Models of Financing Sanitation Infrastructure Initiatives in India: Challenges and Opportunities

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***Abstract*— Access to sanitation is one of the key sustainable development goals. The data from World Health Organizations suggest that worldwide 2.3 billion people lack access to basic sanitation facilities such as toilets or latrines. About, 892 million people defecate in the open. This open defecation includes street gutters, open fields, railway tracks, behind bushes, into open bodies of water etc. (WHO, 2018). With 56 per cent population lacking access to basic sanitation, India ranks one in the list of top 10 worst countries with basic sanitation facilities (Wateraid, 2017). Poor sanitation leads to several health problems, and the data suggest that worldwide improper sanitation is estimated to cause 4,77,293 diarrheal deaths annually. In India alone, about 39.8 percent of the population face the problem of open defecation which causes 1,10,031 diarrheal deaths annually (Unicef,2018).**

Toilet economy in India, including toilet construction and upgradation is worth US $32 Billion per year market in India today and is expected to double to an estimated US $62 Billion by 2021 (Toilet Board Coalition, 2017). As infrastructure projects are capital intensive and require large investments with long gestation periods, it will be difficult this huge investment by one stakeholder. Meeting this huge requirement will need collaboration between various stakeholders like government, private sector, non-government organizations, public funding, member's contribution and so on. Various stakeholders have taken various initiatives in this regard and adopted innovative strategy to get financing for the same. A relook on various existing models and their pros and cons will help in building policies for financing sanitation programme and will help in increasing access to sanitation. The objective of this study is to document and analyse various models of financing for sanitation projects. The paper will explore various existing model of financing infrastructure projects through secondary review of literature and will analyse the suitability of each model in Indian context based on a six set criteria adopted by IRC (2011). The study concludes that only construction of toilets will not be sufficient to meet the requirement of increased access to sanitation, rather, the focus should be on a full chain financing as maintenance of these created infrastructure will also be crucial for sustaining the impact of sanitation initiatives. Initiatives like Swachh Bharat Abhiyan is only a tip on iceberg in achieving the goals of sanitation and open defecation free India. It will require a more sustainable approach in the form of full chain financing for a larger impact on sanitation. Various models have been tried but most of them operate at one or two stages of the chain. A full cycle approach is still missing and a more holistic approach is needed for achieving this objective. Partnership between various stakeholders will play an important role in achieving this objective.

Keywords*— Sanitation, Financing models, Infrastructure, development.

I. INTRODUCTION

Access to sanitation is one of the key sustainable development goals. The data from World Health Organizations suggest that worldwide 2.3 billion people lack access to basic sanitation facilities such as toilets or latrines. About, 892 million people defecate in the open. This open defecation includes street gutters, open fields, railway tracks, behind bushes, into open bodies of water etc. (WHO, 2018). With 56 per cent population lacking access to basic sanitation, India ranks one in the list of top 10 worst countries with basic sanitation facilities (Wateraid, 2017). Poor sanitation leads to several health problems, and the data suggest that worldwide improper sanitation is estimated to cause 4,77,293 diarrheal deaths annually. In India alone, about 39.8 percent of the population face the problem of open defecation which causes 1,10,031 diarrheal deaths annually (Unicef,2018).

Toilet economy in India, including toilet construction and upgradation is worth US $32 Billion per year market in India today and is expected to double to an estimated US $62 Billion by 2021 (Toilet Board Coalition, 2017). As infrastructure projects are capital intensive and require large investments with long gestation periods, it will be difficult this huge investment by one stakeholder. Meeting this huge requirement will need collaboration between various stakeholders like government, private sector, non-government organizations, public funding, member contribution and so on. Various stakeholders have taken various initiatives in this regard and adopted innovative strategy to get financing for the same. This paper is an attempt to analyse the feasibility of various models of financing sanitation and infrastructure and recommend the best suited model for Indian scenario.

II. LITERATURE REVIEW

Sanitation and hygiene is considered as one of the basic need. Ending open defecation by 2030 is a global goal. However, looking at the huge need of infrastructure creation, this goal looks difficult to be achieved. Access to proper financing will play an important role in attainment of these goals.

Revised Manuscript Received on September 10, 2019.

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A. The Sanitation Gap

Various research on sanitation have emphasised that a huge gap exists in sanitation in almost all developing countries. Evans et.al. (2004) emphasized that 2.4 billion people are devoid of sanitation in the world and 80 percent of them are from Asia. The authors also stated that these developing countries are not able to keep the pace of providing sanitation with the growing population. "WHO burden-of-disease analysis" suggests that hygiene, sanitation and lack of access to safe water is the main risk factor of poor health in developing countries. Absence of toilets results in lakhs of people walking to unhygienic and unsafe locations for open defecation and absence of hygienic sanitation correlates with lack of economic prosperity. Many authors describe the situation where the raw sewage runs through houses and even through communities and their houses. Toubkiss (2008) stated that although the there are fewer people with latrines in rural areas but the situation is much worse in urban and semi urban areas and even more difficult in slums. With increasing rate of migration, the situation is worsening further.

The situation in India is dismal where open defecation is a norm in urban slums as well as rural areas. Public toilets, are filthy and unusable and are often very less than necessary which leads to men defecating in public places and women are forced to go out early in the morning or late at the night. The sewerage systems are also badly maintained in India where the sewerage connected to homes flows out in open drains which are filled to capacity and choked with solid wastes. This results in the raw sewerage harming surface and ground water sources causing an environmental threat combined with health hazards largely for the poor. (James, 2008).

Sustainable development goal number six mentions about water and sanitation for everyone as these are basic necessities of life and necessary for human development. Around 800 children under the age of five die every day due to preventable diseases related to drinking water and hygiene. Sustainable development goal number six is also connected to four other SGD's (1.4, 3.3, 3.9, 12.4) which are, ensuring that all men and women have access to basic services, including water and sanitation, combating water borne diseases, the reduction of the number of deaths and illnesses from hazardous chemicals, and air, water, and soil pollution, access to safe and affordable drinking water, environmentally sound management of water resources. To achieve the SDG six, it is clear that we also need to achieve these inter-linkages. To achieve the SDG number six India launched Swachh Bharat Mission (SBM) and National Rural Drinking Water Program (NRDWP) to improve the quality of the existing population and the upcoming generations (Iyer ,2018). The data shows that there is huge need for building sanitation infrastructure for improving quality of life in developing countries, particularly, India.

B. Sanitation Management Chain

It need to be noted that only creation of infrastructure will not be sufficient. A well-developed strategy is needed for maintaining these infrastructures. Management of these sanitation infrastructure will require a systematic approach. In a study conducted by IRC (2010) mentioned that as sanitation is scaled up, there is more focus given on the household level and subsequent stages of the management chain are ignored. Sijbesma (2011) defined the sanitation management chain as a cycle of five process i.e. excreta containment, collection and transport, excreta and wastewater treatment, Final disposal of excreta and Productive use of excreta. Septic tanks, pit latrines, toilets are often referred to as sanitation systems but they are merely a part of sanitation systems (Lüthi, and Tilley 2008). In South Africa the progress of majority of sanitation programs was not achieved as the municipalities failed to study the operations and maintenance plans of toilets. (Mjoli and Bhagwan, 2008).

The experiences of water aid (Water Aid, 2008) revealed that these programmes often focus only on step one i.e. the confinement of human excreta and not on the other steps in the management chain that are to collect, transport and make these human excreta safe. The management of the entire chain requires innovations such as community participation, partnerships with the government, civil society, NGO's and government organisations. Unless, a holistic approach of management of whole chain is taken, it will be difficult to have a sustainable impact. For a long lasting impact, we need to focus on managing the complete chain of sanitation and hygiene. In achieving this huge task, partnership between various stakeholders will be a most required step.

C. Need of partnerships for sanitation

There is a focus on the interventions on the sanitation market i.e. between the buyers and the sellers but the need is to intervene in the sanitation system that also includes supporting institutions like financial organisations and other players associated with the supply chain. (USAID, 2018). The concept of "pay and use" toilets operated by various NGO's, charitable trusts, local associations work well in public areas such as bus stations and toilets and user charges take care of the maintenance, salaries of cleaners etc. but this concept is not workable in slums and rural areas due to high prices charged. Usually 1 rupee per visit is charged which translates to 150 rupees a family for a month if one person uses a toilet for once a day. This sum is beyond the reach for many urban and rural poor. (Sundar et.al. 2003). There are various other factors which helps us to understand the willingness to pay and invest in sanitation by poor which can be potential benefits and spread of investment over a time period. (Trémolet et al. 2011; Cairncross 2004). Gender, ethnicity, and culture are also relevant factors in investment towards sanitation (Nguyen et al. 2016; Kamasan 2008; Coombes et al. 2013). This can be proved by various examples as many groups see open defecation as a practice which is traditional and convenient and men in India are habitual defecating while working in fields, so they never saw a need of toilet. (Devine 2009; Perez et al. 2012). The key discussion is that the sanitation supply chain comprises environmental, financial, behavioural, institutional, social and technical aspects and is therefore

complex. The key to sustain the models of sanitation lies in solving the complexities and building the models around communities, link these models with loans, effective partnerships with local governments, community based solutions on hygiene and upgrading these processes over time. (Water Aid, 2008).

D. Cost of sanitation Programmes

There are various estimates of costs for sanitation infrastructures for various countries over a period of time. For example, under the 3Si program in Bihar, the price of full toilets cost 300 dollars in the year 2013 and took a period of over 2 months to install. The reason for the low cost was the prefabricated roof and PVC doors instead of using conventional methods of construction and wooden doors. (USAID, 2018). The Community Hygiene Output-Based Aid (CHOBA) intervention in Cambodia extended help to the bottom 40 percent of the households by providing a 18 dollar subsidy on a toilet substructure priced at 55 dollars. The subsidy amount of US $18 per toilet was paid in the form of a supplier rebate to the sanitation enterprise. (Rivera et al. 2016). Apart from the costs estimates of single toilets or toilets substructure, there are estimates for national programs as Toubkiss, 2008 suggests that a review of sanitation suggests that approximately US $ 26 Billion are required to complete sanitation programs in Africa. At the community level the estimates suggest that on an average it took 4,60,000 (a range of 1,50,000 to 13,00,000) rupees to construct community toilets and 4,800 (550 to 15,700) rupees for the maintenance depending upon different configurations in the year 2008. (Water Aid, 2008).

III. OBJECTIVES AND METHODOLOGY

A relook on various existing models and their pros and cons will help in building policies for financing sanitation programme and will help in increasing access to sanitation. The objective of this study is to document and analyse various models of financing for sanitation projects. The paper will explore various existing model of financing infrastructure projects through secondary review of literature and will analyse the suitability of each model in Indian context. This paper adopted a model discussed by a paper by IRC (2011). This was a set of six criteria which was adopted to explore the suitability of sanitation financing for urban slums. In this paper we will adopt those criteria for evaluating the feasibility of sanitation financing models in India. The suggested indicators were

- Applicability
- Simplicity
- Sustainability
- Scalability
- Pro-poor
- Equity

IV. SANITATION FINANCING RESULTS

In countries like India, non-usage of toilets is considered to be a behavioural issues. Affordability is not a big issue given support from various government programmes and schemes· One of the key step in achieving the goal of open defecation free villages is to create awareness about advantages of using toilets. This will help in generating demand for sanitation services. Once the demand for the service is generate, we need to ensure affordable financing for construction, repair and upgrade of these toilets. In a study by Wateraid (2018) it was concluded that in Indian condition, the major issues in sanitation financing are: Need for improved data, transparency, disaggregation and reporting, Sustainability and equity of services and provisions for institutional strengthening and processes.

As far as the sources of finance are concerned there are private and public sources of finance which includes commercial banks, MFI's, alternative mechanisms like crowd funding etc. and public sources may include government budgets or intermediaries like development banks. These finances may be used by customers, enterprises, communities or government bodies. (Agarwal, et.al. 2018). If we take into account different models of sanitation financing, there are various models of sanitation financing according to the literature. North South Partnerships or NGO Model (Thom, 1997) is a hierarchy between the donors, the NGO's and the communities. This model has a flow of resources down to the community and required for the development of the community. Some of the models are also based on Public Private Partnerships (Plummer, 2002) to enforce the performance standards in low income and developing countries with weak public enterprise, private sectors join hand with public sector to develop and transfer. These types of partnerships can also be tri-sector partnerships where NGO's join hand with the Public-Private Partnership. (Jones, 2002). The value chain of sanitation financing also includes sanitation entrepreneurs which may be large scale industry players like cement and toilet component manufacturers or waste management firms and small scale operators like distributors, retailers, masons etc. (Heierli et al. 2004). Apart from private entrepreneurs, there are corporates which intervene through their CSR initiatives for example 90% of the corporates responded to the Government's call-to-action on WASH with at least one CSR intervention in WASH. (Parekh et.al. 2011).

A. Models of Sanitation Financing

Various models of sanitation financing are existing across world. The objective of this paper is to explore the suitability of models for Indian condition. The models can be categorised in two broad categories i.e. construction of toilets and maintenance of toilets. Various models identified under these two categories are as below

Various models of construction of toilets is presented in the figure 1.

Construction of toilets

- Community driven
- Public finance
- Private financing
- Partnership model

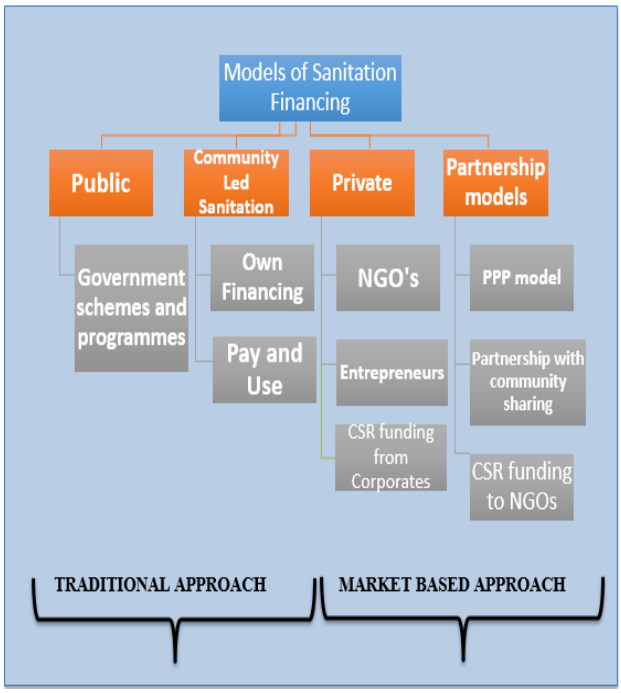

Figure 1 : Models of Sanitation Financing

B. Public Sector Schemes/Models

The government has various options to implement public sector models through subsidies, creating a demand through awareness, providing loans etc. We will discuss a few cases from the public sector and discuss the feasibility for a country like India.

Total Sanitation Campaign: Maharashtra (2000-2008)

This program was aimed to create an Open Defecation Free (ODF) and clean environment in rural villages, at household and institutional levels including schools, nursery and community areas (Trémolet et.al. 2011). The program was mainly demand led leaving a variety of choices among the customers. The government provided support for information, education and communication, capacity building and hygiene education (software support).

Financing Model

In recognition of household achievement, 7% of the total software sanitation cost will be paid to villages when they become complete defecation free (for Below Poverty Line households). Hardware subsidies will be paid once the village get ODF status and this will be subject to an upper limit of 24 dollars per household or 22 percent of hardware costs. Some commercial banks also offered credit facilities but this was not a part of the plan.

Plan Evaluation

38% of the targeted 21 million population gained the access to sanitation. Hardware costs amounted to US208$ with an operating cost of US4$ per year. Public funds were utilised in such a way that 50 toilets were built per US1000$ of public funds. The program was poverty targeting as it was based on the classification of income. 5-20% of error was observed in inclusion of poor and exclusion of non-poor. 9% of the total sanitation funds were utilised for the plan and plan was found affordable at state level.

What worked for the plan?

1) This program was mainly based of communication and motivation for the attitude change leading to household investment and improved hygiene.

2) The rewards were to be paid when villages achieved a 100% ODF status which led to a wide mobilization at village level.

What didn't work?

Sanitation Chain Stage				
Stage 1 (Containment of Excreta)	Stage 2 (collection and transport of excreta)	Stage 3 (Wastewater treatment of excreta)	Stage 4 (Disposal of human excreta)	Stage 5 (Productive use of human excreta)
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Feasibility Analysis		
Criteria	Yes/No	Reason
Applicability	No	The model is less relevant and applicable in the present context as providing mere subsidy won't be a wise idea for long term sanitation relevance
Simplicity	No	The model is less simple as there are a lot of financial calculations and ceilings for finance.
Sustainability	No	The model is not sustainable as it does not provide any long run operations and maintenance infrastructure in the sanitation chain.
Scalability	Yes	The model is definitely scalable as it cost only 9% of the state budget allocated to sanitation and was found to be affordable for the state
Pro-poor	No	The model is not pro-poor as there was no financing mechanism involved for the poor.
Equity	No	The model is not equitable as there was 10-20 percent error reported in the inclusion of poor.

1) Since the financial support was to be received after

the construction, many households had Problems in mobilising funds and even some MFI's were linked to the villages with high demand, only APL households were easily able to receive the credit.

2) Exclusion of 10-20% of BPL households created a concern about the equity of the scheme.

C. Community Managed Toilets: Tiruchirappalli (2000)

The history of community toilets in Tiruchirappalli can be dated back to 1970 but prior to the year 2000, the toilets were managed by the Tiruchirappalli City Corporation. These toilets managed by the corporation were free to use which caused financial losses. Post year 2000, Tiruchirappalli City Corporation began transferring these toilets to the communities. The problems with these community managed toilets is that most of them do not have hand washing facilities and most of the community managed toilets rely on bore-well for the water supply and have underground drainage or septic tanks attached.

Community Management Model

Often the only community managed toilets become dirty and unusable within a few years of construction. Once abandoned, these toilets can cause a sever health risk to the surrounding communities. Due to non-maintenance only a partial of the population uses these toilets and others practice open defecation.

Financial Model

For all the community managed toilets the only source of revenue is the fees collected from the users. Therefore, the factors of income include size of the community, the fees collected, the size of the toilet etc. For all CMTs, the only source of income is the fees collected from the users (Wateraid, 2008).

Average expenditure to run these communities managed toilets ranges from Rs.5000-Rs.10000. The expenditures might include payments to clean septic tanks, staff payments and operations and maintenance materials etc. These toilets save on the electricity costs as the corporation provides free electricity. Model Evaluation

What Worked?

1) These toilets were cheap to use and often provided a monthly family pass for around Rs. 15- 30.

2) The construction cost was taken care of by the corporation itself, so the community didn't have to invest in the construction.

What didn't work?

1) Most of the toilets had septic tanks which simply perform the function of holding. Often these tanks fill up quickly as these had washing and bathing facilities also. So emptying septic tanks become an overburden expenditure for these communities.

2) When the septic tanks fill up, often these communities managed toilets got closed. This caused the ODF village turning to Non ODF (Open defecation free), daily in some cases, this becomes a substantial expenditure for communities.

3) Many consumers refuse to pay the user charges or often pay less than what they are ought to.

Sanitation Chain Stage				
Stage 1 (Containment of Excreta)	Stage 2 (collection and transport of excreta)	Stage 3 (Wastewater treatment of excreta)	Stage 4 (Disposal of human excreta)	Stage 5 (Productive use of human excreta)
				

Feasibility Analysis		
Criteria	Yes/No	Reason
Applicability	No	The model is not applicable in the present scenario as it is not relevant in urban areas and often fails in the rural areas.
Simplicity	Yes	The model is fairly simple as it is just based on pay and use and the collected amount becomes the expenditure.
Sustainability	No	As most of the community led toilets become financially unsustainable within few years of construction. This model is less sustainable.
Scalability	No	Scaling up of this model depends upon the municipalities or the corporations which invest on the construction of these toilets, pay and use funds are not enough for scaling up.
Pro-poor	Yes	This model is pro-poor as monthly expenditures are as low as Rs.15- Rs.30 per family.
Equity	No	As we see that a significant number of consumers refuse to pay the charges, this model becomes less equitable.

D. Private Sector Models

There can be various models under the private sector where the private sector stakeholders like the NGO's, Corporates through CSR and sanitation entrepreneurs intervene through the funds available.

Sustainable Sanitation Solutions Intervention (3SI) program: Bihar (2012-2017)

The approaches towards the sanitation programs have always been traditional rather being innovative. The traditional approaches to the sanitation includes subsidies and government initiated programs. These programs are not

able to deliver a long lasting success as often these toilets are not able to meet different criteria post construction.

One of the better option to the traditional subsidised approach is the community led sanitation approach which aims to target the first step of the sanitation chain that is the change in behaviour. Community led approaches empower their target group to innovate their own solutions to become defecation free and to maintain these toilets. But different experiences suggest that the community led sanitation approaches work well in rural areas and not so well in urban areas as urban areas have dense population and limited space for sanitation management. So these areas required more specific and organised solutions and alone behavioural interventions won't be sufficient. One of the new approach to the sanitation intervention is the market based approach that acts upon the market inefficiencies that restrict behaviour changes. One of the market based approach is the 3SI or the Sustainable Sanitation Solutions Intervention, Bihar (Sievers, and Kelly, 2016). This approach focused on bringing new toilets within the range of 250 dollars to 350 dollars using the existing markets setup. This program was implemented by PSI (Population Services International, Deloitte Monitor Group, and Water for People and funded by the Bill and Melinda Gates Foundation. More than 1,90,000 households bought toilets with the help of this program.

The 3SI model- The implementation of the program was done by dividing the market in three parts or known as 'sweeps' in the model. Sweep one were the districts which were willing to purchase the toilets, so existing infrastructure could be used for intervention. Sweep two had districts in flood prone areas and required changes in the existing designs. Sweep 3 were the districts which were unable to pay for existing toilet options.

Financing Model of the 3SI program- As the product offered by the 3SI program fulfilled the requirements under the Indian government's Swachh Bharat Mission, the toilets constructed under the program were eligible for a subsidy of 200 dollars. Also more flexibility was provided in order to satisfy different pay levels of the consumers with different options like deeper pits, number of pits and slab materials. To activate the demand and increase the awareness of the program, PSI introduced Toilets Motivators to the program. These motivators received a commission of 1-3 dollars to sell the toilets. At the demand side the targeted customers didn't had enough funds to the toilet upfront and MFI were not willing to extend the loan to these customers as this is not an income generating activity. Also the presence of MFI is weak in Bihar. Therefore, PSI partnered with a fund manager, Friends of Women's World Banking India (FWWB), setting up a fund by underwriting part of default risk. Some loans were also provided by the MFI's to the Turnkey Solution Provider, a sanitation enterprise to provide all the components to construct the toilet. The role of credit as bridge finance was seen in 3Si intervention.

Program Evaluation

What worked?

1) The loans offered by MFI's were recovered with a 100 percent repayment rate. A total of 8.1 million US dollars were offered.

2) The inclusion of high income households in the program resulted in early adoption of the program.

3) The Cement Ring Manufacturers provided information to the households about government subsidies and to motivate them to purchase toilets. These manufacturers also joined the other connecting points to the customer like the masons, suppliers of raw material etc. and negotiated with relevant actors charging no commission in return.

What didn't work?

1) Initially PSI's felt that the TSP (Turnkey Solution Provider) model would be relevant and this model would make the buying process easier for the customers but this model didn't work as customers preferred the cement ring manufacturers as they were traditionally associated with the sanitation chain. Also as TSP stocked all the components, their prices were higher.

2) The sanitation infrastructure of pit emptying was not present in these districts as most of the entrepreneur have just one vehicle for emptying as banks perceive this industry to be highly risky and manually emptying of pits in banned by the government.

3) The districts which had access to suppliers of inputs within five kilometres were only targeted.

Sanitation Chain Stage				
Stage 1 (Containment of Excreta)	Stage 2 (collection and transport of excreta)	Stage 3 (Waste water treatment of excreta)	Stage 4 (Disposal of human excreta)	Stage 5 (Productive use of human excreta)
				

Feasibility Analysis		
Criteria	Yes/No	Reason
Applicability	Yes	As this model is based on the market conditions and offers market segmentation based on 'sweeps', this model is much more relevant.
Simplicity	Yes	This model is fairly simple as it is similar to a purchasing experience and as the actors in the value chain provide one stop solution, this models become simpler.
Sustainability	Yes	This model is sustainable as we have seen this model tries to activate the demand from consumer's side. So it is consumer's willingness to have and use the sanitation services.
Scalability	Yes	The model is definitely scalable but interventions from many more organisation is required to make this model scalable.

Pro-poor	Yes	This model is pro-poor as financing is available and due to segmentation, different products are provided at different price.
Equity	No	The Swachh Bharat Subsidy is not available for all households. So the final cost of the infrastructure might differ for each and every household.

E. Partnership model of sanitation financing

In today's context partnership model is becoming very popular. It helps in engagement of various stakeholders and help in attaining a more sustainable model.

NGO's Creating Sanitation Chain: Svadha, Odisha (2015)

In a report of Ministry of drinking water and sanitation of Government of India (2015) it was reported that Svadha Wash Private Limited is a NGO working in Odisha to provide high quality and affordable sanitation solutions to the BPL households.

Sanitation Model

Svadha follows a twin strategy model where on the one hand they directly procure all the sanitation material directly from national level manufacturers and on the other hand train micro entrepreneurs to target the households who are beyond the reach of traditional marketing channels. Before entering the market, Svadha does a Market Finance, Infrastructure, Institutions and Skillset (MFIIS) study to assess the market opportunity in a given administrative block. Svadha also encourages the SHG's to become micro entrepreneurs. These SHG's usually become one part of the sanitation supply rather than being a one stop provider. Impact of Svadha's program is measured through number of sales and income earned by the micro entrepreneurs.

Financing Model

Micro entrepreneurs earn their profit from two sources profits on the products sold and construction of toilets. To encourage the sales, micro entrepreneurs promote programs like Swacch Bharat Mission and organize other value chain actors like labour, documentation etc. Svadha also facilitates CSR funding for start-up entrepreneurs. Cash flows for Svadha works in a way where micro entrepreneurs order after receiving the order and the down payment from the customer. By following this, micro entrepreneurs can save the inventory cost, reduces cash flows and risks. However, as the demand increases the entrepreneurs face capital shortfalls. To fulfil the capital shortfall, Svadha offers a 30-day credit and also offers financial training.

Model Evaluation

What Worked?

1) Post toilet construction, Svadha provides toilet and pit maintenance solutions to its consumers.

2) The Research & Development team of Svadha identifies consumer preferences that will lead to better adoption of a toilet.

3) Increased choices provided by Svadha will lead to household toilets that consumers will actually use and maintain over time.

What Didn't Worked?

1) No linkage to banks/MFI's to provide loans.

2) The scalability of the model is a doubt as it is completely funded by a NGO.

Further, it need to be noted that maintenance of these sanitation infrastructure is another bigger challenge. Some of the models which can be adopted for managing these infrastructures sustainably are

- Charging per visit (per use)
- Monthly subscription
- maintenance contract to third party

Sanitation Chain Stage				
Stage 1 (Containment of Excreta)	Stage 2 (collection and transport of excreta)	Stage 3 (Wastewater treatment of excreta)	Stage 4 (Disposal of human excreta)	Stage 5 (Productive use of human excreta)
				

Feasibility Analysis		
Criteria	Yes /No	Reason
Applicability	Yes	This model is applicable as it tries to target the barriers which restrict sanitation adoption.
Simplicity	No	The model is not simple as it involves a lot of actors in the sanitation chain managed by a single NGO.
Sustainability	Yes	The model is sustainable as it creates sanitation entrepreneurs, start-ups which will ultimately become the part of the sanitation chain.
Scalability	Yes	The scalability of the model in other parts depends on the funds available with the NGO and market conditions.
Pro-poor	No	As there is no linkage to the MFI's, this program is not pro poor.
Equity	Yes	This model is equitable as it takes all the potential consumers into the account and treats them equally.

V. CONCLUSION

Sanitation financing requires huge investments. Government funding should increase in this sector for creation of infrastructure. However, attaining scale and sustainability will be a major challenge. This can be achieved through partnership between various stakeholders. It is equally important to explore some cheaper option of

construction of toilets for attaining the scale.

The study concludes that only construction of toilets will not be sufficient to meet the requirement of increased access to sanitation, rather, the focus should be on a full chain financing as maintenance of these created infrastructure will also be crucial for sustaining the impact of sanitation initiatives. Initiatives like *Swachh Bharat Abhiyan* is only a tip on iceberg in achieving the goals of sanitation and open defecation free India. It will require a more sustainable approach in the form of full chain financing for a larger impact on sanitation. Various models have been tried but most of them operate at one or two stages of the chain. A full cycle approach is still missing and a more holistic approach is needed for achieving this objective. Partnership between various stakeholders will play an important role in achieving this objective.

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VII. PROFILE

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