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# PROPOSAL FOR SANITATION IMPROVEMENT IN ROHINGYA REFUGEE SETTLEMENTS IN JAMMU

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## PROPOSAL FOR SANITATION IMPROVEMENT IN ROHINGYA REFUGEE SETTLEMENTS IN JAMMU

### Executive Summary

There were 856 Rohingya refugee households living in 16 clusters and 73 more households in a scattered manner in and around Jammu city in 2013 in congested settlements of flimsy huts made of wood and plastic without proper sanitation and water supply facilities in unhygienic conditions. A combined sociological and technological survey of the sanitation situation of a sample of the larger refugee settlements in Jammu city was carried out between December 13<sup>th</sup> to 15<sup>th</sup> 2014 to assess the needs and problems and suggest possible solutions. Focus group discussions were held with the refugees and interviews were conducted with technical and NGO persons to assess the situation.

The lack of tenure, lack of water supply and poverty arising from a lack of livelihood options and a total lack of public institutional support are the main causes of the poor sanitation situation prevailing in the settlements and women are the worst sufferers of this problem. Given the refusal of the private plot owners or the Indian Railways in the case of Marathi Mohalla to allow any permanent constructions on the land on which the settlements have come up, the only viable solution is to go in for low cost pit based latrine systems which can be easily dismantled in case of eviction from the plot. Water supply is a severe problem, especially in Sunjwan and Narwal where the underlying hydro-geological conditions do not favour the installation of handpumps. In the few settlements that handpumps can be installed either the land owner is not agreeable or if he is, then the costs are prohibitive at Rs 750 per foot for boring plus the installation cost of about Rs 30000.

The sewer and septic tank cum soakpit systems for disposal of sewage require considerable funds that are not available to poor people and so pit latrines have been designed that ensure a level of sanitation for the user while discharging the effluent into the ground without treatment. These latrines can only be constructed in areas where there are no open wells and this is the case with the settlements studied. The respondents agreed to bear the costs of labour and the construction of a makeshift toilet superstructure. The material costs of pit latrine, septic tank cum soakpit systems for black water from toilets and soakpits for grey water from bathing and kitchen for individual and five household units built from plastic materials is given in the table below.

SI No	System Type	Components with cost in Rs in brackets	Total Cost
1.	Individual Pit Latrine	2no.s Recycled 200ltr Plastic Drums (@Rs750), 2 seats (@Rs750), Cover Slab and piping (@Rs3000)	6000
2.	Community Pit Latrine	2no.s, 500ltr Plastic Tanks (@Rs5000), 2 seats (@Rs750), Cover Slab and piping (@Rs3500) (serving 5 households)	15000
3.	Individual Septic Tank	3no.s Recycled 200ltr Plastic Drums (@Rs750), piping (@Rs750), 2 seats (@Rs750), Cover Slab (@Rs3000), Brickcrush& Sand (@Rs2500)	10000
4.	Community Septic Tank (CST)	2, 500ltr Plastic Tanks (@Rs5000), 2 Recycled 200 ltr Plastic drums (@Rs750) piping (@Rs1000), 2 seats (@Rs750), Coverslab(@Rs3500), Brickcrush and Sand (@Rs2500) (serving 5 households)	20000
5.	Aerated CST	Same as above + vacuum pump and piping (@Rs5000)	25000
6.	Ind. Soakpit	A recycled200ltrPlasticDrum(@Rs750), Brickcrush&Sand (@Rs2250)	3000
7.	Com. Soakpit	1 no. 500ltrPlastic Tank(@Rs5000), Brickcrush&Sand (@Rs2500)	7500

The Government of India has special schemes for implementing such decentralised sanitation projects through NGOs like Wateraid and Sulabh International. The DAJI team should build synergies with these agencies to explore possibilities for providing sanitation solutions in refugee settlements.

## **PROPOSAL FOR SANITATION IMPROVEMENT IN ROHINGYA REFUGEE SETTLEMENTS IN JAMMU**

### **I. INTRODUCTION**

There were 856 Rohingya refugee households living in 16 clusters and 73 more households in a scattered manner in and around Jammu city in 2013 according to a survey conducted on behalf of the UNHCR by the NGO Development and Justice Initiative (DAJI) in 2013 (DAJI et al, 2013). The report states that most of the refugee settlements were very congested with flimsy wood and plastic sheet houses of less than 5 sq.m.area each and a lack of water supply and sanitation facilities. This leads to unhygienic conditions that cause disease, especially for the women and children, which is a severe economic burden as the refugees don't have access to public health services.

A combined sociological and technological field survey of the sanitation situation of a sample of the larger refugee settlements in Jammu city was carried out between December 13<sup>th</sup> to 15<sup>th</sup> 2014 to assess the needs and problems and suggest possible solutions. Focus group discussions were held with the refugees and interviews were conducted with technical and NGO persons to elicit information regarding the following -

1. The sanitation and water supply facilities currently available at the settlements
2. The social, economic and administrative hurdles preventing better facilities
3. The willingness of the refugee communities to cooperate in the provision and maintenance of sanitation and attendant water supply facilities

Secondary research was done of the overall sanitation situation in Jammu and the steps being taken to address the problems. In what follows the information collected from the focus group discussions, interviews and research is first detailed, followed by a set of solutions specific to the situations studied that can be easily implemented.

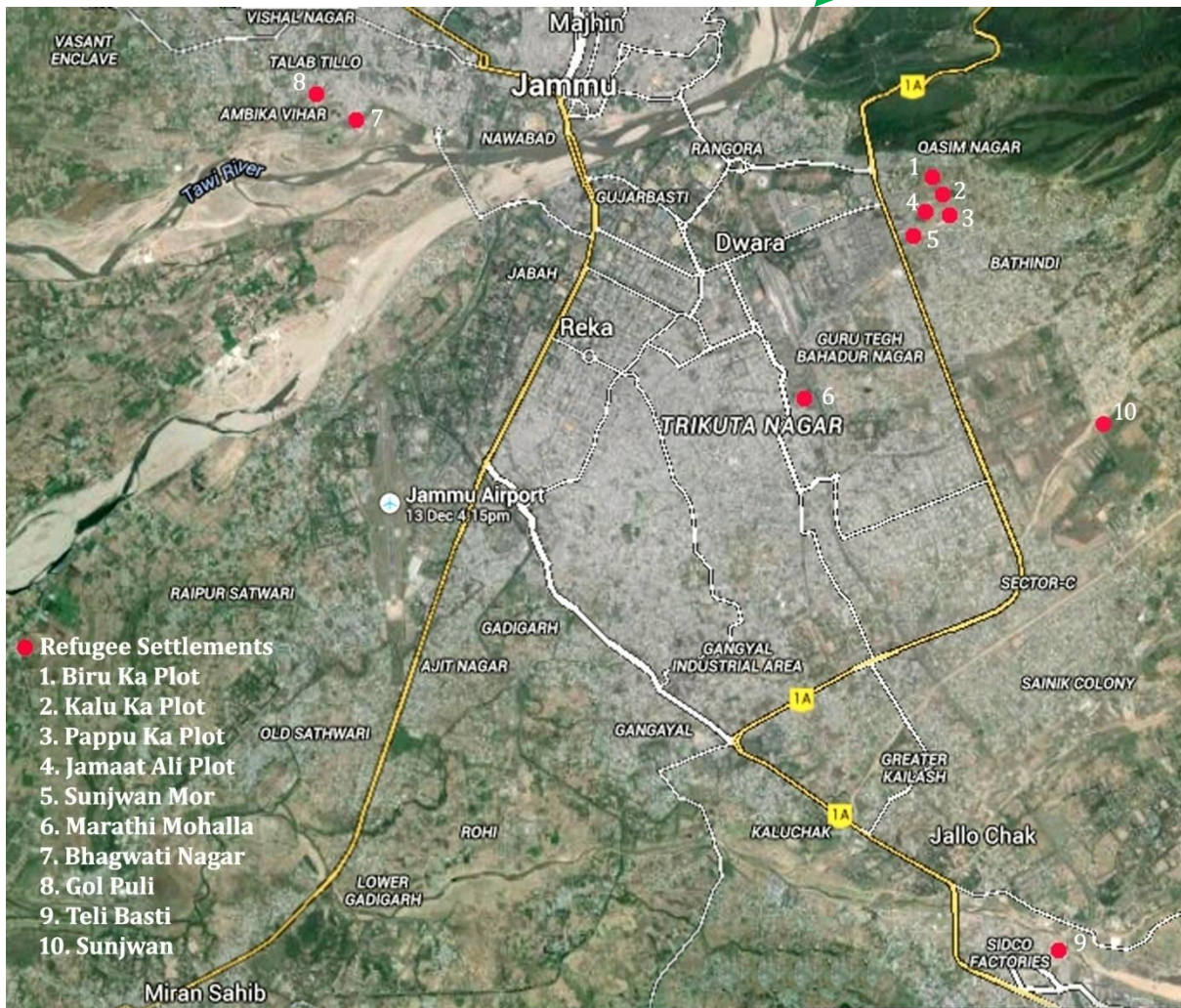
### **II. SITUATION IN THE REFUGEE SETTLEMENTS**

The focus group discussions were conducted with the help of Ms Shazia and Mr Arafat who are full time field workers of DAJI and are themselves Rohingya refugees. Supervisory staff of DAJI, Ms RenaSanyal and Mr Gurmeet Singh, provided additional information about the overall refugee situation in Jammu. The ten refugee settlements visited for the field study are as follows -

1. TeliBasti, Bari Brahmana
2. Marathi Mohalla
3. Gol Puli, TalabTillo
4. Sunjwan
5. SunjwanMor
6. Jamaat Ali Plot, Narwal
7. Pappuka Plot, Narwal
8. Kaluka Plot, Narwal
9. Biruka Plot, Narwal
10. Rahimnagar, Narwal

The locations of these settlements are shown in the map of Jammu city in Fig. 1 below. Jammu city was originally situated in the alluvial plains flanking the Tawi River but over the years with urban expansion has spread to the hills on the eastern side. While the plains areas have ground water in both phreatic and confined condition at good rates greater than 30 m<sup>3</sup>/hour, the hilly areas which

have underlying hard rock have very poor water availability in the confined aquifers and none at all in the phreatic aquifers (CGWB, 2014). Of the settlements visited those in the TalabTillo, Marathi Mohalla and Bari Brahmana areas are situated in the plains region and have fairly good water supply and the potential for better water supply from handpumps but those in the Sunjwan and Narwal areas are severely water stressed and have to rely only on meagre municipal water supply and expensive private commercial water supply from tankers.



**Fig. 1. Map of Jammu showing Location of Rohingya Refugee Settlements**

The situation in the settlements visited is as follows -

**1. Teli Basti, Bari Brahmana**

This is situated at 32.650159N and 74.906426E in SIDCO industrial area on the banks of a stream. There are 70 households and the number is growing as more refugees are coming to the settlement. Initially a few families had rented rooms in brick and concrete buildings of a farmer named Anwar Maulvi. Later as more families came in they rented the land of this and other farmers to construct wood and plastic sheet homes and recently a masjid cum madrasa has also been constructed. The focus group discussion was held with men led by Muhammad Kamaal and women led by Sitara Begum.

The lack of proper latrines is the main problem. While men go to the stream nearby for open defecation, women have to use makeshift toilets like the one shown in Fig. 2. Old metal, cardboard and plastic sheets are used to somehow cover the pit and this is very unhygienic. Even these toilets were few in number as compared to the population and so the women often have to defecate within their houses in plastic bags and then throw them away at night.



**Fig.2. Makeshift toilets in Refugee Settlements**

The water supply is uncertain and inadequate. People have to store water in plastic drums. Anwar Maulvi the owner of the land on which the refugees are staying also participated in the group discussion. He was agreeable to the construction of pit latrines using plastic drums. He also said that water supply could be improved by the installation of a handpump. The refugees were prepared to contribute labour for the construction of toilets and requested especially that their precarious water supply situation also should be improved. The people here are mostly daily wage workers in the factories in the industrial area and have very low incomes. So they are not able to expend much on provision of amenities. Those few families that live in the brick and concrete buildings too do not have toilet facilities and live in congested quarters as shown in Fig. 3. below



**Fig. 3. Brick and Concrete Quarters in TeliBasti**

## 2. Marathi Mohalla

This is a huge mixed settlement near Jammu railway station on land belonging to the Indian Railways. There are Biharis and Maharashtrians in addition to the 40 households of Rohingya refugees in this settlement located at 32.697983N and 74.883268E. The refugees here mostly work as sanitation workers at the Jammu railway station for a contractor and earn about Rs 4000 per month which they say is just about enough to keep mind and body together at a very low level. Matters are compounded by the lack of water and sanitation facilities for women. The focus group discussions here were conducted with men led by Mohammad Shafi and the women led by Ayesha Begum. The people have to go one kilometer distance to a public standpipe to get water and there is a big queue there at all times. Even though they do not have to pay any rent as they are on public land, this also means that they are not able to get any water supply facility as the Indian Railways do not give permission for any development. There is a fire hazard also as wood stoves shown in Fig. 4 are used for cooking in addition to electric stoves and the huts are made of wood and plastic. The people here too were prepared to contribute labour for the construction of toilets but were concerned about the lack of water facilities and asked for a handpump.



Fig.4. Wood Stove

## 3. Gol Puli, TalabTillo

This is a settlement located on a private plot at 32.727335N and 74.828732E. There is a public handpump on the main road in front of the plot and so the refugees here do not have any serious water supply problems. The focus group discussions with the men were led by Ilyas while those with women were led by Anwara Begum. Here too the men go out for open defecation but there are makeshift toilets for women which are very unhygienic. The people here are ready to contribute voluntary labour for the construction of toilets and they said that the plot owner would also agree to such construction as long as it was not of a permanent nature. There are 20 households settled here.

## 4. Sunjwan

This settlement is located on a private plot at 32.697112N and 74.915282E and has 60 households. The focus group discussions with the men were led by Mushtaq Ahmed while those with the women were led by Dilara Begum. There is a Madrasa and Masjid campus in the middle which has a toilet with a proper seat. However, there is severe shortage of water which has to be bought from private water suppliers through tankers. That is why there is little water to flush the toilet and it remains dirty with faeces as shown in Fig. 5. The Muslim religious body which has funded the construction of the Masjid campus is prepared to arrange for a handpump also but the geo-hydrological characteristics of the area are such that water is available only in the hard rock at depths of 300 metres or more and that too without any surety and it will cost 8 lakhs. The people here agreed to contribute labour for the construction of toilets but like in the case of Marathi Mohalla were more concerned about the supply of water which was in severe short supply. Waste collection and recycling is the main occupation of the people here in addition to wage labour and the women are involved in the sorting operations. The women are shown in Fig.6. below.



Fig.5. Toilet at Sunjwan



**Fig.6. Women at Sunjwan**

## **5. SunjwanMor**

This settlement is located 32.712437N and 74.897509E on a plot that belongs to one Amrik Singh Reen who is a well to do businessman and the candidate for the assembly election from the People's Democratic Party. There are 24 households here paying on an average a rent of Rs 700 per month. The Google map shows this land to be vacant as these families have settled here only about a year

ago. Thus, renting out land to the refugees is such a profitable proposition that even well to

do businessman are not averse to doing this and not just poor farmers. The discussions with the men were led by Nur Hussain while that with the women were led by Jannatara Begum. Since this plot is located in a central area there is good public water supply and the only problem is that of sanitation. There are make shift toilets but they are inadequate in number and so the women here too have to defecate in plastic bags and throw the faeces away at night while the men go out to defecate in the open. The people agreed to contribute labour for the construction of toilets.

## **6. Jamaat Ali Plot, Narwal**

This site is located at 32.714803N and 74.894761E and the discussions with the men were led by Maulvi Syed while the discussions with women were led by Shazida. Here there were both water supply and sanitation problems. The Narwal region like Sunjwan has a poor hydrogeological characteristic as far as groundwater is concerned and so here too there is severe water shortage which is made up for by hiring water tankers at an exorbitant cost of Rs 100 per Kilolitre with the price going up to Rs 200 per Kilolitre in summer. The same problems with regard to sanitation witnessed in other settlements earlier, exist here too. The people were agreeable to putting in labour for the construction of proper pit latrines and they also agreed to construct the superstructure above the latrines on their own. The owner of the plot Jamaat Ali also took part in the discussion. He said that he had no objection to pit latrines being built.

## **7. Pappuka Plot, Narwal**

This site is located at 32.714838N and 74.898359E and is one of the bigger and older settlements with about 100 households. The focus group discussions with men were led by Syed Hussain while those with women were led by Zahida. The problems here were similar to those of Jamaat Ali Plot and common to the Narwal region where due to the lack of water the sanitation problem is compounded even further. The women detailed the problems with regard to sanitation, especially those related to menstrual hygiene. The lack of privacy and the lack of good cloth made it extremely difficult for the women to maintain hygiene. Often they had to use the discarded cloth that they collected as part of their waste collection trips. Disposal of the used cloth was a problem as in their religion it is a sin for

the men to see these cloth pieces. This is also the reason that it is difficult to dry the cloth after washing for reuse. The few women who use sanitary napkins also face this problem of disposal apart from their not being able to afford the high prices. The lack of menstrual hygiene and privacy, in fact, are problems common to all the refugee women to a greater or lesser extent.

Here too people were agreeable to contributing their labour and resources to the digging of the pits for the latrines and for constructing the super structure. Since the people here have been residing for a longer period of time and quite a few of them are educated, their confidence levels are higher than at other sites.

### **8. Kaluka Plot, Narwal**

This settlement is located at 32.716402N and 74.897227E and faces the same water supply and sanitation problems as in the other plots in the Narwal region. There are about 80 households residing here. The focus group discussion among the men was led by Dil Mohammad while the women were led by Ramida Begum. The people here were the most enthusiastic about contributing labour and resources to the building of pit latrines.

### **9. Biruka Plot, Narwal**

This is the most congested and biggest settlement as 120 households are crammed into a small plot of about 1000 square metres. In addition to the usual problems of lack of water supply and toilets, the drainage problems are severe due to this congestion as the waste water from the bathrooms and cooking has nowhere to go and festers in between the huts as shown in Fig. 7. below.



**Fig.7. Open Drains in Refugee Settlements**

The focus group discussions here among the men were led by Mohammad Younus while the women were led by Hasina Begum. The need to do something to improve sanitation was acknowledged by the men but they felt that any construction, even of pit latrines and soak pits would be opposed by the landlord and may lead to their eviction from the site. They suggested that advocacy should be done with the Government to settle them on public land with proper civic amenities and provide them with livelihood opportunities so as to free them from the insecurity and abysmal living

conditions that they currently face.

### **10. Rahimnagar, Narwal**

This is a settlement close to Biruka Plot with about 50 families in several locations facing more or less the same problems as in the other settlements in the Narwal region. The focus group discussions were led by Amir Husain among the men and Anarkali among the women. The people here were very enthusiastic about improving the sanitation in their settlement and promised to contribute labour and resources as much as possible.



## 11. Other Stakeholders

DAJI team made efforts to meet with local municipal authorities about sanitation concerns in refugee settlements, but it was not possible as all officers were on election duty. At the Sewage Treatment plant there was no officer who could tell about the situation in the city and the junior staff were unable to provide any data. Concerned persons in the Sulabh International office in Jammu advised us to contact their main office in New Delhi for information and possibilities of the agency providing solutions in the refugee settlements.

## 12. Conclusions from the Situation Analysis

The lack of tenure, lack of water supply and poverty arising from a lack of livelihood options and a total lack of public institutional support are the main causes of the poor sanitation situation prevailing in the settlements and women are the worst sufferers of this problem. Given the refusal of the private plot owners or the Indian Railways in the case of Marathi Mohalla to allow any permanent constructions on the land on which the settlements have come up, the only viable solution is to go in for low cost pit based latrine systems which can be easily dismantled in case of evacuation of the plot. Water supply is a severe problem, especially in Sunjwan and Narwal where the underlying hydro-geological conditions do not favour the installation of hand pumps.

### III. PROPOSED SOLUTION FOR SANITATION PROBLEMS IN SETTLEMENTS

Sanitation in urban areas is a problem throughout India. Primarily because centralised treatment of wastewater requires huge capital investments in treatment plants and sewerage followed by substantial recurring operation costs. Urban local bodies are rarely able to garner the resources for this from the citizens through user charges. Consequently, in all urban areas in the country including the capital Delhi a considerable amount of waste water gets released into the environment untreated causing serious pollution (CSE, 2013). In Jammu city also two sewage treatment plants have been constructed but they are not functional as shown in Fig. 8. below and all the wastewater of the city is flowing untreated into the Tawi River and polluting it (Bhagat et al, 2014).

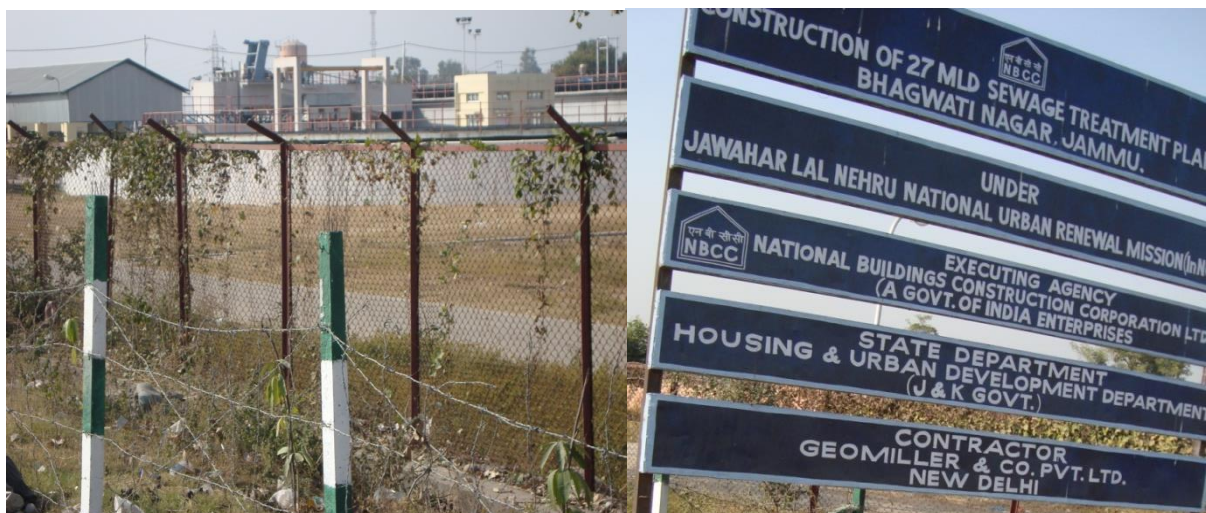
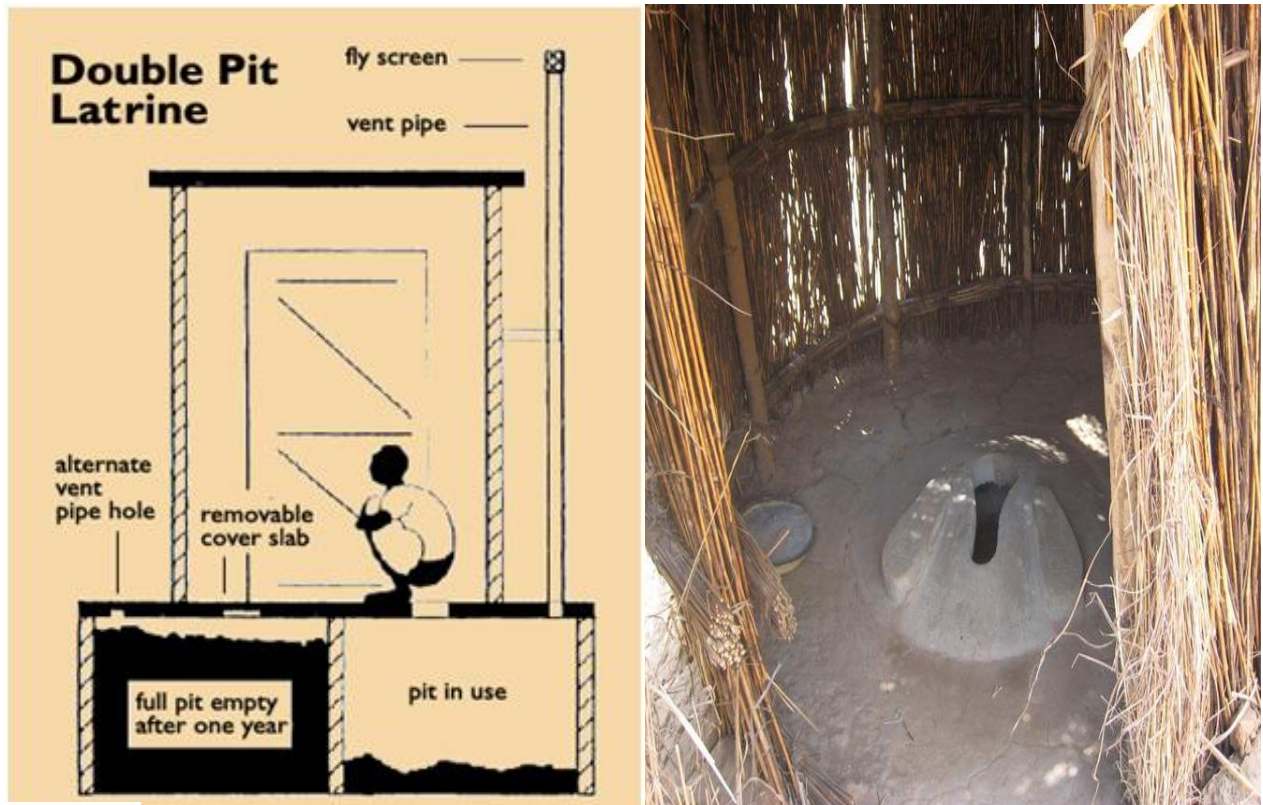


Fig.8. Sewage Treatment Plant in Jammu lying idle

That is why in most urban areas in India, there is some decentralised treatment of black water from the toilets through septic tanks and soakpits and the grey water from the bathrooms and kitchen are not treated at all. Since the construction of properly designed septic tank and soakpit systems too require considerable funds that are not available to poor people, pit latrines of various types have been designed that ensure a level of sanitation for the user while discharging the effluent into the ground without treatment. These latrines can only be constructed in areas where there are no open wells as the polluted water from the latrine pits requires at least 10 metres of soil to be freed of all pathogens and become potable and usable once again (Tearfund, 2014).



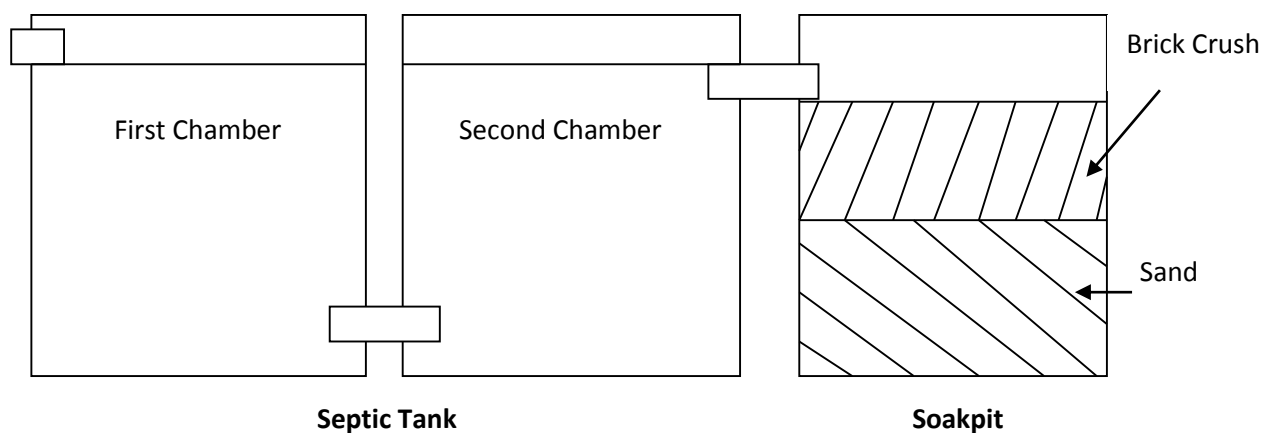
**Double Pit Latrine**

A typical double pit latrine is shown in Fig. 9.

These systems use two shallow pits of 1 m to 1.5m in all dimensions to be used alternatively. When one pit is filled up it is left idle for the faeces to be converted into manure over a period of six months to a year. In this time the other pit is used. The removable cover slab has two separate seats with water seals over each pit and the one that is not in use is kept covered. The superstructure on top can be of a permanent variety or it can be of a temporary variety as shown in the photo along side. The pits too can be of a permanent variety made of bricks and concrete or they can be made from old plastic drums or plastic tanks which have been perforated to let the water pass through to the surrounding soil. These systems are very cheap and hygienic and easy to maintain with very little use of water. The only drawback is that the water leaching into the ground has a high content of pathogens and requires at least 10 m of soil to be rid of them. That is why these latrines can't be built in areas where there are open wells or tanks as the water in them gets polluted by the latrine pits. Throughout the world, including in India where they have been popularised by NGOs such as Sulabh International, the double pit latrine, with modifications to suit local conditions, is used as a cheap and hygienic sanitation solution.

The refugee settlements of Jammu are ideally suited for a pit latrine solution since the people do not have money to implement more sophisticated solutions and neither do they have a good supply of water that is necessary for such solutions. They have also agreed to contribute the labour required for digging the pits and construct the makeshift superstructures from wood and plastic. Therefore, only the cost of the plastic drums, water sealed seat and removable cover and piping will have to be borne by the implementing agency. This cost in the case of individual household toilet systems made with 200 litre recycled plastic drums would be as low as Rs 6000. In some settlements there is a serious lack of space and so bigger latrines catering to 5 households each will have to be built and in such cases the cost will be Rs 15000 as new water tanks will have to be purchased for use as pits.

There are a few other slightly costlier solutions which are better as far as control of pollution is concerned though they give the same level of hygiene. The first is the installation of a septic tank cum soakpit system where the effluent instead of leaching directly into the ground is treated in a two chamber septic tank constructed of plastic tanks and pipes and then this treated water is routed through a soak pit consisting of brick crush and sand contained in a perforated plastic tank into the ground. In this case the cost will be about Rs 10000 for an individual latrine system and Rs 20000 for a five household one. A diagram of a septic tank cum soakpit system is shown in Fig. 10 below.



**Fig. 10. Septic Tank and Soakpit System**

The second alternative which is feasible only for the five household system is to insert air into the second chamber of the septic tank system through a bubble diffuser attached to a vacuum pump outlet which runs intermittently for an hour and stops for an hour through the use of an electronic relay. The use of aerobic digestion ensures a better and faster digestion of the sludge and also avoids the generation of foul smelling gases. Where there is space the outlet water from the aerated septic tank can be used for producing vegetables in kitchen gardens. This system will cost Rs 25000 to install and it will require about Rs 100 in electricity costs per month to run apart from repair costs of the pump once every year to replace the diaphragm.

The grey water from the kitchen and the bathroom which is currently festering in the open, can be directed into a soak pit filled with brick crush and sand next to the huts and this will effectively remove

the unhygienic conditions resulting from dead ended open drains. This would cost about Rs 3000 for individual households and Rs 7500 for a five household system. All these alternatives with their specifications and cost estimates have been summarised in Table 1 below.

**Table 1: Proposed Decentralised Sanitation Solutions (Labour is to be contributed by Beneficiaries)**

SI No	System Type	Components with cost in Rs in brackets	Total Cost
1.	Individual Pit Latrine	2 Recycled 200ltr Plastic Drums (@Rs750), 2 seats (@Rs750), Cover Slab and piping (@Rs3000)	6000
2.	Community Pit Latrine	2, 500ltr Plastic Tanks (@Rs5000), 2 seats (@Rs750), Cover Slab and piping (@Rs3500)	15000
3.	Individual Septic Tank	3 Recycled 200ltr Plastic Drums (@Rs750), piping (@Rs750), 2 seats (@Rs750), Cover Slab (@Rs3000), Brickcrush & Sand (@Rs2500)	10000
4.	Community Septic Tank (CST)	2,500ltr Plastic Tanks (@Rs5000), 2 Recycled 200 l Plastic drums (@Rs750) piping (@Rs1000), 2 seats (@Rs750), Coverslab (@Rs3500), Brickcrush and Sand (@Rs2500)	20000
5.	Aerated CST	Same as above + vacuum pump and piping (@Rs5000)	25000
6.	Ind. Soakpit	1 Recycled 200ltr Plastic Drum (@Rs750), Brickcrush & Sand (@Rs2250)	3000
7.	Com. Soakpit	1, 500ltr Plastic Tank (@Rs5000), Brickcrush & Sand (@Rs2500)	7500

Agencies such as Water Aid and Sulabh International are already implementing some of the above mentioned sanitation solutions. The DAJ team should build synergies with these agencies to explore possibilities for providing sanitation solutions in refugee settlements.

#### IV. PROPOSED SOLUTION FOR WATER SUPPLY PROBLEMS IN SETTLEMENTS

The underlying rock structure of the Narwal and Sunjwan areas makes it impossible for the sinking of bores and installment of handpumps in those areas. Rainwater harvesting is a possibility but this requires permanent construction which the land owners are not going to allow and the investment on these is fairly large. Therefore, the only solution for these areas is to provide subsidised tanker water supply. At present the refugees are buying tanker water commercially at exorbitant rates.

The Marathi Mohalla and Teli Basti areas can be provided with handpumps. Permission will have to be taken first from the Indian Railways for installing a handpump in the Marathi Mohalla as it is situated on railway land. The owner of the land in Teli Basti is agreeable to a handpump being installed on his land and the cost of sinking a bore is Rs 750 per foot inclusive of casing pipes. The cost of a handpump will be another Rs 30000 inclusive of pipes and labour.

#### V. IMPLEMENTING AGENCIES

The Government of India has a well funded programme of decentralised low cost sanitation which is implemented by established NGOs in the water supply, sanitation and hygiene (WASH) sector like WaterAid and Sulabh International (GoI, 2015). The above water supply and sanitation improvement plan for the Rohingya refugee settlements can very easily be implemented as part of this programme.

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