

Solid Waste Management System in Mudichur Gram Panchayat, Kancheepuram District, Tamil Nadu: A Model for Replication

Centre for Rural Infrastructure (CRI)
National Institute of Rural Development & Panchayati Raj (NIRD-PR)
Hyderabad – 500 030

Abstract

The domestic waste generated in rural households of India is increasingly becoming an issue of serious concern. The concern is domestic-refuse should be handled responsibly. Inconsiderate littering causes poor environmental sanitation resulting in unhealthy quality of living. In order to manage waste in a desirable way, there should be a functioning waste management system in place. Without a functioning waste collection and disposal system at the Panchayat level it is arbitrary to hold individual households responsible, or blame them of irresponsibility. The Government of India (GoI) as well as many state governments are looking up to Village Panchayats to come up with a system, which can be replicated, and spread across Indian states as a model for small-scale solid waste management. Interestingly, Mudichur Village Panchayat in Kancheepuram district, Tamil Nadu has such a model. It is functional for more than seven years now. This paper clarifies, what makes Mudichur click, while in many other Panchayats such models fade after a brief stint? And what lessons Mudichur can give for replicability in other parts of the country?

Key Words: Solid Waste Management, Success Story, Village Panchayat, Tamil Nadu

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The Changing Face of Rural India

The type of waste generated in Indian villages - about a score ago - was mostly of organic in nature, such as kitchen refuses, agricultural wastes, and cow dung. They were never considered as *household refuse or domestic refuse*, although there was no use for them inside a house. People had their own ways of composting them, for use as manure in their farms. In fact, the excess [compost domestic-refuse] used to be sold for money to farmers in need for their farm use. So, they were never considered 'waste'. They were used for rejuvenating the nutrients the soil might have lost due to erosion or repetitive farming. There was no concept of 'household waste management' especially in villages, until a decade ago. It was a concept applicable only to Indian towns and cities.

Waste generation is more to do with the culture of living i.e. it is to do with the way people choose to live in a society progressive like the Indian. Exposure to urban ways of living; consumerist culture introduced by TV commercials even in the villages, and the demonstrative styles of living people have increasingly come to adore, have multiplied the amount of waste generated even in villages¹. All these, necessarily, have made solid waste management as a subject of significance at Village Panchayat level as well. For almost a decade now, household solid waste management has become one of the serious issues to address in Indian villages. This is inevitable or inescapable when the economy of a country moves more in the direction of marketization.

Domestic Refuse in Rural Areas

The concern is domestic-refuse should be handled responsibly. Inconsiderate littering leads to poor environmental sanitation resulting in unhealthy living or poor quality of living which amount to retrograde in a society. *In order to manage waste in the desirable way, there should be a functional waste management system in place.* Without a functioning waste collection and disposal system at the Panchayat level it is unreasonable to hold individual households responsible, or blame them of irresponsibility.

It can be centralized system put in place by the state government; it can be a decentralized system to do with Village Panchayats at grassroots level; it can be a market-based or private sector based system; it can be a system primarily of the local bodies in association with some CBOs, or NGOs etc. Since rural sanitation in Indian context is in the purview of Village Panchayats, the government can play facilitator and can fund to whatever extent is feasible. But, the onus of putting a system in place to make it functional on a day-to-day basis is with the Village Panchayats – and rightly so. Therefore, the Government of India (GoI) as well as many state governments are looking up to Village Panchayats to come up with such a system (a model), which can be replicated, and spread across Indian states as a model for domestic refuse management in Village Panchayats.

Considering the heterogeneity of the nature of Indian villages, one model to become applicable in all conditions and situations is most unlikely to emerge. Therefore, what we can look forward to is, *a sensible model to work with, alter and improvise*. This one model that is proposed must be from practical experience of not less than a period of five years. Interestingly, Mudichur Village Panchayat in Kancheepuram district, Tamil Nadu has such a model. Mudichur has been successfully implementing a household solid waste management system since 2007. It has evolved over the years, and since 2010-11 it is reported to be operational in a successful way.

- What constitutes Mudichur Model?
- How is this model being implemented in a sustainable manner?
- What makes it tick, while in many other places such models fade after a brief stint?
- What lessons Mudichur can give for replicability in other parts of the country?

This is the purpose of this paper, in brief. The Profile of Mudichur village is given in Box – 1.

Scenario Prior to this Initiative

Mudichur being very close to Chennai, the influence of city culture of keeping one's house clean, and remaining unconcerned of the filth on the street in front was common. *Litter anywhere irresponsibly and accuse the neighbors of their irresponsibility was the culture*. The massive campaign run by the state government to stop open defecation, made the

Panchayat functionaries to work towards making the Panchayat open defecation free (ODF). Mudichur Panchayat got Nirmal Gram Award in the year 2007 for facilitating every one of the household to own and use individual household latrines (IHHL). Cent per cent toilet coverage was achieved. A niggling doubt that aroused in the mind of the Panchayat President at the time of receiving the award was: *‘does being ODF mean clean village at all - before addressing the issue of domestic waste being thrown around in all corners of the village is addressed sufficiently?’*

Box – 1 Profile of Mudichur Village Panchayat, Tamil Nadu

Mudichur is in St Thomas Mount Block in Kancheepuram district of Tamil Nadu. This is close to Chennai (about 37 km) towards south. Total population is 15,000 (2011), and number of households is 5326 (2012). There are 12 wards and 209 streets and lanes. There are more than 520 shops. The Village Panchayat president is a business person, and he comes from the tradition of his father, and sister-in-law being former Panchayat Presidents of Mudichur. From the type of conversations he generates one can understand his commitment to the village he was born in, and the vision he has for the village. That he is apolitical stands as an advantage because he has no hesitation to move anyone for any good thing for the village – be it a government staff or NGO or politician. He is supported by a team of committed local youth. The Panchayat Secretary - being an MBA degree holder - is equally active too. The Panchayat functionaries of Mudichur with the support of the district administration and an NGO called Hand-in-Hand, have made a solid waste management system functional uninterruptedly for more than five years now.

Issues and Challenges

When the Panchayat decided that something solid must be done to manage the domestic refuse, Hand-in-Hand (an NGO from Kancheepuram primarily known for micro credit, and micro finance activities) pitched in for help. But initially Hand-in-Hand had to grapple with several problems due to unawareness of the people, and the casual attitude of *‘why ponder over a non-existent problem, i.e. they found no problem with the existing practice of throwing garbage in vacant places and street corners’*. People found no problem throwing domestic wastes in street corners and vacant places. They had got used to the habit of getting

‘garbage out’ – rid garbage out – out of my kitchen – out of my house. That’s all. That’s considered the end of it. It’s for the Panchayats (or the stray dogs!) to take care of them once it’s out on the streets. That was the wide spread attitude and customary practice.

The two major challenges that the Village Panchayat and Hand-in-Hand faced were:

- (i) awakening the people from their slumber to make them see the problems of inconsiderate throwing of domestic waste at street corners;
- (ii) putting in place a *domestic waste collection and disposal system*, and aligning people’s attitude to fall in line with the arrangement so that the practice becomes regular and the system becomes functional.

Strategies Adopted

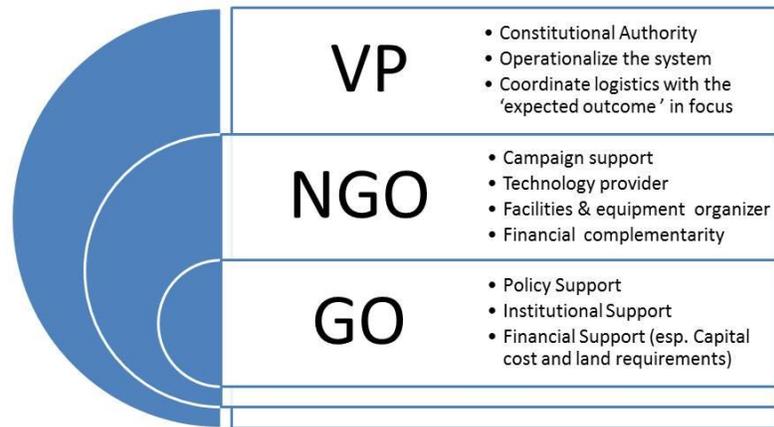
Incidentally, the Additional Collector, DRDA Kancheepuram called for a meeting of an array of stakeholders - including Panchayat functionaries and NGOs - to discuss about solid waste management in villages. This supportive signal from the state government gave the impetus for Hand-in-Hand to confidently lend a helping hand to Mudichur Panchayat to develop a solid waste management system. Thus Mudichur Panchayat took Hand-in-Hand and the DRDA into partnership to create a solid waste management system. This partnership model is presented as a figure – 1.

Figure – 1: Mudichur Model



For any system to become functional there must be an operational structure (i.e. institutional set up) that implements the plans and programmes envisaged through a policy. Figure – 2 briefly puts across the institutional partnership and the role each institution played in creating a ‘solid waste management system’ at the grassroots level in Mudichur Panchayat.

Figure – 2: The Institutional Partnership and their roles

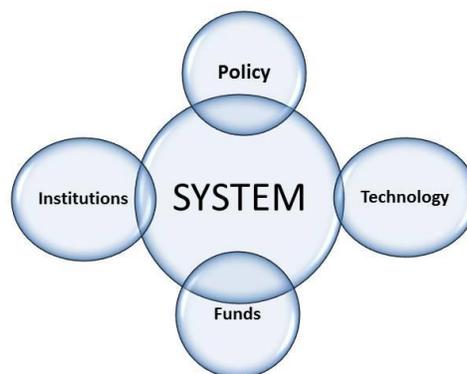


What constitutes Mudichur model (what elements went into making this model) can be explained as follows.

- **POLICY:** There is clear policy goal. That is to establish a waste collection, transport, and treatment and disposal system within the Panchayat. The waste collected should be segregated into biodegradable and non-biodegradable wastes at the source itself. The biodegradable wastes go into making *biocompost* and *vermicompost*, while the other types of wastes are sold to recyclers or sent to landfill as the case may be. Thus, keep the village clean; and considerably reduce the amount of waste that ends up in the land fill. This is the policy.
- **TECHNOLOGY:** Hand-in-Hand brings in the treatment technologies, other equipment and tools required for daily collection and treatment; the government machinery has given the required land to construct a treatment plant and the capital cost that was required to construct the vermin-compost bed, shed etc.

- INSTITUTIONS:** As shown in Figure -1 above it was a tri-patriate partnership among the Village Panchayat, DRDA, Kancheepuram and Hand-in-Hand. These institutions, they have their clear cut roles to play, as presented in Figure -2. The Panchayat has ensured community cooperation and support, and has approved in the Gram Sabha for the entire operation to get grounded, besides supporting Hand-in-Hand to make the model functional by implementing the arrangement on a day to day basis. Hand-in-Hand has recruited and trained a team of youth, locally known as Green Friends (GF), who do the entire operation - starting from collection at the doorsteps of households to secondary segregation to composting to sending the non-biodegradable to the landfill.
- FUNDS:** The funds for operation are brought in through user fees – initially fixed at Rs.20 pm per household (pmph), later revised to Rs.30 pmph and currently it stands at Rs.50 pmph. The Green Friends are paid a monthly salary of Rs.4500 – Rs.6000. This is paid partly from the user fees collected and partly from the funds made available by Hand-in-hand. As an incentive the GFs are allowed to take away and sell recyclable wastes such as bottles, plastics, iron pieces etc. The maintenance of equipments and tools such as tricycles used for collection, and tools such as broomsticks are met out of the sale proceeds of vermin-compost.

Figure – 3: What Constitutes Mudichur Model?



As a connective summary, what constitutes Mudiuchur Model can be presented as given in Figure – 3 above. There are aspects like: technical management, financial management and institutional management of the system. Putting them together and making it functional is done with the efforts of the Panchayat and active support by this NGO – Hand-in-Hand. That they have been able to sustain it for more than 5 years from the year 2010 makes it out of the ordinary, and appealing to study it for replication. Before, we take a look at the financial sustainability arrangement it will be in order, if we come to know the steps involved in implementation the whole thing.

Steps Involved in the Process of Implementation

- 1) **Awareness Campaigns:** Preparing the households (i.e. the community) to understand, appreciate and agree to go with the arrangement was thought the first and foremost thing to be done. *A series of awareness campaigns* were organized in all the streets of the Panchayat to nail this arrangement in the mind of the local community. It included stakeholder meeting; mass awareness campaigns; door-to-door campaign; auto-rickshaw campaign; Tri-cycle campaign; special campaigns for SHGs, youth, school teachers and school children; campaigns at temple entrance; liter picking campaign; mass cleaning campaigns and so on.
- 2) **Appoint and Train Green Friends:** Recruitment and training of Green Friends on various aspects of waste collection, segregation, treatment etc. They have also been ingrained about sanitation as part of preventive health care in a community. Their job as Green Friends was described to them during the training. Each Green friend is provided with two sets of uniforms, one cap, Footwear, ID card, a whistle, a pair of gloves, raincoat, and soap. They also undergo periodical health check to guard themselves against any possible personal infliction.
- 3) **Get Started in a Small way:** It was started only in 4 of the 12 wards to start with, for two reasons. One was to learn from experience and gain confidence from practice in order to be able to expand it further to the entire Panchayat; and the other reason was the facilities the Panchayat and Hand-in-Hand could mobilise at that point of time was considered inadequate to cover all two hundred and odd streets in the Panchayat.

- 4) **Segregation at Household Level:** Each household has been provided with two garbage bins – green one for kitchen wastes, and red one for other types of wastes. About 70 – 75 per cent of the households are reported to be giving waste segregated at household level. Yet, for the remaining busy people the GFs do the segregation themselves.
- 5) **Secondary Segregation:** Whatever awareness and education community members are given, there are households that mix-up wastes. Necessarily, the GFs have to do a secondary segregation for which the Panchayat has allotted a small piece of land. In order to reduce the time spent on secondary segregation, the GFs while receiving waste from households, segregate waste at their door steps, which also helps gradually to educate the people on waste segregation. The GFs have been trained in thorough combing of wastes for bottles, plastics, papers, cardboards, iron pieces, batteries degradable waste etc. during secondary segregation. This stage helps a clear-cut segregation to take place so that what should go to land fill does not get into vermin-compost beds, which might upset the process.
- 6) **Waste Processing:** Bio-composting and vermin-composting are the two processing activities done. The rest of the unusable garbage ends up in the landfill, after shifting for recyclables. Discussing the biochemical technicalities involved in composting is beyond the scope of this paper. However, the physical facilities needed for setting up a ‘waste processing shed’ is presented in Box – 2.
- 7) **User Fees Collection:** Those households that who wish to pay user charges at the Panchayat Office can pay. The GFs have also been authorized to collect user fees at door steps, issue a receipt, and remit the amount collected at the Panchayat the same day.
- 8) **Expand the facilities and the Coverage:** The Panchayat functionaries with the support of Hand-in-Hand started implementing this model in 2007 in a small way in 4 wards. People in other uncovered streets started urging the Panchayat President to expand coverage to their streets as well, volunteering to pay the monthly user fees regularly. In 2010-11 facilities were expanded with a new shed constructed in a place provided by the government, and the whole operation was expanded to cover all the

12 wards of the Panchayat. Since, then Mudichur keeps getting visitors (development tourists) to learn from this model.

9) **Review Meeting for GFs:** There is monthly review meeting conducted for the GFs to air their views for making the system function better, and also to express the difficulties, if any, they face. The Panchayat and Hand-in-Hand together address the issues raised by GFs so that the system sustains, and goes on.

10) **Feedback from Households:** The GFs carry a Register for the households to put down community views on the system, as well as to provide for lodging complaints, if any. This Register is reviewed during monthly review meeting of GFs.

Box – 2: The Physical Facilities Required for Compost Park

- Land to construct the segregation shed plus composting yard or the vermi-beds
- Setting up a compost shed / segregation yard
- Containers for households – 2 per household
- Tri-cycles for every 300 households – 1
- Green Friends for every 300 households – 2
- Uniforms, tools and equipment (broom sticks, bins, tin, sheets etc.)

The institutional arrangement looks well-built to sustain the system given the strong Panchayat in place with a gifted leader. Yet, there are other questions that remain to be answered, for instance:

- (i) How about the financial sustainability of the system?
- (ii) Given the situation now, does it financially breakeven with the user fees collected and from the sale proceeds of the vermin-compost?

These are some of the questions that linger in the mind of an enthusiast who tries to recommend this model for replication.

Does the Income Breakeven? To our question ‘*on the adequacy of income generated through user fees plus sale proceeds of vermi-compost to be able to meet the expenditure incurred on the operational expenses*’, the reply from the Panchayat President, Mudichur was an unequivocal: ‘*NO*’ *Not sufficient at all*. As such, the Panchayat is not able to breakeven, given the income sources and the items of expenditure, they have to meet out.

Box – 3: Income and Expenditure for a Solid Waste Management Project (It is worked out assuming that this project is for 300 Households)	
Items of Expenditure	Possible Income Sources
A. <i>One-time Expenditure (Capital Cost)</i>	1. User fees
1. Containers (600 numbers)	2. Sale of compost items
2. Tricycles - 3	3. Sales of recyclables
3. Compost pit, segregation shed	4. Fine and penalties
4. Uniforms + accessories	
5. Tools & equipment	
B. <i>Recurring Expenditure (Operational)</i>	
1. Supervisor Salary	
2. Sanitary Workers Salary (Green Friends)	
3. Consumables / bleaching powder	
4. Repair and maintenance	

In the case of Mudichur, the funds required for the construction and purchase of tri-cycle, equipment and tools are provided as ‘capital cost’ through a project from the state government, and partly met out by Hand-in-Hand (NGO). The Panchayat President puts it categorically that it is impossible to meet the operational expenses i.e. the expenditure to meet the day to day running of the system, out of the income earned locally. Besides, this there are other expenses like awareness creation campaigns, uniform and salaries to the Green Friends, tri-cycle maintenance etc. All these cannot be met out of the local income generated as user fees, and from the sale of compost. He holds a view that the expression ‘*wealth from waste*’ especially in rural context is only a made-up humbug. The one who implements realizes that they are only motivational phrases used in training programmes with little truth in it. If one calculated the items of expenditure and sources of income to meet the expenses’ one can understand why many solid waste management projects fail.

If one can *figure out a sustainable source of fund for meeting out the operational expenses month after month*, one can be confident of being successful in running a solid waste management project. Finding funds for meeting out the *capital cost requirement* (i.e. non-recurrent one-time investment) must be possible either through a government programme, or as one-time grant from an NGO or INGO. But, daily operation and sustainability depends on being able to meet the operational expenses daily. This is a matter for serious consideration.

Sustainability Plan: From the foregoing statements of the Panchayat President, Mudichur, one tends to ask: *then how are they are being successful?* In fact, this is a pertinent question. The success of Mudichur must be put across in two stages.

- **Stage - 1:** Hand-in-Hand (NGO) has been bearing the *operational expenses* of the solid waste management system in Mudichur bearing a monthly expenditure of nearly Rs.40000 through a special project. Sustainability of this arrangement was a matter of concern for quite a few months, until they found a way out.
- **Stage - 2:** It was decided that the system must be made self-sustaining, and some strategy must be devised towards that. They noticed that community members depend on private water suppliers for drinking water. In 2011, it was decided that Hand-in-Hand shall financially support Mudichur Panchayat to install a Reverse Osmosis Plant (RO Plant with a capacity of 4000 litre per hour) for drinking water supply under Hand-in-Hand Inclusive Development Services (HHIDS). The understanding was HHIDS will work with Mudichur Panchayat to:
 - Provide the residents of Mudichur Panchayat with potable water conforming to WHO and BIS standards.
 - Provide packaged drinking water to local shops and marriage halls at half the existing market prices.
 - Support the Solid Waste Management Project at Mudichur with the revenues earned out of the Project.
 - HHIDS will operate and run the plant for a period of 4 years to recover the investment made over the plant before handing over the plant and its operation to the Panchayat.
 - Hand-in-Hand is running the plant successfully now through their network of local SHG women. Rs.3.3 million invested in the RO Plant (including construction of an open well of 30 feet depth and 30 feet diameter) is treated as SHG loan.
 - The RO Plant, the open well and vermi-compost shed are all in 2 acres of land given to the Panchayat by the government. The HHIDS sells a 20 litre water

can at Rs.11 to SHGs. The SHGs are allowed to sell it for an MRP of Rs.15 to households in Mudichur. On an average 800 cans are sold daily.

- This arrangement has made local SHG women also to earn an income out of this operation. This can be considered as a social enterprise.
- As of now (March 2015), there are one and a half years left for the HHIDS to recover the investment they made on the plant. After one and a half years, HHIDS shall hand over the plant to the Village Panchayat.
- The plant is functional successfully, and the income from water sale is used to make up for the loss incurred in solid waste management plant. This is the financial sustainability strategy that Mudichur Panchayat has devised and is implementing successfully.

Lessons from Mudichur for replicability in other parts of the country

For solid waste management, there is no dearth of technologies. What is required is a functional management system (model), which in Mudichur they have developed one. They are implementing it meticulously that it has become regular, making us call it ‘a system’. The Panchayat President, Mudichur with the help of a team of youth (and appointed Green Friends) is managing household waste admirablyⁱⁱ. Certainly, the role of Hand-in-Hand (NGO) in making this system functional deserves to be appreciated as well. The challenges presented here, along with the factors that have contributed to the success of Mudichur Model, could be taken as a lesson for those who wish to replicate Mudichur Model. Mudichur model has several ideas and precautions for any Panchayat that wants to replicate. In replication, the following points deserve to be emphatic.

- **Systemic Thinking:** Measures to be taken in advance to avert possible failures and to secure good results are an imperative in a solid waste management project. The normal way of thinking about solid waste management are (Failure Model - 1) place dustbins at certain distance, and forget about it. It overflows and takes a run-off extending the area under garbage; (Failure Model - 2) collect, transport and dispose – dispose irresponsibly at the outskirts. On the contrary, in Mudichur, they have created a system taking into account the logistic aspects, technological aspects,

financial aspects, and they have roped in the support of external support agencies where required. This systemic thinking makes the difference, and this has made Mudichur Panchayat President stand tall amid a crowdⁱⁱⁱ.

- **System Sustainability:** The experience of Mudichur puts it fairly clearly that finding the sources of income for meeting out the ‘operational expenses’ (day-to-day running expenses) month after month, determines the real system sustainability. Without a clear-cut idea of sources of income to meet the operational expenses, investing in non-recurrent expenses such as dustbins and tri-cycles do not augur well. Such a case shall help write only a failure story very soon. This is a caution, one should make note of.
- **Social Enterprise Model:** In order to meet out the expenditure involved in managing the solid waste management system, the source of income from user fees collected plus sale of compost etc. were found to be insufficient. This did not deter them. They have thought out of the box to come up with sensible solution, instead of being on the same sludge grumbling about the impossibility. The excess income earned out of RO Plant through sale of drinking water is used to make up the loss incurred in running the solid waste management system for the same community. It is win-win in terms of both drinking water supply and environmental sanitation in a given community.

Conclusion

For solid waste management, there is no dearth of technologies. What is required is a functional management system (model), which in Mudichur they have developed one. They are implementing it meticulously that it has become regular, making us call it ‘a system’. The Panchayat President, Mudichur with the help of a team of youth (and appointed Green Friends) is managing household waste admirably. Certainly, the role of Hand-in-Hand (NGO) in making this system functional deserves to be acknowledged.

Measures to be taken in advance to avert possible failures and to secure good results are an imperative in a solid waste management project. One surmise from Mudichur’s success is, failure of many of the solid waste management projects is, perhaps, not due to technology

failure. Rather, it is due to 'poorly planned management system' - included in this are: logistics planning, manpower planning, operational planning, and financial planning and so on. Inappropriately, we have been barking at a wrong tree, meaning someone comes with vermin-composting solution, another person comes with bio-gas plant from waste, and so on. In the absence of a local management system solid waste management is solidly a waste of time only. Mudichur model has several ideas and precautions for any Panchayat that wants to replicate. It may not be suitable in all socio-cultural and economic contexts. Sure enough, the system is flawless. Mudichur Panchayat has a lot of instructions and guidance to build a functioning solid waste management system.

NOTES

ⁱ Consumption expenditure of households is one of the conventional indicators of development. Higher the consumption better is the standard of living. A corollary to this is higher the consumption, higher is the waste generated. In such a case, addressing the issue of 'waste' becomes an issue, and whose responsibility is it to address becomes an issue as well.

ⁱⁱ Another extraordinary thing about Mudichur was that this Sarpanch (Mr Dhamodharan) has a marvelous collection of photographs of *development trends* in Mudichur since 1940s. He has made a wonderful album arranging those photos in chronological order. It shows developmental path this village has taken - the trends, contrasts etc. It is captivating and educational as well. It's a marvelous documentation of rural development.

ⁱⁱⁱ When every Panchayat was talking about 100 coverage of toilets, Mudichur completed 100% coverage of toilets and moved towards solid waste management; when everybody moved working for managing solid waste, we find Mudichur already has a system for solid waste management in place, and is moving towards full use of e-governance at the grassroots level. Mudichur is being extraordinary by being a step ahead - always. Surely enough, leadership matters.

Acknowledgements

The authors gratefully acknowledge the cooperation extended by Mudichur Village Panchayat President, Panchayat Secretary; and the Hand-in-Hand (NGO) officials during our visit and interaction with them. They were generous enough to readily provide all information they could possibly share with us for the purpose of preparing this paper. This is condensed version of a paper prepared for presentation in a National Workshop on 'Small-scale Solid and Liquid Waste Management' to be held at NIRD-PR in the last week of April 2015.

Authors

P SivaRam

Professor & Head

&

R Ramesh

Assistant Professor

Centre for Rural Infrastructure (CRI)

National Institute of Rural Development & Panchayati Raj (NIRD-PR)

Hyderabad – 500 030

The authors can be contacted at polankis@gmail.com, ramesh.gri@gmail.com