population and contribute to maintaining a clean environment. The study has also shown that the less the access of woman to individual household latrines, the more they use community complexes. This leads us to suggest that till such time as individual household latrines can be provided in an adequate manner, the network of community complexes with sufficient arrangements for use by females must receive priority attention. The survey also shows that in the towns served by community complexes managed by Sulabh the users have faced less difficulties.

In brief, the study establishes the fact that both household latrines and community complexes under the low-cost sanitation banner have contributed in improving the urban environment, and that in this endeavour both Sulabh and other NGOs have had an important role, although the involvement of Sulabh has been more than other NGOs in the overall national context.

4.1 Survey Findings of Twelve Towns: Household Toilets

Out of 1649 respondents in the twelve towns surveyed, 81 per cent male respondents and 19 per cent female respondents were interviewed. The survey findings revealed that 36 per cent of all respondents obtained education below primary level, 26 per cent up to high school and 12 per cent above high school levels. The remaining 26 per cent were illiterate. The percentage of illiteracy among the respondents was as high as 63 per cent in those areas of Hyderabad where the NGOs other than Sulabh had constructed PF latrines. Among these respondents, it was also found that 52 per cent belonged to SCs, while the overall percentage of respondents belonging to SCs, STs and others worked out to 20, 74 and 6 respectively.

With regard to income, it was found that 61 per cent of the 1649 respondents had a household monthly income between Rs. 1250 and Rs. 2500, 14 per cent between Rs. 2501 and Rs. 4000

and only five per cent above Rs. 4000. The percentage below Rs. 1250 was 20. The households with income below Rs. 1250 was as high as 52 per cent in Madras and as low as 4 per cent in Ambattur.

With regard to occupation, it was found that the workforce participation rate in the twelve towns was 83 per cent. Among the workers, 32 per cent were engaged in service, 47 per cent in business and 4 per cent in farming. There were 51 per cent joint families as against 49 per cent nuclear families.

With regard to the characteristics of the respondents' habitations, 21 per cent were living in slums, 39 per cent in a slum-like situation and two per cent in unauthorised colonies. The remaining 38 per cent were living either in newly developed areas or developed colonies. The percentage of respondents living in slums was nearly 50 or above in Bhopal, Madras, Ambattur and Gonda. With regard to types of housing, out of the total households in the twelve towns, 80 percent had either pucca or semi pucca houses and 20 per cent were living in kutcha houses. The percentage of kutcha houses was as high as 50 in Bhopal and 44 in Madras.

Piped water and handpumps are the major source for drinking and other purposes. The overall amount of piped water and hand pumps in the twelve towns/cities was 80 per cent. However, in Madras 48 per cent depend on other sources, and the people there faced an acute shortage of water.

With regard to location of PF latrines, it was found that 59 per cent of the households had their PF latrines constructed outside the covered area but within the premises, and about 30 per cent had their PF latrines constructed in the covered area of the verandah. Eleven per cent had their PF latrines either outside the premises or attached to their rooms. In addition, women and children in 79 per cent of the households were using PF latrines. However, the percentage of these households varied a great deal in respect of individual towns. In some towns, such as Ajmer, Ambattur and Gopalganj, the women and children of a large number of households were not using PF latrines. It was as high as 42 per cent in Ajmer, 40 per cent in Ambattur and 34 per cent in Gopalganj. The main reasons for not using them were inhibition on the part of women, reluctance of children due to old habits of defecation outside, the absence of superstructure and apprehension of the pits getting filled up due to their small size. Among women and children not using PF latrines, 67 per cent of the respondents of sample households stated that women went to open field for defecation, 14 per cent stated that the children used roadsides for defecation and 11 per cent stated that their children used open drains for defecation.

Only about 8 percent of the sample of beneficiaries observed technical defects in their latrines. However, the percentage of defects observed was substantial in two towns, namely, Ambattur and Barwani. In Ambattur, 45 per cent observed technical defects, and, in Barwani, 31 per cent observed the same. In Madras and Gopalganj, no beneficiary observed any defect.

About 86 per cent of the respondents felt satisfied with the PF latrines. However, the percentage of sample respondents expressing dissatisfaction was substantially high in Ambattur and Barwani. In Ambattur, 51 per cent expressed dissatisfaction with PF latrines, and in Barwani, 41 expressed dissatisfaction. Those who expressed satisfaction stated that scavengers were not needed for cleaning the PF latrines, privacy and security was maintained, foul smell was not emitted and less water was required. The reasons for dissatisfaction were the absence of superstructure and the installation or construction of small pits.

In the absence of meaningful comparable data with respect to the eight towns where Sulabh had constructed PF latrines, the analysis covers only the five towns where other agencies had constructed PF latrines. With regard to construction of superstructure on PF latrines located outside the covered area, 62 per cent had had the superstructure constructed. However, the percentage varied between the towns. It was as high as 88 per cent in Gopalganj and as low as 19 per cent in Ambattur. Among those who had superstructures, 87 per cent had the superstructure constructed themselves. With regard to type of superstructure constructed, 60 per cent had pucca superstructure and the remaining 40 per cent had katcha superstructure. Although the exact number of superstructures built on PF latrines constructed by the Sulabh was not gathered, it can be stated that the majority of women were not using the PF latrines owing to the lack of superstructures.

With regard to construction of PF latrines by different agencies, of the total sample in five towns, 66 per cent had their PF latrines constructed by NGOs, 23 per cent by the municipality, about 8 per cent by private contractors, three per cent by self and others. However the percentages varied between the towns. In Ambattur, Gopalganj and Hyderabad, it was mainly the NGOs which had constructed the PF latrines. In Barwani, it was primarily the municipality which did the construction, while in Gonda, various agencies had constructed the PF latrines, although about 50 per cent households had PF latrines constructed by private agencies.

When asked whether the household members were consulted in the planning and construction of the latrines, 46 per cent of households stated that they were consulted. However, the percentage of households in the five towns varied a great deal. In Hyderabad, only about 3 per cent were consulted, while in Gopalganj 98 per cent had been consulted.

When the respondents were asked to state the reasons for conversion of dry latrines, 48 per cent stated that it was more convenient to use PF latrines, 21 per cent stated that it would not adversely affect the health, 18 per cent stated that they were dissatisfied with the scavengers' service and their service was expensive. Another 4 per cent stated that the privacy of women could be maintained.

4.2 Survey Findings of Fourteen Towns: Community Complexes

The educational level of the beneficiaries of the community complexes in different towns varied a great deal. The overall percentages of 593 beneficiaries according to level of education were (1) primary level 26 per cent, (2) up to high school 41 per cent and (3) above high school 11 per cent. The overall percentage of illiterate beneficiaries worked out to about 12. However, the percentage of illiteracy was as high as 83 in Ambattur, followed by Gopalganj and Barwani where the percentage was more than 50.

The majority of beneficiaries were engaged either in service or business in all the towns except in Gonda. The overall percentage of beneficiaries engaged in service was 36 and in business 58. The number of housewives was only seven per cent. The students and children constituted 3 per cent. The percentage of unemployed was insignificant. However the percentage of housewives was as high as 55 in Gonda, followed by Hyderabad (another NGO) and Barwani.

With regard to income, 30 per cent of the beneficiaries belonged to the monthly household income category below Rs. 1250, 19 per cent belonged to the income category between Rs. 2501 and Rs. 4000, and 11 per cent belonged to the income category above Rs. 4000. However

this percentage varied a great deal among the towns. The monthly household income level of the beneficiaries in three towns, namely, Ambattur, Barwani and Gopalganj, showed that the beneficiaries mostly belonged to the income category below Rs. 1250.

In the fourteen towns, 389 beneficiaries (66 per cent) were local and 227 (34 per cent) were commuters. However, the survey analysis is limited to local beneficiaries because they use these complexes more regularly.

With regard to housing, 50 per cent of the beneficiaries had pucca houses, 13 per cent semi-pucca houses and 36 per cent katcha houses. In some towns, such as Ambattur and Barwani, the percentage of beneficiaries with katcha houses was quite high. In some other towns, such as Madras, Jammu, Bangalore, Ajmer and Hyderabad, the percentage of beneficiaries with pucca houses was quite high.

Out of 389 respondents using the community complex, 42 per cent had individual household latrines and 58 per cent did not. The percentage of beneficiaries with individual latrines was as high as 96 in Bangalore and as low as 3.3 in Bhopal. When the respondents were asked whether the women of their households were using the community complex, 64.3 per cent stated that they were not. The percentage of households whose members were using the complex was as high as 87 per cent in Bhopal, followed by Gonda, Bombay and Puri. It was below 20 per cent in Ajmer, Jammu, Bangalore, Mirzapur and Patna. The lower the percentage of individual household latrines in a town, the higher was the percentage of women users of the community complex, and vice-versa. For instance, the percentage of households in Bhopal having with latrines was only 3.3, but the women of 87 per cent of the households were using the complexes. Similarly, in Bangalore, women of only 13 per cent of the households were using community complex because 96 per cent of the beneficiaries had individual latrines.

The survey findings revealed that 41 per cent of the beneficiaries of the sample households were using the complex for only the toilet, 24 per cent for urinal and toilet facilities, 13 per cent for toilet and bathing facilities and 19 per cent for all the three types of facilities. The percentage of beneficiaries using them for bathing or urinals only was insignificant.

When the respondents were asked whether they had ever encountered any difficulty in the use of the complex, 21 per cent of the respondents of the total sample indicated that they faced difficulties. It has to be noted that 95 per cent in Ambattur, 65 per cent in Jammu, 67 per cent in Gonda and 56 per cent in Barwani faced difficulties, while in Patna, Bangalore, Hyderabad and Gopalganj, none had faced any difficulty.

4.3 General Observations

The status of the scavengers' liberation programme in case studies of fourteen selected towns/cities reveals that public scavengers, who were servicing dry latrines, have been absorbed by the local bodies as sweepers, gardeners, etc.; their dependants are getting financial assistance for education and vocational training in different trades, most of whom are reported to be self-employed. However, most of the private scavengers who were servicing dry-latrines are even now engaged in the same job, though secretly, where dry latrines exist. None of the municipalities and corporations of the surveyed cities and towns could provide information with regard to the number of private scavengers and the number and nature of different types of latrines presently existing.

The general observations of the case studies of the fourteen selected towns/cities reveal the problems encountered in implementation of the programme. These are related to a lack of co-ordination at the central, state and, particularly, at local levels of administration and management; to delays in furnishing state government guarantees for loan approval for a LCS programme causing delays in the sanctioning of loans by HUDCO, as well as to problems of the release of subsidies by the Ministry of Welfare for training and rehabilitation; to the lack of exact details on category-wise beneficiaries and the number of scavengers to be liberated, trained and rehabilitated; to the absence of exact details on the different types of latrines presently existing in the cities and towns for programming conversion/construction of low cost sanitation measures; to the lack of technical personnel for preparation of project reports and to monitor implementation of the programme; to improper selection of implementing agencies for carrying out both programmes in small and medium towns, and, last but not the least, to the lack of effective arrangements for providing services for household toilets and suitable land for community toilet complexes. Due to various problems in implementation, physical achievement is not up to expectations.

The survey of selected towns/cities further indicates the general acceptability and effective use of both the household toilets and community toilet complexes of Sulabh International. They have potential not only for replicability but also for creating long term impacts in improving urban sanitation and health. This is because Sulabh takes responsibility for implementing the LCS from inception to the provision of facilities, including maintenance and follow up, with a five year guarantee provided to the beneficiaries of household toilets. Moreover, it ensures that the community toilet complexes it owns will be operational for thirty years without any liability on local bodies. On the other hand, the survey findings indicate that such a methodology has not been adopted by NGOs other than Sulabh, thereby causing delay in implementation and dissatisfaction among the beneficiaries.

5. Formulation of National Strategy

5.1 Capacity Building for the Urban Environment

The urban population of 21.7 crore, about 25% of India's total population of 84.6 crores in 1991 (with a growth rate of 2.14% per annum between 1981-91) is a vital concern of planners and policy makers. If the urban growth trend continues unabated, by the turn of the century, the urban population may be one-third, including more than 50% of all India's slum and pavement dwellers and squatters. The urban population is spread over 4696 urban settlements, and the number of cities with a population of one lakh plus increased from 216 in 1981 to 300 in 1991. These cities account for 65 per cent of the urban population. The growth of population in medium and small towns follows, more or less, the same trend. About 1292 medium towns (from 20,000 to one lakh in size) share 24 per cent, and the remaining 3104 small towns (less than 20,000 in population) constitute 11 per cent of the urban population. The problem of excessive urbanisation and industrialisation leading to the growth of slums (particularly in megalopoli and metropoli, but also in medium and small towns) has led to a lack of sanitation and to diseases caused by a contaminated water supply, as well as to a lack of sanitation and mounting piles of filth due to the lack of inadequate systems of garbage disposal. Consequently, urban environmental degradation is visible to a greater or lesser extent in practically all cities and towns.

5.2 Seventy Fourth Constitution Amendment Act (1992)

With the present scenario, capacity building for urban environment management by local bodies (corporations and municipalities) calls for different and urgent options. Presently, more or less, all local bodies are entrenched with the problems of lack of finances, motivation and co-ordination among different agencies concerned with governance and the management of even basic sanitation and health needs. Their task is monumental, and the authority for decisions, governance and management of civic affairs is limited and/or insignificant, because these are delegated to or retained by state governments as the custodian of local finances and the power of governance.

The Seventy Fourth Constitution Amendment Act (1992) pertains to decentralised planning to local bodies (metropolitan and municipal areas) in India. The smallest urban settlements from 100 to 200 families and more, or service centres in metropoli above one million in population, constitute a hierarchy linked in many ways. Hence, planning for people living in urban settlements would mean a change in habit, attitude and behavioural pattern (of heterogeneous migrants). Besides, the planning process will need participation of the people, particularly women and the poorest sections (the scheduled castes, scheduled tribes and backward classes), in the governance of their civic affairs in the urban areas where they live.

The participation of NGOs, along with resident welfare associations, has been shown to be one of the most fruitful avenues to bring about the amelioration of urban environmental conditions (in urban pockets and slums) by implementing integrated low cost sanitation cum scavengers, liberation programmes. The NGOs have also implemented low-cost technologies. For example,

bio-degradable solid wastes have been separated for the production of bio-gas for cooking and mini-thermal power; deep tube wells are being excavated to supplement the declining water supply; street sanitation, drainage, and sewerage is being established and maintained by neighbourhoods. Last but not least, the flood of people to urban areas (particularly slums) can not only be stemmed, but also be reversed, using the same family chains that brought the rural poor to metropolitan and other urban areas. Indeed, this needs unflinching and dedicated efforts of the NGOs/voluntary organisations.

The Seventy Fourth Constitution Amendment Act (1992), therefore, raises more critical issues and doubts for institutions of self-government to function effectively in the absence of complete autonomy in ensuring capacity building for urban environment management. Thus, the components for institutions of local government should be: (i) clearly demarcated areas of jurisdiction vis-à-vis central and state governments, (ii) adequate empowerment of power and authority in consonance with the responsibilities of development needs, (iii) ensured power and authority to raise and/or increase financial and human resources to manage civic affairs in terms of priorities (particularly sanitation and health affairs) and (iv) complete functional autonomy to co-ordinate and monitor the civic affairs in active collaboration with NGOs/voluntary organisations and resident welfare associations.

5.3 National Strategy

The Seventy Fourth Constitution Amendment Act (1992) has, therefore, to be reviewed for developing a national strategy with a fresh look at legislative measures for operationalisation of urban environmental programmes. Among the possible approaches, for early solution, one could include:

I) Supplementing governmental efforts through privatisation and the massive involvement of committed NGOs/voluntary organisations having with track records in the planning, development and management of:
   - (a) Conversion/construction of household toilets and community toilet complexes;
   - (b) Garbage and sewage collection and disposal;
   - (c) Propagation and dissemination of information, education and communication (IEC) for changing the habits, attitudes and behaviour of people migrating from different linguistic, socio-economic and socio-cultural backgrounds;
   - (d) Slum-improvement programmes, and
   - (e) Low-cost sanitation technology, especially for accelerating the process of items (a) to (d);

ii) Ensuring community participation, particularly the involvement of women;

iii) Effective co-ordination of different actors at the local, state and central levels along with NGOs;

iv) Imaginative changes in the municipal/local bodies by-laws for the use of infrastructure support, including financial support to NGOs;

v) Meaningful land-use planning, and

vi) Gender specific approaches to meet fully the needs of women, especially in relation to security and privacy in urban slums.

5.4 Capacity Building and Institutional Strengthening

It is the primary responsibility of the local authorities to look after sanitation in their areas. Their resources being meagre, they are unable to meet the increasing demand. The local authority can, therefore, get a sanitation programme implemented, either through the state government engineering department or board in charge of water supply and sanitation, or by awarding the work to a contractor or an NGO. The government engineering department and many local bodies are strong in hardware, but they have no infrastructure for software, which is an important input needed for the success of an LCS programme. Many of the local bodies do not have technical persons, and even where they are available, they remain busy in their day-to-day work with the result that they are unable to pay due attention to the LCS programme.

The beneficiaries prefer an agency which is prepared to undertake the entire responsibility for the construction of toilets and the follow-up. Responsible and well established contractors are not interested in a project of this type, because the margin of profit is too small, and the work is very time consuming being dependent on the convenience of the householders scattered throughout the town. Moreover, once the toilet are constructed, contractors do not bother about them. There is no follow-up. Hence people are not satisfied with the work carried out by the contractors.

For the implementation of social programmes like sanitation, NGOs with experience in the field of low cost sanitation are best suited. They work as a link and provide a transmission line between the people, the local authority and the government. They motivate, persuade and popularise programmes and projects by bringing about attitudinal and behavioural changes and involving people in community projects. The active participation of the people ensures greater chances of success and cost-effectiveness than total dependence on the government. Then, people tend to become passive. The lack of involvement of the people has also let them to always look to official agencies for help and thus lose initiative. NGOs organise communities and mobilise people's active participation. Women's involvement is also ensured at every stage of implementation.

Nevertheless, even when the LCS programme is implemented by NGOs, local authorities still have to carry out certain functions. They are responsible for:

i) Preparation of budgets;
ii) Training of personnel involved in the implementation of LCS programmes;
iii) Preparing detailed programmes of work;
iv) Processing applications for the construction of household latrines and the execution of agreements with the homeowners for repayment of loans;
v) Receipt and disbursement of loans and subsidies;
vi) Supervising all construction operations to ensure that the work executed conforms to prescribed designs and specifications;
vii) Monitoring for regular surveillance of project activities and uncover operational problems which they must solve;
viii) Recovery of loans from the beneficiaries and repayment of loans taken by the local bodies for LCS programmes;

ix) Providing pit emptying services to households on request, and

x) Attending to complaints of latrine adopters after the implementing agency's warranty period is over.

For carrying out the above duties, the infrastructure in local bodies will have to be strengthened. The personnel engaged for LCS should not be assigned any other work but should look after LCS exclusively. The duties and responsibility of each should be clearly defined and co-ordinated.

5.5 Women's Participation

Much of the demand for latrines comes from women as they are the worst sufferers due to the absence of these facilities. Women have by far the most important influence in determining household hygiene practices and in forming the habits of their children, so the facilities should be planned with full awareness of their perceptions and needs. Women hold the key to the continued operation and effective use of these facilities for the benefit of a family's health. The children can also be educated by them to use the toilets. Involving women in water supply and sanitation programmes, however, requires certain changes in approaches and techniques. Educational materials should be geared to suit their socio- cultural habits, beliefs and educational level.

5.6 Promotion and Health Education

The LCS programme offers a new facility to the people, but offering a facility is not an end in itself. It has to be accepted by the people for whom it is meant. People are often not fully conscious of the health hazards of unsanitary latrines or open air defecation. Socio-cultural habits, customs and traditions are deeply rooted in the society. In order to persuade people to change their habits and accept the new technology, promotion, motivation and health education are important and essential inputs. For this purpose, a separate cell manned by an adequate number of suitable persons under a social scientist should be created in the local authority. Otherwise, the NGO which is entrusted with the implementation of the LCS should have this infrastructure.

Women motivators and health educators are more useful. The motivators should approach the household individually and explain to them the social and health benefits of the programme. These efforts should be intensified during the initial phase of the programme or when the acceptance rate goes down. The motivation and education campaign should be monitored carefully for streamlining and improving the approach.

5.7 Training Module

Although the low-cost technology is easy to implement, it requires ingenuity and expertise to provide for precision in construction and competence in supervision to guard against faulty construction, faulty practices and pollution in the construction, use and maintenance of this relatively low cost sanitary device. It, therefore, calls for mounting a well-planned training programme for the personnel involved in the implementation of an LCS programme.

The professionals in charge of implementing the sanitation project are mostly trained in conventional approaches. They need to be motivated and trained in the application of low cost technologies and exposed to different choices available in order to ensure rapid progress in

expanding sanitation services. This calls for developing trained manpower. The main task of training should be to sensitise decision makers, and to educate and train engineers and other personnel in the low cost technologies; to promote mutidisciplinary approach emphasising socio-cultural and health considerations, and to ensure community participation, especially that of women, in the planning, implementation and maintenance of sanitation systems. The training should bring about significant improvements in the effectiveness of sanitation investments and the extension of service coverage particularly to the low income population groups with a perspective of directing the investments towards the use of low cost technologies which are cost effective, affordable, easily available and maintainable and socio-culturally acceptable.

5.8 Sulabh's Strategy

Sulabh has been following the above practices in the implementation of low cost sanitation. It approaches people at their doorstep, discusses their problems in their own language and cultural medium and finds solutions. Sulabh volunteers go to beneficiaries to learn about their sanitation problems and find solutions to them. Once their income level, cultural preferences and indigenous resources are known, the users are recommended the type of sanitation facilities they should opt for. The organisation takes full responsibility from beginning to end in providing the sanitation facility, and it also gives a five year guarantee for satisfactory performance. It encourages people to build such facilities on their own, and help is given by Sulabh experts. There is also a system to ensure quality control and the participation of the community, especially of the women.

Sulabh's innovativeness is best demonstrated in another aspect of sanitation, namely, the community pay-and-use toilet system, which is a self-sustaining system it adopted for the first time in the country. In 1878, the then Bengal Government of British India enacted a law to set up the pay-and-use toilet facilities in the city, which was then the capital of India. But during the following 100 years, nothing was done until Sulabh moved in to revive this concept. Earlier, public toilets used to be the dirtiest places in city centres, but not now. More than 3000 Sulabh pay-and-use toilet complexes are operating all over the country without any financial burden on the public exchequer. Sulabh community toilets have improved the quality of life of poor people, especially of the slum and pavement dwellers, and have helped local authorities in keeping cities clean.

6. Conclusions

At the beginning of Sixth Five Year Plan in 1980-81, the implementation of a programme for scavengers' liberation was taken up by the Ministry of Welfare, Government of India. This programme was initiated in pursuance of the legislation on Protection of Civil Rights Act, 1955. The expenditure on the programme was shared equally by the central and the state governments; the local bodies implemented them as per prescribed guidelines. Besides, the Ministry of Welfare, other actors of the Government of India, namely, the Ministries of Urban Development and Environment and Forests, local authorities and some NGOs/voluntary organisations were also implementing low cost sanitation programmes with different strategies. In the process, there was lack of co-ordination.

For resolving the above issues, a co-ordination committee was constituted at the central level in 1989-90, with HUDCO as convenor, and it was composed of the representatives of all concerned ministries of the Government of India. A representative NGO, namely, Sulabh International, was also invited for consultation. Thus, the Integrated Low Cost Sanitation for Liberation of Scavengers has been brought together in a unified manner for implementation since 1990-91. The Ministry of Urban Development became the nodal agency for implementation of the low cost sanitation programme, whereas liberation, training and rehabilitation remained with the Ministry of Welfare. The financial pattern for the programmes was modified.

An official report of HUDCO from May 1995 provides information on sanction with respect to pour flush household toilets and community toilet complexes under an integrated low cost sanitation programme of the Government of India covering 996 towns. It was indicated that from inception in 1980-81 to May 1995, a total of 23.93 lakh pour flush household toilets have been sanctioned for conversion of 13.58 lakh dry latrines and construction of 10.35 lakh new PF latrines. Furthermore, 3843 community complexes have been sanctioned. Out of about 7.20 lakh identified scavengers and their dependants in 912 towns, 84,932 scavengers have been liberated and rehabilitated.

The baseline situation of integrated low cost sanitation reveals the monumental task ahead as per 1991 census, about 1.4 crore households (36.15 per cent) did not have toilet facilities in urban India. Consequently, majority of these people are compelled to defecate in the open. Added to this is the abysmal state of sanitation and filth due to garbage and sewage generated every day, more or less, in all urban settlements causing immense damage to the social fabric, the environment and to health standards. The local bodies are not equipped to handle the situation due to a lack of financial and resources and manpower and to poor co-ordination of different concerned departments from central and state levels. What is lacking as a baseline sine-qua-non is responsible co-ordination and monitoring to achieve results.

An all India survey was conducted by the Ministry of Welfare, Government of India, for identification of scavengers and their dependants under the national scheme for liberation, training and rehabilitation. This was done with a view to providing ultimate employment opportunities to both public and private scavengers. The status of the scavengers' liberation programme in case studies of fourteen selected cities and towns reveals that public scavengers, who were servicing dry latrines, have been absorbed in the local bodies as sweepers, gardeners, etc.; their dependants are getting financial assistance for education and vocational training in

establishes the fact that to achieve sustainable development of communities, the participation of enterprises and citizens in civic affairs, particularly sanitation and health services, as well as the massive involvement of committed NGOs and voluntary organisations under the guidance of local bodies, is absolutely essential. It has been observed that low-cost sanitation programmes mainly benefit the weaker sections of India's population, and, hence, the commitment of government to sustain the programme is crucial for its success.

The study further suggests certain approaches for the formulation of a national strategy to enhance effectively the capacity building for urban environmental management capabilities of institutions of self-government. This, inter alia, calls for a review of legislative measures and for amendments to the Seventy Fourth Constitution Amendment Act, 1992. Institutions of self-government need complete autonomy, and their improvement in consonance with the responsibilities of development requires that their financial and human resources be raised and improved respectively.

The study points out the special areas, such as gender issues and slum populations, requiring deliberate interventions. The heterogeneous nature of the urban settlements calls for meaningful local initiatives to address adequately the varying demands for low cost sanitation packages with the large scale involvement of NGOs, voluntary organisations and resident welfare associations. The one summary conclusion that the study enables draws is that the country is on the correct path, though obstacles need to be constantly cleared away, in the search for clean urban living.