# Moving Forward:

## ENDING MANUAL SCAVENGING IN PALIYAD


AUTHORS

Marisa Arpels
Phuong Anh Bui
Debmalya Guha
Alexa Rosenberg
Amit Sarin
Amruta Sudhalkar

PROGRAM ON HUMAN RIGHTS & JUSTICE

Massachusetts Institute of Technology

# TABLE OF CONTENTS

Table of Figures ..... iii

Table of Tables ..... iii

Table of Boxes ..... iii

Acknowledgements ..... v

PART I: BACKGROUND on Manual Scavenging and the MIT-Navsarjan Project ..... 1

1 Introdution ..... 1

1.1 Manual Scavenging ..... 1

1.2 The MIT-Navsarjan Partnership ..... 1

1.3 The Paliyad Project ..... 2

2 Project Context ..... 3

2.1 Sanitation Context ..... 3

2.2 Institutional Context ..... 5

2.3 Socio-Economic Context ..... 6

2.4 Health Context ..... 11

2.5 Cultural Context ..... 11

3 Project Progress To Date ..... 11

PART II: CONSIDERATIONS for ending manual scavenging ..... 15

4 Navsarjan's Manual Scavenging Program ..... 15

4.1 Core Strategy ..... 15

4.2 Major Achievements ..... 16

4.3 Limitations ..... 16

4.4 Recommendations ..... 19

5 Government Approach to Sanitation Provision ..... 19

5.1 Total Sanitation Initiative (TSI) ..... 20

5.2 Public Toilets Provision ..... 21

5.3 Shortcomings of Government Programs ..... 22

6 Alternatives to Government-led programs ....22
6.1 Methodology for a Community-Led Total Sanitation Approach in Paliyad ....24
6.2 Potential Partnerships for a Community Empowerment Approach in Paliyad ....28
6.3 RECOMMENDATIONS FOR A SUCCESSFUL INTERVENTION ....31
7 Appropriate Sanitation Technologies and Provision Options ....32
7.1 The Value and Limitations of Ecosan ....32
7.2 Alternative Technological Options ....36
7.3 SANITATION Provision OPTIONS ....43
7.4 Recommendations ....45
8 Alternative Livelihoods and Economic Development for Scavengers ....45
8.1 Alternative Livelihood Considerations ....46
8.2 Ongoing Efforts ....47
8.3 Some Possible New Opportunities ....48
8.4 Considerations for generating new economic opportunities ....49
8.5 Recommendations ....50
PART III: RECOMMENDATIONS for moving forward ....52
9 Logical Framework for Recommendations ....52
10 Sequencing of activities ....53
References ....55
Appendices ....57
A. Sanitation options Matrix ....57

## TABLE OF FIGURES

Figure 1. Percentage of toilet access by caste. ....4

Figure 2. Structure of government in India. ....5

Figure 3. Frequency of denial of access to social, cultural or religious events by caste. ....7

Figure 4. Frequency of denial of access to the market by caste. ....7

Figure 5. Frequency of denial of access government institutions by caste. ....8

Figure 6. Primary occupations of Paliyad residents by percentage. ....9

**Figure 7. Box plots of reported family income and expenses per person (in Indian rupees), by caste.** ....9

**Figure 8. Value of total family owned assets (in Indian rupees) by caste.** ....10

Figure 9. Number of persons that may be served by and animals required for different capacity biogas plants. ....38

Figure 10. Comparison of net cost of installation of among different biogas plant models. ....39

## TABLE OF TABLES

Table 1. Recommendations presented in this report. ....2

**Table 2. Recommendations from the 2006 MIT report to Navsarjan.** ....13

Table 3. Logical framework for recommendations. ....52

Table 4. Sanitation options and selected attributes. ....57

## TABLE OF BOXES

Box 1. Case Study of a Zero Open Defecation Campaign: Gundi Village ....29

Box 2. The Need for Education ....35

## ACKNOWLEDGEMENTS

This report is the product of many people's work, insights, and support, and we wish to thank everyone who assisted us in our research and writing process. We are first and foremost grateful for the constant, intensive support of the entire Navsarjan staff and community, specifically from Martin Bhaii, Manjula Behn, Sanjeev Bhaii, Naresh Bhaii, Suresh Bhaii and the rest of the manual scavenging team. We also greatly appreciate our other interviewees who shared their time, experiences, resources, and information. Many thanks to Professor Rajagopal and Topher McDougal for their support, feedback, and on-going guidance. Finally, while in Gujarat, Amruta's Sudhalkar's family was incredibly generous with their hospitality, as well as in providing alternative sources of information for this report, and we thank them warmly.

# PART I: BACKGROUND ON MANUAL SCAVENGING AND THE MIT-NAVSARJAN PROJECT

## 1 INTRODUTION

### 1.1 MANUAL SCAVENGING

Manual Scavenging[1], the manual cleaning, handling, and carrying of human excreta, is a pervasive practice in India, despite its detrimental implications for health and human rights. Manual scavenging is performed exclusively by one sub-caste of Dalits, also known as "Untouchables," for whom it is often the sole economic opportunity. Scavengers, the majority of whom are women, earn less than a dollar a day gathering excreta from dry latrines or open defecation fields, often with their bare hands and a broom, and transporting the untreated waste to dumping sites. Despite being one of the most dehumanizing practices in the world, denounced by both Indian and international law, the practice is perpetuated and legitimated by the caste system which condemns scavengers to this decent-based occupation. Manual scavengers, called by different names in different regions constitute the lowest sub-caste of Dalits, who are outside the Varna (caste) system. There are approximately 160 million Dalits in India, and an estimated 50,000 to 60,000 manual scavengers in the state of Gujarat alone.

The persistence of manual scavenging demonstrates that legislation and court orders are insufficient for ending this degrading and dangerous practice. The Indian State has written many constitutional and legal provisions into law protecting Dalit rights, including the Protection of Civil Rights Act of 1955, the Scheduled Castes and Scheduled Tribes (Prevention of Atrocities) Act of 1989, and the Protection of Human Rights Act of 1993. The 1955 Untouchability (Offences) Act outlawed discrimination on the basis of untouchability, and the 1993 Employment of Manual Scavengers and Construction of Dry Latrines (Prohibition) Act required the demolition of dry latrines and banned manual scavenging. This act also provided institutional mechanisms and allocated resources for the rehabilitation of scavengers. However, gaps between legislation and enforcement, the absence of appropriate sanitation facilities, and limited alternative economic opportunities for scavengers work together to perpetuate the manual scavenging practice. Ironically, the Gujarat state government is one of the largest promoters of scavenging, employing members of the sub-caste as sanitation workers, tasked with cleaning vaada (wall) latrines in villages to maintaining sewerage systems in urban areas. Clearly, the State alone is incapable of eradicating manual scavenging.

### 1.2 THE MIT-NAVSARJAN PARTNERSHIP

The Gujarat-based Navsarjan Trust, one of India's leading Dalit rights advocacy groups, has been working on the issue of manual scavenging for years. In 2006, they teamed up with graduate student researchers from the Massachusetts Institute of Technology (MIT), led by Professor Balakrishnan Rajagopal, Associate Professor of Law and Development in the Department of Urban Studies and Planning and Director of the MIT Program on Human Rights and Justice. The goal of the two-year collaboration between MIT and Navsarjan was to help move the

1 Throughout this report, we will use the terms "manual scavengers" and "manual scavenging" to refer to sanitation work, as this is the term used in the 1993 law, and also because the term indicates the manual and degrading nature of the work

debate on manual scavenging from advocacy and legislation to enforcement and implementation and was based on two sub-goals:

- The elimination of manual scavenging; and
- The rehabilitation of scavengers to mitigate the effects of potential sanitation interventions.

## 1.3 THE PALIYAD PROJECT

In order to focus efforts of the MIT students, Navsarjan suggested undertaking a pilot project in one village in Gujarat, with the notion that if strategies for eliminating manual scavenging could be developed there, they could be spread and scaled-up to eliminate the practice more universally. For this pilot village, Navsarjan selected Paliyad, a village in Botad Taluka, Bhavnagar District of the state of Gujarat. Paliyad is a village of approximately 14,000 inhabitants and faces a serious sanitation deficit: open sewage runs in streams through the streets, few households have private latrines, and open defecation is widespread. There are over 300 Dalit households that have no access to sanitation facilities, and there are a total of 17 scavenger families, responsible for collecting waste from dry latrines and open defecation sites throughout the village. Together, students from MIT, advocates from Navsarjan, and members of the Paliyad scavenging community embarked on a collaborative effort to understand the situation of manual scavengers in Paliyad, to design sustainable sanitation technology that eliminates the need for manual scavengers, and to develop alternative employment strategies to improve the living and working conditions of members of the scavenging sub-caste.

This report is an attempt by the second MIT student researcher team to evaluate the challenges encountered in the Paliyad Project and to make recommendations about how Navsarjan should proceed in light of these challenges. A summary of our recommendations is shown in Table 1.

**Table 1. Recommendations presented in this report.**

| | |
|---|---|
| Boost Sanitation Demand | •Organize the community with the formation of a CBO or pani samiti<br>•Raise awareness with an on-the-ground women's rights and public health campaign (with suitable partners)<br>•Prohibit open defecation |
| Enable Sanitation Provision | •Build local capacity by identifying skilled artisans and developing training and facilitation programs for toilet construction<br>•Identify appropriate sanitation technology options depending on local conditions<br>•Identify financing options |
| Rehabilitate Manual Scavengers | •Investigate promising alterative industries<br>•Provide training for manual scavengers in those fields<br>•Invest in the development of those industries |

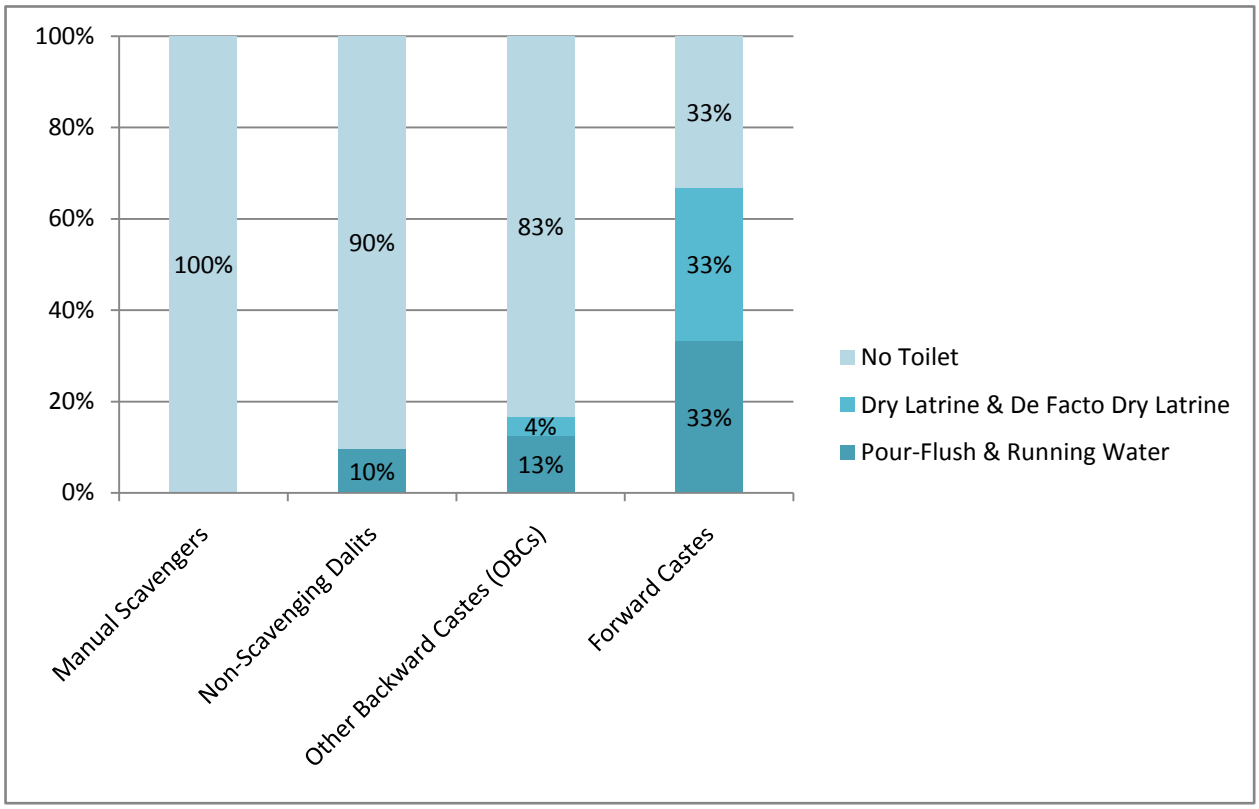
# 2 PROJECT CONTEXT

Paliyad is a relatively large village, with a population around 14,000, about 100 kilometers southwest of Ahmedabad. A variety of factors—related to sanitation, institutional arrangements, socio-economics, health, and culture—make addressing the issues of sustainable sanitation and manual scavenging in the village quite challenging.

## 2.1 SANITATION CONTEXT

In Paliyad, the majority of middle and upper classes have private and communal dry latrines or pour-flush toilets connected to septic tanks. Both dry latrines and septic tanks require periodic removal of waste and/or sludge, which is performed manually by members of Paliyad's 17 scavenger households. Most Dalit and other poor communities have little access to adequate sanitation, so open defecation is common practice. Historically, the principal public sanitation facility was the vaada, a walled, roofless space for open defecation, which was cleaned by scavengers. With the help of Navsarjan, a law suit was brought before the Gujarat High Court demanding closure of dry latrines in Gujarat, so the walls of the vaada were partially demolished, and the Panchayat was tasked with constructing public, pour-flush facilities. During our visit we saw two or three facilities that had been constructed without pits or septic tanks, and so had become de-facto dry toilets—another job for the scavengers. There is only one area in the village that has relatively functional public toilets, located adjacent to the Dalit community. The toilet area is low-lying and therefore frequently flooded with surface run-off from the village, containing trash and human waste. To reach the toilets, villagers must cross this stream of waste, often without footwear. Thus, many people choose to defecate in the open or in the partially-demolished *vaada* latrine, necessitating employment of manual scavengers to remove the waste.

**Figure 1. Percentage of toilet access by caste.**




*Source: MIT-DUSP 2006 survey, N=77.*

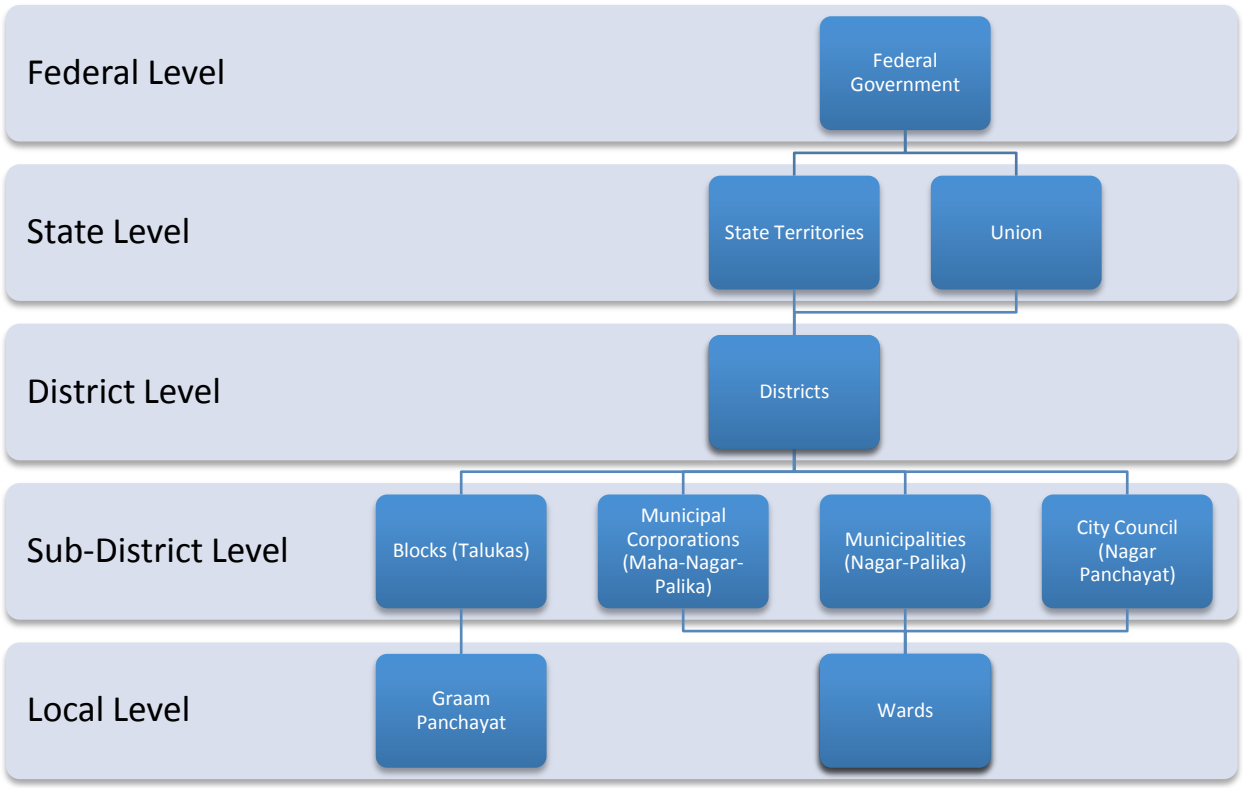
Navsarjan employees and local government officials informed us that there are plans to develop an underground sewerage system in Paliyad, with household waste and surface runoff being piped into large septic tanks. However, this kind of system may not be a sustainable solution to Paliyad's sanitation issues. First, Paliyad already faces acute water scarcity problems, and there is no evidence that current or projected water resource levels in the village could support a water-based sewerage system. Second, the grid system would do little to address the sanitation needs of the many families who lack toilets. Finally, without mechanical pumps, the system would likely suffer from routine clogging, leakage, and saturation. As shown by the experiences of larger towns and cities with such systems, manual scavengers remain employed to carry out the work of unclogging sewers and emptying septic tanks, which can be more dangerous and degrading than cleaning dry toilets and open defecation sites.

Clearly, there are technical constraints to addressing the sanitation issue in Paliyad in a way that eliminates the practice of manual scavenging. Due to water scarcity, the various project teams have been investigating technologies requiring no or minimal usage of water, including Ecosan composting toilets or biogas toilets. It is also important to consider how waste is removed from various technologies, particularly in the context of manual scavenging. Composting toilets require waste removal, but only after it has composted. Biogas toilets produce a sludge that must be handled, but also in a processed state. Various technological options will be discussed in more detail below, but it is important to note that no option has been identified yet that offers the perfect solution to all of the technical challenges of supplying sanitation and eliminating manual scavenging.

## 2.2 INSTITUTIONAL CONTEXT

The decentralized system of governance that exists in India makes policy design and implementation a complicated and slow process. Figure 2 depicts India's government structure.

**Figure 2. Structure of government in India.**




Paliyad is governed at the local level by an elected village council, called the Panchayat, composed of a head Sarpanch and around 12 additional council members. Panchayat elections take place every 5 years, and Paliyad's most recent elections were at the end of 2007. The Panchayat is responsible for construction and maintenance of public infrastructure like street lights and roadways; keeping records of births, deaths, and marriages in the village; assuring public health and hygiene by providing water and sanitation facilities; education; implementation of development schemes for agriculture and animal husbandry; public markets, fairs, festivals, and celebrations. The primary source of the Panchayat's income is property taxes; other sources include professional taxes, pilgrimage taxes, animal trade, and grants received from the State Government or from the Zilla Parishad, the District Council.

The District is the principle subdivision within Indian states, and Districts are further subdivided into Talukas, geographic areas containing from 200 to 600 villages. Much of the District funding, along with Economic Development and Social Welfare Departments, operate through the Talukas. The Taluka serves as a sort of headquarters for many rural development activities, particularly through the position of the Taluka Development Officer.

While this decentralized governance structure can be valuable in terms of providing important checks and balances, it can create challenges in the implementation of new projects. For example, we heard from the new Sarpanch in Paliyad that the Taluka Development Officer had funds to build three new, public toilets in the village. According to the Sarpanch, the Taluka will use their own contractors to come in and build those toilets as they see fit. There is no way for the Panchayat to access the funds directly or influence decision-making about how the money could be best spent or even what kinds of toilets ought to be built. In other cases, governmental programs operate directly through the Panchayat, as in the case of the Rural Development Ministry's Total Sanitation Initiative, which will be discussed in some detail in Section 5.1. Due to fragmentation of funding streams and regulatory responsibility, the scope for project experimentation at the local level is extremely limited.

Even if an innovative sanitation project were possible, it is unclear what organization would implement it. Navsarjan is not interested in becoming a sanitation service delivery organization, but few organizations in Gujarat are working on the issue of rural sanitation. Additionally, of critical importance to Navsarjan is the fact that sanitation organizations do not necessarily come from a pro-Dalit background. They see sanitation not as a caste-issue, but rather as a technical issue. In order to be successful, any sanitation project in Paliyad will require the work of organizations that can: 1) use education to facilitate a change in mindset about sanitation, hygiene, and caste; 2) organize diverse communities to elicit demand for toilets; and 3) supply and install toilets. Institutionally, it is not at all clear which organizations would be willing and capable of taking on these tasks.

## 2.3 SOCIO-ECONOMIC CONTEXT

### 2.3.1 DISCRIMINATION

According to data from the Manual Scavenging Health and Socioeconomic Baseline Assessment Survey conducted by the first MIT-Navsarjan team, discrimination affects many Dalit castes in Paliyad, but the most profound impact is on the Manual Scavenging population. As stated above, there are 17 scavenger families in Paliyad who are the target of systematic discrimination that puts them in a separate class even from the other Dalit sub-castes. Due to concerns about "pollution" and "untouchability," manual scavengers are routinely denied access to village cultural, social, and religious events (see **Error! Reference source not found.**). More critical, however, is the fact many are frequently or always denied access to the marketplace and to government institutions and services, including healthcare and education (see Figure 4, Figure 5 and section 3.3 of previous report).

**Figure 3. Frequency of denial of access to social, cultural or religious events by caste.**

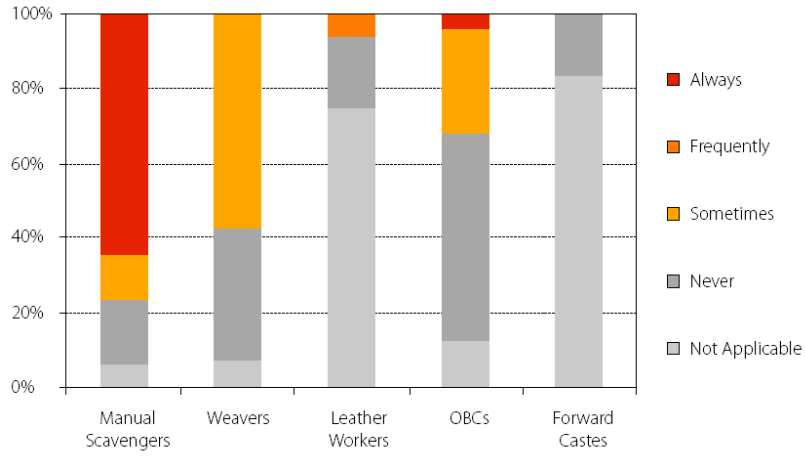



**Figure 4. Frequency of denial of access to the market by caste.**

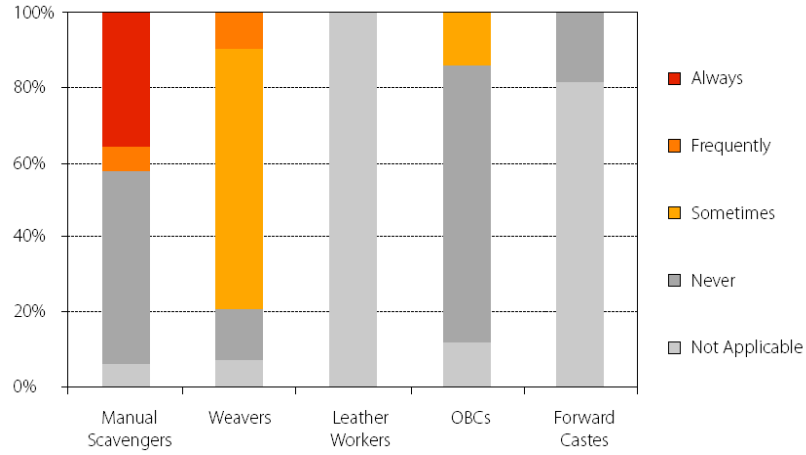
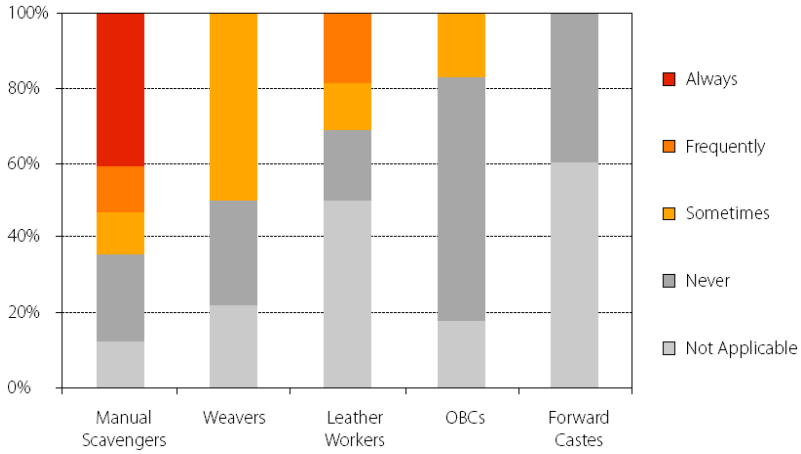


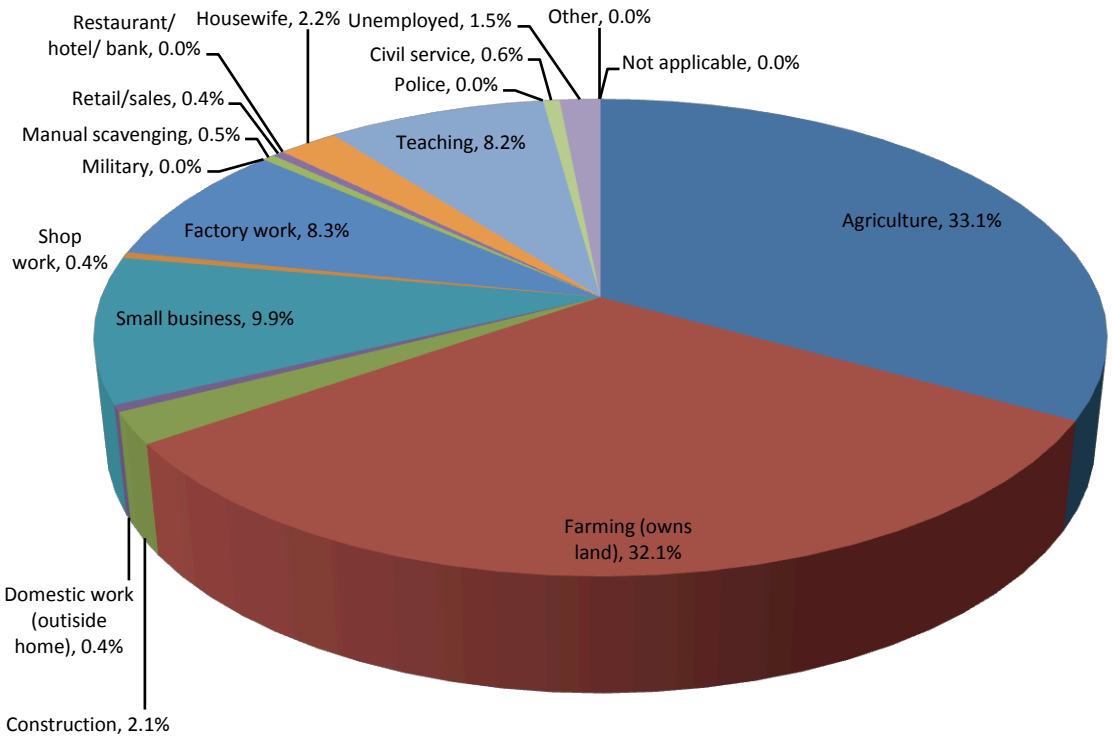

**Figure 5. Frequency of denial of access government institutions by caste.**



### 2.3.2 THE ECONOMICS OF MANUAL SCAVENGING

While a disgusting and degrading job, manual scavenging provides scavengers with fairly consistent income, giving them some sense of financial stability that some others in the village lack. Due to fear and humiliation, it is difficult to collect data on the total number of people working as scavengers; particularly difficult to count are those scavengers who work informally in private homes, cleaning dry latrines in exchange for a few rupees or leftover food. The 2006 survey of Paliyad yielded the breakdown of primary occupations by percentage seen in Figure 6. In terms of formal employees, in 2006, there were 33 manual scavengers employed as sanitation workers by the Panchayat, 27 as daily wage earners and 6 as permanent employees. Salaries are paid by the Panchayat Secretary every month out of the Panchayat budget. Daily wage earners are not entitled to the benefits or job protection afforded to permanent employees, meaning they cannot complain about working conditions or wage withholding. For example, five female scavengers were fired from the Panchayat for signing affidavits detailing the inhumane working conditions of sanitation workers in Paliyad. Under pressure from groups like Navsarjan, the Panchayat offered to hire them back, but reduced their monthly wages from 2500 rupees to 1100 rupees. While one woman refused the offer, four others accepted. According to the woman who refused, she was able to because her husband is a permanent employee of the Panchayat and therefore has a secure income. The other four women, however, had no choice but to return to the work for less than half the pay.

**Figure 6. Primary occupations of Paliyad residents by percentage.**




As long as there is demand for manual scavengers, members of the scavenging community will do the work, as it provides income where few other opportunities for income generation exist. Scavengers actually have higher

monthly personal income than some non-scavenging Dalits and Other Backward Castes (OBCs), but the value of their owned assets is strikingly lower. In a village economy, where benefits deriving from subsistence farming and other non-monetized resources often substitutes for money, assets (such as land, livestock, and tools) can greatly affect livelihood. Additionally, the discrimination faced by members of the scavenging sub-caste in social, governmental, and educational realms limits their access to income and asset accumulation. These issues combine to severely constrain the economic mobility of members of the scavenging community. (See section 4 of previous report)

**Figure 7. Box plots of reported family income and expenses per person (in Indian rupees), by caste.**

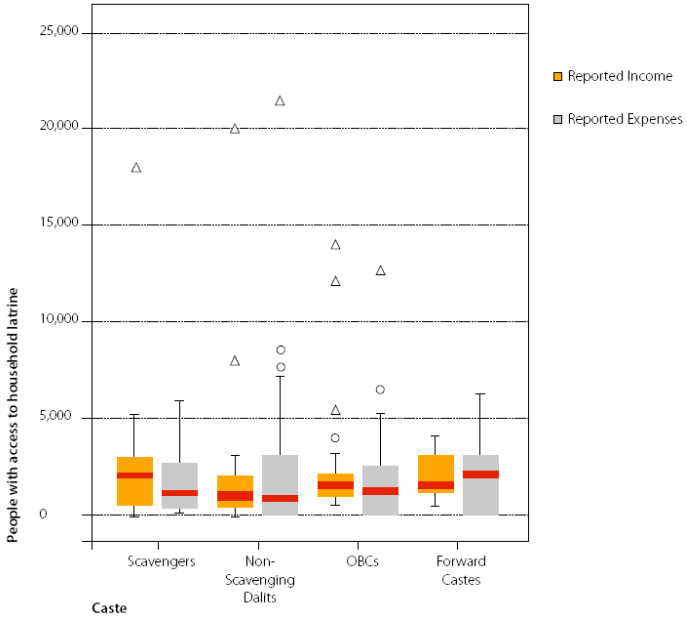
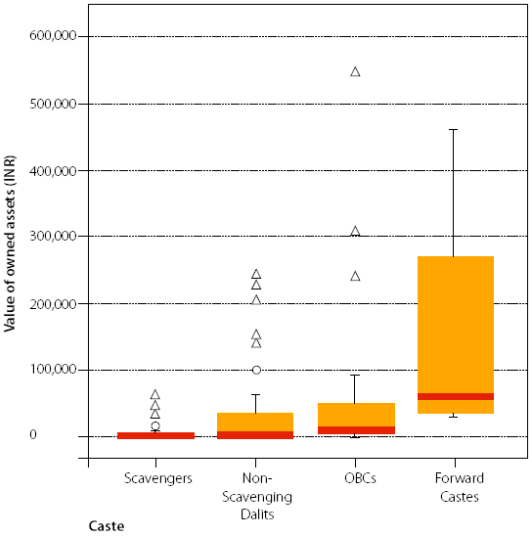



**Figure 8. Value of total family owned assets (in Indian rupees) by caste.**




### 2.3.3 GENDER

Overwhelmingly, women are the members of the community employed as manual scavengers. As a result, female scavengers confront a threefold system of caste, gender, and occupation-based discrimination and oppression

affecting their health, wellbeing, and dignity. Women scavengers and their female children are particularly vulnerable for a number of reasons:

1. They tend to perform their job alone and at night, placing them at increased risk of gender-based violence
2. If a non-scavenger women marries into a scavenging family, she is forced into the occupation, which is not true for men
3. Scavenging women are required to work through pregnancy, increasing health risks for both them and their unborn children
4. Women gather water, prepare food, and care for children and are therefore more likely to transmit pathogens to their entire families
5. Mothers tend to bring their female children with them to help in their scavenging duties, keeping girl children out of school and perpetuating generationally the gender-based scavenging practice (See section 5.2 of previous report)

It is also important to mention that the sanitation issue in rural India is gendered beyond just the scavenger community. All women who live in households lacking access to private sanitation facilities are forced to urinate and defecate in public areas, which can be both humiliating and dangerous. Out of embarrassment, many women refrain from urinating and/or defecating during the daytime, waiting until the night affords them some level of privacy. Of course, this can have negative physiological impacts and also puts them at greater risk of sexual assault.

## 2.4 HEALTH CONTEXT

Due to the ubiquitous practice of open defecation, exposed wastewater running through the village streets, and general lack of understanding about germ theory and hygiene, all of Paliyad's population likely suffers health consequences. Manual scavengers, however, face a dual risk of exposure to harmful pathogens in both their environment and their occupation. Scavengers are consistently exposed to human and animal waste with minimal or no protective equipment. Anecdotal evidence suggests that many scavengers prefer not using protective gear, even if it were available, due to issues of comfort and stigma. Hygienic practices like handwashing are effective at reducing diarrheal and respiratory diseases. While 58% of manual scavengers and 60% of non-scavengers report washing their hands frequently or always after urination/defecation, manual scavengers have reduced access to soap both at home and at work. Additionally, manual scavengers have reduced access to water in the household due to distance from water collection points and frequent cuts in water supply. Limited water supply increases the likelihood of diseases and deaths from diarrhea-related infections, particularly in young children and those with vulnerable immune systems. When members of the scavenging community do fall ill, they may be less likely to access medical care due to fear of discrimination, cost, and inability to take leave from work. (See section 5 of previous report)

## 2.5 CULTURAL CONTEXT

Without significant changes in mindset of villagers from all of the various castes, demand for the kinds of sanitation initiatives that would eliminate the practice of manual scavenging will remain low. In a village like Paliyad, people are used to defecating in the open. While this poses many problems in terms of health, privacy and safety, particularly for women, the people controlling the resources, typically men, do not understand the importance of sanitation and hygiene and are therefore not willing to invest in improvements.

Additionally, due to the system of caste-based occupation, sanitation in Indian society is considered the problem of only some people, specifically the manual scavenging caste. Other castes take no responsibility for sanitation or hygiene and simply expect their waste to be dealt with by other people. Until sanitation becomes everyone's problem, the complexities of the sanitation issue in a village like Paliyad are unlikely to be solved.

## 3 PROJECT PROGRESS TO DATE

After studying the issues of Dalit rights, manual scavenging, and sustainable sanitation in a semester-long course during the spring of 2006, the first group of MIT students traveled to Gujarat in June, 2006. During that initial three-week visit, the team conducted an in-depth case study of ground conditions in Paliyad and used their academic preparation, field work, data collection, and analysis to prepare an options assessment for Navsarjan. Their work began with a Manual Scavenging Health and Socioeconomic Baseline Assessment Survey, which Navsarjan employees carried out in 77 households throughout the village. The survey provided a baseline assessment of health, socio-economic, financial, and caste discrimination data in order to understand sanitation practices and manual scavenging in Paliyad. While there, they also explored options in terms of sustainable sanitation technologies. Based on these studies, the MIT team prepared a report for Navsarjan analyzing the various dimensions of the manual scavenging problem in Paliyad, offering an Ecosan composting toilet model sanitation technology as a viable option, and making recommendations about the institutional and other arrangements needed to make this technology address the goals of the project successfully. The recommendations for the Paliyad project presented to Navsarjan in that report are presented in Table 2.

**Table 2. Recommendations from the 2006 MIT report to Navsarjan.**

| | |
|---|---|
| Awareness-raising | • Introducing a curriculum on Ecosan technology and hygiene, already used in Navsarjan's three schools, for adoption by local schools and/or health centers<br>• Using advocacy strategies to assure the right to water for manual scavengers |
| Implementation | • The identification or creation of a non-profit institution to take ownership over the management and building of Ecosan units and setting maintenance structures in place. This implementing organization should have a focus on sanitation and a demonstrated commitment to human rights, fair labor practices, and economic justice<br>• The construction of 75-80 household Ecosan toilets, based on the number of initial orders placed, in the next 2-3 years<br>• Scale up of the program from Paliyad to the multi-village level and eventually to the state-wide level |
| Alternative livelihoods | • Ensure that manual scavenging community benefits economically from new technology through alternative employment, either in building and maintenance of Ecosan units, in marketing of compost, or in other, unrelated occupations<br>• Garner support from other Paliyad- and Gujarat-based institutions, including government, to gain legitimacy, financial resources, land and technical assistance for the effort |
| Additional Research | • Alternative materials<br>• Bundling costs<br>• Cross-subsidization to boost affordability for the lowest castes<br>• Minimization of collection costs<br>• Training costs for managers and other employees<br>• Demand for the new Ecosan product |

In March, 2008, a second team of student researchers from MIT traveled to Gujarat to evaluate the Paliyad project's progress and develop strategies for moving the project forward. They found that in the nearly two years since the first team's visit, little progress has been made toward the goals and objectives set out for Paliyad. One Ecosan unit has been built—though not in accordance with the original design suggestions, which specified a dual-tiered waste storage chamber—and one manual scavenger has successfully left the occupation, but otherwise relatively little has changed.

Through site visits and conversations with Navsarjan's Manual Scavenging Team and the organization's director, Manjula Pradeep, the students learned of a variety of factors, both external and internal, that have impeded project implementation.

First, local Panchayat elections made it difficult to engage in conversations with local officials who were more concerned with their campaigns than with this project. Given that 2007 was a year of political changes, securing

political support for the project was near impossible. Additionally, the elections installed a new Sarpanch who may prove less supportive of the project than the previous Sarpanch was. The previous Sarpanch was a Dalit whose house was in the Dalit community, so he was more attuned to the issues of sanitation and manual scavenging in the village. The new Sarpanch is from the Dharbar (upper) caste and seems indifferent to these issues in his village. When asked about the practice of manual scavenging in Paliyad, he told us that the "custom no longer existed" there.

Second, Navsarjan does not wish to take on the role of implementing organization for delivery of sanitation services or health awareness-raising, but has not identified partners with whom to collaborate.

Third, through more detailed market studies in the village, Navsarjan learned that demand for Ecosan toilets at the household level was much lower than initially believed. When the first team was there, they got orders for 75-80 Ecosan toilets throughout the village, but by February, 2008, less than 5 families were eager to install an Ecosan toilet. The reasons for this lack of demand include increased understanding of cost, size and height of the units, and discomfort with the idea of waste collecting and composting inside the household compound. Demand may also have gone down due to lack of project progress.

It is clear that the Paliyad project, and the larger project of eliminating manual scavenging altogether, is confronting some significant challenges. In order for the Paliyad Project to progress, significant attention must be focused on understanding the cultural, institutional, technical, and socio-economic barriers and developing strategies for addressing them.

# PART II: CONSIDERATIONS FOR ENDING MANUAL SCAVENGING

## 4 NAVSARJAN'S MANUAL SCAVENGING PROGRAM

Manual scavenging is an issue of priority importance on Navsarjan's agenda. As a leading advocacy organization for Dalit rights and organizer of a social movement for equality, Navsarjan recognizes the necessity of putting an end to this inhuman and dangerous practice, which has long exposed Dalits, mainly women and young girls, to abysmal work conditions, serious health hazards, exploitative wages, and systemic social discrimination. Since 1996, Navsarjan has been actively organizing, campaigning and advocating for the eradication of manual scavenging and rehabilitation of scavengers into alternative employment in Gujarat and across India. This section aims to i) describe the core strategy and achievements of Navsarjan's program on manual scavenging ii) analyze the structural and practical limitations of the program and iii) recommend actions that Navsarjan can take to remedy the constraints and move forward.

### 4.1 CORE STRATEGY

Navsarjan's program on manual scavenging is rooted in a human rights advocacy framework, which encompasses three underlying missions: eliminate caste discrimination, ensure equality of opportunities for all, and ensure the rule of law.[2] The program adopts a dual strategy that combines legal with grassroots activism. In addition to advocacy and campaigning for changes at the national and state level, Navsarjan also engenders practical changes at the local level through on the ground training and education to instill in scavengers a Dalit consciousness and bolster their will to fight oppression and inequality themselves. The program has eight field staff, most of whom come from the communities in which they work. Concrete activities of the program include[3]:

- Filing law suits against offending governments and individuals
- Working to gain arable land for scavengers through government programs
- Assessing the incidence and magnitude of manual scavenging through research, and further publicizing the existence of such practice
- Running life insurance programs for scavengers
- Conducting meetings with scavengers to educate them about their rights, and organizing unions
- Encouraging youth from scavenging communities to join the vocational training school Dalit Shakti Kendra (DSK) and gain skills to support themselves
- Promoting Ecosan (ecological sanitation) facilities that eliminate the need for manual scavenging
- Coordinating with other national and international institutions to continue to develop new strategies to combat manual scavenging

[2] http://navsarjan.org/navsarjan/navsarjan/aboutus
[3] http://navsarjan.org/programmes/eradication-of-manual-scavenging-campaign/

## 4.2 MAJOR ACHIEVEMENTS

Since its inception, the program has achieved tremendous successes and delivered perceptible impact to various scavenging communities.

### 4.2.1 LEGAL ADVOCACY

By waging legal actions against non-performing government bodies, Navsarjan has been able to exert significant pressure on the State to change its policies and practices in ways that benefit scavengers. A landmark court victory in 1996 forced the State to admit that it employed thousands of scavengers to clean human excreta from public latrines using rudimentary tools and carry the untreated waste in headloads to disposal sites. It also resulted in the court ordering the State to demolish all vaada latrines (wall-enclosed areas on the open ground), and allocate funds for rehabilitation schemes to transfer manual scavengers to other occupations. Navsarjan's campaigning, alliance-building and media activities have helped bring the issue of manual scavenging into sharper public focus. The public has been made aware of the continued existence of manual scavenging and inadequate attention paid to the issue by the State and concerned agencies. Other successes include securing minimum wage to hundreds of sanitation workers and awarding dozens of life-insurance claims to enable families of scavengers to quit this degrading work.

### 4.2.2 GRASSROOTS ACTIVITIES

Through education and training efforts at the local level, Navsarjan has fostered a collective Dalit identity that helps advance a sense of shared responsibility among Dalits on the manual scavenging issue. Navsarjan has also succeeded in informing scavengers of their legal rights and empowered them to stand up and fight for their rights. In the past, many scavengers, trapped in the psychology of the oppressed, did not protest against the practice nor call for its abolition. They even denied that they engaged in this work for fear of losing the only source of income to meet basic survival needs. Yet many practicing manual scavengers are now vocal about the fact that their work is "manual scavenging". They have gained confidence to speak about their experience to the media and government officers. Many young people from families of scavengers have gone to acquire vocational skills through DSK or other programs to move away from the hereditary occupation that has relegated them to the bottom of the social hierarchy.

## 4.3 LIMITATIONS

As a traditional human rights organization, Navsarjan relies primarily on advocacy intervention to safeguard the rights of scavengers through judicial and legislative channels. Yet, there are inherent and practical limits to this rights-based advocacy approach in tackling the multifaceted nature of the manual scavenging problem.

### 4.3.1 GAP BETWEEN LEGAL ADVOCACY AND GRASSROOTS CHANGE

The reality of India reveals a troubling paradox. Despite myriad anti-scavenging legislations and government rehabilitation schemes, millions of Dalits throughout India are still cleaning and transporting other people's filth. The high prevalence of such illegal practice can mostly be attributed to the weak enforcement power and implementing capacity of the government and the political class' apathy towards the issue. The State fails to acknowledge the gravity of the situation and its own duty to abide the law. State and local governments

routinely deny the existence of manual scavenging while continuing to employ many Dalits as sanitation workers for cleaning vaada latrines in villages or sewer systems in cities. Thus, the traditional advocacy framework with undue reliance on the State to deliver change on the ground is largely deficient. Macro-reforms at the national and state level have rarely led to improved conditions for manual scavengers at the community level. In certain cases, legal activism from above can even worsen the conditions for manual scavengers if follow-up actions are not pursued to ensure effective implementation of legislations and court rulings at the local level. To give an example, in response to the law suit filed by Navsarjan to demand the closure of dry latrines in Gujarat, the court ordered the demolition of all vaada latrines and their conversion into pour-flush latrines. In the village of Paliyad, the local government, pleading lack of funds, replaced the half-demolished vaada latrine with water-sealed latrines that are neither supported by septic systems nor connected to a water supply source. These toilets became immediately clogged with feces and unhygienic in the extreme, making the task of cleaning more odious for manual scavengers.

The divergence between written laws and reality also points to the brutality of India's caste system, which has for centuries forced onto Dalits the task so undignified that no one else will do it. Yet, manual scavenging is not only perpetuated by caste pressure. Various socio-economic factors continue to impede the program's progress. Not only is there prolonged resistance to occupational change within the scavenger community due to the dearth of replacement jobs and stiff social biases, but there is also unremitting demand for manual scavenging work from both private households and the public sector. Manual scavenging also exists in various forms, and is often a coveted job in the public sector as it is associated with multiple social benefits, including housing. To make matters worse, intra-caste divisions remain acute as many non-scavenging Dalits still do not see manual scavenging as a "Dalit problem" and refuse to relate to manual scavengers.

Given the complexity of the issue, legal interventions to push for more anti-scavenging laws and court orders at the national and state level will most likely be insufficient to end this pernicious practice. The solution will require a multi-pronged intervention that introduces a radically different sanitation system and creative, locally-relevant strategies to handle various cultural barriers and bypass the lack of political will and enforcement. This, however, cannot be easily accomplished within the confines of the human rights advocacy framework which relies on the legal system to implement social change.

### 4.3.2 LACK OF FOCUS ON BROAD SANITATION NEEDS

The fight against manual scavenging is inextricably linked to the broader struggle for sanitation in India. Popular statistics show that 700 million people in the country have no access to any form of basic sanitation. The distribution of access mirrors the distribution of wealth and social status. The majority of middle and upper class are served by private toilets and communal pour-flush latrines connected to septic tanks. Dalits and poorer communities have little access to sanitary facilities. Thus, manual scavengers belong to the group that faces the most serious sanitation deficit. Along with other poor families, they are frequently forced to defecate in vaada latrines or in the open. However, the lack of access to sanitation service by scavengers is only one aspect of the manual scavenging issue. The other aspect, equally important, is the lack of appropriate sanitation alternatives that remove the need for manual handling of human waste. Current rural sanitation options involve dry latrine pits and septic tanks which demand periodic waste and sludge removal to be performed by manual scavengers. The centralized sewerage systems in cities also rely on the cleaning and servicing of scavengers. In short, manual scavengers have fallen victim to a system that breeds and supports unsafe sanitation practices and unsanitary facilities.

### MOVING FORWARD

While Navsarjan has made concerted efforts to address sanitation as it relates to manual scavengers (such as promoting Ecosan technology), it has not yet tackled the inadequate sanitation coverage that has caused innumerable problems for rural residents, particularly women and children. Such problems include public health risks, lack of privacy and convenience, safety and security, sexual assault and harassment. Like water, sanitation is a basic human right that needs to be protected for all, regardless of caste, wealth, or gender. Yet, Navsarjan's program on manual scavenging has thus far failed to establish the link between the human rights of manual scavengers and the right to sanitation for every human being.

#### 4.3.3 INSTITUTIONAL DESIGN UNFIT FOR SERVICE DELIVERY

As discussed above, the operation and maintenance deficiencies of existing sanitation options have triggered the demand for manual scavengers. Therefore, a sanitation intervention centered on alternative technologies that minimize water use and physical contact with waste offers a viable solution for realizing Navsarjan's goal of abolishing manual scavenging.

However, Navsarjan's structure as an advocacy organization constrains it from serving concurrently as the implementing agency of sanitation technology. Navsarjan lacks the capacity, institutional knowledge and technical experience to deliver large-scale sanitation services. It already stretches its resources thin across a number of programs covering a multitude of issues affecting Dalits, from education, minimum wage, vocational training to women's rights, land rights and manual scavenging. It simply cannot afford to take on the leading role of overseeing the construction, operation, and maintenance of sanitary facilities on the ground. Moreover, the provision of sanitation often entails organizing various communities across caste lines for eliciting demand and deploying toilets. But in the Dalit activist tradition, a cohesive caste identity is often needed to exert pressure upward against the prevailing system.

#### 4.3.4 INSTITUTIONAL CONSTRAINTS FOR FORMING PARTNERSHIPS

The key to successful implementation of sanitation technology is partnering with a service delivery NGO that has a sanitation focus. Yet, the potential organizations may not have a clear mandate to tackle caste discrimination or manual scavenging, which are central to Navsarjan's missions. This incongruity in institutional commitments can potentially hinder partnership formation.

Furthermore, the requirement of advocacy puts Navsarjan in an adversarial relation with the State. Navsarjan deems sanitation provision as a core state responsibility, and pressures the State to fulfill this role. Yet, improving access to sustainable sanitation in rural villages can greatly benefit from government's financial resources, land and technical assistance. The counter-state position that advocacy organizations adopt makes cooperation with the State ever more challenging.

#### 4.3.5 GENDER BIAS OF MANUAL SCAVENGING TEAM

The gender composition of Navsarjan's Manual Scavenging team is unbalanced. There is no female representation although manual scavenging is performed mainly by Dalit women and young girls. The director of Navsarjan informed our team that it was generally difficult to recruit women to the organization, but even more difficult to find female staff for the Manual Scavenging team. The only woman who joined left the team after one year of service due to family pressure. As manual scavenging predominantly affects women's

health, well-being and dignity, the failure to involve female presence in the field staff can undermine grassroots community organizing activities.

### 4.3.6 LACK OF SCALABLE PLAN FOR REHABILITATING MANUAL SCAVENGERS

Navsarjan's approach to rehabilitation of manual scavengers has typically been to provide them with vocational training through DSK in hope that they will be able to obtain new jobs with the acquired skills. However, this strategy is unlikely to sustain long-term in the absence of an institutionalized mechanism to assist scavengers with job search. It is currently unclear what scavengers end up doing after DSK because DSK does not systematically follow up with students who have been through their programs. The only study that evaluated DSK graduate's job placement was conducted by a Swiss student for her Masters thesis. On top of that, there are very few alternative occupations for scavengers that are proven as viable alternatives. Unless there is a systematic plan to identify economic opportunities to help scavengers restore lost incomes, new technological interventions may hurt, instead of help, manual scavengers.

## 4.4 RECOMMENDATIONS

From the analysis of the existing constraints to ending manual scavenging, it is clear that an advocacy intervention needs to be implemented in tandem with a sanitation intervention. Given the inherent limits of the human rights framework under which Navsarjan operates as well as the lack of organizational capacity, there is an obvious need for Navsarjan to partner with other actors to make the fight against manual scavenging fruitful in Paliyad. Navsarjan can also adopt actions to strengthen its own program on manual scavenging simultaneously. The following recommendations can be considered:

- Reframe the issue as a right to sanitation and develop an awareness-raising campaign targeted more broadly, particularly at women. There are two possibilities for the focus of this campaign:
    - Expand the existing campaign on women's rights to address explicitly the need for sanitation by women. The campaign can emphasize the effects of poor sanitation and hygiene that most adversely affect women such as such as privacy, safety, security, and children' health.
    - Initiate a new "right to health" campaign to raise awareness on the public health consequences of lack of sanitation. Navsarjan can partner with other NGOs to carry out this campaign.

- Increase the number of field employees
  Navsarjan should commit more staff, especially female staff, to work at the community-level and build a broad-based constituency. This will allow the advocacy campaigns to reach a broader public.

- Expand ongoing anti-manual scavenging advocacy
  Navsarjan should advocate for the inclusion of sustainable sanitation technology in government-funded sanitation programs and projects (such as the Total Sanitation Campaign). Specifically, Navsarjan should educate public officials on alternative technology options, and highlight the positive impact of new technology on the environment, public health, and manual scavenging and lobby the government to support the construction of household or public toilets with government subsidies using the improved technology.

# 5 GOVERNMENT APPROACH TO SANITATION PROVISION

In addition to its human rights campaign, Navsarjan has also tried to address manual scavenging by raising awareness about alternative sanitation technologies, particularly Ecosan. These efforts have been hindered due to a lack of demand for sanitation generally, the cultural barriers to using Ecosan, and lack of capacity. Navsarjan acknowledges these limitations and that the organization's expertise is not in the realm of sanitation provision. Instead, it emphasizes the government's role and responsibility in providing sanitary facilities. Yet the current government's approach to sanitation is inadequate to address the main barriers to sanitation access: the need for demand creation and the supply of sustainable sanitation options.

## 5.1 TOTAL SANITATION INITIATIVE (TSI)

The government's approach addresses sanitation coverage and access through financial support for toilet construction. This national program, known as the Total Sanitation Initiative or TSI, provides households under the poverty line with a subsidy of 1200 rupees, approximately $30, to build household toilets. Households above the poverty line are offered Rs. 600 to build household toilets. The state Rural Development Office is in charge of disseminating funds to its regional offices based on the number of people below the poverty line. These regional offices, in Paliyad's case the Taluka Development Office (TDO), use the 1200 rupees per household to buy low cost sanitation hardware, such as a ceramic squatting plates and concrete. Households interested in building toilets must apply for these materials through their local panchayat. The panchayat then submits their application to the TDO, after which the materials are delivered to the panchayat for collection.

This approach has many shortcomings, detailed in subsections 5.1.1, 5.1.2, 5.1.3, and 5.1.4

### 5.1.1 INCENTIVES WITHOUT AWARENESS BUILDING TO GENERATE DEMAND

The TSI program does not attempt to generate demand for toilet facilities on the local level. For example, to date no one in Paliyad has applied for the TSI subsidy. In order for a sanitation program to work, demand for sanitation must be created. This requires changing people's perceptions about open defecation through education about the benefits of sanitation, coupled with government subsidization. According to the World Bank, subsidy programs that do not promote awareness and behavior change also fail to promote usage of toilet facilities. According to one study in Andhra Pradesh, 50 percent of the subsidized toilets implemented through the TSI program were unused or being used for purposes other than sanitation.[4]

### 5.1.2 MATERIALS WITHOUT TRAINING, ASSISTANCE AND VERIFICATION

For those who already want toilets, neither the Gujarat Rural Development Office nor its regional offices provide any technical assistance to help villages build their toilets. Many villagers do not know how to build

[4] World Bank Water and Sanitation Program, "Community-led total sanitation in rural areas: an approach that works." February 2007. URL: esa.un.org/iys/docs/san_lib_docs/WSP-Community%20Led.pdf

toilets. Providing materials without technical assistance may lead to improper toilet design and construction, which could lead to conditions that are worse for manual scavengers. While the Rural Development Office claims that 69 percent of households in Gujarat have access to toilets**,** it is unclear how the office evaluates this progress. The sanitation staff of the State Rural Development Office consists of one administrator for the entire state and there is no system of verification at the local level where the materials are used.

### 5.1.3 SUBSIDIZING POOR CONSTRUCTION AND UNSUSTAINABLE TECHNOLOGIES

Third, the subsidy consists solely of the materials for construction. It does not account for labor or other amenities such as a wooden or metal door, brick foundation or washroom. Moreover, it is unclear whether these materials are sufficient or of consistent quality to build an adequate facility. The procurement strategy also limits the type of sanitation technologies available to ventilated improved pit (VIP) latrines and pour flush toilets. Pit latrines are sustainable only if a new pit can be dug when the old one is full, or if a pit-emptying service is available. For lack of sophisticated equipment such as vacuum pumps, it is conceivable that manual scavengers will be employed to empty pits in the future. In a village the size of Paliyad, where lack of water supply is a chronic problem, pour-flush pit latrines and soak pits should not be offered as the only technology option available to the community, but should be one of many options, which include ecological sanitation technology such as dry composting toilets, bio-gas toilets, etc.

### 5.1.4 OTHER LIMITATIONS

Other commonly cited limitations of this program relate to poor choice of improvement indicators (e.g. number of toilets constructed as opposed to reduced open defecation), inadequate provisions for waste-disposal, and high reliance on the potential of subsidies and grants as incentives.

Interestingly, the national Total Sanitation Campaign, on which the TSI is based, provides guidelines to address many of these shortcomings. The state and regional government are supposed to conduct a survey to assess the current sanitation status, hygiene practices, attitudes and demand for improved sanitation. This survey is meant to help the state develop an information, education and communication plan to generate demand locally. Similarly, the national guidelines call for the creation of a Rural Sanitation Mark and Production Center in towns to provide materials, services, and guidance to construct different types of latrines. These aspects of the program are absent from the Gujarat Rural Development Office's current program. Nonetheless, evidence from other states that have implemented these features indicates that the top-down approach to generating demand and facilitating procurement has been largely unsuccessful.

## 5.2 PUBLIC TOILETS PROVISION

As in the case of private toilets, the government's arrangement for financing and constructing public toilets is flawed. In order to build a public toilet, the panchayat must identify and donate land for a new facility. Once the site has been selected, the panchayat requests funds from the Rural Development Office and notifies the Taluka Development Office (TDO). Two-hundred-thousand rupees (= $50,000) are available for public sanitation. The TDO uses these funds to buy materials and hire a contractor, typically affiliated with the TDO, who builds the public toilets locally.

### 5.2.1 LACK OF VERIFICATION AND SUPERVISION

Like with private toilets, neither the TDO nor the Rural Development Office verifies the construction of the toilet facility. Under the current approach, contractors have a perverse incentive to save on costs through poor quality construction. For example, the public toilets built to replace a vaada latrine in Paliyad did not even have a pit in which to defecate – the TDO material had simply been used to build a wall and lay ceramic squatting pits on the bare ground. The sarpanch blames the TDO for this error, while the Rural Development Office places the responsibility of verification on the panchayat. The process of public toilet constructions lacks accountability.

### 5.2.2 POOR MAINTENANCE

Moreover, public toilets are not a sustainable strategy for sanitation. Maintenance is usually poor, which leads people, particularly men, to continue to defecate in the open. Water-sealed pit latrines typically fill up within a short period of time, after which they either fall into disuse or manual scavengers are employed to empty them. For example, according to the sarpanch of Paliyad, the panchayat has identified three areas for public toilets and has submitted an application to the TDO. The sarpanch acknowledged that these water sealed pit latrines would fill up within a short period of time and that open defecation would continue.

## 5.3 SHORTCOMINGS OF GOVERNMENT PROGRAMS

The government's current approach to sanitation lacks the key ingredients to improve sanitation conditions at the village level. These necessary factors are:

- Organizing communities and building awareness for demand generation
- Facilitating implementation through technical assistance, training, verification, and maintenance
- Providing flexible technological options that are cost effective and sustainable

However, it is unclear whether the Rural Development office, TDO, or the panchayat are capable of generating sanitation demand, much less supporting its supply, at the village level. They lack three essential assets to do so.

- EXPERTISE: None of these groups have the expertise to conduct a successful sanitation campaign or the skills to build toilet facilities.
- COMMUNITY TIES: Neither the Rural Development office nor the TDO have the necessary ties to the community to conduct a successful sanitation campaign.
- COMMITMENT: Sanitation is low on the list of priorities of both the Rural Development Office and the sarpanch. As mentioned, the State Rural Development Office sanitation staff consists of only one person. The sarpanch is more concerned with re-election than ending open defecation.

Therefore, pressuring these governmental entities to fulfill this role would likely lead to unsatisfactory results.

# 6 ALTERNATIVES TO GOVERNMENT-LED PROGRAMS

In order for any sanitation initiative to be successful, it must first make sanitation everyone's problem, not only the problem of manual scavengers. This requires a radical change in mindset.

People in Paliyad are accustomed to defecating in the open and are resistant to change for a variety of reasons. Despite the social humiliation factor, open defecation is free, compared to pay-and-use public/community toilets, or to the more expensive option of building a private toilet. For the families that have private dry toilets or pour-flush latrines with septic tanks, the aesthetic or health problems (if any) caused by the presence of dry toilets or septic tanks within households do not seem to be severe enough to warrant consideration of alternative technologies, because currently these toilets are cleaned daily by manual scavengers. The current caste structure of society in Paliyad offers households from higher castes no incentive to adopt better sanitation technology. Also, lack of awareness about the health and environmental risks involved in the improper disposal of waste may also be a possible reason for the lack of initiative to improve household sanitation.

Examples of successful sanitation campaigns worldwide demonstrate the benefits of a **community empowerment approach** to improved sanitation practices and services over the subsidy, supply side approach used by the government. This approach emphasizes changing cultural attitudes towards sanitation, and thus behavior, in order to build demand. Such campaigns are typically focused at ending open defecation at the village level through organizing and education.

Unlike the subsidy, supply-side focus of the TSI program, the community approach looks to address the cultural barriers associated with sanitation and stimulate change in mentality, and thus behavior, in order to create a demand for sanitation technology. The goal is to bring about behavioral changes by casting community members as the central figures in the design and implementation of their sanitation facilities. It assumes that individuals will only pursue courses of conduct that they comprehend and choose to follow.

The community empowerment approach consists of two broad phases:

- Demand creation through organizing and education
- Supply-side facilitation through capacity building, verification, and flexible and cost-effective technological options.

Additional consideration should also be placed on the long-term sustainability of the technical options and maintenance.

The community empowerment approach is the best way to address the sanitation problem in Paliyad and thus end manual scavenging. It requires community organizing, education, capacity-building and long-term maintenance strategies. Though a potentially daunting undertaking at the village level, this approach could easily be scaled down to a neighborhood level, for example that of the Dalit community. The risk of scaling down, however, would be that open defecation and manual scavenging would continue in other parts of the village.

The following section outlines what a community empowerment approach could look like in Paliyad and offers some suggestions for partners in developing such an initiative.

Whether on a large or smaller scale, this approach, while effective, requires on-the-ground staff to help organize community members, conduct education campaigns, and facilitate latrine provision. Navsarjan must commit to increasing its staff in Paliyad and/or form strategic partnerships to help them conduct these activities.

## 6.1 METHODOLOGY FOR A COMMUNITY-LED TOTAL SANITATION APPROACH IN PALIYAD

### 6.1.1 PHASE 1: BUILDING AWARENESS TO INCREASE DEMAND

The first stage of the community empowerment approach is the key to creating demand for sanitation. It requires organizing community members on the ground, building their awareness about the risks of open defecation, and moving them to take responsibility to end open defecation in their village.

#### 6.1.1.1 ORGANIZING COMMUNITY MEMBERS

The community empowerment approach depends on grassroots organizing to involve community members in the education, planning, and implementation of a successful sanitation campaign. There are many different options for organizing village members. However, all examples illustrate the importance of an organization on the ground to bring together individuals and to conduct education campaigns. Several options include:

THE PANI SAMITI: Most community empowerment initiatives have been aimed at the whole village community, rather than at a particular group or caste. One example is WASMO's water and health education campaigns. Their activities focus around the pani samiti, a sub-committee of the panchayat which focuses on water issues. The pani samiti consist of 4 members of the panchayat and 4 non-members, selected from the village, preferably through democratic processes. At least two members are women. WASMO uses the pani samiti to organize village meetings and events where they or an intermediary organization can talk to community members about village conditions and health and involve them in future planning and project activities. The advantage of this wide focus is that ending open defecation requires everyone's cooperation. In a large village like Paliyad, getting all community members on board may prove more difficult than in smaller ones.

WOMEN AND DALITS: Unlike WASMO's village focus, SEWA organizes water campaigns around women. Instead of acting through the pani samiti, SEWA organizes women in eight villages to take a leadership role in watershed planning. These women form new water committees composed of representatives from different sub-communities, castes, and religions. These committees plan the watershed program, mobilize funds, and a manage operations and maintenance.[5]

Given Navsarjan's increased interest in women's issues, bringing women together to address sanitation appears like a natural extension of their existing programmatic activities.

#### 6.1.1.2 EDUCATIONAL CAMPAIGNS (PUBLIC HEALTH AND WOMEN'S RIGHTS)

Most successful sanitation campaigns have focused on public health education in order to motivate villagers to tackle their sanitation situation. These campaigns are typically hands-on, consisting of village walks, meetings, and demonstrations. Either Navsarjan or a partnering organization need to dedicate staff to

[5] Daniel W Crowel, The SEWA Movement and Rural Development: The Banaskantha and Kutch Experience. Sage Publications: Thousand Oaks, 2003

conduct a campaign to increase villagers' awareness about the risks of open defecation to their own health and that of their children.

Techniques include:

VILLAGE WALKS: In order to motivate the community members, the staff of Navsarjan could use simple exercises such as walking all the areas of the village in which open defecation takes place and where dry toilets exist. Members of the community should be asked to participate in this walk (known as a 'shaming exercise'), and a list of open defecation areas and dry toilets used by the community must be compiled. Examples in Bangladesh and Maharashtra illustrate that the participation of women and children in these exercises are key in raising their awareness and interest in changing their sanitation practices.

NEIGHBORHOOD MAPPING: Another technique that can be useful in increasing awareness is a neighborhood mapping exercise in which households in the neighborhood are marked on a map and connected to places in the neighborhood visited by the households for defecation (vaada latrines). These maps and flow diagrams can trace contamination patterns from its source to the medium of transmission to the target (residents). In Bangladesh, this mapping process was particularly successful with women and children. [6]

FECES CALCULATIONS: A crude but effective practice has been community-led feces calculation exercises. Organization leaders encourage community members to calculate the amount of feces that their families generate in a year using simple units of measurement. This exercise in particular is effective in increasing villagers' awareness about the magnitude of open defecation and its impact on manual scavengers.

PERSONAL HYGIENE EDUCATION: Health and personal hygiene meetings allow experts to share information to villagers about the diseases caused by fecal contamination. By using simple language, organizers can present facts about diseases related to contact with human feces. Tools such as microscopes or bacterial culture tests are useful to show the presence of pathogens in water, under fingernails, and other places where they may impact villagers' health. In Maharashtra, these exercises were accompanied by lessons on personal hygiene and safe handling of food and water.[7]

ENVIRONMENTAL AND HUMAN RIGHTS EDUCATION: Including Dalit rights and water availability in a sanitation campaign can influence communities to take these factors into consideration when selecting sanitation options. For example, in Paliyad where water scarcity is an important issue for many people, educating villagers about the low water table and technical options that conserve water may influence some individuals to select more suitable options. This is an area where a partnership with WASMO could potentially bring results. Public Ecosan demonstrations can also help demonstrate the value of human waste as a soil conditioner by comparing it to the value of cow dung,

[6] Kamal Kar, "Subsidy or Self-Respect? Participatory total community sanitation in Bangladesh." Institute of Development Studies Working Paper 184. Sussex: ISD, September 2003

[7] Ramesh Sakthivel, Inventive Villagers: Innovative Approaches to Total Sanitation in Maharashtra. WES-Net India. New Dehli. From www.solutionexchange-un.net.in/environment/cr/res05070601.pdf

### 6.1.2 PHASE II: PLANNING FOR IMPLEMENTATION

After these interactive sessions with the community, it will be possible to gauge the overall demand for sanitation in that community. At this stage, planning should begin with guidance from facilitators about next steps. Again these meetings can occur through an informal sanitation committee like the pani samiti or women's group. The goal at this stage is to help community members form an action plan. This includes identifying houses requiring sanitary toilets, getting households to commit to installing sanitation facilities, and outlining a village plan to discourage other members from continuing to openly defecate (e.g. shaming, morning and late night patrols, warnings, or fines).

During this phase, communities are offered a range of technological sanitation options and even helped design new models which accommodate their budget, use local materials and are more suitable for their living conditions.[8]

### 6.1.3 PHASE III: IMPLEMENTATION

Although community level planning process is the most important aspect of generating demand for sanitation, supply-side facilitation should not be ignored. Rather than depend on outside sources for construction, the community empowerment approach looks to build up local capacity to implement latrine construction at the village level.

Unlike with demand generation, DSK may be a more logical facilitator in this part of the process. DSK should consider dedicating staff resources to help train locals in proper design of latrines or even help Dalit and manual scavengers create a local enterprise to build these projects. Alternatively, they should look to partner with an organization such as Aga Khan Planning and Building.

#### 6.1.3.1 TRAINING LOCALS

In some rural villages, villagers may prefer to build their own latrines. In Paliyad, however, many villagers are not used to this type of labor. In these situations, identifying local masons or training a local workforce may be needed.

In either case, quality control during the construction phase is of utmost importance as far as durability of toilets is concerned. In many cases, poorly constructed latrines have collapsed due to adverse weather and improper construction. Therefore, field workers need to be sufficiently trained in the proper techniques of construction to ensure that new latrines don't create conditions worse for sanitation workers or place villagers' public health at risk.

DSK should consider incorporating a course on latrine construction in their curriculum and invite residents of Paliyad to receive vocational training on construction techniques. Yet as with many other courses at DSK, there is a risk that local interested parties may not be willing to go to DSK. In this case, some organization – either DSK or a partner – should provide training on-the-ground in Paliyad and verify construction.

---

[8] Kamal Kar, "Subsidy or Self-Respect? Participatory total community sanitation in Bangladesh." Institute of Development Studies Working Paper 184. Sussex: ISD, September 2003

#### 6.1.3.2 FINANCING

The financing options for constructing sanitation are quite limited. Currently TSI is the only incentive for latrine construction for low income communities, and the materials offered can only be used for certain technologies. Navsarjan could easily extend its current advocacy work to lobby the government to provide additional funds for more sustainable technologies and help villagers apply for the subsidy and ensure that their requests are filled.

Navsarjan may also consider using the funds available for the Paliyad project to create a revolving loan fund for villagers who would like to upgrade to a more expensive technology.

In addition, some partner organizations such as WASMO may be willing to help villagers finance some of this construction as part of a larger water and sanitation scheme.

### 6.1.4 PHASE IV: LONG TERM MAINTENANCE AND REGULATION

#### 6.1.4.1 MAINTENANCE

Planning for future maintenance is necessary to any successful sanitation campaign. Maintenance options, however, depend on the type of latrines that are proposed. Pit latrines and pour flush toilets have a propensity to fill up quickly and require high-tech equipment to absorb materials and large spaces to dispose of them. Septic tanks require similar equipment. Creating a sanitation organization or identifying agencies is needed for long-term maintenance.

The maintenance phase is of particular significance in communities where communal toilets or public toilets are determined to be the only feasible option. Community toilets are those that are used by a limited number of pre-designated families, whereas public toilets are meant for the use of the general public with no restrictions on who can use them.

Considerations for communal toilets:

In order to ensure proper maintenance of communal sanitation systems, a periodic sanitation tax can be levied on community members who will benefit from that system. The success of a sanitation fee system depends on the scale of operation of the toilet (i.e. number of toilets, and number of users) and the presence of a permanent care-taker who can prevent improper use of toilets.

Community toilets cost less per household compared to private toilets. Since community toilets would serve a limited number of families, a system could be envisioned in which each user family buys a family pass for 20 rupees a month in order to be able to use the toilets – This is a much more affordable option compared to the one rupee per use per person charged by conventional pay-and-use public toilets. For those individuals who are not subscribed to the monthly pass, they can have the option of using the toilet on a daily basis at the cost of Rs. 1 per use per person.

Employing a permanent care-taker on-site to collect taxes, monitor toilets for damage, guard the premise/compound and prevent open defecation or abuse of toilets is an effective means of ensuring accountability of users and maintaining toilets. The care-taker should be provided with lodging and a

salary. That person can be an official panchayat employee and that person's salary can come partially or fully from the government budget, depending on the magnitude of revenue generated from user payments.

Considerations for Public Toilets:

Although we do not recommend public toilets, the possibility that they might be constructed in Paliyad in the future cannot be ruled out. In the event that public toilets are constructed in Paliyad, they would also require continual supervision of a care-taker to manage them. If a uniform annual sanitation tax were to be collected in conjunction with the annual water tax (both can be combined into one tax rate), and if the proportion of total tax revenue designated as sanitation tax were to be invested back into the maintenance of public sanitation systems, it may be possible to maintain these toilets under the supervision of a salaried care-taker.

#### 6.1.4.2 REGULATION

Unless measures to improve sanitation are accompanied by regulation, open defecation and improper use of toilets will continue, particularly if the community decides that public toilets or communal toilets are the only feasible option. In order to prevent open defecation, monetary fines can be set only if there is an entity with legal authority to collect such fines. Other forms of social penalties, such as shaming can be useful in discouraging open defecation. Volunteer inspectors chosen by informal sanitation committees within the community can patrol commonly-visited land during early morning hours or late night hours to stop people from defecating in the open. Sanitation workers employed by the Panchayat can be assigned the responsibility of monitoring and recording acts of open defecation which can be made public. Signs should be placed at all open public spaces prohibiting open defecation. Case studies from other countries reveal extreme measures of regulation to discourage open defecation, in which volunteer inspectors or local law-enforcement officers have forcefully taken away water containers from people who were caught in the act of defecation. These measures violate personal dignity and are prone to abuse, and therefore, are not recommended. The only plausible situation in which strict prohibition of open defecation will bring about desired behavioral change is if people have a viable alternative to open defecation.[9]

### 6.2 POTENTIAL PARTNERSHIPS FOR A COMMUNITY EMPOWERMENT APPROACH IN PALIYAD

A successful sanitation campaign requires an organization on the ground to generate demand, build local capacities, and provide technical expertise to help implement household toilet facilities. On its own, Navsarjan does not want to engage in such an intervention. Instead, it should look to either expand its capacity or develop strategic partnerships in order to address the sanitation problem in Paliyad and thus move closer to ending manual scavenging.

There appear to be few organizations involved in sanitation provision in the state of Gujarat. This is not surprising given the cultural stigma associated with sanitation and the lack of demand. Nonetheless, we have identified a few organizations in Gujarat with whom Navsarjan could potentially partner.

---

[9] "Inventive Villagers: Innovative Approaches to Total Sanitation in Maharashtra." Maharashtra Water and Sanitation Board. http://www.solutionexchange-un.net.in/environment/cr/res05070601.pdf Retrieved on May 10, 2008

### 6.2.1 PARTNERSHIPS FOR DEMAND GENERATION

Navsarjan has expressed interest in developing an advocacy campaign to increase demand for sanitation centered on women. A state-wide campaign of this sort is important. However, to be effective, it must be done in tandem with on-the-ground organizing and education.

**WASMO**'s expertise in public health education may help Navsarjan build a local campaign. WASMO, a quasi-governmental agency, has helped both in the creation of demand and facilitation of water provision throughout Gujarat. Typically, WASMO works through local NGOs which serve as intermediaries between WASMO and the community. WASMO itself serves as the facilitating agency, providing health education materials for campaigns, technical expertise, verification, and financing.

Although its main focus has been water, WASMO has helped a few villages organize to end open defecation (see Box 1).

**Box 1. Case Study of a Zero Open Defecation Campaign: Gundi Village**

An example of apparently successful sanitation intervention by WASMO is the village of Gundi in the Bhavnagar District of Gujarat. The population of Gundi is approximately 2000. This village has collaborated with WASMO and was awarded the Nirmal Gram Puraskar (Rs. 200,000) for achieving zero open defecation, providing household access to latrines, and a consistent water supply.

The sarpanch of this village has spearheaded the effort to achieve zero open-defecation in the village with assistance from WASMO (the Gujarat Water and Sanitation Management Organization). Following the award, the sarpanch has been called upon to play a significant role in increasing awareness about the Nirmal Gram Puraskar in neighboring villages. Cooperation from the Panchayat was a key factor in creating trust in WASMO as a facilitating agency.

Today, each household in Gundi has been provided with individual pit latrines and soak pits (for wash-water), including the manual scavenging household. Primary schools in this village have also been provided pour-flush toilets coupled with septic tanks and soak-pits. According to the principal of one such school, the toilets in these schools are maintained and cleaned by all students on a rotational basis.

The members of the village have complied with WASMO's policy of requiring 10% of the total funding for the project to be contributed by the village. Different sources of water supplied to this village include communal standpipes, wells, and piped household water supply from the Narmada river.

There is only one manual scavenging family residing in this village. This family has been provided with a household level pit-latrine. However, this family is socially and geographically isolated from the rest of the village. These factors indicate that while the commitment of the Panchayat and village members in this village has resulted in zero open defecation and improved sanitation, it has not led to a change in the caste structure of this village. The one manual scavenging family in this village has experienced ostracism and has not been able to achieve upward social mobility.

PROJECT SUSTAINABILITY THROUGH TAXATION SYSTEM:

An important factor that made it possible to achieve the goal of zero open defecation is adequate supply of

water. WASMO facilitated the provision of water to this village, which subsequently led to the demand for sanitation among the residents. The Panchayat has created a water taxation system which ensures that all families have access to water at affordable prices

LESSONS TO BE LEARNED FROM THE GUNDI CASE STUDY:

- Cooperation from the Panchayat was a pre-requisite to successful sanitation intervention by a quasi-government agency such as WASMO
- Provision of water can be used to create demand for sanitation. Provision of basic water needs at nominal prices, coupled with additional water services through price differentiation allows basic access to water for all, and has the potential to conserve water.
- Intervention by a third party must take into account the sensitivity of social realities, particularly when that agency works with weaker sections of society such as women or scheduled castes and tribes.

The example of Gundi can serve as a model for other villages of similar size looking to achieve zero open defecation. The question of scaling up a successful project like Gundi to a village like Paliyad needs to be addressed.

WASMO has expressed willingness to work with Navsarjan and the MIT team on sanitation and manual scavenging in Paliyad. They acknowledge that sanitation is in some ways more difficult to address than water supply because of caste-based issues having to do with handling of human waste. This willingness to engage in dialogue about caste in relation to sanitation provides an opportunity for Navsarjan to partner with another organization to address sanitation issues related to manual scavenging. In addition, WASMO is a logical partner to create a sanitation campaign due to their expertise in public health education, well-trained engineering staff, and extensive financial resources. However, there are significant challenges to such a partnership.

First, WASMO's main focus has not been sanitation. Although some of their educational materials focused around hygiene may be appropriate, they have little experience with large-scale sanitation demand-creation or provision. In addition, they have only helped communities build pit latrines and have not explored other sanitation technology options.

Second, there is no obvious local organization in Paliyad to serve as an intermediary between the community and WASMO. Finding an organization to play this role should be a priority.

Third, working through the pani samiti may not be appropriate for a large village like Paliyad. Most of WASMO's successful sanitation efforts have been in small rural areas, where organizing the community through the panchayat is easier.

Additional efforts are needed to target manual scavengers and other members of the Dalit population in order to ensure that both those who are worst off benefit from the program and Navsarjan's own programmatic goals are met. **SEWA**'s approach to organizing village women and ensuring adequate caste and religious minority representation may be an alternative way to get Dalits working with other community members to address sanitation.

### 6.2.2 PARTNERSHIPS FOR IMPLEMENTATION

Navsarjan should also look to partner with an organization to help develop supply-side interventions necessary for a successful sanitation campaign. This includes identifying local masons and workforce and providing on the ground training, technical assistance, and verification.

To date, we have yet to identify such an organization. **Aga Khan Planning and Building** may be one option, as they have operated water and sanitation programs in India and Pakistan since 1997. They serve as a local intermediary between government organizations like WASMO and local communities. Aga Khan provides engineering and construction services, non-local materials, skilled labor, training, and health and hygiene education during the scheme implementation.[10]

While they should be approached to determine their interest in a potential partnership, it may be that there is no such organization in the state of Gujarat. If no such organization can be identified, one option may be for Navsarjan or **DSK** to work with **WASMO** collaboratively to conduct these activities in Paliyad. WASMO's staff engineers could provide some technical assistance and verification for implementation, similar to their assistance in water projects. DSK could also help set up training sessions or even help organize local manual scavengers to form a sanitation construction business. Yet, like with demand creation, this type of intervention requires an additional staff and time investment in Paliyad. Although we are cognizant of Navsarjan's limitations, it is clear that without on-the-ground staff, none of these interventions are possible.

Other activities could complement this supply-side capacity building:

- Creating demonstration projects: The DSK campus and Navsarjan's local schools could be used as a demonstration center for sustainable technological options.
- Building school facilities coupled with sanitation education
- Lobbying the government for flexible and enhanced subsidies

## 6.3 RECOMMENDATIONS FOR A SUCCESSFUL INTERVENTION

- Build awareness to generate demand for sanitation:
  - Work with WASMO to create a campaign targeting women and Dalits
  - Develop sanitation committees on the ground with Dalit representation
  - Commit additional staff, especially female representatives, on the ground to help build a campaign

- Build capacity for technical assistance to implement projects:
  - Identify skilled artisans who could become delivery agents
  - Develop training and facilitation programs for latrine construction
  - Establish a system for quality control
  - Provide a variety of technological options suited for different settings, using local materials, and allow communities to help shape the design
  - Create demonstration projects for technologies, including local public facilities such as schools

[10] Aga Khan Planning and Building. Website: http://www.akdn.org/agency/akpbs.html#intro

- Identify long term maintenance options which take into account the wellbeing of sanitation workers and lobby the government for financing
- Lobby TDO to provide new and additional financing for alternative technologies

# 7 APPROPRIATE SANITATION TECHNOLOGIES AND PROVISION OPTIONS

## 7.1 THE VALUE AND LIMITATIONS OF ECOSAN

Together, the first team of MIT students and Navsarjan staff decided that Ecosan was the preferred sanitation technology to promote in Paliyad. There are a number of important benefits of Ecosan from the point of view of eliminating manual scavenging and ensuring ecological sustainability, but there are also a number of barriers to successful adoption of this model, some of which have already been discussed.

### 7.1.1 NEED FOR ECOLOGICAL SANITATION

For a sanitation solution in Paliyad to be sustainable, it is important that the solution be ecologically sound, particularly considering the high population density and water scarcity in Paliyad. Therefore, among all available sanitation options, a technology embracing the principles of ecological sanitation seems most appropriate. Ecological Sanitation has three fundamental principles: "rendering human waste safe, preventing pollution rather than attempting to control it, and re-using the transformed human waste as a resource."[11] Unlike most traditional sanitation methods, ecological sanitation processes human waste to recover nutrients that would typically be discarded. The greatest advantage of ecological sanitation is that it creates alternatives for handling of human waste. In addition to this, ecological sanitation provides a solution to environmental contamination, health problems and water shortage.

An ecologically sound technology must also be socially viable and economically sustainable. It necessitates a change in how human waste is perceived, and a willingness to acknowledge the non-monetary benefits of this technology. Given the lack of demand for any kind of improved sanitation technology, efforts to make people adopt an ecologically sound technology (which comes with certain inconveniences) face an even greater challenge, and will not be successful unless they are preceded by an aggressive education and awareness campaign.

Keeping in mind the ecological constraints in Paliyad, and the caste-based stratification of society in Paliyad, it is in the best interests of the Paliyad community to think about the long-term implications of actions taken in this village to meet water supply and sanitation goals. By adopting an environmentally sustainable technology, Paliyad could potentially serve as a model for other villages by minimizing its environmental footprint and in reducing the degradation associated with handling of human waste.

### 7.1.2 BENEFITS OF ECOSAN

[11] Smet, Jo and Sugden, Steven. "Ecological Sanitation." April 2006. WELL – Resource Centre Network for Water, Sanitation and Environmental Health. Retrieved on May 10, 2008. http://www.lboro.ac.uk/well/resources/fact-sheets/fact-sheets-htm/Ecological%20sanitation.htm

#### 7.1.2.1 DECENTRALIZED SANITATION

Since Ecosan is a decentralized technology, it does not give rise to environmental problems associated with central sewage systems, such as such as high concentrations of heavy metals and microbes, inadequate treatment of human waste, improper application of inadequately treated sludge to agricultural fields, leakage, and environmental contamination. Conventional sewage systems are supposed to remove fecal material and the pathogens it contains from the immediate household and community environment and deliver it to a sewage treatment facility. In many developing countries, however, most of the sewage generated by rural areas is untreated. For villages that do have a treatment facility, these facilities are incapable of effectively treating the waste as the volume entering the plant exceeds its design capacity (either because of high population density, lack of water, or high cost of electricity). The result is that poorly treated sewage is discharged into streams and rivers with detrimental effects on the rivers' quality. It is argued that if eco-sanitation was more widely used, the need to build and operate expensive sewage works would diminish and the water quality in surface water sources would improve.

#### 7.1.2.2 SAFETY

If used correctly, eco-san transforms feces and urine into a pathogen-free resource. No risk is associated with handling the feces provided it is allowed to undergo transformation for 8 – 12 months. Similarly, urine collected in a separate container and stored for a month can be mixed with water and used as liquid fertilizer.

#### 7.1.2.3 MINIMAL WATER REQUIREMENT

Ecosan minimizes the usage of water. It only requires the amount of water that is needed for washing (approximately 1 liter per person per day).

This is particularly important because Gujarat is a water-scarce state with limited sources of good quality water. The entire village of Paliyad receives approximately 900,000 liters of water per day from 2 main sources:

- The Narmada water project
- Municipal groundwater wells

The population of Paliyad is approximately 15,000. Therefore, considering a best-case scenario, 60 liters of water are available on average per person per day. It is important to remember that if the water supplied to Paliyad remains constant in the foreseeable future, the actual amount of water available to each resident of Paliyad is less than 60 liters because the total water supply of 900,000 liters is not only for domestic consumption, but for commercial purposes. Moreover, these statistics hide the inequity in the distribution of water among the resident of Paliyad.[12]

The limited availability of water is a significant challenge in the consideration of water-based sanitation technology in Paliyad. A water-based pour-flush toilet requires a minimum of 3 liters to be able to wash away

[12] Data on daily water supply of Paliyad was provided by the Panchayat of Paliyad during an interview

waste if hygienic conditions are to be maintained. Assuming each person uses the toilet 5 times a day, then 15 liters (=25% of the total amount) of water per day, per person would be consumed only for sanitation purposes. In light of this acute water-scarcity, the option of water-based septic tank/pit latrine seems unsustainable. A centralized sewage system would require an even larger amount of water to keep waste mobile and prevent blockages in the system. Therefore, any sanitation option in Paliyad must take into account future water availability.

#### 7.1.2.4 LOWER RISK OF ENVIRONMENTAL CONTAMINATION

Since the Ecosan unit stores waste above ground, there is significantly lower risk of soil and groundwater contamination compared to other onsite storage sanitation systems such as septic-tanks and pit-latrines.

#### 7.1.2.5 USEFUL BYPRODUCTS

The use of Ecosan generates high quality organic fertilizer (solid and liquid). On average, each person generates approximately 500 liters of urine and 50 liters of solid waste per year. This amount can fertilize approximately 250 kilograms of cereal. [13] Research suggests that waste generated by each person in a year can fulfill the annual calorific requirements of that person. Human waste is valuable not only for its nutrient quality, but also for its ability to improve soil structure. However, it is important to note that the amount of fertilizer generated by household eco-san units is not profitable at the household level.

#### 7.1.2.6 DIGNITY OF LABOR

Handling of transformed human waste much less degrading compared to handling of raw human waste. In theory, the stigma associated with raw human waste should no longer be applicable once the waste is transformed into pathogen-free and odor-free resource.

### 7.1.3 BARRIERS TO THE EASY ADOPTION OF ECOSAN TOILETS

#### 7.1.3.1 SPACE

A properly constructed double chambered eco-san toilet occupies approximately 3.5 sq. meters of area. Feedback collected by the manual scavenging team of Navsarjan suggests that families in the Dalit communities of Paliyad do not own sufficient land to be able to construct private toilets.

#### 7.1.3.2 INCONVENIENT DESIGN

[13] Smet, Jo and Sugden, Steven. "Ecological Sanitation." April 2006. WELL – Resource Centre Network for Water, Sanitation and Environmental Health. Retrieved on May 10, 2008. <http://www.lboro.ac.uk/well/resources/fact-sheets/fact-sheets-htm/Ecological%20sanitation.htm>

The design of Ecosan requires that it be constructed at a certain elevation above ground-level. Therefore, users must climb a staircase in order to access the toilet. This causes an inconvenience to elders and children. Secondly, the Ecosan technology relies on separation of urine and solid waste for the production of dry compost and liquid fertilizer. In order to separate urine from solid waste, Eco-san has a 3-hole design (one for wash-water, one for urine, and one for solid waste). This design is not convenient to use, and can be highly confusing. Users need to remember the designated use of each hole. If urine and solid waste are not separated with appropriate care, or if wash-water is mixed with solid waste, it can lead to significant problems such as odor, flies, and health risks. Therefore, proper use of this technology requires a level of conscientiousness that cannot be achieved without awareness and will.

#### 7.1.3.3 CULTURAL BARRIERS

The Ecosan toilet requires human waste to be stored onsite for extended periods of time. Before it can be used as fertilizer, solid waste (feces) needs to be stored for 8-12 months after the eco-san solid waste chamber is full. Similarly, urine needs to be stored for a month in a container after it is full. There is strong cultural resistance to the accumulation of human waste within one's private property among the Darbar as well as the Dalit community. Human waste is considered to be impure, and there is no acceptance of human waste as a potential soil fertilizer or conditioner, particularly for growing food crops. This perception towards human waste is strongly linked to the -caste-based discrimination against the manual scavenging community, because handling waste is regarded as their responsibility.

#### 7.1.3.4 IMPROPER USE

As a result of lack of awareness, users tend to dispose of non-organic material such as plastic, sanitary napkins, etc. in the solid waste chamber. This adversely affects the quality of the compost.

**Box 2. The Need for Education**

Education and awareness-raising is the key to removal of these barriers. This has been proven by the primary schools run by the Navsarjan Trust. The Navsarjan Trust has established 3 primary schools (classes 5th – 7th) at the following locations in Gujarat:

- Raika village in Dhandhuka district
- Kataria village in Limbdi district
- Sami village in Patan district

These schools have fully embraced Ecosan and can serve as model campuses of ecological sanitation. The students and teachers at these schools have been conscientiously trained about the proper use of Ecosan and its benefits.

The success of these cases can be attributed to the commitment and dedication of the Navsarjan community. The teachers at these schools have been selected on the basis of a rigorous process which includes a written application, interviews and a physical test. Selected applicants are required to undergo a special training for three months under the supervision of Mr. Martin Macwan, the former Director of Navsarjan. One of the objectives of this training is to create awareness among teachers about personal hygiene, ecologically sound sanitation, and conservation of natural resources. These schools have successfully

managed to train all incoming students on the use of eco-san toilets. The transformed human waste from these toilets is used to fertilize the vegetable gardens on campus.

The ecological consciousness is also seen in other aspects of the schools' operations. For example, the primary school in Raika is run purely on solar energy with a battery generator as a back-up. It is not connected to the central electricity grid. This school also re-uses grey-water (after primary and secondary treatment) to irrigate the school campus. The magnitude of effort that was required to be put in to sustain ecological consciousness in the school proves that unless teachers are committed to the idea of creating an environmentally sustainable campus, it is impossible to instill these values in children.

The successful adoption of eco-san at Navsarjan schools is an indicator of the viability of this technology at educational institutions. However, this requires an aggressive education and awareness campaign about the benefits of this technology, along with continuous reinforcement on the proper use of this technology. Keeping this model in mind, teachers at primary schools in Paliyad should be approached and education about sanitation and hygiene must be incorporated into the school curriculum. Education should focus on broader issues beyond technology, such as cultural preconceptions about human waste, and environmental consciousness.

## 7.2 ALTERNATIVE TECHNOLOGICAL OPTIONS

Considering the low acceptance level of the Ecosan toilets and the feedback from the manual scavenging team of Navsarjan, it is imperative to consider other options for adoption in Paliyad. The major factors that must be considered before making a selection of any type of toilet are listed below:

- Cost of construction
- Space required and available
- Convenience of use and cultural acceptance
- Sustainability in terms of water requirement and other ecological impacts
- Impact on Manual Scavengers

(See Appendix A for an options matrix of the various technological options available)

Even after analyzing in detail all the different technological options and considering the prevailing conditions on the ground, it is impossible to zero in on any single solution that is appropriate in all situations. In the case of Paliyad, we have seen the way the above factors combine to create a web of complexity. The wide disparity among people's income, space availability and willingness to adopt new systems makes the choice different in different situations.

It will therefore be logical to adopt a pluralistic approach and identify a range of possible solutions. We recommend that the community work collaboratively along with the facilitating organization to select the most suitable technologies from the solution set under different circumstances.

That said, the solutions can be organized in a preferential sequence based on long-term ecological sustainability:

- Ecosan toilet
- Toilet with biogas facility

- Improved pit toilet

Unfortunately, the preferred options are the most resource intensive, both in terms of money and space. Ecosan has already been discussed; the benefits and drawbacks of the other two options are discussed in more detail below.

### 7.2.1 TOILET WITH INDIVIDUAL BIOGAS PLANT

The biogas toilet consists of a conventional water sealed toilet and a spherical underground tank. The human waste, both urine and feces, are washed into the tank where they undergo anaerobic decomposition to produce methane gas, commonly known as biogas. The biogas accumulates in the tank and is led to the kitchen through rubber pipes and fed into gas burners. Odorless slurry, which is safe and easily disposable, comes out of the tank after the process of decomposition. This slurry is rich in nutrients and can be used as manure for agricultural purposes.

Biogas plants are basically of two types: floating gas holder type and fixed dome type. Each type has a number of different varieties and sizes to suit specific needs.

The floating gas holder type biogas plants consist of a digesting tank usually made of masonry and a steel gas holder container floating on top. The gas holder can also be constructed of ferrocement or bamboo cement. The advantage of this type is that it maintains a steady supply pressure, thus it is more suitable for power generation and other critical uses. But as the gas holder is made of steel, it requires welding and workshop facilities. Also there is a high maintenance cost due to corrosion of the metal parts. KVIC, Pragati, Water jacket are few of the different types of floating biogas plants.

The fixed dome type biogas plants are more suitable for small, domestic purposes. They are constructed with local materials like bricks, concrete, lime concrete or lime clay. However, masons are required to be trained for the construction of spherical domes of proper measurement. The maintenance cost in these types is considerably less as there are no moving or metal parts. Another major advantage of this tank is that it is underground and the space above it can be reutilized. Being underground these tanks are also more tolerant to temperature variations. The major disadvantage of the fixed dome type biogas plant is that the pressure of supply fluctuates, thus it requires a gas pressure regulator. Different types of fixed dome plants that are commonly used are Janata and Deenbandhu.

#### 7.2.1.1 REQUIREMENTS AND RATE OF PRODUCTION

Biogas plants were initially designed to produce gas from cattle dung and kitchen waste. The designs of the plants have been modified to suit human excreta also. The average amount of feces required to produce one cubic meter of gas is 8 kilograms. As the amount of feces produced by an individual is 200 to 300 grams, about 25-30 people are required to use the toilet to produce 1 cubic meter of gas, sufficient to cook for a family of 6-8 people. In other words, the feces of 4 people is required to produce enough biogas to cook for one person. Figure 10 shows a comparative study of the amount of biogas generated from different sources.

From the above calculations we can infer that individual family biogas plant is not viable if there are only 6-8 users. This will need to be augmented by cattle waste from one cow or ox. The other option is to involve other neighboring families in the use of the toilet such that sufficient human waste is generated.

The community toilet model has been experimented with in Dehu village in Maharashtra with considerable success. In this model, one family invested in construction of the toilet and biogas plant in its compound. Then they allowed the neighboring families to use the toilets for a token charge. A case study by Dr. S.V. Mapuskar on Dehu Village documented that the project which started with two biogas plants soon became popular and there are now seventy five biogas plants constructed in the same village.[14]

**Figure 9. Number of persons that may be served by and animals required for different capacity biogas plants.**

| S. No. | Capacity of biogas plant ($m^3$) | No. of persons that may be served | Quantity of dung required (kg) | No. of animals thus required |
|---|---|---|---|---|
| 1 | 1 | 2–3 | 25 | 2–3 |
| 2 | 2 | 4–6 | 50 | 4–5 |
| 3 | 3 | 7–9 | 75 | 6–7 |
| 4 | 4 | 9–12 | 100 | 8–9 |
| 5 | 5 | 12–15 | 125 | 9–10 |
| 6 | 6 | 14–17 | 150 | 10–12 |

### 7.2.1.2 CONVENIENCE OF DESIGN

The biogas toilet consists of a conventional squatting seat with only one, water sealed hole. This can be considered a major advantage over the Ecosan toilet as it is easier for people to adopt and does not require extensive education.

Secondly, this toilet can be constructed at the ground level and does not require any stairs, thus making it convenient for users, particularly elderly and disabled.

Third, the human waste is not stored above ground as in the case of Ecosan which makes this a more culturally acceptable option for people uncomfortable with the idea of human waste collecting inside their household/compound.

Fourth, the squatting pan and cement are standard products and can therefore be paid for by TSI funds. This defrays some of the cost.

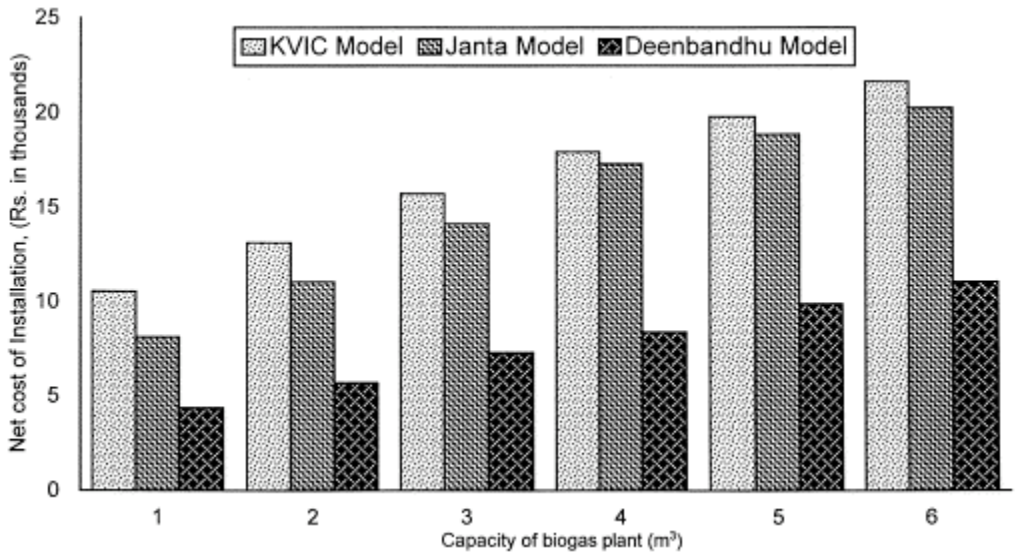
### 7.2.1.3 COST

The cost is a major disadvantage as a biogas unit is the most expensive among all the available solutions. It costs approximately Rs 20,000 ($500) to construct a biogas plant with the toilet and suitable connections.

However, the cost varies with different technologies and Figure 11 gives a comparison of all the different systems (only biogas tank). From the table we see that Deenbandhu type of biogas plant is the most economical, according to the comparative studies done by K. Jatinder Singh et al in the state of Punjab.

[14] Mapuskar S.V. "A Brief Note on Sanitation Programme in Dehu Village."

Figure 10. Comparison of net cost of installation of among different biogas plant models.




### 7.2.1.4 MAINTENANCE AND MANUAL SCAVENGERS

The biogas toilet system is one of the most sustainable systems as it converts human waste into a safe, non-pathogenic slurry, which can be used as manure for fertilizer. The system is more beneficial if it uses cattle waste along with human waste for decomposition.

However, certain precautions and maintenance are required for uninterrupted functioning of the system. The toilets should be kept clean, but antiseptics and disinfectants should not be used for cleaning. Only organic soaps and cleaning agents that will not harm the microbes in the tank should be used.

To minimize scum formation, no undesirable foreign material should be allowed to enter the tank except for animal and human excreta.

The sludge is required to be pumped out after 7-10 years with a suitable machine.

A regular observation is required to monitor the quality of the effluent, and take suitable oversight and monitoring measures.

As the excrement from the biogas plant is an odorless and disinfected slurry and is pushed out by the pressure of gas, the biogas plant does not require extensive manual handling of human waste. It is therefore a suitable option for the eradication of manual scavenging.

### 7.2.1.5 SPACE REQUIREMENT

Biogas plants require a larger space than is available in many urban and densely populated rural environments. The construction of the toilet and the biogas plant together requires about 70 sq. feet of space, and this can be a major drawback for implementation of these toilets.

However, in the fixed dome type of plant, the space above the underground tank can be used for other purposes. In some cases the toilet can be constructed directly upon the tank thereby reducing the space requirements. The minimum space requirement in the combined tank and toilet system is about 50 sq. feet.

#### 7.2.1.6 WATER REQUIREMENT

Like with other pour flush technologies, biogas requires more water than an Ecosan toilet. For every use, an estimated three liters must be used in order to wash the squatting pan and carry the feces to the underground tank. The water also helps in diluting and mixing the solid waste materials to a required concentration for the process of biogas formation. According to the technical report of UNICEF on solid and liquid waste management in rural areas, a person should use at least 2.2 liters of water to achieve the minimum concentration of the slurry. The recommended density of the slurry is 5% solid.

Considering the water-scarce condition of Paliyad, biogas might be a difficult proposition, and water availability should be assured before implementation of a biogas plant. One way of mitigating this problem is to replenish the water supply by rainwater harvesting. The rainwater falling on the roofs of the individual buildings may be collected and stored to be used in the toilets for washing and diluting the slurry for the biogas plant. Additionally, bathing water could be directed into the biogas unit and used to dilute the slurry.

#### 7.2.1.7 CONSTRUCTION

Finally, the construction of biogas toilet requires some specialized masonry skills, thus construction workers must be trained. Moreover, the system also requires occasional maintenance by technical experts.

The floating tank requires a workshop and skills in welding metal. Moreover, as it involves movement it requires more precision in construction, and a technician must ensure leak-proof moving joints.

In the case of fixed dome type biogas plant the challenge is to construct the spherical tanks from conventional and locally-available building materials like brick and concrete.

#### 7.2.1.8 ADVANTAGES

Biogas plants have multiple advantages and help in poverty alleviation of a community. The major benefits are:

- They ensure hygienic and economically efficient management of human waste. The human wastes which would otherwise create pollution and health hazards are decomposed into a useful resource of biogas and manure.
- The digested slurry which is ejected after the production of biogas is rich in nutrients like nitrogen and phosphorus and acts as valuable manure for farms.
- Majority of villagers use wood, coal and cow dung cakes as the major source of fuel for cooking. These carbon-based fuels are expensive and cause indoor air pollution. Biogas helps to eradicate these problems by providing clean fuel.
- As the handling of human waste is greatly reduced, biogas systems help in eradication of manual scavenging to a great extent.
- Biogas systems have a number of positive effects on women. First, provision of a toilet helps to resolve the privacy issue. Second, reducing indoor air pollution helps provide them and their families

with healthy living conditions. Third, the biogas helps them save a lot of time as it eliminate the need to collect wood or cow dung for cooking. Moreover, biogas cooks faster and does not form soot on the utensils. Thus, women have more time to spend in economically productive ways.

#### 7.2.1.9 DISADVANTAGES

Though the biogas toilet has a number of advantages, it suffers from some disadvantages which limit its applicability in some cases.

- It is not suitable for individual residences with 5-8 members, and requires a cattle or neighboring families to make it functional
- The cost is prohibitively high for a low or middle income village family; it requires support from the government or non-profit organizations for them to be able to afford construction
- Though the fixed dome type of tank is possible to construct with local materials, it requires extensive training and supervision of local masons
- Space required by the biogas plant and the toilet is quite high, making it difficult to construct in many households in densely populated areas

### 7.2.2 PIT LATRINES

The simplest and cheapest variety of toilet is the pit toilet. While we are not advocating the construction of pit latrines, they are preferable over no sanitation facility and should therefore be considered as an option when both Ecosan and biogas are not feasible due to lack of funds or space.

These toilets consist of a pit dug in the ground which stores the feces and urine, where it undergoes natural vermicomposting. There are three main types of pit latrines.

Ordinary pit toilets are the most rudimentary form where the toilet is just above the pit and the seat consists of a tin or concrete base with a hole. Usually they even lack a water seal, thus these toilets can generate significant odor. The pits get filled up usually in 2-3 years depending on the size and number of users. Once filled, the whole toilet must be moved and a new pit dug. This type of toilet costs about Rs. 2,400 (USD 60) and requires only 15 sq. feet of space.

The ventilated pit latrine is a modified variety of the pit latrine where there is a water seal in the toilet. The pit is provided with a vent that carries the gases away from the toilet and releases them high up in the air. The vent top needs to be protected by fly nets to prevent insects from entering the pit. The water seal and ventilation prevent the toilets from being filled with obnoxious odor and keeps the area more hygienic. These toilets require the same space as ordinary pit toilets and cost slightly more, about Rs. 3000 (USD75).

Improved pit latrines consist of a water seal and two pits which are used alternatively. Being water sealed, they require 3 liters of water, and the solid waste collects in one of the pits where it gets decomposed. Once the pit gets filled up, the other pit can be used while the previous one is allowed to let the waste become completely digested. It takes about 8 to 12 months for the waste to get completely reduced to nutrient rich fertilizer, when it is dug out and used for agricultural purposes. The double pit toilet costs about Rs 4,000 (USD 100) and requires 40 sq. feet of space.

#### 7.2.2.1 ADVANTAGES: COST, SPACE, AND CULTURALLY ACCEPTABLE

The major advantages of pit latrines are that they require the minimum amount of space and funds to construct. They are also culturally more acceptable as they have the conventional seat. Finally, they are the easiest to construct as they require basic construction skills.

#### 7.2.2.2 DISADVANTAGES

Ordinary pit toilets have a disturbing smell and must be moved after the pit fills up. In the case of improved varieties one of the drawbacks is that they do not make the most economical use of human waste, though some amount of fertilizer is produced.

The greatest disadvantage is that pit toilets may perpetuate the practice of manual scavenging and increase the risk of ground water contamination.

#### 7.2.2.3 WATER AND SUSTAINABILITY

Human wastes contain various types of pathogens which have the potential to cause diseases. Pit toilets risk contaminating ground water if the pit comes into contact with the water table. Some of the pathogens can survive a long time and spread diseases over wide regions through the ground water and may cause epidemics.

However, in the case of Paliyad, the observed level of ground water table is quite low. The open wells that exist in the village have water levels below 30 feet. Under these circumstances we may consider constructing pit latrines where the depth of the pit is not more than 10 feet. This will reduce the chance of human waste coming into contact with the ground water.

#### 7.2.2.4 MAINTENANCE AND MANUAL SCAVENGERS

Pit toilets require very minimal maintenance during the course of use until the pits get filled up. Once the pit is filled, the waste must be dug out and moved to the fields. This process has the potential to encourage the practice of manual scavenging, thus directly contradicting the goals of the MIT-Navsarjan collaboration.

## 7.3 SANITATION PROVISION OPTIONS

In order to address the lack of sanitation facilities in Paliyad, there are a few provision options to be considered. These include:

- Private toilets
- Public toilets
- Community toilets
- Institutional toilets

### 7.3.1 PRIVATE TOILETS

Private toilets in individual households represent the most comprehensive solution for ending manual scavenging. If every household has a latrine, sanitation becomes everyone's business. Moreover, private toilets are more easily maintained: individuals have an incentive to keep their latrines clean and maintain them. Private toilets address issues related to women's privacy and security. They can be used alternatively as facilities for bathing and changing, and do not require one to leave the household compound at night.

Creating demand for private toilets should be a priority for Navsarjan in their fight to end manual scavenging. Constraints such as space, cost and water availability shape the type of technologies that are appropriate for individual households. For this reason, flexible options are necessary.

*Pit Latrines:* Given the cultural barriers, incentives available, and cost and size limitations, well-designed pit latrines may be a viable option for poor households as long as there is a long-term plan for their maintenance. Whenever possible, a two-pit system should be implemented in order to switch between pits whenever one is filled. A single pit system will not work realistically unless the pits can be covered once filled and built in a new location.

*Biogas:* Biogas may be more appropriate for rural households with livestock. Additionally, compounds and neighborhoods could be encouraged to develop shared family facilities which use biogas as in the Dehu village in Maharashtra.

*Ecosan*: Navsarjan should continue raising awareness about the benefits of Ecosan. This should be central to any awareness-raising strategy. However, at this time, it is difficult to recommend this technology for widespread implementation on a household level due mainly to cultural barriers. Developing more affordable options for Ecosan and adapting the technology to be more culturally sensitive with community assistance would help increase demand for Ecosan on a household level.

### 7.3.2 PUBLIC TOILETS

Public toilets are theoretically a good solution for poor communities where there is a lack of both funds and space. Practically, however, public toilet projects are usually unsuccessful due to operation and maintenance failures. The individuals who use the toilet lack ownership and have no incentive to keep the toilets clean. The local government agency responsible for the toilets often lacks efficiency and accountability and therefore fails to maintain public toilets properly.

Privately managed public toilets where users pay a fee for each use have been successful in some cases. However, these "pay-and-use" toilets are most viable in urban and semi-urban locations, in places such as bus stations, where there is a transient crowd and enough traffic to support use. They are typically less successful in low-income communities, as people are not in a position to pay the high fees that the private management agencies charge. In rural areas, people prefer to defecate in the open than to spend 1 rupee to use a toilet.

However, since it often becomes the only alternative due to financial reasons, community-based operation and maintenance models have been successfully adopted. There have been some successful cases where the community was actively involved in the process from the initial planning phase all the way through construction and maintenance. The process requires extensive awareness-raising and consensus-building by a dedicated facilitating organization. The model of maintenance involves collecting a regular fee from the families that will be using the toilet and appointing a person to maintain the toilet. In some cases a residence is provided to the caretaker adjacent to the toilet in return for the services he/she provides.

Although we do not think that developing public toilets will end manual scavenging, the current sarpanch plans to create 3 or 4 public facilities in the upcoming years. These facilities will be conventional pit latrines, which may be suitable for household use, but as public facilities will likely have a short lifespan and worsen conditions for manual scavengers. Given that public toilets will be built, alternative technologies should be considered and promoted by Navsarjan.

*Biogas:* Biogas appears to be the most suitable option for public facilities due to the need for high fecal loads and cultural suitability. Ideally, the caretaker of the facility could use the energy generated for his/her household use and sell the fertile bioproduct for a profit. These benefits would be supplementary to a salary.

However, a public biogas plant must be designed to guarantee water supply (through rainwater harvesting or water connection) and the caretaker must be provided with appropriate technology to maintain the facility without coming into direct contact with fecal matter.

### 7.3.3 COMMUNITY TOILETS

Community toilets can be considered a hybrid version of public and private toilets. In this case, a small group of households ranging from two to five families cooperate to construct a common toilet. Different types of cooperation are possible. In some cases one family bears the construction cost, builds the toilet on its compound, and maintains it. They allow other families to use the facility in return for a moderate fee. Alternatively, neighbors may share the construction costs in order to build a facility in a common compound. This design is a bit problematic as maintenance is shared and thus encourages free riding. It can also cause conflicts between neighbors. For this reason, community toilets are particularly suited for compounds and closely knit communities. Nonetheless, the community toilet model addresses major issues such as cost, space, and management, but requires active involvement of community members.

*Biogas:* Again biogas is the most suitable technology for community toilets. Households willing to build a communal biogas latrine will benefit from energy generation, in addition to or instead of a user fee.

### 7.3.4 INSTITUTIONAL TOILETS

Institutional toilets, such as those in schools and hospitals, are public facilities for designated user groups. They typically have an accountable organization to maintain them. For this reason, institutional toilets are usually more successful than public toilets. Institutional latrines provide a unique opportunity to bridge sanitation education with other broader social and ecological goals.

*Ecosan at local schools:* Coupling institutional Ecosan facilities with sanitation education at existing schools in Paliyad is a robust way to build awareness about the social and ecological benefits of Ecosan technology, as well as more generally about hygiene and health. Navsarjan already has experience with this approach. Bringing their expertise to local schools would be an important first step in addressing sanitation in Paliyad and ending manual scavenging.

*Biogas at hospitals or temples*: Biogas also should be proposed for larger institutions such as hospitals and temples with high human traffic and access to water. Approaching these organizations, particularly the ones who have dry toilets (i.e. the Jain temple), and selling the energy benefits may be an option for Navsarjan to pursue.

## 7.4 RECOMMENDATIONS

- Consider a variety of technological options, including EcoSan, biogas, and ventilated improved pit latrines, depending on local conditions
- Focus efforts on expanding private latrine coverage
- Consider facilitating the creation of a public biogas toilet
- Create an EcoSan project at a local school with an accompanying curriculum
- Develop a low-cost and more culturally suitable version of EcoSan or drum pit latrine

# 8 ALTERNATIVE LIVELIHOODS AND ECONOMIC DEVELOPMENT FOR SCAVENGERS

In addition to ending the need/demand for manual scavenging via technological and societal interventions, in order to truly transform caste relations and move toward abolishing the caste system, there must be alternative economic opportunities for Dalits, especially those in the manual scavenging sub-caste. Without identifying or creating means to alternative livelihoods, many manual scavengers will not want to leave their work—especially those with guaranteed pay who are employed by the municipality—and all will have a difficult time making ends meet as Dalits are systematically excluded from parts of the economy outside those they are forced into via their caste and sub-caste.

There are a variety of approaches for creating alternative economic opportunities, ranging from accessing market opportunities outside of Gujarat or internationally to identifying gaps in the local village economy that could be filled by people who previously manual scavenged. In all cases, it will be necessary to identify, create, and sustain methods to transition manual scavengers into other occupations; this can include many approaches and forms of training and capacity building. This section will present some issues to consider in

creating alternative economic opportunities; evaluate ongoing efforts; propose possible new opportunities and ways to incubate them; and discuss strategies to move forward.

## 8.1 ALTERNATIVE LIVELIHOOD CONSIDERATIONS

### 8.1.1 THE MARKET

A major consideration for creating alternative economic opportunities is the market. Identifying needs that are currently not met in the Paliyad economy—be they due to gaps in the existing market or public goods that are not being provided sufficiently by the government—is a primary step to understanding what some potential opportunities for scavengers are. Beyond identifying needs, an assessment of people's willingness to pay is critical to ensuring the opportunity will be profitable. For example, the government does not currently provide adequate sanitation for residents of Paliyad, but concentrated demand does not exist either, and so without other efforts to increase demand, sanitation related venture would not necessarily be profitable.

This leads to a second approach: creating markets for goods or services that scavengers can or can be trained to provide. This approach takes more finance, time, and energy inputs but it can also serve other purposes—such as creating a demand for sanitation that complements the movement to end manual scavenging.

### 8.1.2 "UNTOUCHABILITY"

Regardless of whether the approach is responding to current gaps in the market or creating new demand, any analysis of what possibilities should be pursued must include how caste relations and caste constructions affect the viability of a venture. This is especially relevant with regard to people who manual scavenge because they hold the lowest position in the caste construct—first as Dalits, or untouchables, and second as the sub-caste regarded as the dirtiest. There are different approaches to dealing with this limiting factor: from avoiding opportunities where physical contact is a factor to choosing opportunities where the physical contact can be concealed to transcending this factor by choosing an opportunity where consumers have an inelastic demand (high demand and no substitutes).

### 8.1.3 GENDER

As discussed above, manual scavengers are disproportionally women. In considering viable alternative economic opportunities, gender must be considered—be it with regard to education, family constructs, or mobility. Ventures must be explored in terms of cultural appropriateness for women, as well as with regard to the mechanism and/or institutional arrangement which builds and supports the venture. For example, if women are limited in their ability to travel, this must be included in how a training program is created. Microfinancing schemes have focused on women traditionally and therefore has some potential, but still is limited in its scope, as discussed later.

### 8.1.4 SCALABILITY

Another consideration is if the opportunity can be scaled up to work in other villages and localities. This is critical to ensuring our approach ends manual scavenging in sum, and not just in one village. While alternative opportunities for manual scavengers do not have to all connect to one type of venture, the ventures should all

be scalable so that a mix can fulfill all income needs of scavengers as opposed to case-by-case assessment and solution, as this is not feasible.

#### 8.1.5 SUSTAINABILITY

The venture or approach must also be sustainable for those who move out of manual scavenging. As far as can be planned for, the opportunities considered should be able to continue indefinitely into the future. Similarly, they should be constructed so that those who are moving out of manual scavenging can continue to generate income from the opportunity, even if it becomes very profitable. The case of leatherworking reminds us that upper castes will take over professions of lower castes once they become profitable or "cleaner" unless ownership or comparative advantage is entrenched structurally from the beginning.

#### 8.1.6 NON-MARKET APPROACH

While it will not be explored in depth here, another approach to ensuring alternative livelihood opportunities is to hold the state accountable to do so and not rely on the market. The danger with this approach is that it most probably would entail a large, time and energy intensive campaign. In addition, past efforts of the government to provide alternative opportunities have not fared well, as will be discussed later.

### 8.2 ONGOING EFFORTS

#### 8.2.1 JUST ACTION INTERNATIONAL (JAI)

The first effort of note is Just Action International (JAI). JAI took the approach of providing a sewing machine and organizing a group of women who were already skilled in the quilt making trade. Hoping to create an international market for the quilts and follow that with building institutional support on the ground, JAI is still in the building phase. Thus far though, some challenges have arisen that help inform how to move forward at scale.

First, the difficulty in creating a strong demand and market is clear and has even pushed JAI to focusing on education as opposed to the marketing of the quilts. Second, the limitations of going to scale are evident as they are limited by demand, especially in a luxury item market such as quilts. Third, and related to the second point, an industry such as quilts that takes a microloan approach has limitation of creating income generation for a whole sector of workers, which is needed in the case of eliminating manual scavenging. Fourth, the large impediments to creating viable institutional support on the ground are evident as well. Without someone managing the project—from training and cooperative member support to marketing—in Paliyad, small to medium size impediments become show stoppers. All these issues have pushed JAI in the direction of focusing on supporting the education of Dalit youth via Navsarjan and Asha scholarships.

#### 8.2.2 SHAKTI

Shakti, another venture that came out of the practicum's first trip to Gujarat, reveals a different model for alternative economic opportunity. Shakti has linked with DSK to create high-end designer clothing and has an online store to sell from. While too early to evaluate the success of the venture, Shakti has chosen to partner

for the creation of garments while doing the business side externally—by a group of former MIT and Boston-area student. One serious limitation in this approach is getting manual scavengers to DSK campus to partake in the training and clothing production.

## 8.3 SOME POSSIBLE NEW OPPORTUNITIES

There are many possible approaches to creating new economic opportunities for those who are currently manual scavengers. There are three that we will highlight, followed by a brief overview of advantages and disadvantages, benefits and challenges.

First though, a brief mention of past attempts: the last group of MIT students to evaluate and propose solutions to manual scavenging discussed the possibility of having the fertilizer from Eco-san toilets create a new industry for those who are currently manual scavenging. Sanjeev, Navsarjan's engineer, estimates that if used properly, Eco-san could generate Rs. 104 of fertilizer per person per year. This is not much and furthermore, the work of packaging and marketing so that the stigma attached to fertilizer made from human waste is overturned, identifying strong markets, and creating the network and business model to make it a successful venture is immense as well. As such, we believe that the fertilizer approach is not viable.

### 8.3.1 SANITATION PROVISION

While the market and demand for sanitation in Paliyad does not currently exist, as detailed earlier in this report, there are methods for creating this demand—from regulation to education. The market for sanitation, especially of an environmentally friendly type, is ripe for the picking in Paliyad and relates directly to eliminating the demand for manual scavenging. As manual scavengers are designated to be in the industry of waste disposal, they may have a competitive advantage—though this is both a benefit and a cost, as it entrenches caste's relation to employment type, just a healthier, more respectful form of employment. DSK could expand to include a masonry training program and support the creation of this industry while supporting those currently in manual scavenging transition out of it.

The difficulties are that TSI does not provide a grant that can be used for any sanitation industry, and so limits its applicability to a DSK led sanitation industry. Though, if a design could be created to use the TSI materials to do ecological sanitation engineering by DSK trained workers, this could meet the need of income generation while using existing resources. Second, there has been difficulty in getting manual scavengers to DSK, especially women, and so a DSK based intervention/training could prove problematic as the only transition training site. Possibly, a temporary satellite training site could be set up close to or in Paliyad by DSK that would provide jobs in its own right and could travel to other localities for similar on-the-ground capacity building. Lastly, there is a question of what happens when toilets are built to the level of demand. Maintenance of the new technology as employment is an obvious possibility, but an assessment of the viability of this for constant, sufficient income generation is needed.

### 8.3.2 DRUM MAKING

Many Dalits, including those in the manual scavenging sub-caste, are known for making drums and playing them during ceremonies for the whole village. The craft of making drums by hand is a skill that few have and may have potential as a craft/industry for those who are currently manual scavengers. Because it is a skill developed over time, not easily hijack-able, and produces a unique, authentic product, it has sustainable

potential as well. Because Dalits already have the skill, the focus would be on identifying a market, creating a venture to support the production and export of the drums, and providing institutional support for growing at scale.

### 8.3.3 CELL PHONE AND COMPUTER-RELATED INDUSTRY

Martin told the story of a graduate of DSK's cell phone repair program who raised his own capital and started a cell phone repair store that is hugely successful, across all castes, in his village. While there are complexities to this story, the growth of the cell phone industry and usage across all castes and economic classes has spawned a great demand for cell phone related services. Because of cell phone usage throughout India, an industry aimed at servicing this growing need is positioned well to be scalable and apply to many situations, therein providing an opportunity that could be accessible to manual scavengers across India. Furthermore, cell phones do not have a foreseeable technological replacement and therefore provide a sustainable employment opportunity in this sense. A cell phone service industry is potentially good for manual scavengers, though some concerns about "untouchability" come into play. Martin's example though shows how demand can outweigh discriminatory societal constructs in some cases.

A computer training industry has similar industry advantages—no foreseeable industry replacement and scalable demand. Aga Khan runs training programs that have been successful, not only in operation but also in placing people in new job opportunities. Because there is a need for local labor as well as exportable skills, this venture could be both starting local training grounds that those currently manual scavenging could be trained to be trainers in while creating a computer literate and able workforce.

Another advantage of this high-tech approach is that DSK already trains in both cell phone repair and computer literacy so the capacity exists. The problem of getting people to DSK is still relevant and so an exportable training model as mentioned above may be appropriate. Another consideration is that men tend to dominate this sector and so a concerted effort must be made to ensure the training, entrepreneurship, and hiring of women. Also, there is a high capital investment requirement that must be accounted for.

## 8.4 CONSIDERATIONS FOR GENERATING NEW ECONOMIC OPPORTUNITIES

This section hopes to raise some central considerations in alternative economic opportunity creation and provide some suggestions. It is not exhaustive by any means. Clearly, more research about how different size village economies operate (from large ones like Paliyad to small ones) needs to be conducted, specifically with regard to gaps in the market and public goods that are not being provided. This will most effectively help guide what opportunities and ventures should be pursued for manual scavengers.

Secondly, more consideration should be given to how the Entrepreneurship Development Institute of India (EDI) in Ahmedabad[15] and state rehabilitation and training programs can be incorporated into creating employment transitions. While there are limitations to the state's ability—notably in who is eligible for

[15] EDI is an autonomous body and not-for-profit institution that promotes the development of entrepreneurs nationally and internationally, specifically understanding that anyone can be an entrepreneur with well conceived and well directed interventions.

getting rehabilitation and corruption in administration—the possibility of another entity running the program, which is funded by the state, but is accountable to Dalit communities and organizations, should be explored.

Lastly, institutional arrangements for moving any or all of the industries forward must be explored. Economic opportunities should be created concurrently with technological interventions which eliminate the need for scavenging; if this does not happen, there will be a period of time when those who currently scavenge have no means for making money or supporting themselves. The transition to new professions must be smooth and fast to be viable.

While it would be ideal for DSK to serve the role of building new industries—keeping the economic growth within the Dalit community and building it around their pro-Dalit approach—it is not clear that DSK has the capacity or interest. Currently, they are not monitoring graduates of their program or connecting how many people they train in each skill with what the market demands (those at DSK self-select what skill they build). DSK may want to take these steps first—supporting graduates and providing market information to help participants decide what the best skills to learn are. But if DSK chooses to and has the capacity, keeping business and industry growth in-house certainly has economic and ideological benefits.

Another potential option is building a partnership with the Gujarat Safai Kamdar Vikas Nigam (GSKVN). They could work with Navsarjan or other partners (WASMO, etc.) to connect with scavengers after technological interventions have taken place to provide opportunities, as well as in building industries while the interventions are being built. Regardless, this is an unresolved puzzle—Navsarjan's strength is not creating a job industry and even DSK does not have experience in this. All partners must explore their roles and interests and come to the most effective and feasible solution.

## 8.5 RECOMMENDATIONS

- Further investigate the feasibility and effectiveness of three potential industries: drum-making, computer and cell phone training and repair, and sanitation provision
- Create a local training program for manual scavengers for the chosen industry(ies) appropriate to the location and demand therein (a combination is viable)[16]
- Build enterprise support into DSK's operations and/or find a strong partner to do this, possibly the Nigam or the state rehabilitation program

The issue of creating alternative economic livelihoods is complicated and difficult, but it is critical to making the eradication of manual scavenging sustainable and socially just. Herein, the supply side, proactive approach of eliminating scavenging by creating better opportunities must complement the demand side,

[16] Note: If locally based training is not a viable option, and adult manual scavengers will have to come to DSK's campus for training, in addition to training adult manual scavengers, advocating for adults to bring their children is important to building capacity and skills for future generations and for breaking the entrenchment of caste. This is something that DSK is working toward and should be integrated into the approach.

reactive approach of eliminating the physical need for scavengers. Together, these approaches can help eradicate manual scavenging and improve the lives of those who currently engage in manual scavenging.

# PART III: RECOMMENDATIONS FOR MOVING FORWARD

In order to holistically and sustainably eradicate manual scavenging, a multi-pronged approach is necessary. We have presented one configuration of such an approach that we believe will be most expedient and effective. The following logical framework brings together our various recommendations and delineates the overall goal, specific objective, strategies to achieve each specific objective, action necessary and proposed agent to carry out said action, and finally assumptions in said approach that are necessary for it to work. This framework is intended to bring clarity to how all the recommendations connect and are necessary for eradicating manual scavenging and diminishing the oppressive power of the caste system. Finally, a sequencing of the action steps is presented to clarify how such an approach may be enacted.

## 9 LOGICAL FRAMEWORK FOR RECOMMENDATIONS

**Table 3. Logical framework for recommendations.**

| Goal | Objectives | Strategies | Action (By Whom?) | Assumptions |
|---|---|---|---|---|
| Eradicate Manual Scavenging | Demand for Sanitation | Community Organizing | Formation of CBO/Pani Samiti | Navsarjan willing to build organized base, and beyond Dalit community |
| | | Awareness-Raising | Women's Rights Campaign (Navsarjan) | Navsarjan willing to lead campaign |
| | | | Public Health Campaign (WASMO) | Availability of Experts |
| | | | | Willingness of others i.e. WASMO to collaborate |
| | | Prohibition of Open Defecation | Community Monitoring of O.D. | Cooperation of Panchayat |
| | Sanitation Provision | Capacity-Building | Partner with or form business or NGO for service delivery, monitoring, and maintenance | Willingness of Navsarjan to partner and vice versa |
| | | | Training Sanitation Masons/Engineers (Navsarjan) | Delivery organization has capacity and will to train masons on the ground |

| | | | |
|---|---|---|---|
| | | Build toilets | |
| | Appropriate Technology Identification | Assess biogas, Ecosan, or pit latrines, based on factors identified in figure | Private units will be self-maintaining |
| | | | Navsarjan will be willing to support multiple, imperfect technologies |
| | Identify Financing Options | Lobby TSI for greater flexibility | Funds can be generated |
| | | Use partner funds | People will be willing to pay; demand generation will work |
| | | Establish a community revolving loan fund | |
| Manual Scavenging Rehabilitation | Create sustainable livelihoods that are locally based | Look into 3 potential industries: drum-making, computer and cell phone, and sanitation | There is a market for products; scavengers will be willing to do these activities |
| | | Create village-based training programs for chosen industries | Navsarjan will devote resources to local training programs |
| | | Build enterprise support into DSKs operations and/or find strong partner to do this | Navsarjan will be willing to partner w/Nigam, etc. |

## 10 SEQUENCING OF ACTIVITIES

### PHASE I—6-12 MONTHS: BUILDING A BASE AND CREATING NECESSARY INSTITUTIONS AND PARTNERSHIPS

- Assess biogas, Ecosan, or pit latrines, based on factors identified in figure
- Look into 3 potential industries: drum-making, computer and cell phone, and sanitation
- Begin Women's Rights Campaign, ongoing (Navsarjan)

## MOVING FORWARD

- Formation of CBO/Pani Samiti, ongoing
- Lobby TSI for greater flexibility, ongoing

### PHASE II—18-24 MONTHS: CAPACITY BUILDING AND DEMAND CREATION

- Public Health Campaign (WASMO)
- Community Monitoring of O.D., ongoing
- Partner with or form business or NGO for service delivery, monitoring, and maintenance, ongoing
- Create village-based training programs for chosen industries, ongoing
- Train Sanitation Masons/Engineers, ongoing (Navsarjan)
- Build enterprise support into DSKs operations and/or find strong partner to do this, ongoing

### PHASE III—ONGOING UNTIL MANUAL SCAVENGING IS ERADICATED: IMPLEMENTATION, EMPLOYMENT TRANSFER AND ENSURING SUSTAINABILITY

- Use partner funds
- Establish a community revolving loan funds
- Delivery of Toilet Provision
- Employment Transfer Program and Implementation

## REFERENCES

Aga Khan Planning and Building. Website: http://www.akdn.org/agency/akpbs.html#intro

Crowel, Daniel W. *The SEWA Movement and Rural Development: The Banaskantha and Kutch Experience.* Sage Publications: Thousand Oaks, 2003

Kar, Kamal. "Subsidy or Self-Respect? Participatory total community sanitation in Bangladesh." Institute of Development Studies Working Paper 184. Sussex: ISD, September 2003

Mapuskar, S.V. "A Brief Note on Sanitation Programme in Dehu Village."

Mapuskar, S.V. "Innovative strategy for viability of family owned nightsoil based biogas plant in Dehu Village, Pune."

Navsarjan Trust. http://navsarjan.org/navsarjan/navsarjan/aboutus

Rajagopal, Balakrishnan et. al. "From Promise to Performance: Ecological Sanitation as a Step toward Elimination of Manual Scavenging in India." Cambridge, MA: Program on Human Rights and Justice & Department of Urban Studies and Planning, MIT, 2006

Sakthivel, Ramesh. "Inventive Villagers: Innovative Approaches to Total Sanitation in Maharashtra." WES-Net India. New Dehli. From www.solutionexchange-un.net.in/environment/cr/res05070601.pdf

Singh, K. Jatinder and Sarbjit Singh Sooch. "Comparative study of economics of different models of family size biogas plants for state of Punjab, India." Punjab Agricultural University

Smet, Jo and Sugden, Steven. "Ecological Sanitation." April 2006. WELL – Resource Centre Network for Water, Sanitation and Environmental Health. Retrieved on May 10, 2008. http://www.lboro.ac.uk/well/resources/fact-sheets/fact-sheets-htm/Ecological%20sanitation.htm

"Community-led total sanitation in rural areas: an approach that works." World Bank Water and Sanitation Program. February 2007. URL: esa.un.org/iys/docs/san_lib_docs/WSP-Community%20Led.pdf

"Solid and liquid waste management in the rural areas." A technical Note by UNICEF

"A System Approach to Biogras Technology", in *Biogas Technology: A Training Manual for Extension* (1996). Sustainable Development Deparment, Food and Agriculture Organization of the United Nations.

# APPENDICES

## A. SANITATION OPTIONS MATRIX

**Table 4. Sanitation options and selected attributes.**

| Toilet Type | Description | Space Requirements | Cost | Waste Management | Water Requirements | Advantages | Disadvantages |
|---|---|---|---|---|---|---|---|
| Single pit | The simplest form of toilet, consisting of a pit and a cover over it which has the hole in it. In some cases it is just a corrugated tin sheet with a hole. It can also be made of concrete and fitted with squatting pan. | Room: 1.25 m2, and 125mm-thick wall = 1.90sqm. | Rs 2400 ($60) | The waste collects in the pit and the liquid soaks away in the soil. Upon reaching its capacity, a new pit (1.5 to 3 m deep) is dug nearby. | Washing | 1. Minimal cost.<br>2. Minimal space requirement<br>3. Easy construction<br>4. Only requires wash water | 1. Odor<br>2. Possible groundwater contamination<br>3. Requires new pit after filling up |
| Dual-pit water sealed | Usually a watersealed toilet connected to two pits. This is made such that when one pit is filled the other can be used. | room: 1.9 m2; pit: 2.5 m2 | Rs 4000 ($100) | Waste collects in the pit and the liquid soaks away in the soil. The pit (1.5-3 m deep) fills in 1-2 years, after which the other pit is used while the contents of the first decompose. The decomposed waste is then excavated and used as fertilizer. | Washing and flushing | 1. No smell due to the presence of water seal<br>2. Pits are used in a cyclic fashion<br>3. Slightly more expensive than single pit, but still quite | 1. Chance of ground water contamination |

**Table 4. Sanitation options and selected attributes.**

| Toilet Type | Description | Space Requirements | Cost | Waste Management | Water Requirements | Advantages | Disadvantages |
|---|---|---|---|---|---|---|---|
| | | | | | | affordable | |
| Septic tank | A water tight underground tank is used to store the waste as it anaerobically decomposes. The liquid flows off into a sewer or soakpit. | Room: 1.9 m2; tank: 5 m2 | Rs 15000 ($375) | Waste anaerobically decomposes in a submerged condition in the septic tank. The decomposed liquid flows out either in a soak pit or a sewer system. Some amount of sludge gets accumulated and the tank needs to be cleaned after a period of 15-20yrs. | Washing and flushing | 1. Low-odor due to the presence of water seal<br>2. Low maintenance requirements | 1. High cost (the tank requires concrete construction)<br>2. Waste nutrients not utilized |
| Ecosan | A dry composting toilet, where the waste is stored in a cavity below the seat. It requires separation of urine and wash water. Thus, the seat has three separate holes for waste urine and washwater. The urine is separately stored and in plastic containers. Saw dust or ash is required to be added every time it is used. | room and steps area = 3.5sqm | Rs 15000 ($375) | The waste that is collected in the tank below the seat is added with ash or sawdust. It gets dry-composted after a period of six months and needs to be left in the sun for another six months after which it can be used as fertilizer. The urine which is separately stored in plastic drums is also used as fertilizer after 15-30 days. | Washing | 1. Produces fertilizer and soil conditioner<br>2. Low water requirements<br>3. Pathogenically safe with little risk of contamination | 1. Requires training to use the three-hole system<br>2. High cost, due to the construction of the storage above the ground<br>3. Elderly and physically challenged people finds it difficult to use due to the steps |

**Table 4. Sanitation options and selected attributes.**

| Toilet Type | Description | Space Requirements | Cost | Waste Management | Water Requirements | Advantages | Disadvantages |
|---|---|---|---|---|---|---|---|
| Modified Ecosan | An indigenous innovation, where a plastic tank is used as the storage tank and the structure is made of prefabricated steel frames instead of brick. The advantage of the system is that it can be prefabricated and saves construction time on the site. | Room and steps: 3.5 m2 | Rs 8,000 ($200) | The process is the same as above, only the plastic container which stores the waste is emptied and replaced. | Washing | 1. Produces fertilizer and soil conditioner<br>2. Low water requirements<br>3. Pathogenically safe with little risk of contamination<br>4. Can be prefabricated to save construction time | 1. Requires training to use the three-hole system<br>2. High cost, due to the construction of the storage above the ground<br>3. Elderly and physically challenged people finds it difficult to use due to the steps |
| Biogas plant | A conventional watersealed toilet draining into a spherical tank. The waste gets anaerobically decomposed with the formation of methane gas. This gas is a clean fuel with high calorific value. | Room: 1.9 m2; tank: 4 m2 | Rs 20,000 ($500) | The waste is reduced by formation of biogas from it and at the end a slurry is ejected out of the tank. This slurry pathogen free and odorless and can be used as fertilizer. | Washing and flushing | 1. Produces biogas which can be used for cooking and lighting | 1. High construction cost |

**Table 4. Sanitation options and selected attributes.**

| Toilet Type | Description | Space Requirements | Cost | Waste Management | Water Requirements | Advantages | Disadvantages |
|---|---|---|---|---|---|---|---|
| | | | | | | | 2. Skilled workmen/ engineers required for construction |
| | | | | | | | 3. Human waste along not usually sufficient for biogas production |
| Clivus | Is a dry vermicomposting toilet where the waste is stored in a tank below the toilet. Here the urine is not initially separated, but is filtered through the compost over an incline. Saw dust must be added after each use. | Room and tank: 3.5 m2. | | The waste is vermicomposted in a semidry condition. Following decomposition for 6 months to 1 year, it is used as fertilizer. The urine which is collected below the soil tank gets reduced to an odorless black liquid rich in nutrients for plants. | Washing | 1. produces good amount of fertilizers | 1. High construction cost |
| | | | | | | 2. Requires very little water. | 2. Skilled workmen is required for construction |
| | | | | | | 3. Ecologically safe and presents no risk of contamination | 3. Requires considerable amount of woodchips or saw dust |
| | | | | | | 4. Can be prefabricated to save construction time | 4. Requires regular maintenance. |
| Centralized Sewer | Conventional water-seal latrines are connected to a centralized sewer | Room: 1.9 m2 | Rs 2,400 ($60) + | All waste is carried by the sewer system to a disposal | Washing and | 1. No manual handling of human waste | 1. Effluent requires proper sewage |

**Table 4. Sanitation options and selected attributes.**

| Toilet Type | Description | Space Requirements | Cost | Waste Management | Water Requirements | Advantages | Disadvantages |
|---|---|---|---|---|---|---|---|
| | system. | | connection charge + taxes. | point. The waste must be treated before being discharged into any water body. The pathogens, suspended solids and BOD can be reduced by various systems like sewage treatment plants or bio-remediation in wetlands. | flushing | 2. Economies of scale in large urban areas | treatment<br>2. Requires large public investment for sewer system construction<br>3. High risk of ecological contamination without proper treatment |