

# IMPROVED SANITATION AND ENVIRONMENTAL HEALTH CONDITIONS

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## An Evaluation of Sulabh International's Low Cost Sanitation Project in Bihar

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by

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## FOREWORD

One of the major concerns relating to urbanisation in the developing world, pertains to the growing number of urban settlers, unable to afford even the cheapest house built by public agencies. This group is to be the main beneficiaries of concerted action in the International Year of Shelter for the Homeless—1987. With limited resources and an unabated rush to larger cities, a 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 2-pit latrine as in operation in a large number of States in India. This booklet evaluates the Sulabh International's pioneering efforts in this regard and also the UNDP's role in popularising the system. The scope for its wider use in cities, towns and rural areas through community and individual facilities requires to be fully explored. I commend this booklet which attempts to propagate a workable system for use in a wide variety of situations. Through the application of this system the cost of urban development may be substantially reduced.

**DR. RAJA CHELLIAH**

Member, Planning Commission,  
October 1985.



## INTRODUCTION

Organised disposal of human excreta has undergone a qualitative change over the centuries from pit and bucket latrines to full treatment water-borne sewerage. Today, though a variety of disposal options are available, the developing world has goals largely akin to industrialised nations which are attuned to settlement structures linked to sophisticated integrated disposal systems. However, about four-fifths of the global population live in the developing world and all recent studies in these situations have shown that due to severe investment capital constraints, such goals are beyond public exchequer and beneficiary capacities to develop and maintain, except in limited areas in and around high income housing. This is resulting in an increasing gap between projections and implementation of this fundamental provision with intrinsic links to water, health, education and community action and which, more than any other basic infrastructure provision, contributes to the failure of development plans, which often imply that less costly alternatives as in use be replaced rather than be improved.

### **Sanitation Goals for Developing Countries**

Today, the most important priority of excreta disposal programme in developing countries is the improvement of health through reduction in the transmission of excreta related diseases by sanitation technologies which are cheaper than sewerage. In response to such objectives, the UNDP has sponsored several research projects to popularize low cost sanitation based on systems which are financially and technologically appropriate and which incorporate the integration of socio-cultural aspects of

excreta disposal as a necessary, if not easily quantifiable, component. In addition, the World Bank, the largest international funding agency, has moved strongly towards support for programmes aimed at incremental sanitation as the best way to meet the sanitation goals of the International Water Supply and Sanitation Decade. These promotional activities and also those through the WHO and UNICEF within the framework of their respective mandates are helping each country to establish individual goals on this subject. Accordingly, projects are surfacing, which are replicable in varying degrees, towards the main objectives of safe water and sanitation for all by 1990 A.D. and appropriate new or upgraded shelter for all by 200 A.D.

### **Sulabh Shauchalaya**

The pour flush water-seal sanitary compost latrine or the Sulabh Shauchalaya project, which is in operation in the State of Bihar, India, since 1974 and is now being widely extended to other parts of India and elsewhere by the Sulabh International, is one project which has shown results in a variety of situations by a voluntary non-profit oriented social agency through government sponsorship and aid. This project, which is based on a simple idea of converting dry latrines into water-seal ones, is suited for global replication to fulfil major objectives and goals of IYSH in favour of the poor in developing countries. The project is described and analysed here in the above context and in relation to situations under which it operates in Bihar, India.

### **Extent of Sanitation Problems in India**

High infant mortality rates, widespread disease and malnutrition are characteristic of fly and mosquito infested insanitary environments and it is estimated that in India, the cost in terms of medical treatment and lost production of this account is around Rs. 450 crores (US



\$ 348 millions) annually. In 1981, only 78 percent of the 160 million people living in urban areas of India had an adequate supply of water and only 31 percent of the rural population of 526 millions had access to a safe source of water within a distance of 1.5 km. from the village. Worse still, less than one percent of the rural population had access to sanitary facilities. In urban areas only 20 percent of the households had flush arrangements connected to the sewerage system of which only 7 percent had exclusive use of such facilities, 14 percent households had waterborne toilets connected to septic tanks whereas 33 percent or 10.6 million households had bucket or dry latrines and the remaining 33 percent had no facilities whatsoever. This means not only a widespread misuse of open drains and the soil over open spaces and a resultant spread of disease, but a heavy reliance on the carriage and disposal of night-soil by scavengers who, in the process, are exposed to serious health hazards and continuing social segregation in marginal or low land value areas.

### **Sanitation Goals for India-1990 AD**

In 1967, on the eve of the birth centenary of Mahatma Gandhi, the Government of India launched a massive campaign against scavenging and in the following year, the Ministry of Urban Development directed all States to get converted the existing dry latrines into flush latrines and to connect them to sewers, wherever available or to leaching pits if sewers were not available. Today\* the Government has resolved to step up efforts to provide safe water to the entire population of the nation by 1990 AD whereas the target for human waste disposal by the same period is 80 per cent for urban areas either through the sewerage system or pour-flush latrines and 25 per cent for rural areas through simpler but effective pour flush latrines.

\* A safe water source for a village is proposed at a distance of not greater than 0.5 km as against 1.5 km as hitherto.

### **Partnership with N.G.O.'s**

These targets require enormous financial resources estimated at Rs 14,700 crores at today's prices (US \$ 12,250 millions), but Government response has been encouraging through allocation of Rs. 4200 crores (US \$ 3500 millions) in the period 1980-85 by considering urban and rural water supply and sanitation as priority sectors for integrated action. It is likely that this allocation would be increased in the period 1985-90, apart from additional funds for related sectors like solid waste managements, drainage, basic health and education, shelter upgrading and community development. In addition the UNDP organisational, promotional, demonstrative and research skills as also those by the WHO and UNICEF and funds through the World Bank donor countries are being dovetailed in the programme geared primarily towards low cost solutions for maximising coverage and beneficiary participation. Yet, these efforts are not enough and, therefore, an important area of cooperation has to be addressed to non-governmental organisations in general and voluntary action groups in particular

### **Merits of Sulabh Shauchalayas**

Although more than 19 types of night-soil disposal systems are identified the world over, only 3 systems are found to be suitable for adoption in India, (a) the high cost sewerage system, (b) the medium cost septic tank and (c) the low cost pour-flush water-seal sanitary compost latrine popularly called Sulabh Shauchalaya. The first two are socially accepted systems and all 216 cities in India with population exceeding 1,00,000 have plans for full sewerage system including upgrading of septic tanks despite excessive construction and maintenance costs and large unattained targets as a result, made worse by a continued rush to cities. Untreated and partially treated sewerage and badly maintained systems could precipi-



Family members are sitting and talking to one another on the pit cover of a Sulabh Shauchalaya. This is a common feature. Beneficiaries use the pit cover for a variety of household purposes.



A front view of Public convenience popularly known as Sulabh Complex in Agra (U.P.)



Youngsters enjoying Sulabh bathing facility in Agra (U P)



Two eminent sociologists of India namely Dr (Prof ) Ziauddin Ahmad, Patna (Bihar) and Dr R K Gupta, Jabbalpur (Madhya Pradesh) inspecting the leather training work at the Rehabilitation Institute of Sulabh International

tate health and pollution hazards and septic tanks are rarely free of mosquitos. Therefore, a wider application of Sulabh Shauchalayas in both urban and rural areas offer the best prospect for cleaner and cheaper environments. It is easy to implement in most of the soil conditions and even in high density situations. It could also be connected to septic tanks and the sewerage system wherever required. It, however, involves rapid changes in attitudes and traditions and requires careful rehabilitation of scavengers and their dependents. It, therefore, cannot operate fully within the governmental framework nor outside its umbrella. The project implies a subtle partnership with success depending on decisions to enable efficient voluntary agencies to operate without constraints. In this regard, the Government has no doubt been encouraged by the success of the Sulabh International and its pioneering efforts in the State of Bihar aimed at a "people's programme" for social change.

### **The Founding of Sulabh International**

Bihar offered an appropriate arena for action. It is only the 9th largest of the 22 States of India, but with 70 million inhabitants as per the Census of 1981 AD it is the second largest in population. 61 million people reside in about 68,000 villages and the balance of 9 million are in 202 urban areas. Only 16 cities have a population exceeding 1,00,000 with Patna, the capital, being the largest with a little less than one million inhabitants. With a State level density of over 400 persons per Sq Km against the national average of 214 per Sq Km, but an urbanisation level of only 12 per cent against the national average of 23 per cent, the State also has a per capita income lower than the national average with poor economic, physical and social infrastructure and archaic land tenures and introverted social systems. Until recently, urban and rural sanitation was about the worst in India and the campaign for upgradation on this score got

immediate support with legislation changed in the State in 1970 to declare bucket latrines illegal. The water-seal latrine as known at that time was available to all households through a 50 per cent Central grant and 50 per cent State loan passed on to beneficiaries through local bodies with demonstration and propagation being through the Bihar State Gandhi Centenary Celebration Committee. Due to trady procedures and social taboos the scheme was all but a nonstarter and soon funds were diverted by local bodies to other priority projects. The Centenary Committee wound up in normal course, but in 1974 the Sulabh International (formerly known as Sulabh Shauchalaya Sansthan), a society registered in 1970 as a non-profit voluntary social organisation, was recognised by the Government of Bihar for this programme on the principle of no-profit and other forms of cooperation with the State and local governments.

### **Objectives and Programmes of Sulabh International**

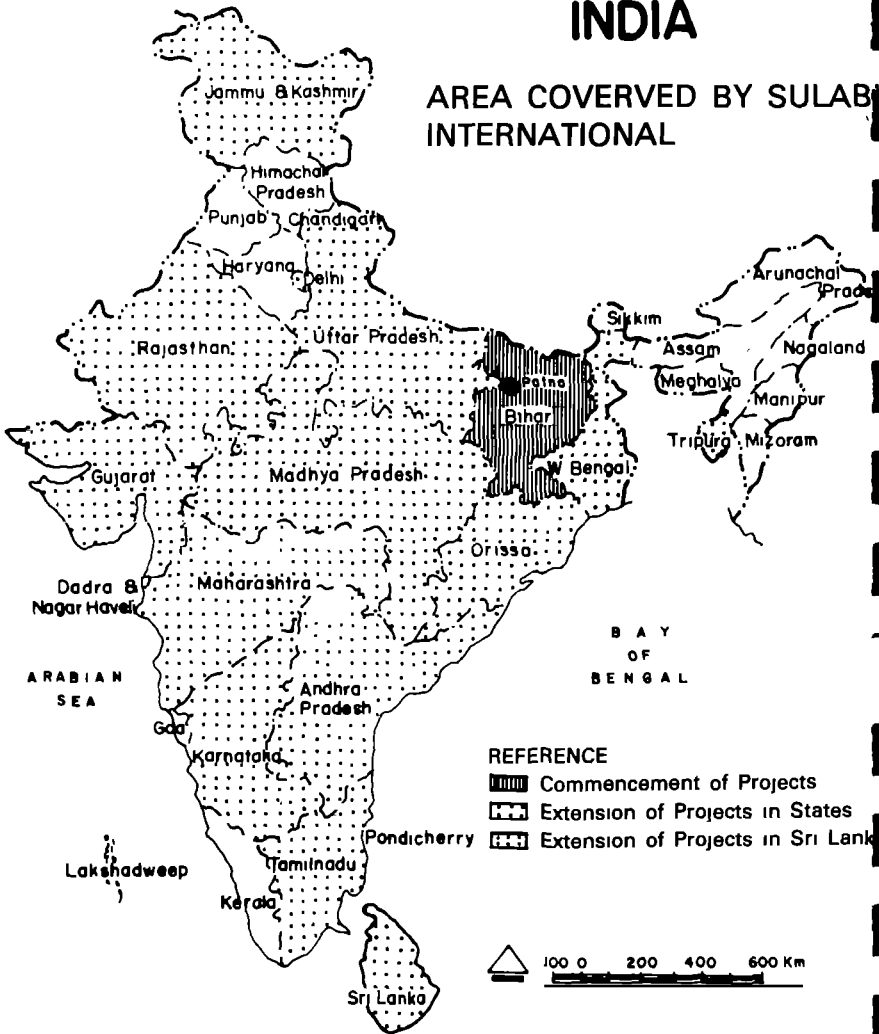
The organisation today in its eleventh year has received recognition from twelve States in India and is likely to operate throughout the country within the decade. Sri Lanka has also commenced the programme with expertise from the organisation and several other developing countries are closely studying the project as in operation in Bihar. From a single exercise of converting bucket to water-seal latrines, the Sulabh International has defined its full scope of operations to tie up with the policies and targets of the Government aimed at cleaner environments and affordable shelter for all during this century.

These objectives are:

- (i) To liberate scavengers by converting existing bucket latrines (also known as service latrines or dry latrines) into Sulabh Shauchalayas (hand-flush water-seal sanitary compost latrines);

# INDIA

## AREA COVERED BY SULAB INTERNATIONAL







Ladies waiting in row for availing public convenience



A view of the Sulabh Complex in Patna, India

- (ii) To construct or get constructed and maintain community toilets, baths and urinals on a pay-and-use basis;
- (iii) To utilise bio-gas generated from human excreta for different purposes;
- (iv) To impart training to engineers, sanitary inspectors, masons and others for the diffusion of this innovation (Sulabh Shauchalaya) in urban and rural areas;
- (v) To provide latrines in rural areas;
- (vi) To assist the government in the implementation of the above programme;
- (vii) To propagate the above ideas through demonstration units and media of mass communication (including publication of literature);
- (viii) To carry on research in the field of sanitation, bio-gas and various themes of applied social research;
- (ix) To rehabilitate scavengers and their offsprings by making provision for their training in various vocations.

To date, the organisation has converted more than 150,000 bucket latrines into Sulabh Shauchalayas and has constructed and is maintaining more than 200 community toilets on a pay-and-use basis, a few of which are generating bio-gas for street lighting and limited domestic use. Those programmes are being rapidly expanded.

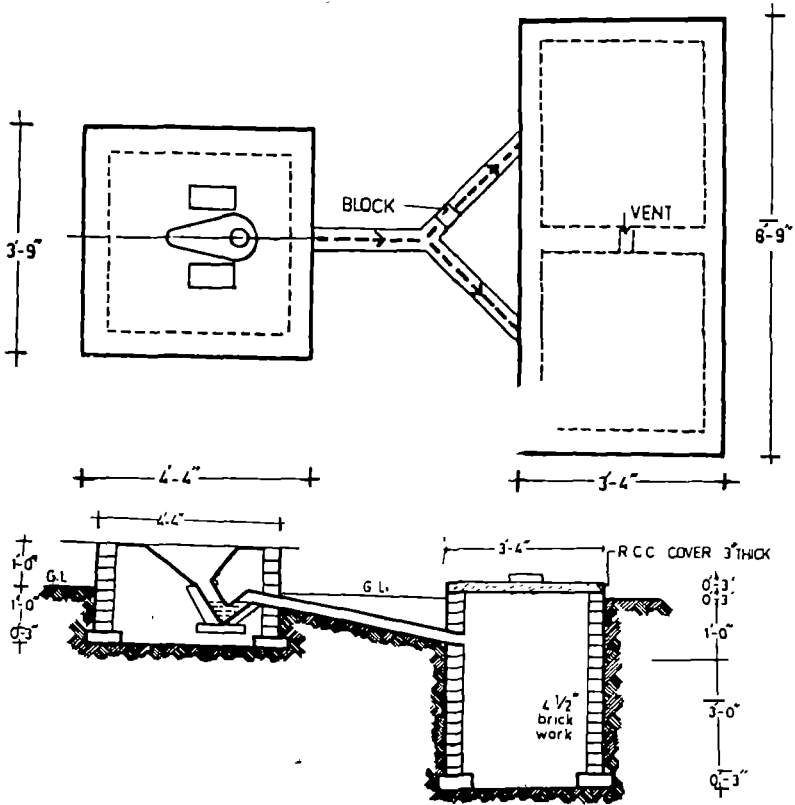
### **Design and Construction of Sulabh Shauchalayas**

The ILO, in a recent assessment, has stated "The idea of double pit pour-flush latrine is not new, although some details of the Sulabh International plans are original. What is new is the success of the scheme, whereby a voluntary organisation has been able to convert thousands of latrines in a short time. "The first success of the



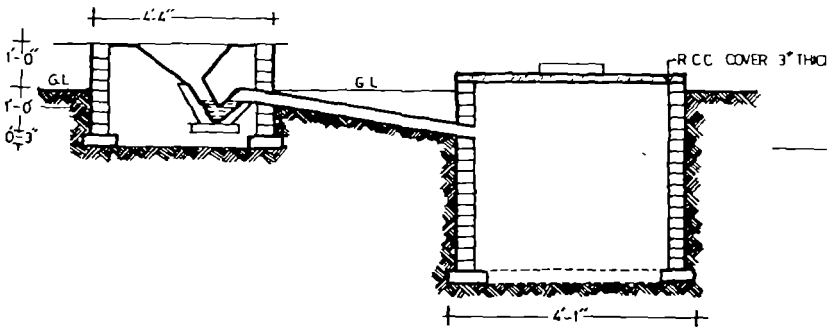
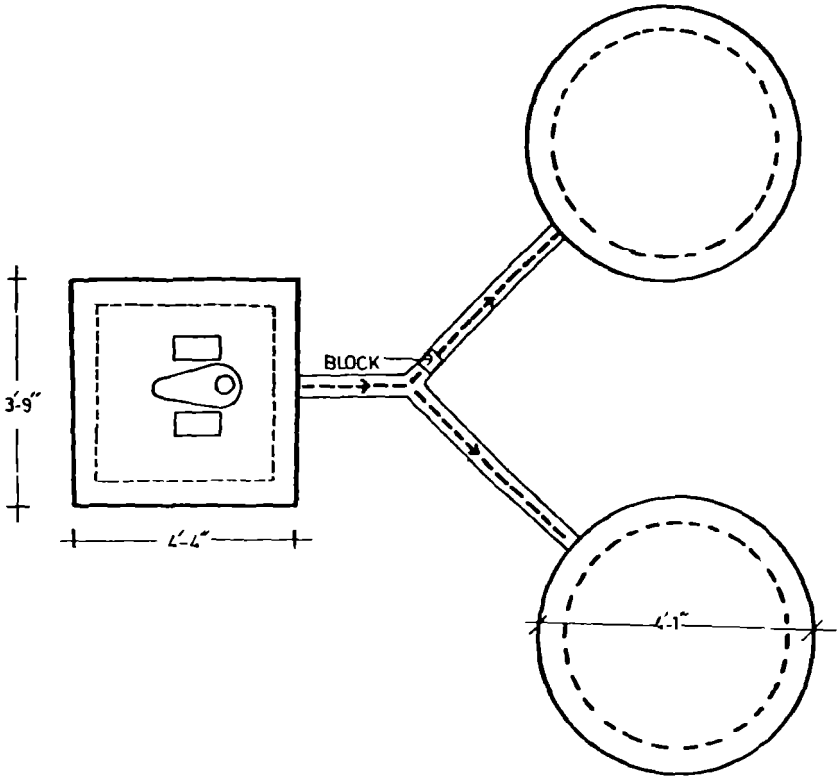
People entering in one of the Sulabh Complexes in Agra early in the morning for availing the facilities

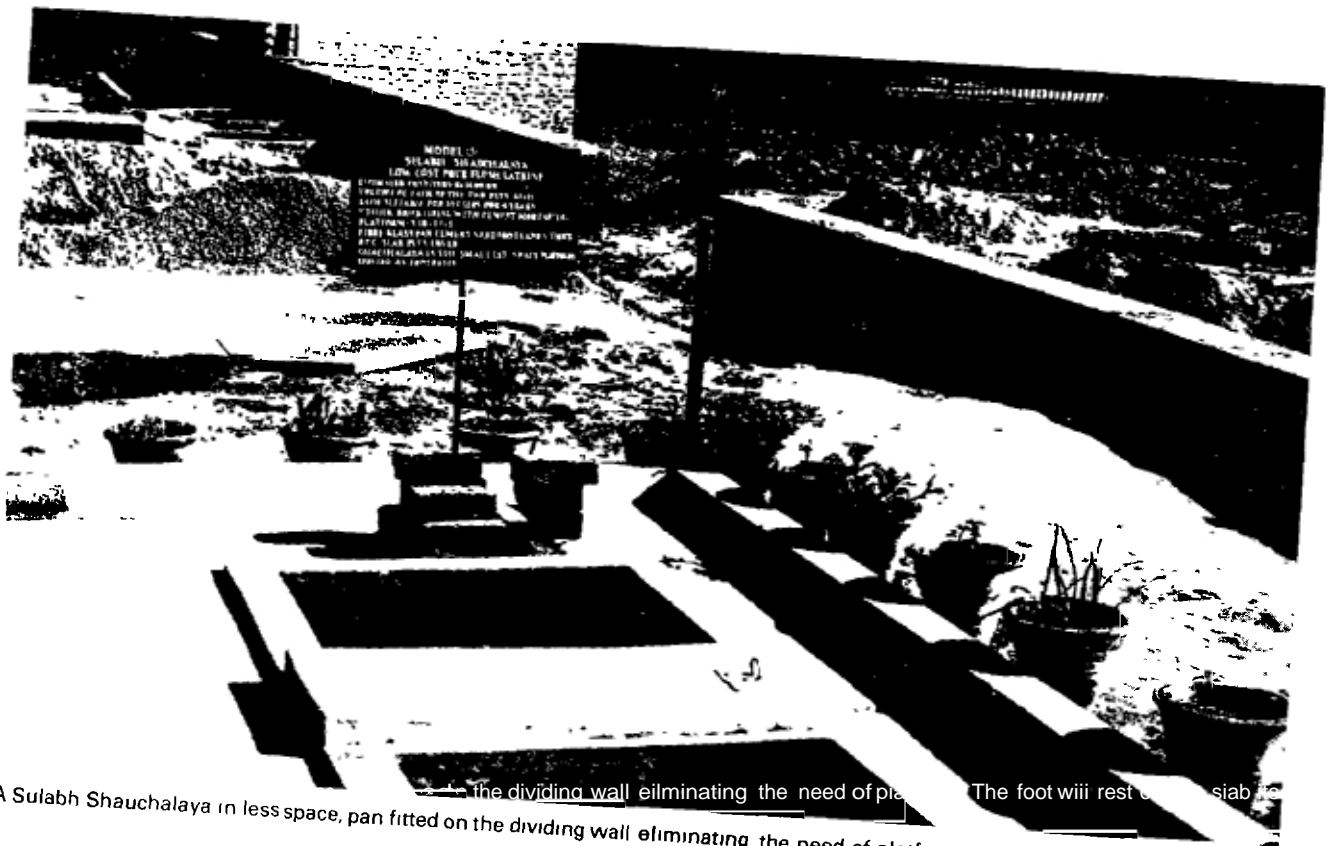
### SKETCH A:— SULABH SHAUCHALAYA (WITH RECTANGULAR PITS)



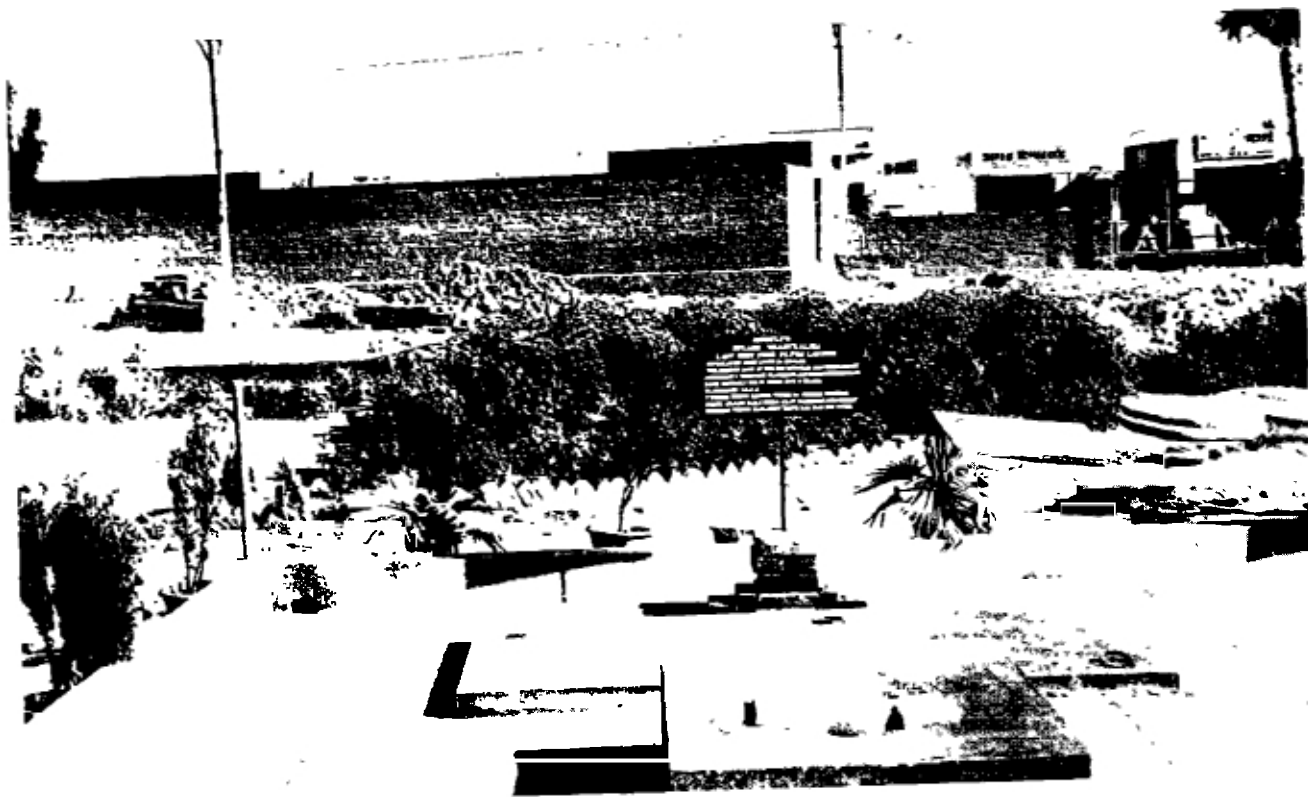
organisation was to ensure that the single pit latrine was redundant. This was until then widely in use as it saved initial investment and space, but created problems once it was filled up in less time required to convert it into manure. Sketch-A explains in plan and section the 2-pit Sulabh Shauchalaya as most widely in use today in urban areas. Sketch-B is of a circular 2-pit design. The pan, the water-seal and the R.C.C., air-tight cover of the pits are manufactured in the Sulabh factories under strict supervision. The platform and foot-rests, drains and pits are masoned at site by trained personnel or under their

## SKETCH B:— SULABH SHAUCHALAYA (CIRCULAR PITS)





A Sulabh Shauchalaya in less space, pan fitted on the dividing wall eliminating the need of platform. The foot will rest on the slab itself

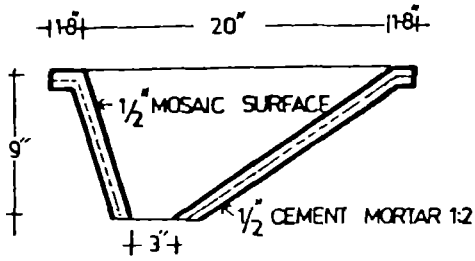


A Sulabh Shauchalaya with square pits, Fibreglass Pan and China Clay foot rest

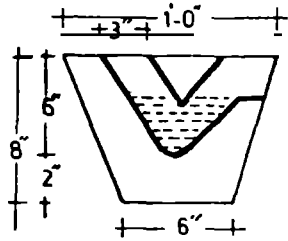


A view of the Demonstration Centre exhibiting various models of Sulabh Shaucharaya costing Rs 200 to 1600/- at Sulabh International's Delhi office complex at Mahavir Enclave, Palam, New Delhi-110 045 Scores of visitors are visiting this centre regularly

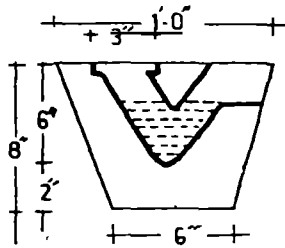




SECTION OF SULABH PAN

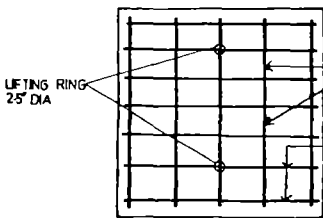
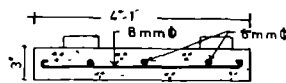
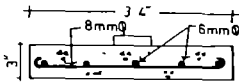


SECTION OF WATER SEAL (WITHOUT GROOVE)

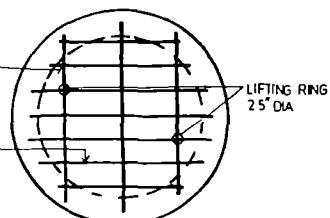


SECTION OF WATER SEAL (WITH GROOVE)

SKETCH C:—FACTORY MADE COMPONENTS OF SULABH SHAUCHALAYAS



RECTANGULAR PIT COVER



CIRCULAR PIT COVER

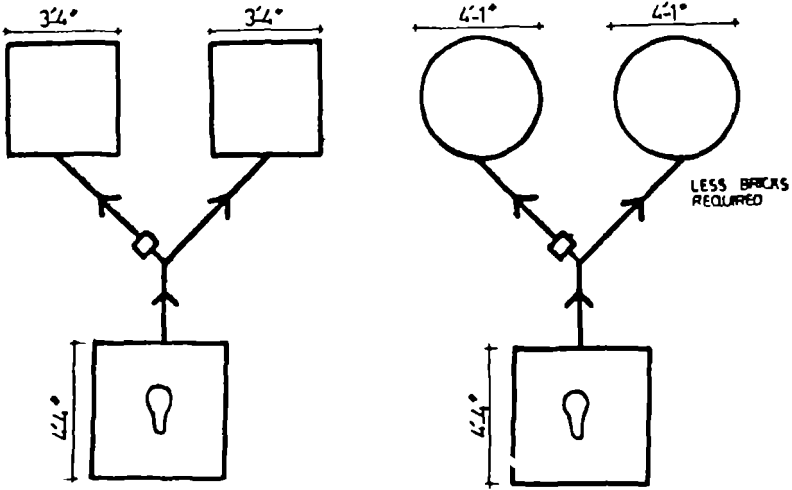
required for pour-flushing as against 10 to 20 litres of water used through cistern flushing. The slopes of the pan and drains are important to ensure proper flushing into the pit. These pits, which are used one at a time, were initially brick honey-combed on three sides, but as they often attract rodents, they are now constructed without honey-combs. The bottom is earth-based so that water leaches out and helps easy decomposition and transformation of the excreta into organic manure and free from pathogens. A wide variety of soils can be used and in high water-table areas it must be ensured that the upper portion of the pit is well above the ground water level. In porous soils, the pits should be at least 10 metres away from a water source and this may be a design constraint or challenge in high density situations. The RCC cover of the pit is to be at least 3" thick to enable the top to be used and to prevent exposure and rusting of reinforcements. It has to be air-tight to prevent foul smell and leakage of gas. The water-seal also prevents spread of odour and the total system is free of flies and mosquitoes unlike septic tanks. Each tank can be used by a household of five members for 5 years. About 2 years after its closure, the manure can be taken out and the pit re-used. The size of the pit may vary and a large size pit may be constructed to clean the pit after 20-30 years or so.

### **Housing and Sulabh Shauchalayas**

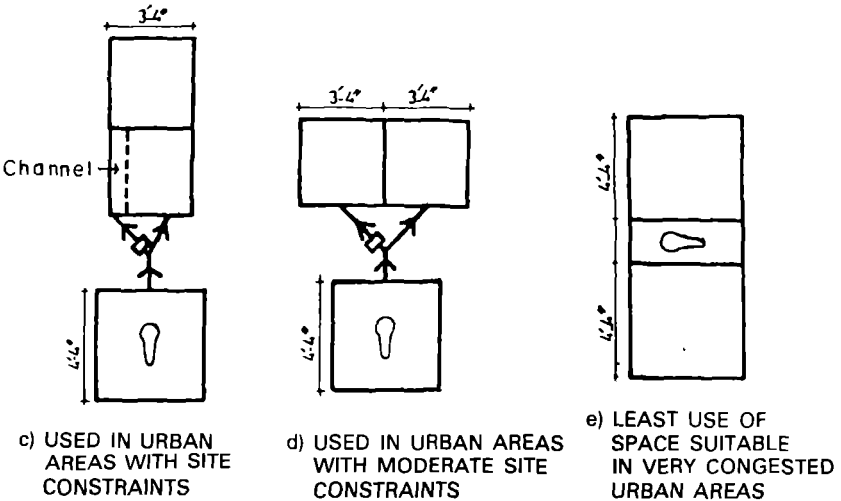
Sketch-D shows various alternative arrangements of the Sulabh Shauchalaya system. Circular pits are the cheapest but more space consuming and are suited to rural areas or where land is not a serious constraint. A pan can be placed in any part of the house or in the open space within the plot, though this would require a separate covered structure over the pan area. It, therefore, gives flexibility in house layouts as shown in Sketch E.

The pits can even serve upper floors through pipes,

SKETCH D:— ALTERNATIVE ARRANGEMENTS OF SULABH SHAUCHALYAS

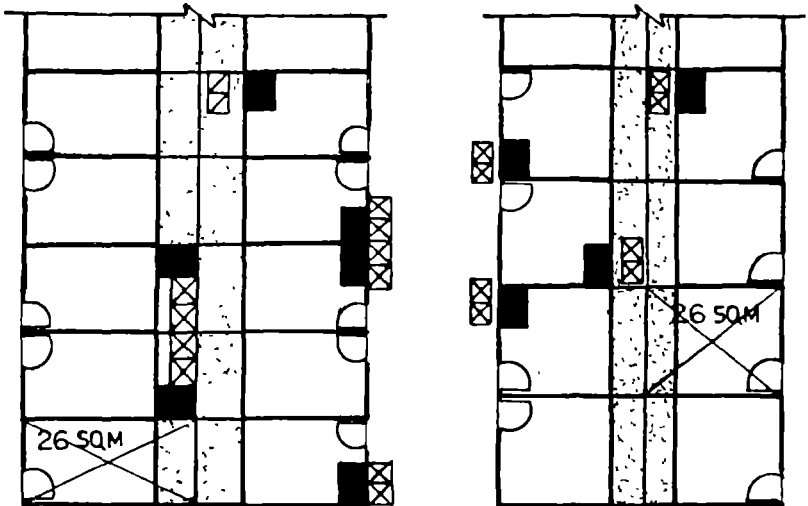


a) MOST POPULAR IN URBAN AREAS      b) POPULAR IN RURAL AREAS

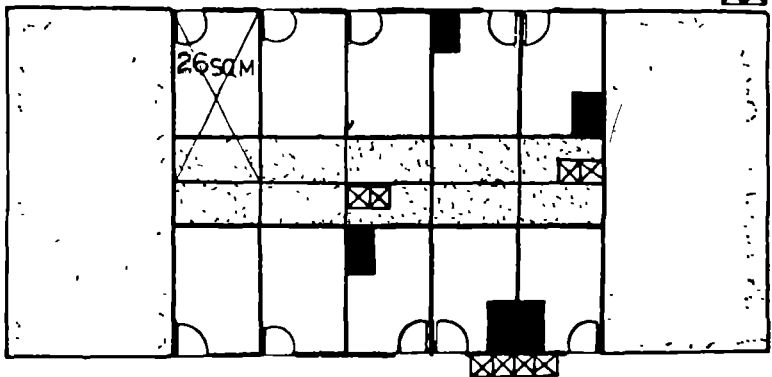


c) USED IN URBAN AREAS WITH SITE CONSTRAINTS      d) USED IN URBAN AREAS WITH MODERATE SITE CONSTRAINTS      e) LEAST USE OF SPACE SUITABLE IN VERY CONGESTED URBAN AREAS

supervision. The dimensions have been arrived at after a lot of experimentation, particularly the factory-made items as shown in Sketch-C. Only 2 litres of water is



THE STREET IS AN EXTENSION OF FRONT OPEN SPACE



### SKETCH E: — LAYOUT OF COLONY WITHOUT SEWERAGE SYSTEM

(MINIMUM PLOT SIZE RECOMMENDED IN URBAN AREAS 26 SQM THIS ENABLES INDIVIDUAL ABLUTION FACILITIES)

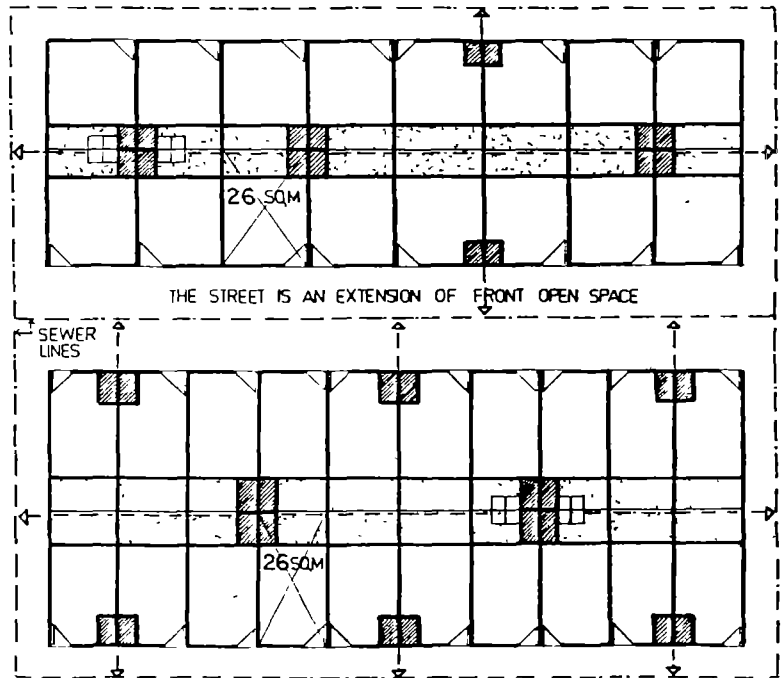
- 1 SULABH SHAUCHALYA— FLEXIBILITY IN LOCATION
- 2 TWO PIT UNIT (TO BE KEPT CLEAR OF DRAINAGE CHANNELS)  1k/ , ¾,
- 2 TWO PIT UNIT (TO BE KEPT CLEAR OF DRAINAGE CHANNELS)
- 3 SAFE DISTANCE REQUIRED FROM WATER MAINS SPECIALLY IN VERY POROUS SOIL
- 4 IF EXTRA HOUSEHOLD PROPOSED ON 1ST FLOOR, PITS FOR GROUND FLOOR TO BE IN REAR COURTYARD AND FOR 1ST FLOOR IN STREET RIGHT— OF-WAY
- 5 BY LAWS TO BE AMENDED, WHERE REQUIRED TO PERMIT PITS WITH IN THE STREET RIGHT—OF—WAY OR WITH IN COVERED AREA OF HOUSE AT DESIRED LOCATION
- 6 HIGH DENSITIES POSSIBLE UPTO TWO HOUSEHOLDS PER PLOT-SUITABLE FOR LOW INCOME HIGH DENSITY
- 7 FREE OF MOSQUITOES AND POLLUTION
- 8 SAVES IN USE OF WATER
- 9 MAINTENANCE POSSIBLE BY HOUSEHOLDERS
- 10 FLEXIBLE LAYOUTS POSSIBLE

but each 2-pit unit serves only one household. 26 sq.m is the smallest plot size now recommended in India so as to enable individual ablution facilities. An additional floor for an extra household would require ingenuity in design for 2 extra pits within the plot or along the street in front of the plot. Sketch F is a layout of a colony with a sewerage system and in such a situation a pour-flush latrine without pits can be used even for upper floors. The constraint, however, is adequate water for self-cleansing of sewers. The system is also not easily adaptable in spontaneous low income settlements without space for locating pits though these can even be constructed below the living space. There are cases, however, where these are preferred and are successful as the alternative is community latrines and baths which is given lower preference to individual ablution facilities by beneficiaries. This is understandable as all wet areas are integral parts of the household functions and cohesiveness.

### **Sulabh Shauchalayas and Implementation**

There are several variations in the design and the cost range is from Rs 700 (US \$ 58) to Rs. 1500 (US \$ 125) for a complete operational unit. A mosaic pan is the cheapest, strongest and easily moulded for mass production, but china clay pans which look neat are also available. The UNDP is now popularising PVC pans. A household that seeks a conversion from a bucket to a water-seal latrine approaches the municipality or other local bodies concerned. This is done through the Sulabh International motivators. Agreements are then signed for the total cost of construction, which amount is not given to the individual, but to the organisation and for this the cost includes an implementation charge varying from 10 to 20 percent. 50 percent of the total amount comes as a Central incentive grant and the other half as a loan from the local body, recovered from the beneficiary in instalments as part of his property or holding tax. The organisa-

## SKETCH F:— LAYOUT OF COLONY WITH SEWERAGE SYSTEM



(MINIMUM PLOT SIZE RECOMMENDED IN URBAN AREAS 26 SQM THIS ENABLES INDIVIDUAL ABLUTION FACILITIES)

- 1 SULABH SHAUCHALYA— FIXED LOCATIONS ACCORDING TO SEWERAGE SYSTEM  $\beta$
- 2 PITS NOT REQUIRED
- 3 DENSITY COULD INCREASE TO EVEN 3-4 STOREYS BUT WITH LARGER PLOT SIZES & FOR HIGHER INCOME GROUP
- 4 NOT MUCH CHANGE REQUIRED IN BYE LAWS
- 5 DISTANCE FROM WATER MAINS AND SEWERS TO BE AS SPECIFIED IN NORMAL BYE LAWS
- 6 FREE OF MOSQUITOES AND POLLUTION
7. MAINTENANCE POSSIBLE BY HOUSE-HOLDERS
- 8 TWO LITRES OF WATER PER FLUSHING & MAY NOT BE SUFFICIENT FOR SELF CLEANSING OF SEWERS
- 9 LAYOUT ARE REGIMENTED

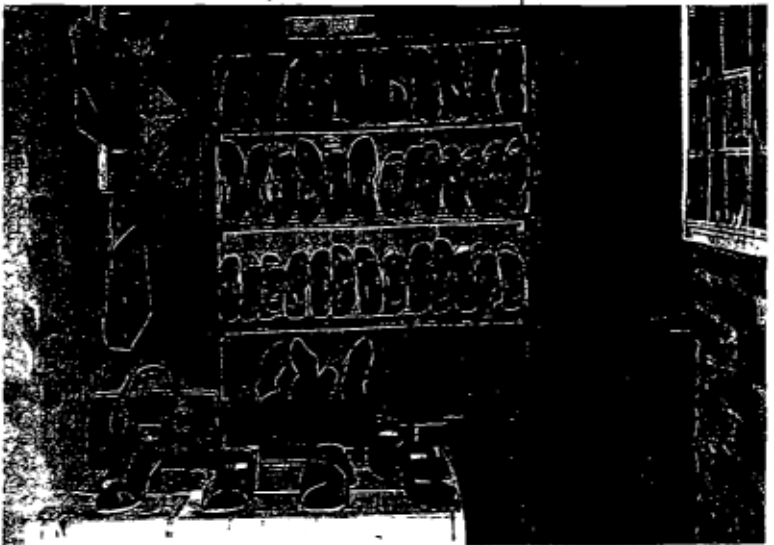


Wards of the liberated scavengers are being trained in 9 different vocations at the Sulabh International's Rehabilitation Centre. Picture shows ladies taking training (above) in cane work and (below) Mechanical Work.





Liberated scavengers getting training in Shorthand and typing



Leather work training to liberated scavengers





Liberated scavengers being trained in Carpentry work

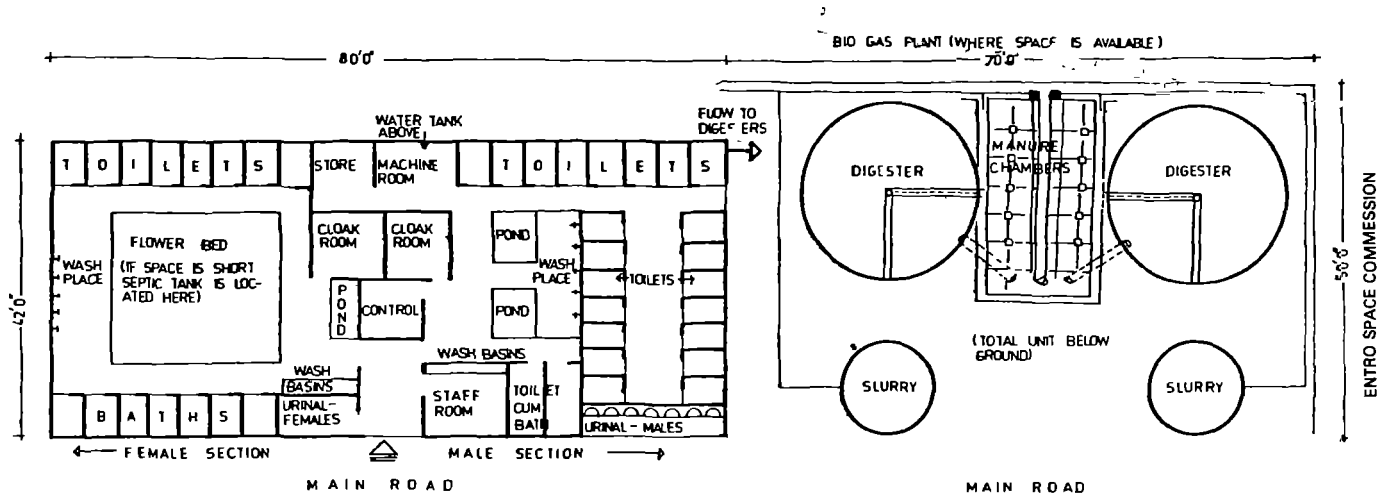


Liberated scavengers opt for Electrician trade

tion hands over a complete unit to the beneficiary with free maintenance and replacement at an early stage asked for, upto the time of the first removal of manure from the pit, which is also done free if asked for. At all stages, the participation of the beneficiary is encouraged, especially in low income areas, where he could help in having the advantages of the system propagated for wider applicability. An advantage is that controlled items like cement and steel and even hiring trained labour is not the burden of the beneficiary. In this process the role of the Government is primarily to ensure that grants and loans are correctly spent and the scheme gets maximised. The organisation acts as a catalytic agent in this three-way involvement, the implementation charge being sufficient for staff upkeep, maintaining and servicing records of each beneficiary plus savings ploughed back to their pool funds for other related activities.

### **Rehabilitation of Scavengers**

As the scheme gathers momentum more and more scavengers require being rehabilitated. It is estimated that their number in India is over 600,000. No retrenchment is allowed, but municipalities help by reducing fresh staff intake and utilizing 'liberated scavengers for street cleaning and allied tasks. The Sulabh International also engages some at community toilets and for other tasks after training. The rehabilitation and training programmes of the organisation, however, are primarily for children of scavengers. Their surveys have shown trades like carpentry, shoe-making, car repair, driving and lathe operations as preferred alternatives by males and dress making, typing and handicrafts by females. This, coupled with some formal education upto the desired levels and community development programmes, would help, in course of time, in rehabilitation, income generation and upgrading the marginal settlements, which invariably are in unfavourable locations. These tasks, with results over



SKETCH G:— LAYOUT OF 30 SEAT SULABH COMMUNITY LATRINE AND BIO-GAS PLANT  
(DOUBLE STOREY ALSO POSSIBLE WHERE LAND IS CONSTRAINT)

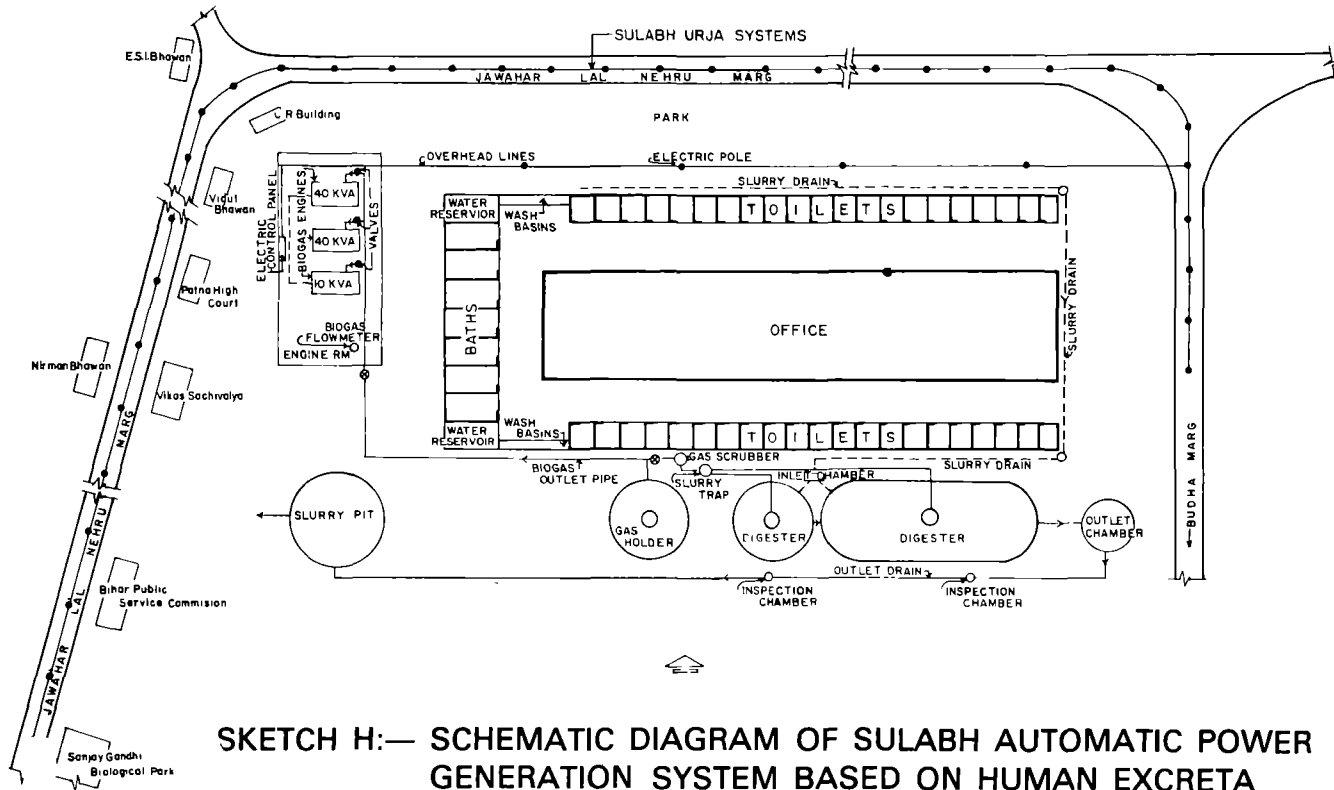
a period of time, are performed by the organisation from its pooled resources and results and results have been encouraging through close collaboration with government departments.

### **Sulabh Shauchalayas In Rural Areas**

Sulabh Shauchalayas in rural areas require a different strategy. The options are between open air defecation and secluded water-seal latrines in or near the house. Women are the worst sufferers through open air usage outside during daylight hours especially in villages on the urban fringe and along major roads. The motivation for providing a circular 2-pit water-seal latrine has to be intense to overcome social complacency and at a financial cost considerably lower than in urban areas. A source of safe water is a necessity and this is a government commitment by 1990 AD. The Sulabh International has published booklets for wide circulation in all 14 official languages of India of 10 alternative designs from about Rs. 200 (US \$ 16) for a totally masoned system at site to a range as in urban areas where at least the pan and water-seal are factory-made. The system of financing through panchayats and turn-key construction through the Sulabh International is the same as in urban areas. Beneficiaries are from all income groups and an immediate gain is better organised house designs and household cohesiveness. In fact, a safe source of water within 0.5 Km. of the homestead, a water-seal latrine within the house and electricity and fuel from bovine-based bio-gas are three prime areas for action leading to better health and village environments and which, with appropriate social infrastructure and adequate access, could help in reducing the rush from rural areas.

### **Sulabh Community Latrines**

Community latrines in congested urban areas is today an important impact-creating programme of the



**SKETCH H:— SCHEMATIC DIAGRAM OF SULABH AUTOMATIC POWER GENERATION SYSTEM BASED ON HUMAN EXCRETA FEED AT ADALATGANJ, PATNA.**

Sulabh International. This was first started by them in 1974 near Gandhi Maidan, Patna, where a large number of pavement dwellers, mainly rickshaw pullers, slept and used the maidan, road sides and open drains for abolution purposes. As a consequence a busy thoroughfare and the areas around were increasingly unhygienic and nearby municipal latrines were no alternatives due to poor maintenance and usage. At the behest of the Municipal Corporation, the organisation submitted designs for a 30-seat pay-and-use community latrine as patented by them complete with specifications, quantities and 20 per cent implementation charges. A layout is at Sketch G. A contract was then awarded to the organisation for construction on land given by the municipality along the road right-of-way. On completion they were asked to maintain it on a pay and use basis, with recurring costs to the municipality being only for water and electricity. Due to its success, over 200 such facilities have been provided all over the State at railway stations, bus stands, hospitals, markets and other crowded areas availed of by pavement dwellers, short-term visitors, passers by and staff of establishments without access to such facilities. Where land is a constraint double storey facilities are provided. The scheme is now in operation in 12 other States and is likely to extend to all major urban areas in the country as apart from total initial construction cost and free water and electricity, the local bodies have no other expenses and staff problems in this city level service. In fact many scavengers get rehabilitated in this partnership.

### **Design of Sulabh Community latrines**

The success of the project is due to its design and operations. The total area has to be enclosed and women and children segregated from men. In addition to sufficient number of latrines, it is also necessary to provide bathing rooms, wash basins, taps for washing clothes, cloak room, overhead water tank (to ensure continuous

availability of water), water tank (used for manual flushing), a collection-cum-control room, staff room and a machine room-cum-store as also urinals, which for men could be outside the enclosed area. The pour flush latrines with pan and water-seal manufactured either at the factory or the site are connected to a septic tank, which require proper maintenance and regular emptying. Payment is upto 20 paise (less than US 2 cents) per entry, but women, children and invalids are free. Payment is not insisted upon, but a few avoid paying and soap powder is given free. People avail of this facility also to wash clothes and have regular baths instead of frequent visits to the river. Health and hygiene have improved as a result and in addition the organisation has engaged a doctor for free consultations on water and excreta based diseases, but who also helps out in other ailments and prescribe a limited amount of basic medicines free of cost.

### **Impact of Sulabh Community Latrines**

Community toilets have to function round the clock with guaranteed supply of water and electricity and proper maintenance. They function in 3 shifts with a staff of 4 to 6 senior and junior caretakers per shift depending on the size of the total facility. Their job is to collect the user charges, provide soap powder and attend to the flushing, general cleanlines and maintenance. A few persons near the facility now sell tooth sticks so as to make the daily abolution process complete. Today in Patna and other crowded urban areas fewer people use road berms and other open spaces and the most unhygienic cities of India are gradually becoming cleaner and this is leading to less complacency among citizens in other spheres of civic life. The organisation has also built these toilets in inner city spontaneous settlement areas where no charges are levied, but designs are generally constricted due to lack of space and success is not as apparent as



Tailoring also a favourable choice for the liberated scavengers



People in que for attending the call of nature at Adalatganj, Patna



amidst pavement dwellers as due to regular work hours of such residents, ablution demands are overlapping during peak hours and children continue using nearby drains. Also in such colonies the pour-flush individual latrines are favoured social symbols wherever these can be constructed and community toilets may not be the answer.

### **Sulabh Bio-Gas and its Use**

Community toilets have necessarily to be connected to septic tanks which can be constructed within the compound itself. However, where space is available and a sufficiently large use of toilets is made, bio-gas is being considered for subsequent conversion into energy. In 1982 the first such plant was constructed in Patna by the Sulabh International. 54 Sulabh Shauchalayas feed an underground digester and the plant produces about 55 cubic metres of bio-gas per day. First this was being processed for cooking fuel and heating purposes, but difficulty arose with potential users on the use of such forms of fuel. The gas was, therefore, fed into a prime mover for generating electrical power for a 10 KVA generator. This gave electricity to the complex and the adjoining park and the rest was used to light 4 Kms portion of a busy city road. The organisation erected 100 light poles and fitted each with 125 watt mercury lamps from the pool funds as a demonstration project and a hitherto lonely section of the road is being lit daily from dusk to dawn. The advantage is that surplus gas is not vented away to pollute the atmosphere. The process involves 1/5th portion of diesel and the biogas is more effective than that from bovines. A great advantage is that in a situation of excessive power shortage as in Patna an alternative has been available. It is, therefore, being replicated in several situations where sufficient quantities of biogas can be generated and land for constructing these units are available. The process, however, does not have prospect for domestic use due

to heavy power consumption. A 54-seated Sulabh complex with electric generation and utilisation system and 20 per cent implementation charge costs about Rs. 9,00,000 (US \$ 75,000). The organisation undertakes this as a turnkey project for the municipality and operates and maintains the system, but receives electricity generating fees from the municipality.

### **Management of Sulabh International**

The Sulabh International, within 11 years of integrated action, has defined its objectives as indicated in page 14 para 2 above. It now has a staff of over 15,000 workers all of whom receive monthly honorarium or amounts which are marginally better than equivalent government salaries. Their turnover in work today exceeds Rs. 10 crores (US \$ 8.3 millions) per year and government and conversion contracts are increasing. Its source of income is not through grants and loans as preferred by some voluntary agencies, but through implementation/handling charges of contracts. This is 20 percent for community latrines and bio-gas plants and between 10 to 20 percent for conversion from bucket to water-seal latrines. The other source is collection from pay-and-use facilities and for generating street lighting. The honorariums are paid from these amounts; the surplus is utilised in ploughing it back to other activities which include maintenance and expansion of their offices and factories, training of workers, mainly masons and motivators, training and rehabilitation of scavengers and their offsprings, research publicity and advertisements through the press, publications distributed free for wider applicability of the system, undertaking demonstration projects and a number of other services like engaging doctors, distribution of free medicines etc. If there is surplus it goes to the society for further activities or incentives to workers, but no individual member can take profit. There is also a provision that if in case the voluntary organisation winds up, the

assets go to government after meeting all liabilities and debts. The society is controlled by a board, most of whose members, including the President, are elected by members, who are workers of the Sulabh International. Mr Bindeshwar Pathak, founder of the society and the force behind the total operations, which commenced with a simple idea, is the Chairman. In India alone the task is so large that more such motivated voluntary agencies are required.

### **Synthesis**

The global programme for safe water and sanitation, as being rapidly implemented, is encouraging the conversion of bucket latrines into water-seal units. Most developing countries plan for full sewerage systems, but due to costs are willing to settle for incremental sanitation. Sulabh Shauchalayas, however, can serve both incremental sanitation or be an alternative to full sewerage systems at affordable costs for all income ranges and with considerably less use of water. If this household unit is properly constructed and used, it can be the safest and cleanest form of sanitation, both in urban and rural areas. For pavement dwellers and others in crowded locations, properly maintained community toilets operating round the clock with regular supply of water, electricity and bathing facilities, ensure improved city level sanitation and better health of the beneficiaries. The Bihar experience in these two areas is already being widely replicated in India, with flexibility available and adaptable to a variety of climates, soils and social situations. The project liberates scavengers and particularly helps in upgrading low-income settlements and reducing costs of new such settlements. For maximising coverages, the role of the government is best restricted to that of a financier and promoter, leaving committed voluntary agencies to act as turn-key implementing agencies and maintenance agencies on costs and implementation charge basis. Inno-

tive designs, reducing operational and manufacturing costs, motivating and increasing the number of beneficiaries, rehabilitating, scavengers and training of persons is a continual exercise through the UNDP, UNICEE and WHO and a number of agencies with stress on implementation through voluntary action groups with Government at the fulcrum to ensure that the targets and goals are achieved in the best method possible with an immediate priority being water and sanitation for all by 1990 AD and appropriate shelter for all by 2000 AD

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