

**SUSTAINABLE WASTE MANAGEMENT & RESOURCE  
RECOVERY FOR CLEAN AND HEALTHY VILLAGES  
(VICHOOR PANCHAYAT)**

**CSR Project Funded by  
India Additives Ltd. (IAL), Chennai  
Phase-I & II**

**Executed by  
IIT Madras**



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## EXECUTIVE SUMMARY

Vichoor Panchayat was selected by the Indian Additives Limited (IAL) for implementing their CSR project “Sustainable Waste Management and Resource Recovery for Clean and Healthy Villages”. The overarching goal of this initiative was to provide sustainable solutions for wastewater management and rain water harvesting, demonstrate resource recovery from waste to the maximum extent possible, and thus make the village clean and healthy. In addition, efforts were made to involve the community during the process in order to make the system sustainable after it is transferred to the people. Meticulous planning and execution by the teams from IIT Madras (IITM) and the cooperation by the Vichoor panchayat officials is helping in running the system successfully and smoothly. In Phase-I, the project was implemented in Ezhil Nagar village in Vichoor panchayat and benefited 300 households. Based on the successful implementation of the project during Phase-I, it was extended in Phase-II to cover 8 more villages: (i) Ganapathy Nagar, (ii) Sriram Nagar, (iii) Lakshmi Nagar, (iv) Velavan Nagar, (v) Sivakumar Nagar, (vi) Srinivasa Nagar, (vii) Subramanya Nagar and (viii) Angallamman Nagar of Vichoor panchayat. Phase-II of the project benefited a total of 530 households.

The project was initiated in May 2015 after conducting pre-feasibility studies in Ezhil Nagar, Vichoor panchayat. Quantity and the characteristics of the waste generated were studied first in order to design and implement appropriate treatment of the solid and liquid waste. IIT Madras team (i) conducted awareness programs for proper solid waste management practice, (ii) restored the lake and (iii) organized mass cleaning of the village so that the community not only becomes aware of proper solid waste management and importance of hygiene to maintaining good public health but also feels that they are an important part of the whole project. A change in their mindset has helped a lot towards the success of the project. The solid waste management chain starts with source segregation. The source segregation (at households) is ensured using a two-bin system (blue bin for dry waste and green bin for wet waste) followed by door-to-door collection. Sanitary workers collect the segregated wastes and do primary segregation in the tricycles. The secondary segregation occurs at the compost yard wherein dry waste is further segregated into plastics, paper, cardboards, glass etc. The organic waste is composted. The adapted composting technology was developed and refined (to obtain a high quality compost) by Dr. Anu Rachel as part of her doctoral thesis work under the guidance of Prof. Ligy Philip. The sanitary workers were fully trained by the IIT Team to carry out segregation and composting operation. Regular monitoring of the compost operation produces excellent quality compost which meets all the national as well as the international standards. Revenue is generated by selling (i) the segregated dry waste having high recyclable potential and (ii) the organic compost in the nearby markets.

Other major component of the project was to prevent pollution of the environment by wastewater and consequent unhygienic conditions. This was achieved by treating the wastewater coming out of the households before it is discharged into the surroundings. For this purpose, a small-bore system was designed and

implemented. This system collects wastewater from each household, transports it to a centralized location and then treats it using a natural system, known as constructed wetlands. The design of constructed wet lands was based on the work carried out by two doctoral students: Dr. C. Ramrasad and Mr. Manthiram Karthik, under the guidance of Prof. Ligy Philip. The small-bore system was initially implemented in Ezhil Nagar during the Phase - I of the project. This was later extended to other eight villages during the Phase - II. The treated water can be re-used as well as stored in the nearby existing lake (waterbodies) for consumption during drought periods. Samples from treatment units are collected frequently and analyzed for quality parameters to ensure the treatment efficiency and the discharge standards.

The project also provided storm water drainage to the community in Ezhil Nagar during Phase – I of the project. The drainage system collects the storm water and stores it in the lake that was rejuvenated as part of the present project. IIT Madras team had undertaken several support activities during the great Chennai floods of 2015 and the Corona Pandemic of 2020-2021 to be there for the community and help them out of trying times. IIT Madras team had provided relief materials during the floods and sanitary material during the pandemic. Awareness programs earlier conducted by the IIT Madras team had helped the community to fight the pandemic in an effective way. Various strategies were adopted during the time and all measures emphasized on the effective functioning of the project for the betterment of the village.

The IITM team has developed a plan for sustainable operation and self-sustenance of the project. The revenue obtained from the sale of compost and the inorganics can meet the operation and maintenance expenses of the project. However, to support the sanitary workers for the smooth functioning of the project, it is essential to collect a solid waste collection fee from each household. This fee not only pays for the salaries of the sanitation workers, who are drawn from the community itself but also will give a sense of ownership to the community, which will help better maintenance of the system. IIT Madras had conducted community meetings, with participation of village elders and elected representatives, to explain the concept and got their general approval. The plan was also officially communicated to the District level Government officials and their official approval was obtained.

Starting from May 2015 till date, the project has been successfully ongoing in Vichoor Panchayat. The awareness about proper solid waste management practice in these villages not only enlightened households to segregate the waste but also the Panchayat is ready to undertake and train the other wards of the Panchayat to achieve proper solid waste management. The sanitary workers have been well-trained for the execution of proper waste and wastewater management practice in the villages. The small-bore systems (for wastewater collection) and natural treatment systems are working fine. The solid waste segregation using bin systems, collection using tricycles, organic waste treatment through composting and recovery of recyclable inorganics are operating well.

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# **CHAPTER 1**

## **INTRODUCTION**

### **1.1 GENERAL**

Developing countries have been experiencing rapid population increase and economic development over the last several decades, a trend that has led to an unprecedented increase in solid waste generation. Rural household solid waste includes wet waste (leftovers, vegetable waste, meat waste etc.) and dry waste (paper, plastic bottles, metal, cloth, plastic bags, glass, metal etc.). Most commonly practiced solid waste disposal methods in rural area in India include burning and dumping in open areas without any treatment and landfilling. Disposal of large quantity of untreated solid waste to the environment leads to significant greenhouse gases emission, contamination of water sources and serious health threats. Similarly wastewater from households is either used in the gardens or discharge into open spaces without any treatment. Rapid growth of solid and liquid waste generation in rural areas of developing countries has led to rapid deterioration of rural environmental quality. Therefore, there is a pressing need to treat the solid and liquid waste before disposal in order to prevent the environmental deterioration, improve cleanliness, hygiene and public health in rural areas.

### **1.2 NEED OF THE PROJECT**

Hygiene and sanitation are very closely related to human health and well-being. Therefore, a lot of attention is being paid to waste management, sanitation and hygiene in India, through Swatch Bharath Mission initiated and being carried out by the Government of India. These activities need to be supported by citizens and corporate sector through their corporate responsibility funds. There is an urgent need for improving the hygiene and sanitation conditions through sustainable waste management practices. Though there is a misconception that waste is a problem, actually waste can be viewed as a resource. Through innovative and sustainable waste management, one can improve the hygiene and sanitation conditions and there by improve the health. One can also generate revenue through the recovered resources. Hence, this CSR project being funded by the India Additives Limited (IAL), Chennai, in line with the Swatch Bharath Campaign of the Government of India and the Sustainable Development Goals (SDGs) defined by the United Nations, aimed at implementing a circular economy concept rather than the linear approach for waste management. A circular economy is an economic system aimed at eliminating waste and the continual use of resources. Circular systems employ reuse and recycling to create a closed-loop system, minimizing the use of resource inputs and the creation of waste, pollution and carbon emissions which usually occurs through linear approach.

### **1.3 OBJECTIVE**

The main objective of the proposed project was to develop sustainable waste management and resource recovery practice for a clean and healthy village

### **1.4 SCOPE OF THE PROJECT**

The project focused on strategies for effective waste and wastewater management in the adopted villages and the scope of the work included the following:

- To implement Integrated Municipal Solid Waste Management that includes collection, segregation, transportation, reduction and reuse of waste.
- To demonstrate complete resource recovery from inorganic waste (through reuse and recycling of waste, etc.) and organic waste (composting) by involving locally trained manpower.
- To study the status of environmental pollution by wastewater, identify suitable solutions for collection, treatment & reuse of waste water .
- To identify the status of water bodies, rejuvenate them if needed and use them for storing storm water / treated waste water in order to solve the water scarcity problem during droughts.
- To make a plan for self-sustaining of the operation & maintenance of the system, post the creation of infrastructure using the CSR funds.

## CHAPTER 2

### PROJECT ACTIVITIES DURING PHASE - I

#### 2.1 INTRODUCTION

Vichoor (Panchayat) is a developing residential area in North of Chennai, the capital of Tamil Nadu. Ezhil Nagar is a part of Vichoor Panchayat and was chosen for implementing the project during Phase – I. Ezhil Nagar consists of 12 streets with 300 concrete houses. The aim of the CSR initiative was to demonstrate maximum resource recovery from waste, provide solutions for clean water in all possible forms and during the process, involve the community and thus make the system sustainable. The project is being run successfully and smoothly by the teams from IITM, with cooperation from Vichoor panchayat officials. Project activities that were undertaken during the period from May 2015 to December-2018 are described in this chapter.

#### 2.2 PRELIMINARY FIELD VISITS

Two preliminary field visits were undertaken by the IIT Madras Team [Photo-2.1]. The purpose of these field visits was to:

1. Establish rapport with Panchayat officials, which is crucial for the successful implementation of the project,
2. Identify, with the help of Panchayat officials, the village (within Vichoor Panchayat) where the activities would be initiated and focused and
3. Get information for planning of the activities for the following one year.



**Photo-2.1: Field Trip to Vichoor**

- First field visit was undertaken by Prof. Ligy Philip and Prof. B.S. Murthy, along with the officials of IAL on May 8<sup>th</sup>, 2015. The second visit was on May 19<sup>th</sup> 2015. Project associates from IIT Madras and

new staff recruited for this project who have experience in waste management, were also part of the team during the second visit.

- During the first visit, the team met the then President of Vichoor Panchayat and also the secretary of Panchayat. The purpose of the visit and the importance of the project in improving the quality of life in their Panchayat were explained to them. Both the Panchayat President and the Secretary were very encouraging, cooperative and assured their help in implementing the project. The panchayat consists of nine wards. It was explained to the team that the Panchayat consists of two parts: the old panchayat part and the newly added part (Ward 9), comprising of 17 Nagars. These 17 nagars are close to the Chennai – Ponneri highway and so are easily accessible. Busses ply directly from Broadway to this place, with good frequency (once in half an hour). Moreover, this is the only part of the Panchayat which has 100% toilet coverage
- It was brought to the notice of the visiting team that construction of toilets in the old Panchayat part has not been completed yet and open defecation is being practiced. Total population of the nagars is 5000, and most of the households in that locality have toilets.
- Panchayat President suggested that the project be initiated in the area comprising the 17 nagars. The team then visited these 17 nagars during both the trips. Panchayat President accompanied the team during the first visit to 17 nagars, while the Panchayat Secretary accompanied the team during the second visit.
- Panchayat president informed the team that drinking water is supplied from a groundwater source located near the Vichoor village (5 km away). Water is pumped from the ground and transported through pipelines to overhead tanks located near the 17 nagars. Water is then supplied by gravity from these overhead tanks. Street taps are provided for public consumption, and individual house hold connections are also given. Drinking water is supplied twice a day. Residents have their own wells, from which water is drawn for purposes other than drinking.
- Following important observations were made during these trips: (i) There is no underground drainage (UGD) system and all the toilets are provided with septic tanks and (ii) there is no proper surface drainage system to carry either the effluent from septic tanks or the other domestic waste water domestic or the storm water [Photo-2.2]. The groundwater table was only about 10 to 15 m below ground level.



**Photo-2.2: Wastewater being let out into open**

- Panchayat has initiated some action regarding the solid waste management. They have provided public collection bins. They are also attempting to collect the waste from households, and encourage them to do source segregation. These attempts appear to be not so successful, as indicated by the spread of solid waste in public areas [Photo-2.3 and Photo-2.4].



**Photo-2.3: Solid waste collection bins**



**Photo-2.4: Solid waste thrown in public place**

This solid waste was either let to remain there or burnt once in a while. There were plans for starting composting and a DPR had been submitted to the Government of Tamilnadu. The team then met AEE, Rural Development Department. He informed that Vichoor Panchayat had not been selected t for grants from the Government.

- The team also visited the **Rajameri eri** (large water body) located close to the 17 nagars. Excess water from this eri goes to Kostaliyar through a canal. This eri is highly polluted. In fact, tall grass is growing in most part of the eri, and the team could not discern the water body [Photo-2.5].



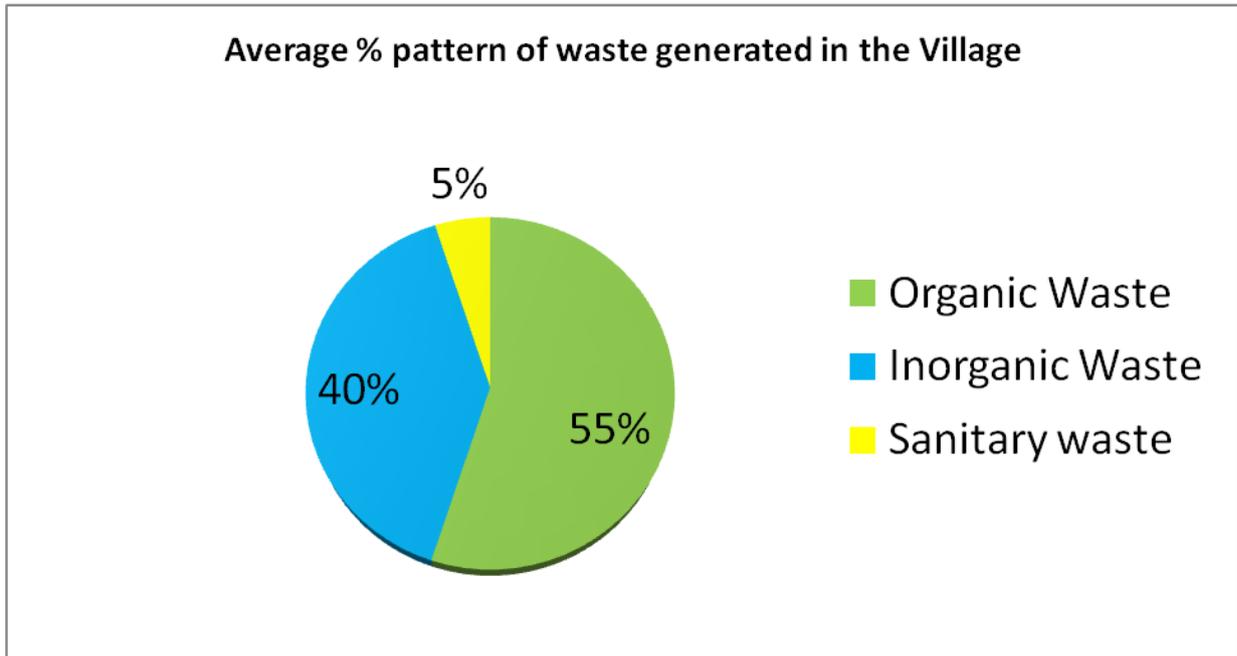
**Photo-2.5: Rajameri eri**

- Based on the observations made during the above two visits and the detailed discussions with Panchayat officials, following broad decisions were taken for taking the project forward:

- (i) The project would be initiated in Ezhilnagar area of Vichoor Panchayat. This village has 12 streets and 300 households. Layout plan of Ezhilnagar was collected from the President of Residents Association. It had no drainage facility and no solid waste collection and management. There was no drainage system or rainwater harvesting system in this area.
- (ii) The activities would start during the First week of June 2015, as the entire Panchayat was busy with a village temple festival until then.
- (iii) A solid waste management scheme would be implemented in this village in the next one year. Panchayat secretary had promised that he would identify the area (about half a ground) where composting of solid waste would be carried out.
- (iv) Panchayat secretary had also identified the school, where the public awareness meetings would be conducted prior to start of the actual activities, for the purpose of making the villagers as “partners” in this project. Villagers would be informed about the importance of segregation at the source. Two persons from the Ezhilnagar village would be identified and given the employment. They would be trained and then they would help in the implementation of the solid waste management scheme.
- (v) Another important activity that would be undertaken during the first year of implementation is: restoration of Rajameri eri. IIT Madras Team, as well as the Panchayat officials felt that this activity be taken up on priority basis. This was important from the point of view of overall improvement of environment, ecology and sanitation of the area.
- (vi) Complete topographical survey of the village would be conducted within the first couple of months. IIT Madras team would then design the surface drainage system, for carrying the storm water from the village to the eri. Discussions with a few villagers indicated the importance of this activity, as the village gets flooded with waist deep water during the rainy season. The costing for the drainage system would also be completed.

### **2.3 WASTE CHARACTERIZATION & SOLID WASTE MANAGEMENT**

Characterization of solid waste was carried out and the results are presented in Fig. 2.1. It was found that 55% of the waste is organic in nature and 40% of the waste is inorganic in nature.



**Fig. 2.1. Characterization of Solid Waste**

### **2.3.1 Need for Solid Waste Management**

Based on the preliminary visits and assessment of the situation, it was decided that a decentralized solid waste management system would be appropriate for a village like Ezhil Nagar,. Existing dumpsites were overflowing and finding new dumpsites would have been difficult due to a shortage of land within the municipal boundaries and surrounding rural communities. Also, inhabitants of nearby localities would prevent the indiscriminate dumping in their vicinity. Many negative impacts result from improper solid waste management some of which are listed below.

- Uncollected waste may end up in drains and cause blockages.
- Dump sites are breeding grounds for flies.
- Discarded cans, tyres and other containers are breeding grounds for mosquitoes.
- Air pollution results from open burning of waste.
- Environment is affected by degradation of uncollected waste. It also affects the aesthetics.
- Leachate from these uncontrolled dump sites pollutes the nearby surface water bodies and groundwater sources.

The IIT Madras team felt that the best way to tackle these problems was to adopt community - based decentralized solid waste management. There are several benefits. Localized collection and processing of wastes minimizes the transport of waste to dumping sites which are farther away. It reduces the contamination of groundwater through the seepage of leachate. This model is labour intensive and provides employment

opportunity to local inhabitants. Appropriate segregation of recyclable material leads to higher revenues. Health and social benefits that accrue from proper solid waste management are well known and cannot be over emphasized.

### **2.3.2 Composting**

In the present project it was decided to go for composting for the organic part of the waste. The process of composting converts the humid organic kitchen waste into compost that can be used as an organic fertilizer. Decomposition of the biodegradable waste on a decomposition- bed using micro-organisms' culture (s) requires 30 – 35 days to convert the wastes into black decomposed mass. Composting of the decomposed matter in concrete composting-pits in which entire mass is rotated using spade at alternate days to provide aeration in composting process. Around 30 – 35 days are required for completing this process. The compost provides an extra source of revenue for the system and helps to maintain the fertility of the soil. Significant amount of research has been carried out at IIT Madras in previous years on composting. Prof. Ligy Philip and her students have developed a composting process which reduces the time of composting as well as results in a very high quality of compost, which meets the international standards. This composting process was chosen for implementation in the solid waste management facility. Quality testing of prepared compost after drying in the air, sieving and obtaining a uniformly granular form for packing were put in place.

## **2.4 OVERVIEW OF PROJECT IMPLEMENTATION DURING PHASE-I**

Following steps were taken for implementing the project during Phase-I:

Step-1: Identified and selected a residential association volunteering team. Core project team members from IIT Madras discussed with them for the collection of baseline data needed for planning the execution.

Step-2: IIT Madras appointed supervisor and labour team were trained on details of the project and its execution plan.

Step-3: Awareness campaign was conducted for the villagers on source segregation. 2 different colour bins, stickers and write-ups were distributed.

Step-4: IIT Madras designed and constructed the dry waste segregation composting yard.

Step-5: IIT Madras appointed team started the door to door collection of waste by categorizing the waste into 3 different types, i.e., wet waste, sanitary waste, mixed waste and dry waste (Inorganic Recyclable waste), segregated at the source i.e. households.

Step-6: Inorganic waste is further segregated into different types and stored in the storage yard, which is being sold to recyclers at a later date. Organic waste is being composted, processed and packaged for selling in the local market. Mixed waste (mostly inorganic construction debris) is disposed of to the existing common bins once they are filled and will be sent to landfill. Sanitary wastes are being collected separately and are being incinerated in the facility provided in compost yard.

Step-7: IIT Madras also designed and implemented a storm drainage system for collecting the storm water and transporting this to the pond. It also designed and implemented a small bore system for collecting the wastewater from septic tanks and transporting the same to a constructed wet land.

Step-8: IIT Madras designed and implemented a constructed wet land system for treating the septic tank effluent before it is discharged or reused.

Step-9: Presently IIT Madras team is closely monitoring the composting being carried out by the village level team, and collecting data on waste received per day, compost produced per day, compost quality and the net returns from the project through sales of inorganic recyclable material and compost.

## **2.5 PROJECT INAUGURATION (July 12, 2015)**

The project was formally inaugurated on July 12, 2015 (Photo 2.6). Approximately 80 residents participated in the inaugural function. IIT Madras team explained to them about the project and sought their cooperation. A tri-cycle was provided for solid waste collection. The residents participated in the open discussion and pledged their support for the project.





**Photo 2.6: Inauguration of Phase-I of the Project on July 12, 2015**  
**2.6 MASS CLEAN UP (July 21, 2015)**

Mass clean-up of solid waste on the streets of Ezhil Nagar was organized by IIT Madras to bring about an overall cleanliness of the ward (Photo 2.7). The clean-up was supported by the then Panchayat President of Vichoor Village along with volunteers from the village and daily wage workers from the panchayat. The task was successfully completed under the guidance of IIT Madras Project team.



**Photo-2.7: Cleaning of the village**

## **2.7 BASELINE SOCIAL SURVEY (July – August 2015)**

The baseline survey was conducted to collect information from 300 households in the village. The information collected primarily included the following:

- Social Demography
- Water Supply
- Solid Waste Disposal
- Sewage Collection System
- Rainwater Harvesting

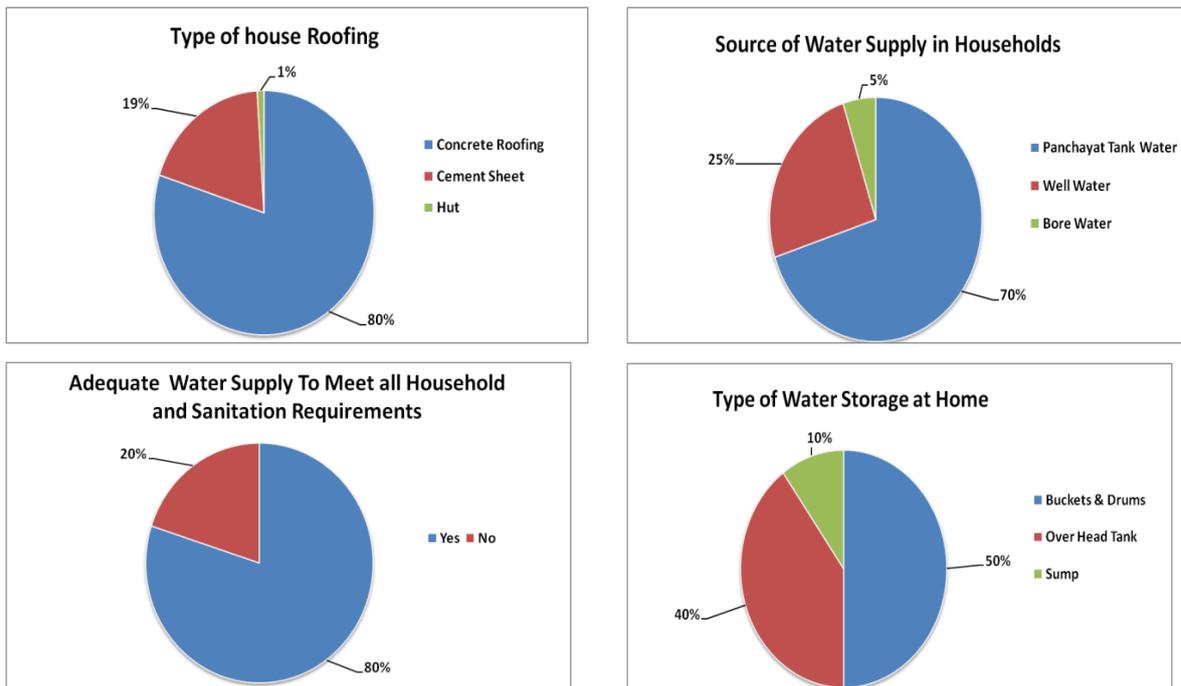
Pictures of baseline survey in progress are shown in Photo 2.8.

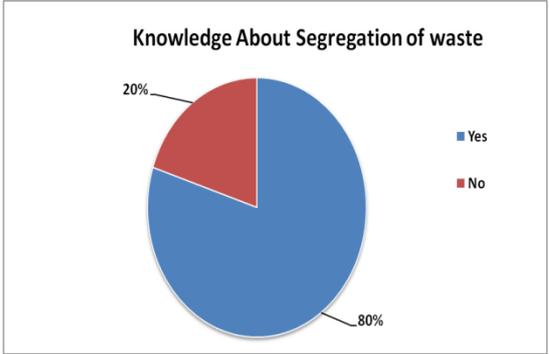
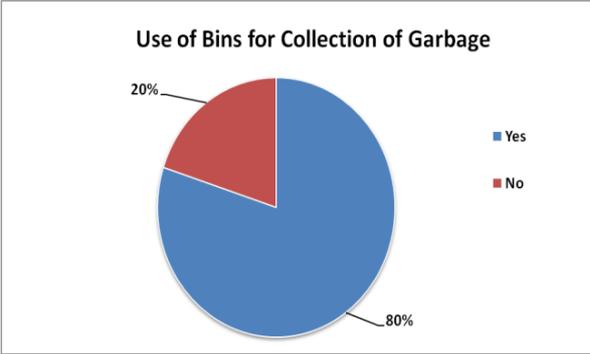
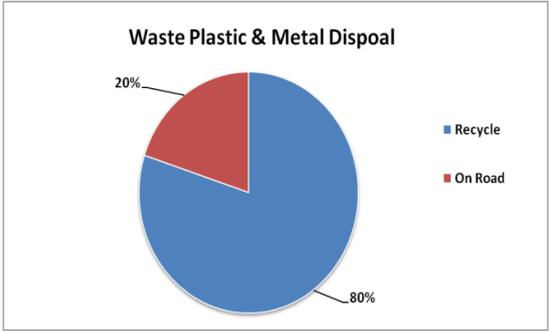
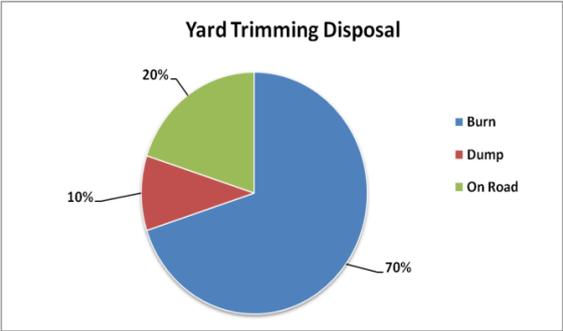
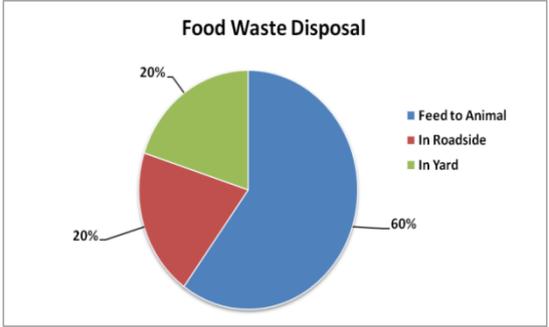
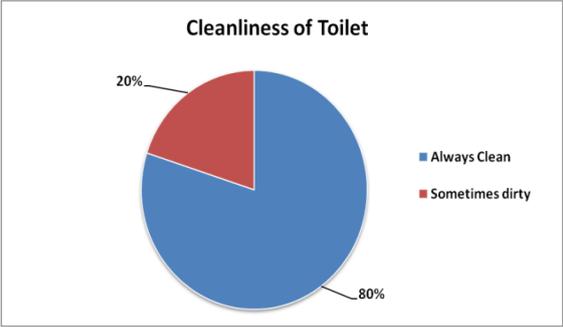
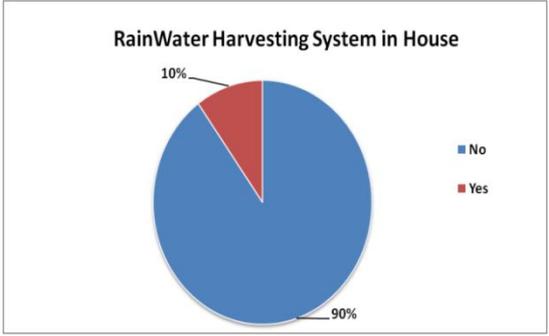
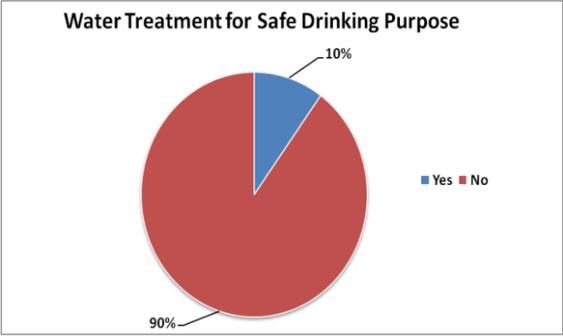


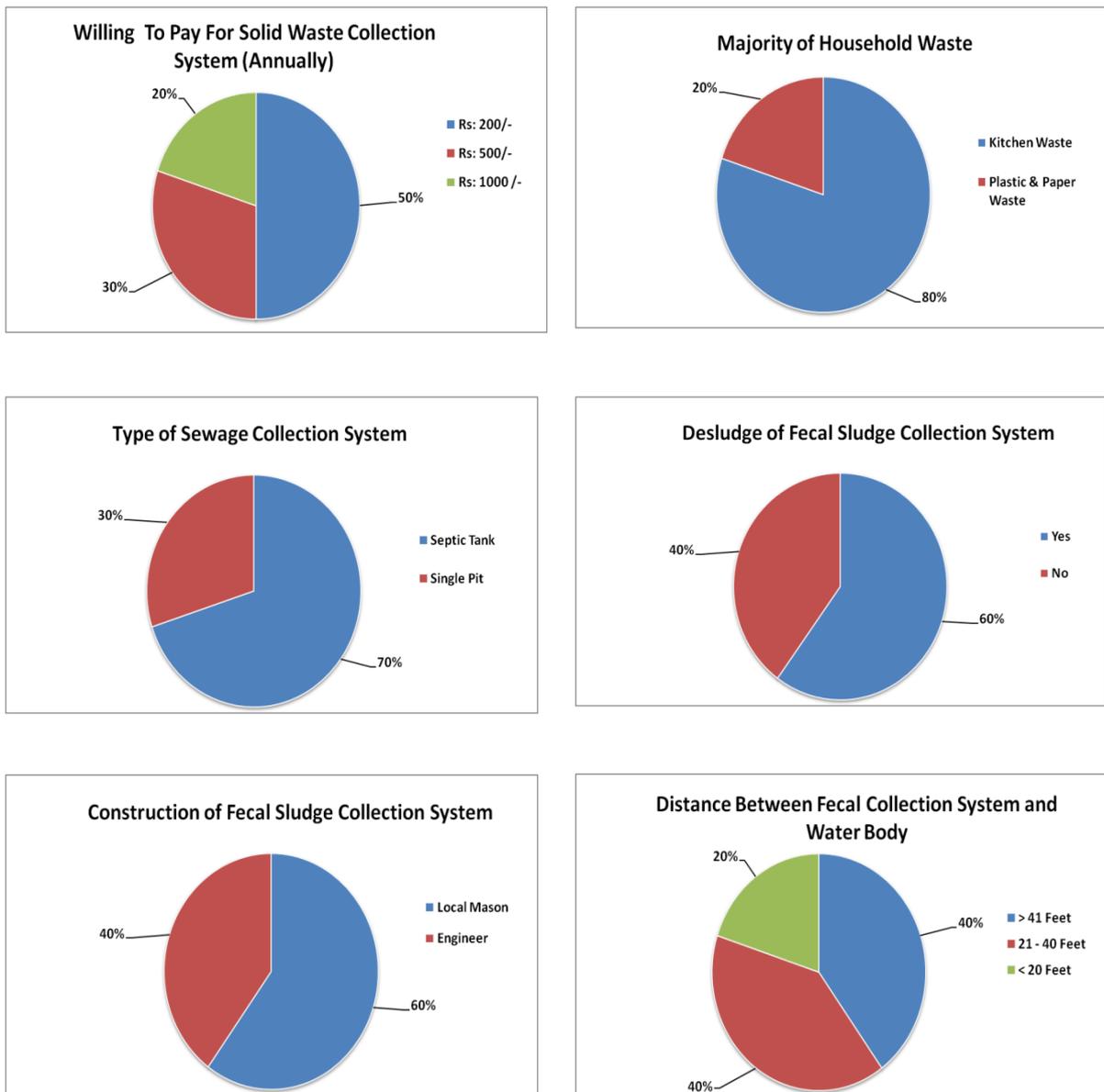


**Photo 2.8: Baseline survey in progress**

The survey was carried out by Project staff along with B Tech students of IIT Madras as interns. There was good support and cooperation from the community including Panchayat president, secretary and welfare association group. The results are explained in the charts provided in Fig. 2.2.







**Fig. 2.2. Results of baseline survey**

### **2.8 LAKE CLEANING (25-8-2015)**

The Rajmeri eri (water body), which is located close to the village was cleaned up. This water body can be used for storing excess rain water during the rainy season and providing it for use during water scarce summer months [Photo-2.9].



**Photo-2.9: The Water body before, during and after restoration**

## **2.9 FIRST AWARENESS PROGRAM (30-8-2015)**

First awareness program was conducted wherein about 30 residents participated. IIT Madras team had explained to them about the sanitation, hygiene and health. They were told about the importance of solid waste management and wastewater treatment [Photo -2.10].





**Photo-2.10: Awareness Program**

## **2.10 RECRUITMENT OF FIELD WORKERS**

Two field workers were recruited for the purpose of solid waste collection and segregation. These workers were trained in the process of composting also [Photo - 2.11].



**Photo-2.11: Field workers recruited for training**

## **2.11 TOPOGRAPHICAL SURVEY**

Complete topographical survey of the selected areas of the Panchayat was completed [Photo-2.12] and a contour map was prepared. This map [Fig. 2.3] also shows the residences, streets and the nearby water body. This was used for designing sanitary and storm water drainage systems.



Photo-2.12: Topographical survey in progress

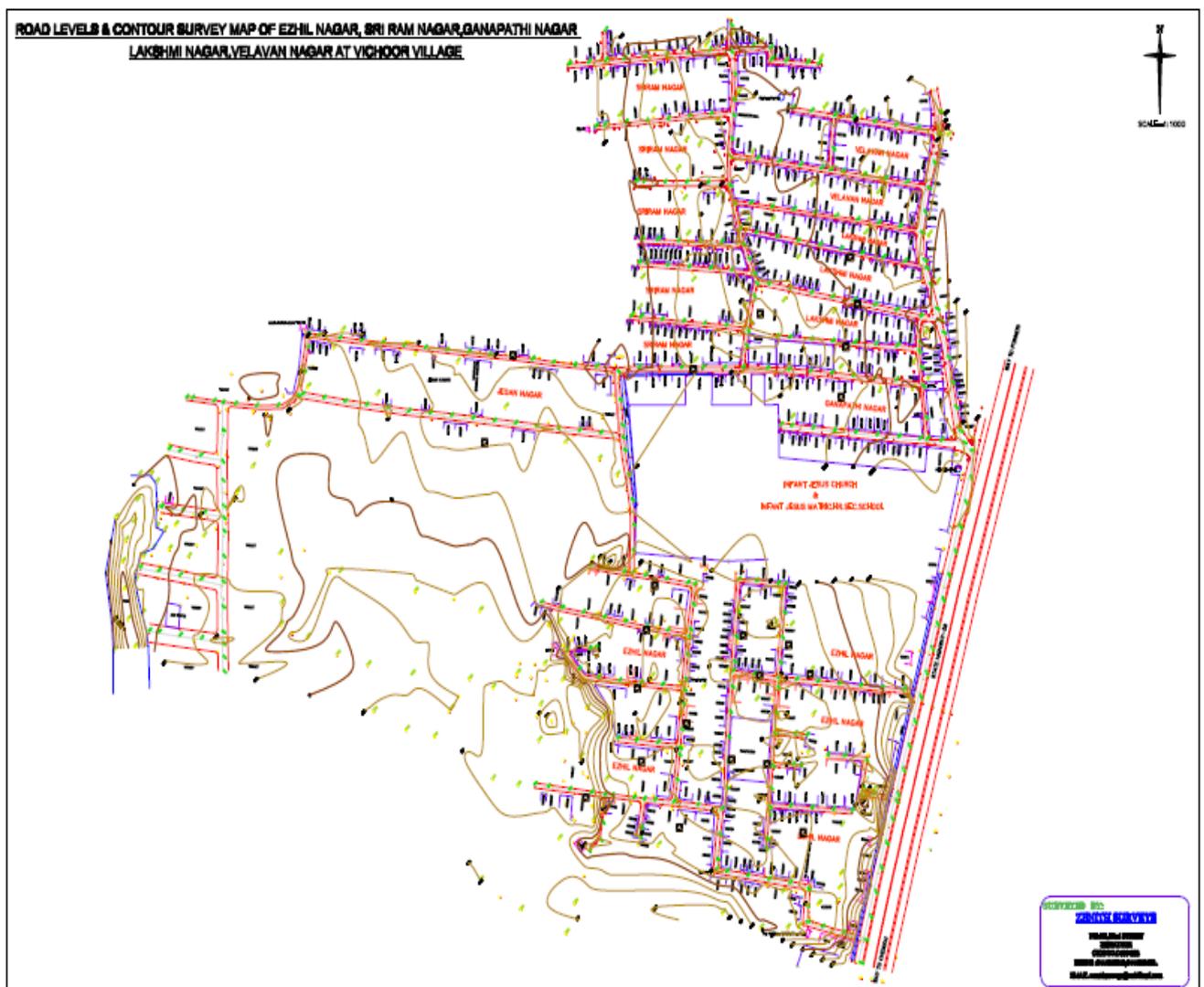


Fig. 2.3: Contour Survey Map

## 2.12 LAND ALLOTMENT (October 2015 to April 2016)

After the baseline survey, topography survey and public meeting held with all stake holders for awareness and to develop action plan for sustainable solid waste management, a formal proposal was submitted to the Panchayat President, who took up the requirement in the in local council member's meeting for their approval to allot Panchayat land for constructing of a solid waste management system in the village. The approval by all members unanimously from the Panchayat level was held in November 2015 and the documents was processed to block level to in charge-BDO for their approval. The block level approval was obtained in March 2016 and further processed for the final approval by Collector by April 2016.

## 2.13 CHENNAI FLOODS (December 2015 to February 2016)

Ezhil Nagar was severely affected by Chennai floods and the entire village was surrounded by flood water from December 2015 onwards. This high level of flooding at Vichoor (Photo 2.13) was mainly due to rain water overflow from Poondi and nearby lakes. Many people were rescued from their houses and were arranged shelter & food in nearby school (Infant Jesus). There was no major damage to the residents due to this flood but the water level took 2 months to recede out of the houses completely. The Panchayat President, State Govt. officials were completely in relief work for this entire period. IIT Madras project team has taken special care to supply relief materials to the people of Vichoor and support them with all necessary needs requested by the Panchayat President.



**Photo 2.13: 2015 Flood in Vichoor Panchayat**

## 2.14 LAND PREPARATION FOR COMPOST YARD (May 2016)

The 100 year rainfall and the resulting massive floods in months of November and December delayed the progress of work until February 2016. The land for constructing the compost yard needed to be allotted by the Panchayat and officially transferred by the State Government. All the district officials were busy with rescue and relief work, and the following rehabilitation work. Fortunately, just before the state elections were declared, we could manage the official transfer of the land for construction of the compost yard. Photos showing the (i) survey work for demarcating the area, (ii) progress of site clearance and (iii) progress of the fencing of the area are shown in Photos -2.14 through 2.16.



**Photo-2.14: Progress of Survey for Compost Yard**



**Photo-2.15: Progress of Site clearance for Compost Yard**



**Photo-2.16: Progress of Site clearance for Compost Yard**

### **2.15 DISTRIBUTION OF BINS FOR SEGGREGATION AT SOURCE (13<sup>th</sup> July 2016)**

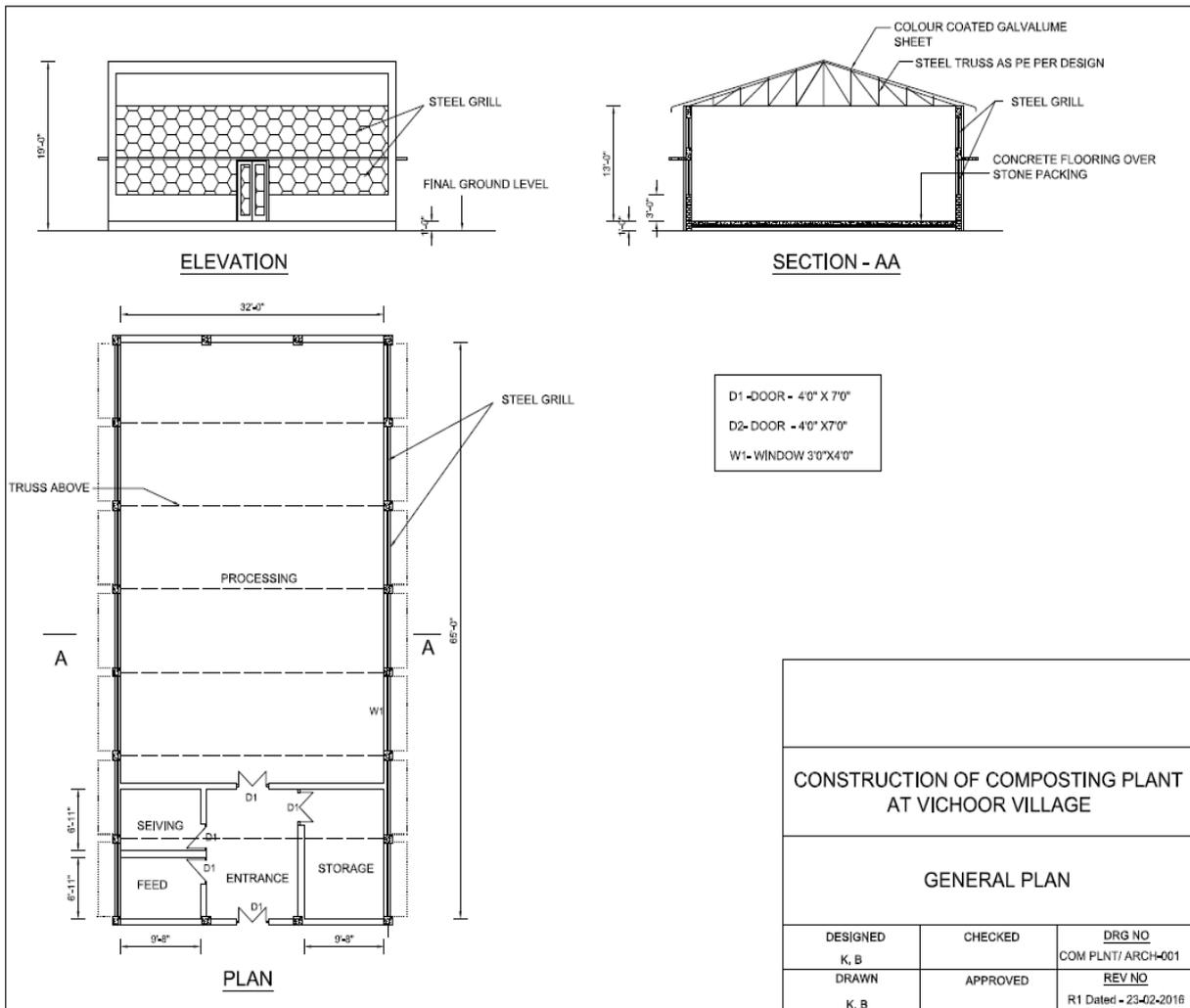
All the residents in Ezhil Nagar village were provided with two bins for segregating the waste, dry (Blue) and wet (Green) waste, in the presence of the then BDO, Panchayat President, Prof. Ligy Philp and Prof. B S Murty (Photo 2.17). The team also distributed leaflets and explained the dos and don'ts for segregation.

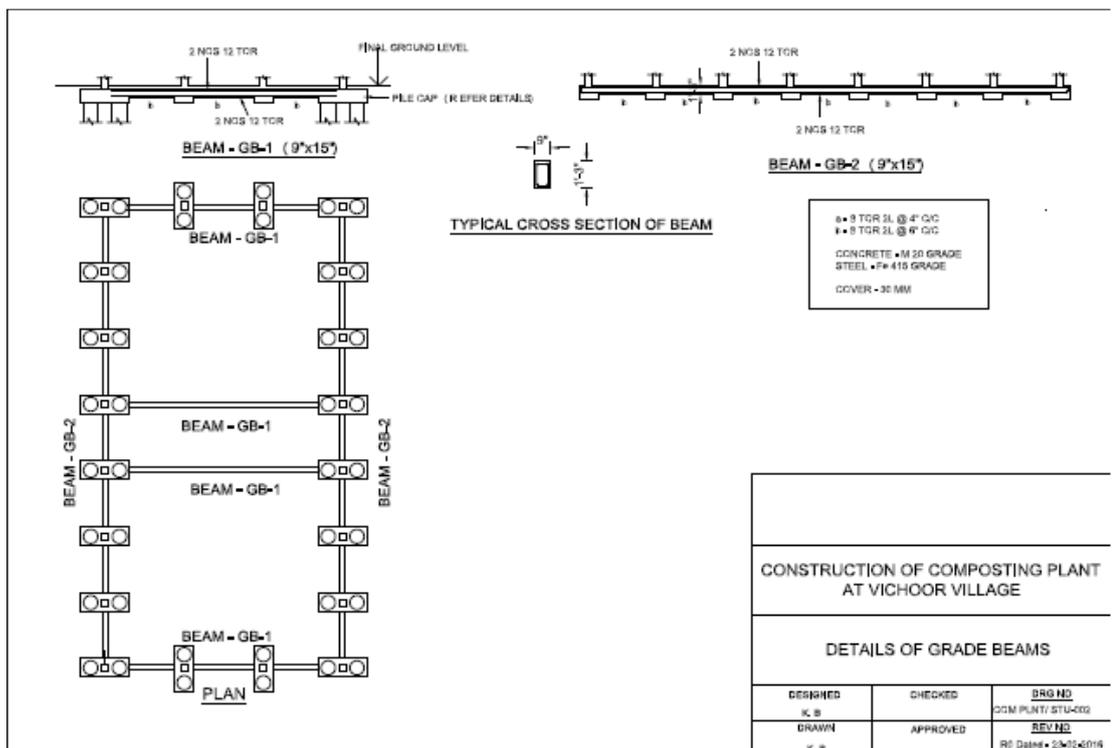
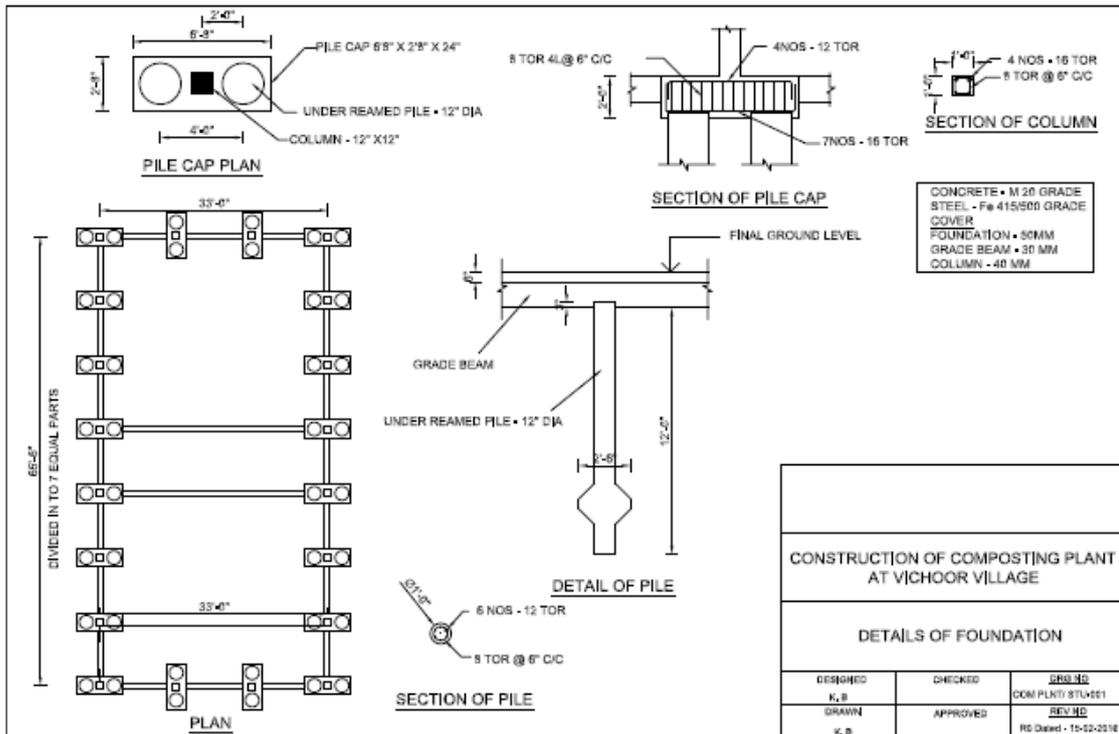


**Photo-2.17: Bin distribution for segregation at source**

## 2.16 STRUCTURAL DESIGN OF COMPOST YARD

Structural designs for the compost yard were prepared the IIT Madras team. These designs were vetted by a professional design engineer. The Bill of Quantities was prepared, as per the guidelines of the Engineering Unit of IIT Madras (which follows the DSR / Market rates) and tenders were floated. A contractor was selected, based on technical assessment as well as the cost. Sample drawings of the compost yard are shown in Fig. 2.4.





**Fig. 2.4: Drawings of Compost Yard**

## 2.17 CONSTRUCTION OF COMPOST YARD (15<sup>th</sup> July 2016 to 15<sup>th</sup> October 2016)

The tendering process was completed during June 2016. The contract was won by M/s Vetrivel Construction at a total project value of Rs 27,99,200/-. The processing capacity of the yard is 150 kg/day. The construction work commenced on 15<sup>th</sup> July 2016. Progress of construction is shown in Photos 2.18 to 2.23.



**Photo 2.18: Visit of IITM team to the site before commencement of civil work**



**Photo 2.19: Pile Foundation Work: (15<sup>th</sup> July to 25<sup>th</sup> July)**



**Photo 2.20: Earth Work Excavation for Foundation and filing: (25<sup>th</sup> July to 30<sup>th</sup> July)**



**Photo 2.21: Plinth works (10<sup>h</sup> August to 31<sup>th</sup> August)**



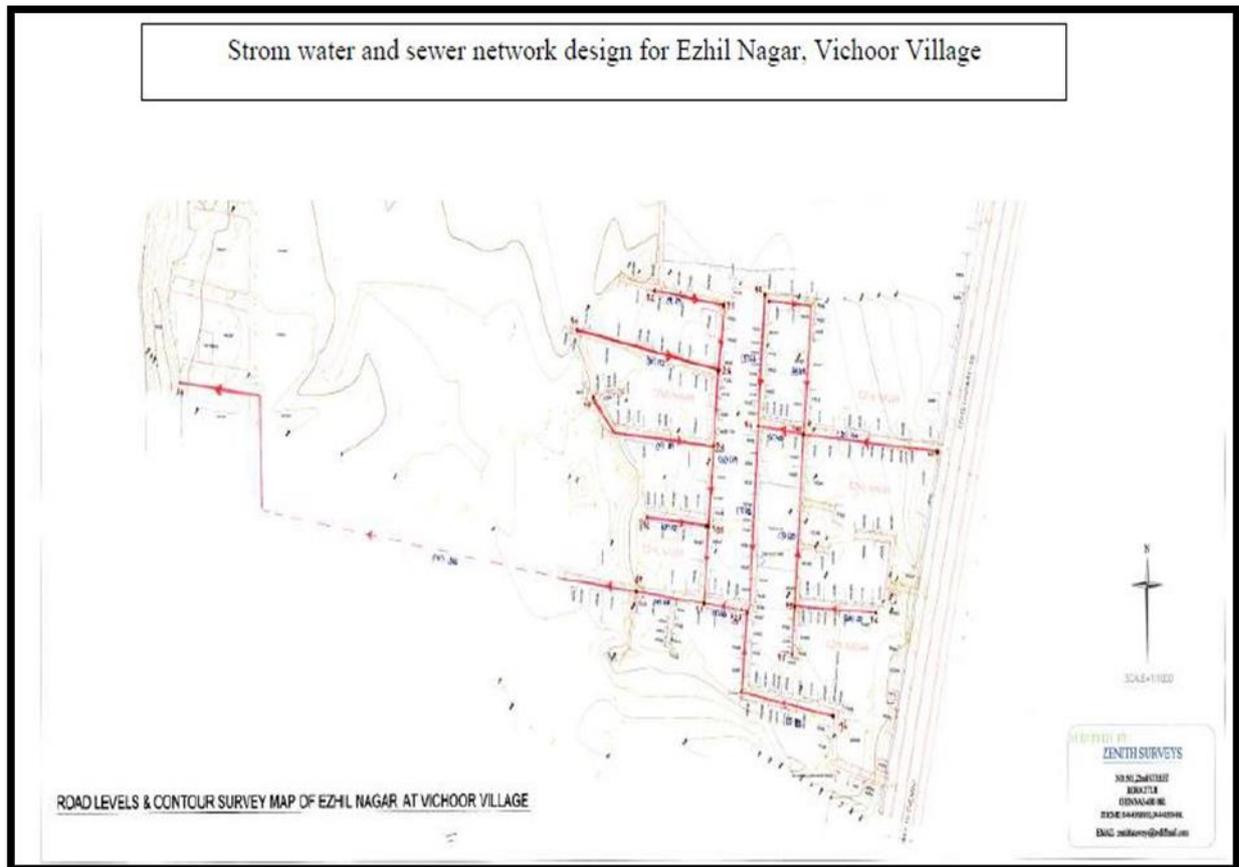
**Photo 2.22: Superstructure Works (Started on 1<sup>st</sup> September)**



**Photo 2.23: Compost Yard after Completion of Construction**

## 2.18 STORM WATER DRAINAGE SYSTEM FOR EZHIL NAGAR (May 2017 to March 2018)

A topographical survey was conducted for the design of storm water drainage system. The designs for both storm water drainage system and the domestic sewage collection were completed. These designs were based on guidelines provided in the CPHEEO manual. The then Panchayat President and Secretary were consulted before the layout plan was finalized. Official approval was obtained for laying the drainage network on the sides of streets. The layout of storm water drainage system is shown in Fig. 2.5.



**Fig. 2.5: Storm water and sewer network design for Ezhil Nagar, Vichoor**

After successful completion of tendering process and allotment of the project to technically and commercially qualified contractor M/s. Vetrivel Constructions, the construction of storm water drain line in Ezhil nagar was started on May 15<sup>th</sup>, 2017 and it got completed by March, 2018. Storm water drains for a total length of 1821 meters got constructed. It was made in such a way that storm water drains into nearby lake which is situated on western side of the Ezhil nagar. After completion of storm water line, a water flow test was conducted on 09/05/2018 to ensure the free flow of storm water into lake. Photos 2.24 to 2.29 show the construction of storm water drainage system.



**Photo 2.24: Construction of Strom water and sewer line commenced on 15<sup>th</sup> May 2017**



**Photo 2.25: Civil work- Earth excavation**



**Photo 2.26: Civil work- Storm water drain constructions near households**



**Photo 2.27: Civil work- Storm water drain constructions near open land**



**Photo 2.28: Civil work- Construction of sewer water pipeline and chambers**



**Photo 2.29: Water Flow Test on Storm water Drain**

## 2.19 CONSTRUCTION OF SEWER PIPELINE (JANUARY 2018)

It was observed from field studies that no sewer drain line was available at Ezhil Nagar. Domestic waste water generated from houses was being drained into soak pits, which may lead to the groundwater contamination and health issues. Thus there was an immediate need for construction of sewage line to carry wastewater away from the village and treat it using an appropriate method before discharging it into environment.

A PVC sewer water pipeline was placed inside the stormwater drain. Domestic wastewater, mainly coming from kitchen waste water (Grey water), and bath water, is draining into this main sewer line. Collected sewer water is going into a constructed wet land where it is getting treated. Currently the treated water is being used for composting and excess water is pumped out into the green belt area situated near to compost yard. As of January 21<sup>st</sup> -2018, wastewater outlets from seventy one (71) households are connected with the sewerage system. Photos 2.30 and 2.31 depict the construction of sewerage line.



**Photo-2.30: Civil work: Sewer water pipeline constructions**



**Photo 2.31: Households connected their grey water into main sewer water pipeline**

## 2.20 CONSTRUCTED WET LAND

A constructed wetland (CW) is an artificial wetland which can be used to treat municipal or industrial wastewater and grey water. A constructed wetland is a basin like structure which is filled with filter material such as sand or gravel, brickbats, and planted with vegetation. Some plants (eg. Cana flowers, and *Phragmites australis*) have significant tolerance and can grow even in saturated conditions. Wetlands filter out excess nutrients and dangerous pollutants in greywater. They also trap natural sediment and organic matter.

### **2.20.1 Types of CWs (UN-Habitat, 2008)**

Constructed wet lands can be classified into three main types:

**Horizontal Flow (HF):** In this type of wet land, the effluent moves horizontally, (i.e. parallel to the surface). In this type of CW the wastewater encounters aerobic and anaerobic conditions. The aerobic zones (roots and Rhizomes) of the wetland vegetation supply the oxygen. When wastewater moves through the rhizosphere, treatment takes place through microbiological degradation and by physical and chemical processes. It is reported that HF wetland can effectively remove the organic pollutants (TSS, BOD<sub>5</sub> and COD) from the wastewater. Due to the limited oxygen transfer inside the wetland, the removal of nutrients (especially nitrogen) is limited; however, HF wetlands remove the nitrates in the wastewater.

**Vertical Flow (VF):** In this type of wet land, the effluent moves vertically, from the planted layer down through the substrate and then comes out. In this type of CW, the waste water is provided with very good aeration as compared to that in HF. Aeration provides good oxygenation which results in good nitrification and it also effectively removes the organic pollutants (BOD<sub>5</sub> and COD) from the wastewater. VF requires comparatively less area.

**Hybrid flow:** In this type of wet land, the effluent moves vertically followed by horizontal flow or vice versa (UN-Habitat, 2008). The HF flow has some limitations with removal nutrients, and VF is also having some limitations with TSS removal. Hybrid flow wet land overcomes these limitations.

### **Advantages and limitations of constructed wetlands (UN-Habitat, 2008)**

#### ***Advantages***

- Wetlands can be less expensive to build than other treatment options
- Utilization of natural processes
- Simple construction (can be constructed with local materials),
- Simple operation and maintenance
- Cost effective (low construction and operation costs)

- Process stability

### **Limitations**

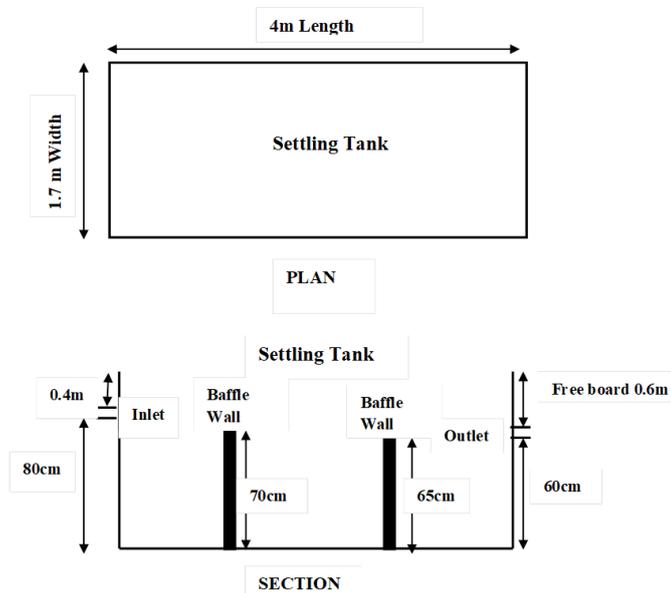
- Large area requirement
- Wetland treatment may be economical relative to other options only where land is available and affordable.
- Design criteria have yet to be developed for different types of wastewater and climates.

### **2.20.2 Constructed Wetland at Ezhil Nagar (January 2018)**

Dr. Ligy Philip and her students have carried out extensive research on the development of constructed wetlands in the last five years. The process design developed by them was used in the design and construction of CW in Ezhil Nagar, Vichoor. The CW was constructed in 1<sup>st</sup> week of January-2018. The CW consists of two (02) main parts: (i) settling tank and (ii) constructed wetland.

### **Settling Tank**

Waste water coming from the village first enters into the settling tank, which mainly removes the suspended solids from wastewater. Settling tank has two baffled walls at different heights (0.70 m and 0.65 m) which improve the TSS removal efficiency by sediment settling. Dimensions of settling tank are shown in Fig. 2.6.

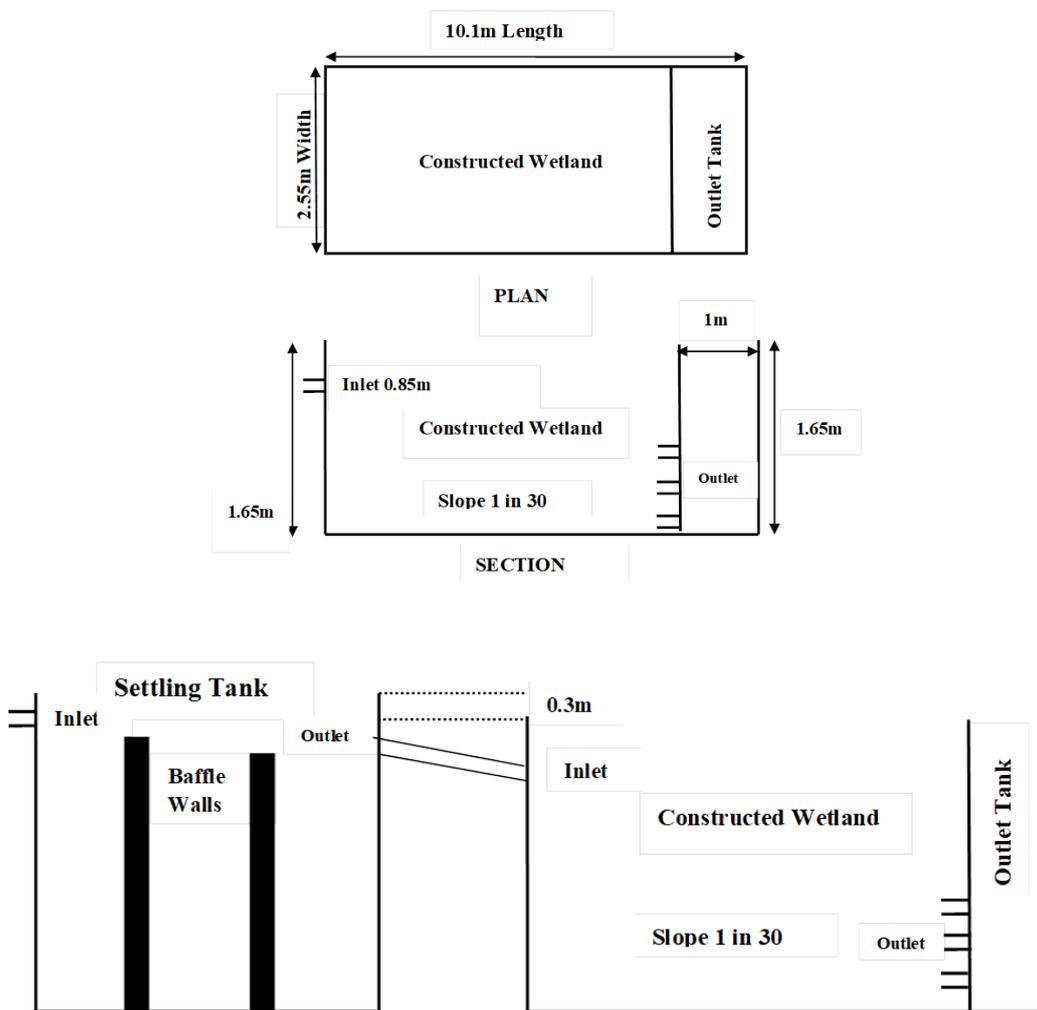


**Fig. 2.6: Settling Tank**

### **Constructed wetland (CW)**

It was decided to construct a CW with vertical flow condition (Fig. 2.7). This CW comprises of 3 major parts which are: (i) concrete basin like structure, (ii) gravel and brickbats, and (iii) vegetation. The waste water

coming from settling tank is spread over the top of the gravel and brickbats bed, and it gradually percolates down through the bed and is collected in the drainage placed at the base and finally drains into the outlet tank. Wastewater treatment occurs as it passes through the wetland medium and the plant rhizosphere (Name of Plants: Cana Flower and Phragmites australis). Rhizomes, roots, and rootlets create an aerobic condition by providing oxygen around each root. The growth of micro-organisms facilitates decomposition of organic matter. Nitrogen gas is released into atmosphere by microbial nitrification and subsequent denitrification. Bacteria and viruses are reduced by filtration and adsorption by biofilms on the gravel media in vertical flow systems. Treated water from outlet is pumped into overhead tank, and is used for purposes like compost preparation and washing at compost yard.



**Fig. 2.7: Constructed Wetland in Ezhil Nagar**

### 2.20.3 Construction work of CW

Progress of construction of CW is depicted in photographs 2.32 to



**Photo 2.32: Shuttering and steel reinforcement for constructed wetland basement**



**Photo 2.33: Reinforced concrete pouring for constructed wetland basement**



**Photo 2.34: Fly ash brick work for constructed wetland**



**Photo 2.35: Construction of settling tank**



**Photo 2.36: Formation of substrate (Gravel and bricks) bed for constructed wetland**



**Photo 2.37: Gravel bed and pipeline work in constructed wetland**



**Photo 2.38: Plantation for constructed wetland**



**Photo 2.39: Waste water coming into settling tank**



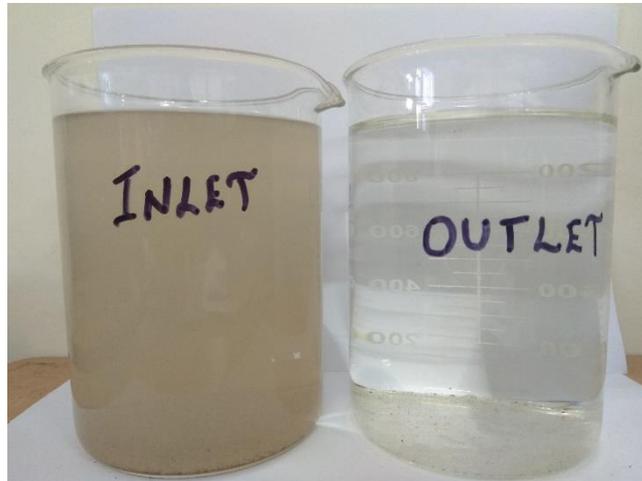
**Photo 2.40: Waste water flowing vertically in the constructed wetland**



**Photo 2.41: Treated water coming out to the outlet chamber**



**Photo 2.42: Treated water from constructed wetland is pumped into overhead tank for reuse (for compost preparation and washing)**



**Photo 2.43: Raw waste water and treated water from constructed wetland**

## **2.21 ACTIVITIES IN SOLID WASTE MANAGEMENT SYSTEM (Jan-2017 to December-2018)**

### **2.21.1 Solid Waste Collection**

Decentralised solid waste management programme at Ezhil nagar is running smoothly and successfully. Villagers have been extending their cooperation well. IIT-M field workers team (i.e., waste collectors) are ensuring the cleanliness of Ezhil nagar by daily collecting the solid waste from 250 households in Ezhil nagar. Solid wastes are being collected after house level separation of wet, dry and sanitary wastes and are taken to the compost yard, where wastes are further segregated with respect to organic / vegetables, plastics, papers, card boards, plastic bottles, glass bottles, etc. Sanitary wastes are being incinerated using the incinerator. These activities are depicted in Photos 2.44 and 2.45.



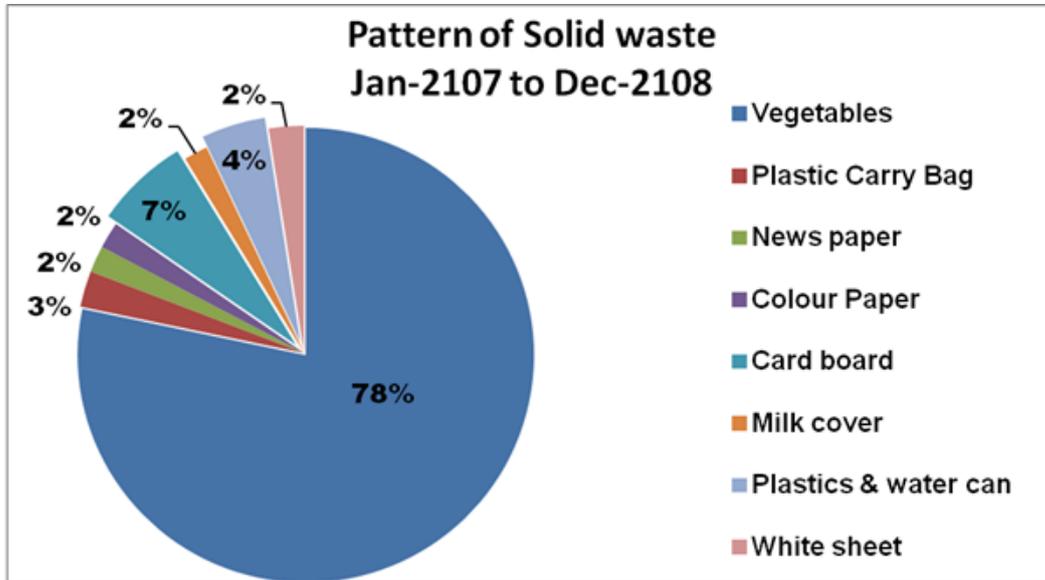
**Photo 2.44: Solid waste to compost yard and further segregation in the yard**



**Photo 2.45: Clean streets of Ezhil Nagar**

From Jan-2017 to December-2018, about 62.9 tons of solid waste was collected from 250 households at Ezhil Nagar. On an average, 2622 kg of waste was collected per month. It was observed that majority of waste comprises of organic/ vegetables waste followed by card board, water cans (Fig. 2.8). Table -2.1 shows the monthly solid waste collection during the 24 month period from January-2017 to December-2018.

After segregation of solid waste, resources such as plastics, papers, card boards, milk covers are sold to appropriate recycle vendors, and in this connection Rs. 39,552/- was earned during May-2017 to October-2018.



**Fig. 2.8: Solid waste composition (January-2017 to December- 2018)**

**Table 2.1 Month wise Data on Solid waste (May 2017 to April 2018)**

<b>MONTH</b>	<b>Vegetables in Kg</b>	<b>Plastic Carry Bag in Kg</b>	<b>News paper in Kg</b>	<b>Colour Paper in Kg</b>	<b>Card board in Kg</b>	<b>Milk cover in Kg</b>	<b>Plastics &amp; water can in Kg</b>	<b>White sheet in Kg</b>	<b>Wastages goes to land fill in Kg</b>	<b>Glass bottle in No. Pcs.</b>	<b>TOTAL in Kg</b>
Jan-2017	187.00	25.00	16.00	1.00	10.00	6.00	4.00		331		249.00
Feb-2017	681.00	74.00	46.00	29.00	74.00	25.00	22.00		1088		952.00
Mar-2017	785.00	92.00	56.00	30.00	104.00	26.00	36.00		1127		1134.00
Apr-2017	690.00	81.00	47.00	30.00	87.00	36.00	32.00		892		1003.00
May-2017	821.00	75.00	45.00	28.00	75.00	27.00	26.00		1033		2130.00
Jun-2017	937.00	61.00	33.00	21.00	57.00	26.00	29.00	167.00	1081		2412.00
Jul-2017	1146.00	67.00	37.00	28.00	88.00	29.00	39.00		1246		2680.00
Aug-2017	1274.09	42.92	20.42	23.31	81.13	26.26	39.67		1276		2783.80
Sep-2017	911.45	39.85	18.42	24.47	80.96	18.95	43.88	10.00	1290		2437.98
Oct-2017	857.57	32.69	18.21	25.40	121.85	17.46	49.70	35.00	1505		2662.88
Nov-2017	854.88	31.25	15.47	23.79	78.62	18.83	42.52		1340		2405.36
Dec-2017	945.00	26.96	15.20	23.63	76.04	16.85	46.58		1179		2329.26
Jan-2018	1100.14	12.30	17.20	36.67	85.88	19.17	56.70	54.00	2133	6	3515.06
Feb-2018	1117.95	11.29	13.56	27.99	79.65	19.95	57.78		2415		3743.17

Mar-2018	1357.93	16.54	18.59	31.77	88.54	21.49	63.19		2634	121	4232.05
Apr-2018	1397.44	20.52	19.17	28.63	91.70	21.70	83.73	17.70	2084	206	3764.59
May-2018	1392.22	21.97	18.76	23.27	93.35	21.10	83.03	89.00	2085	346	3827.70
Jun-2018	1353.32	27.65	22.90	23.74	107.88	25.84	81.35	49.00	1383	96	3074.68
Jul-2018	1342.54	23.66	26.91	29.00	96.46	25.09	80.27		1364	95	2987.93
Aug-2018	1258.74	17.95	22.03	23.51	90.4	21.48	73.68	120	1239	110	2866.79
Sep-2018	1221.48	7.33	19.25	21.72	178.96	20.07	179.37		1157	120	2805.18
Oct-2018	1297.59	6.2	20.47	25.76	171.88	23.59	144.88	139	1221	185	3050.37
Nov-2018	1069.24	7.22	17.64	21.51	87.08	21.85	73.53	46.97	1401	117	2746.04
Dec-2018	1195.2	7.27	19.8	26.35	46.71	26.9	69.14	74.8	1677	182	3143.17
<b>TOTAL WEIGHT</b>	<b>25194</b>	<b>829</b>	<b>604</b>	<b>608</b>	<b>2152</b>	<b>542</b>	<b>1457</b>	<b>803</b>	<b>34181</b>	<b>1584</b>	<b>62936</b>

### 2.21.2 Composting Activities (January 2017 to December 2018)

It was observed from the data during May 2017 to December 2018 that 78 % (1050 kg/ month) of total waste comprised of biodegradable organic matter. This organic waste is being converted into compost by adopting effective methodology which was designed by an expert group from IIT-Madras. Composting includes following steps:

1. Moisture reduction via drying
2. Size reduction via shredding
3. Cow dung addition as booster and dry leaves as bulking agent
4. windrow composting technique operated for 45 days
5. Final compost drying
6. Sieving and packing of final compost
7. Sale of compost in market places

Table 2.1 provides the details of compost generated in Ezhil Nagar during the period March 2017 to December 2018. 3058 kg of compost (in which 1181 kg compost weighed with 10-15 % moisture) has been generated from 34904 kg of organic waste collected (this is inclusive of organic waste collected from Phase II from June 2018 to December 2018), and 540 kg of compost has been sold in the market place during May 2017 to January 2019 and an amount of Rs. 10,820/- has been earned. This data shows the revenue that can be obtained by selling the compost obtained from the waste and demonstrates the application of circular economy concept in the village through proper waste management approach.

**Table 2.2 Details of the compost generated in Ezhil Nagar Phase I**

Sl. No	Details	Weight (kg)
1	Compost generated from March 2017 to 20th December-2018 (in which 1181 kg compost weighed with 10-15 % moisture)	3058
2	Compost Sold from May-2107 to January-2019	540
3	compost given to Panchayat at free of cost	15
4	compost given to various nursery gardens as samples @ free of cost	25
5	Compost in storage	2478

Photo 2.46 depicts the different steps in the composting operation in the yard.



**Photo 2.46: Various steps followed in organic waste composting**

## **2.22 CONSTRUCTION OF ROAD TO COMPOST YARD**

To access the compost yard easily, pathway has been constructed using building waste materials in January-2018 (Photo 2.47).



**Photo 2.47: Construction of Road**

### **2.23 HORTICULTURE AT COMPOST YARD (March to October 2018)**

Horticultural activities are being carried out around the compost yard. Bananas, vegetables like brinjal, tomatoes, and fruit plants like water-melon, mango, pineapple etc are planted in front of compost yard using the compost produced and water recovered (Photo 2.48).





**Photo 2.48: Gardening activities around the compost yard in Ezhil Nagar**

## **2.24 FEE COLLECTION FOR PROJECT SUSTAINABILITY (January 2019)**

In-order to sustain the above project activities, continuous fund is necessary for operation and maintenance for the solid waste management, and wastewater treatment. To achieve this, we attempted to setup an action group which would collect the money from each household at the rate of Rs.100, and also this action group would monitor the inorganic waste and compost sales in the market. On 21.01.2019 a meeting was conducted on Ezhil Nagar by Mr. Christian, Secretary, Vichoor Panchayat and a team from IIT-Madras (Photo 2.49). They discussed with volunteers from Ezhil Nagar to set up an action group and collect the fees. People agreed to pay Rs.100 from February, 2019 onwards.



**Photo 2.49: Mr. Christian, secretary, Vichoor Panchayat discussing with Ezhil Nagar people to setup an action group for collection of fees**

### **References:**

1. UN-HABITAT, 2008. Constructed Wetlands Manual. UN-HABITAT Water for Asian Cities Programme Nepal, Kathmandu.

## CHAPTER 3

### PROJECT ACTIVITIES DURING PHASE - II

#### 3.1 INTRODUCTION

Following the successful planning, implementation and operation of waste management plan (Phase-I) in Vichoor village, Phase-II of the project was initiated on 19<sup>th</sup> May 2019. Photographs of the inaugural ceremony are presented in Photo 3.1. While, the total number of households covered in phase I is about 250, about 580 households are targeted in phase II. Thus, the total number of households getting benefited from this project is 830. The Phase II covers following areas:

1. Ganapathy Nagar
2. Sriram Nagar
3. Lakshmi Nagar
4. Velavan Nagar
5. Sivakumar Nagar
6. Srinivasa Nagar
7. Subramanya Nagar
8. Angallamman Nagar



Prof. Ligy Philip explaining about sustainable village project supported by IAL



Mr. Gunasekaran, BDO shared his thoughts and pledged his support for the CSR project initiative



Mr. Christain, Secretary, Vichoor Panchayat, shared his thoughts on implementing this initiative & explained the benefits to the village

**Photo 3.1: Inauguration ceremony of Phase-II**

### **3.2 PRELIMINARY VISIT AND AWARENESS PROGRAM**

During the preliminary visit, we have documented improper disposal of waste throughout the area, especially on the road sides, in vacant lands etc. (Photo 3.2). Also, majority of the households were not segregating the waste and were dumping waste along the roadsides, which led to unhygienic conditions in surrounding areas. In some places, the cattle feeding on these wastes were noticed. This in turn might have resulted in serious diseases to the cattle. There was no waste collection system in the panchayat. Because of these issues, people in the village were vulnerable to various diseases. The main reason for this state of affairs was lack of awareness among the community about handling waste. Therefore, we organized an awareness program on 19<sup>th</sup> July 2018 to educate the people about proper waste management practices (Photo 3.3).



**Photo 3.2: Improper disposal of garbage noticed in the village**



**Photo 3.3: Awareness program conducted by IIT Madras Projects team**



**Photo 3.4: Color coded bins and Tri-cycle for waste collection supplied by IIT Madras**

In-order to facilitate the daily collection of solid waste, two more sanitary workers were employed and one additional tricycle (Photo 3.4) and cleaning equipment were provided. Also, to implement the waste segregation at the household level, all the residents in the area were provided with two bins (dry (blue) and wet (red) waste) to segregate the waste at household level. The team led by Prof. Ligy Philip and Prof. B. S. Murty along with Mr. Gunasekaran (BDO), Mr. Christian (Panchayat Secretary) distributed the color-coded bins to the inhabitants of the village (Photo 3.5). The team also issued a pamphlet explaining the do's and don'ts during segregation. This event was covered by media (Photo 3.6).



**Photo 3.5: Distribution of color-coded dustbins for source segregation**



**Photo 3.6: Television Coverage on Malai Murasu TV (20<sup>th</sup> June 2018)**

### **3.3 MASS CLEANING ACTIVITY DURING PHASE-II**

Along with awareness program, the team also organized the mass cleaning activity in the village to motivate the inhabitants towards waste management practices. Mass cleaning activity was carried out at Ganapathy Nagar, Sriram Nagar, Lakshmi Nagar, Velavan Nagar, Sivakumar Nagar, Srinivasa Nagar, Subramanya Nagar and Angallamman Nagar on 8<sup>th</sup> June 2018. Garbage in all these areas was cleared as shown in Photo 3.7.



**Before Mass Cleaning**

**After Mass Cleaning**

**Photo 3.7: Pictures depicting the various areas of village before and after the mass cleaning activities**

### **3.4 DECENTRALISED SOLID WASTE MANAGEMENT (JUNE-2018 TO AUGUST 2020)**

Decentralised solid waste management programme (Phase II) in Vichoor panchayat has been implemented and has been operating successfully. IIT-M field workers team (i.e. waste collectors) are ensuring the cleanliness (Phase II of) of villages by collecting the solid waste from 465 households on day-to-day basis. Though 580 households are targeted in the selected area, many houses remain unoccupied. After household level segregation into dry and wet wastes, they are taken to compost yard,

where further segregation of dry wastes into plastics, papers, card boards, plastic bottles, glass bottles, etc. takes place. Sanitary wastes are incinerated using the incinerator in the compost yard (Photo 3.8). The process of collection, transport and segregation of waste is shown in Photo 3.8. The organic wastes are mixed with cow dung and bulking agents (dry leaves, etc.) and piled in the windrow chamber. Temperature of the pile is monitored regularly and the process is shown in Photo 3.9. A log book is maintained for the waste quantity by category wise (paper, plastics, etc.), sale of inorganics waste and compost.



**Photo 3.8: Pictures depicting the collection, transport and storage of segregated solid wastes**





**Photo 3.9: Various steps followed in organic waste composting**

After the implementation of waste management plan, all the streets in the project area remain clean (Photo 3.10). This demonstrates the success of the CSR initiative.



**Photo 3.10: Photographs showing clean streets in Phase II villagea after implementation of solid waste management program**

An average of 4565 kg /month of solid waste was collected. It was observed that organic wastes contribute the major portion followed by inorganics such as card board, water cans. The solid wastes collected in each month from June-2019 to October -2020 were shown in the Table A1 (annexure). After segregation of wastes, resources such as plastics, papers, card boards, milk covers are sold out to appropriate recycling vendors and a revenue of Rs.1,51,475 was generated during the project and the details were given in Table A2 (annexure). The compost produced was tested periodically in the laboratory of IIT-Madras and sold to the people at the appropriate rate. The details are given in Table A3 (annexure).

### 3.5 PERFORMANCE OF CONSTRUCTED WETLAND

In addition to existing set-up of constructed wet land in Phase I, an additional unit of septic tank was constructed in front of settling tank of existing constructed wetland in order to handle the extra load of wastewater from Phase II households. This is also required to prevent the shock loads to existing constructed wetland. The total capacity of the designed septic tank is 60 m<sup>3</sup> which is designed to accommodate the wastewater from both Phase 1 and II, villages. The treatment scheme adopted is shown in Fig. 3.1 & Photo 3.11. The construction of the septic tank has been completed (Photo 3.12). The performance of the existing vertical flow constructed wetland with two varieties of plant species namely *Phragmites australis* and *Canna indica* improved after the installation of septic tank. The raw wastewater and treated water quality are given in the Table 3.1. The pollutant removal efficiency of the modified constructed wetland is illustrated in the Fig 3.2.



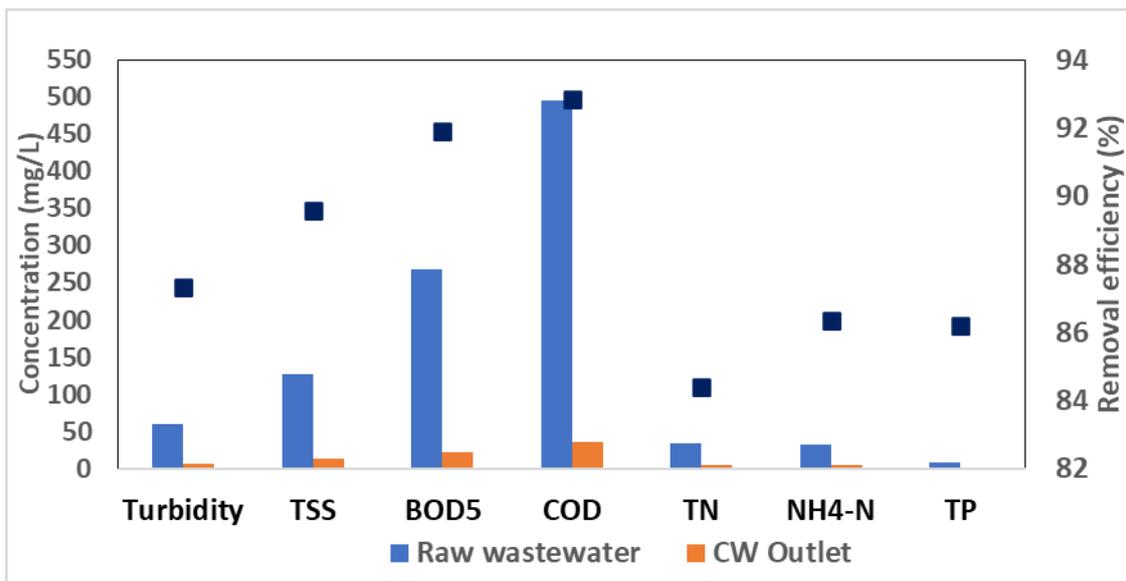
**Fig 3.1 Treatment scheme adopted for the domestic wastewater from the village**



**Photo 3.11: Vertical flow constructed wetland with two varieties of plant species namely *Canna indica* and *Phragmites australis***



**Photo 3.12: Photograph of three chambered septic tank (60 m<sup>3</sup> capacity)**



**Fig. 3.2: Performance of constructed wetland (after installation of septic tank)**

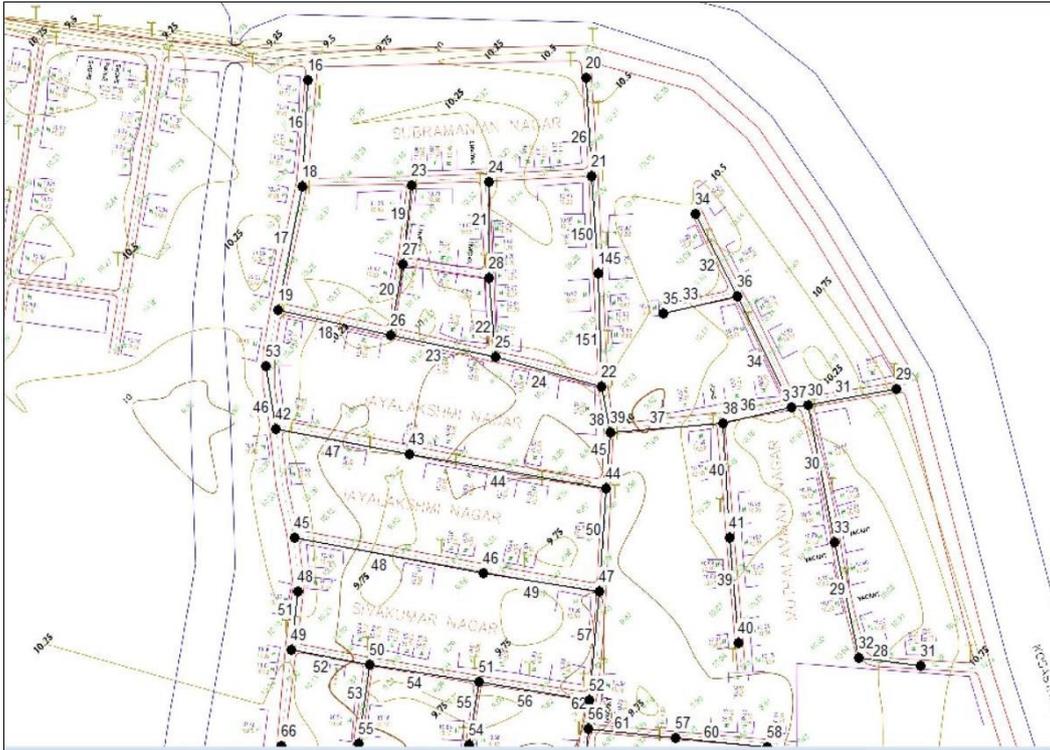
**Table 3.1 Influent and effluent water quality of existing CW at Vichoor**

Parameters	Concentration			
	Raw wastewater	Septic tank Outlet	Settling Outlet	CW Outlet
pH	7.01 - 8.52	7.03 ± 0.15	7.12 ± 0.12	7.54± 1.01
EC (µS/cm)	1548 - 1725	1509.2 ± 2.78	1499.8 ± 1.94	450± 2.26
Turbidity (NTU)	32 - 75	34.23 ± 1.98	34.02 ± 0.64	7.5± 1.56
TSS (mg/L)	77.3 – 162.5	64.0 ± 1.41	65.0 ± 2.36	13.19 ± 1.2
TS (mg/L)	950 – 3130	580 ± 2.12	550 ± 2.73	357.94 ± 3.0
BOD <sub>5</sub> at 20°C (mg/L)	210 – 315	104 ± 2.1	108 ± 1.7	21.66 ± 1.8
sBOD <sub>5</sub> at 20°C (mg/L)	135.7-227.5	46 ± 5.9	48 ± 1.7	14 ± 2.5
COD (mg/L)	425 - 575	216.0 ± 6.79	210.0 ± 0.85	35.40 ± 2.6
TOC (mg/L)	30.5 - 46.2	29.2 ± 1.25	28.4 ± 3.25	10.14 ± 1.3
TN (mg/L)	28 - 45.2	21.4 ± 3.4	21 ± 1.5	5.35 ± 6.2
NH <sub>4</sub> -N (mg/L)	28.5 – 42.8	19.50 ± 1.28	19.38 ± 1.26	4.37 ± 1.8
NO <sub>3</sub> -N (mg/L)	1.15 – 4.25	3.51 ± 0.23	3.32 ± 0.19	0.66 ± 0.4
TP (mg/L)	2.56 – 8.54	7.86 ± 0.08	7.58 ± 0.12	1.83 ± 0.6
TC (CFU/100 mL)	60 – 130 x 10 <sup>4</sup>	10*10 <sup>4</sup>	11*10 <sup>4</sup>	667 ± 6

### 3.6. TOPOGRAPHICAL SURVEY FOR PHASE- II

For the implementation of underground sewer line network, topographical survey was made for the Phase II project area. The sewer line network was then designed based on the prepared contour maps. The details of sewer network are shown in the photos 3.13 and Figs. 3.3 & 3.4. Once the plan was designed, research students of IIT Madras made an evaluation of the prepared topography before implementation of sewer lines (Photo 3.14). Then the excavation for the laying of sewer line in Vichoor Phase –II was commenced on 19<sup>th</sup> August 2020 (Photo 3.15).





**Fig. 3.4: Sample underground sewer layout with node and conduit IDs**



**Photo 3.14: Evaluation of topographical map before field implementation**



**Photo 3.15: Bhoomi pooja and Excavation work for Underground Sewer Line in Phase II**

### 3.7 MAJOR CHALLENGES DURING MONSOON PERIOD

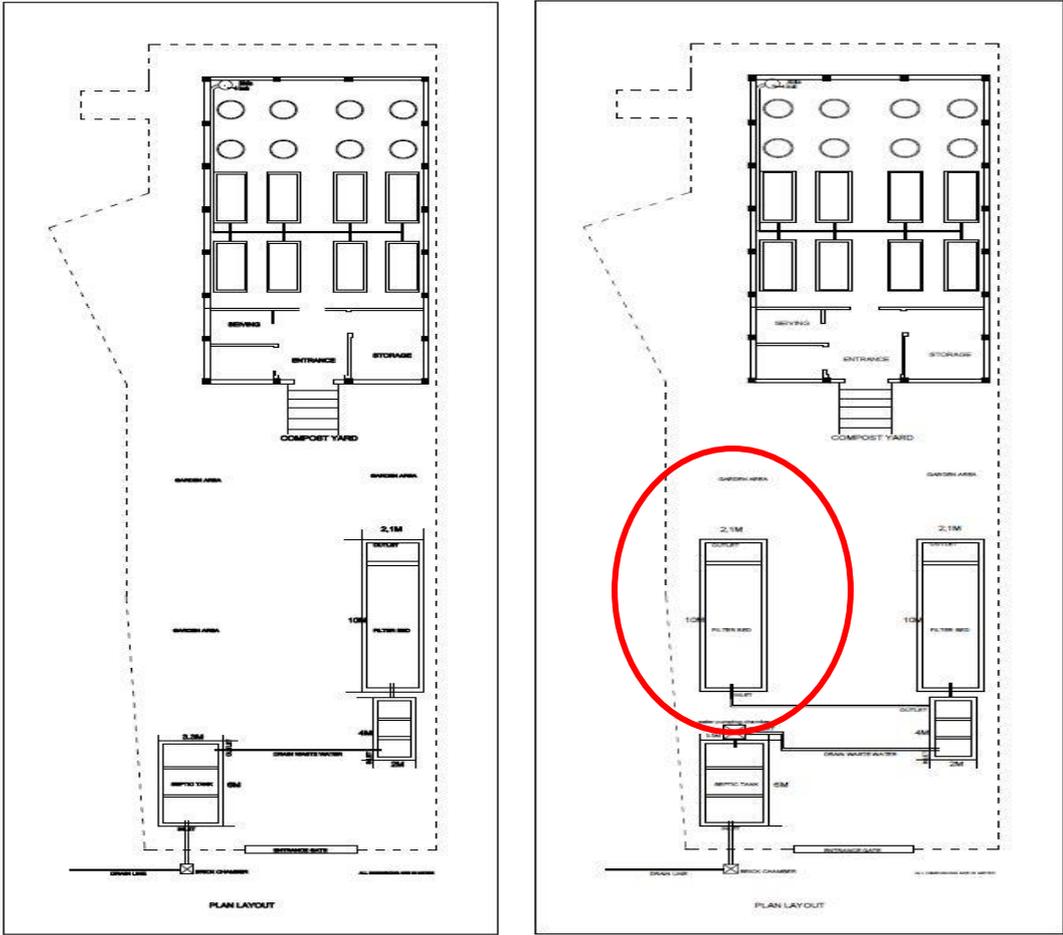
During the monsoon period, severe flooding was observed in the compost yard area. This caused flooding of constructed wetland and increased difficulty in treating the wastewater. The efficiency of treatment plant got affected significantly. The photographs are shown in Photo 3.16. From the past years' experience, it has been observed that the existing treatment unit namely constructed wetland could not withstand the extreme condition (i.e., monsoon period) as the unit is below the ground. Hence, there was a need for an elevated constructed wetland to tackle the monsoon period problems.

To avoid the difficulty in operating the constructed wetland during monsoon period, an elevated vertical flow constructed wetland was designed for implementation. The design details are given in Figs. 3.5 & 3.6.

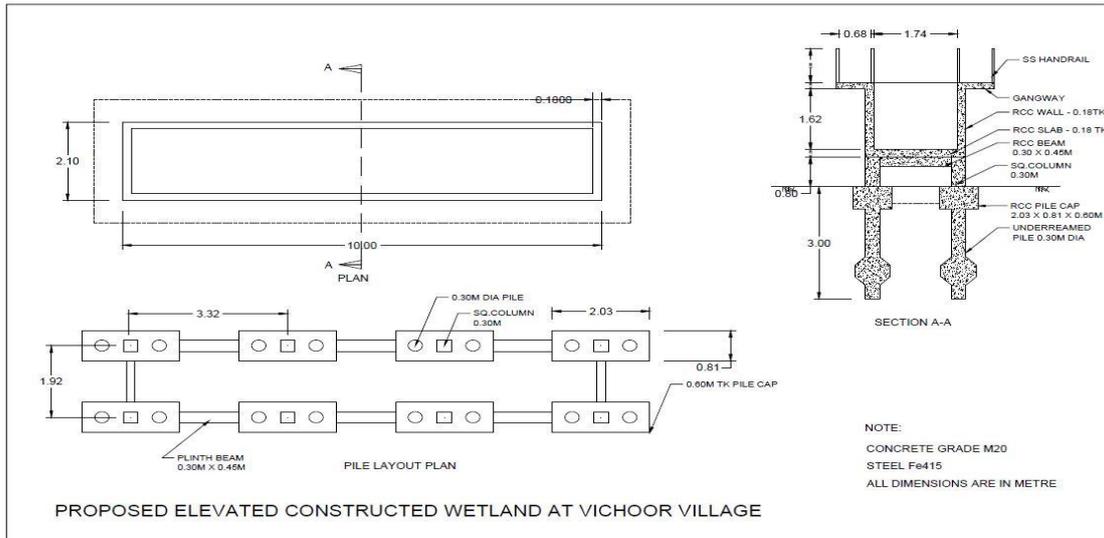




**Photo 3.16: Flooding during monsoon period**



**Fig. 3.5: Drawing of elevated constructed wetland at the compost yard**



**Fig. 3.6: Drawing of elevated constructed wetland**

### 3.8 MEASURES TAKEN FOR ADAPTION DURING MONSOON PERIOD

The following measures were taken during the monsoon period to facilitate the proper functioning of the waste management facilities (Photos. 3.17 – 3.18).

- a) Mass cleaning after the monsoon period
- b) Re-plantation in the existing constructed wetland

#### a) Mass cleaning after Monsoon period at Vichoor



**Photo 3.17: Photographs taken before and after mass cleaning**



**Photo 3.18: Photographs taken during and after re-plantation of plant species in constructed wetland**

### **3.9 CONSTRUCTION OF ELEVATED WETLAND AT COMPOST YARD**

The construction of elevated wetland commenced on 7<sup>th</sup> August 2020. The photographs are shown in Photo 3.19. The final stage of elevated wetland is shown in Photo 3.20.



**Bhoomi Pooja**



**Marking for excavation**



**Excavation work**



**During pile foundation work**





**During construction activities**

**Photo 3.19: Photographs taken during various stages of construction of elevated CW**



**Photo 3.20: Photographs taken after completion of elevated CW**

### 3.10 PERIODIC INSPECTION BY the IITM EXPERT TEAM

Periodic inspections were made by IITM expert team, which includes professors and research students to ensure the proper functioning of the waste management practices and storm water and wastewater management (Photo 3.21). Also, the field workers were involved in the routine cleaning of the storm water drains (Photo 3.22).



Checking of inspection chambers



Checking of storm water drain



Checking of outlet of storm drain to Lake



Checking of Constructed wetland

Photo 3.21: Photographs taken during the inspection at Vichoor village



**Photo 3.22: Photographs of routine cleaning activities**

### **3.11 VISITS BY VARIOUS PERSONS / TEAMS**

The success of the project has attracted several visitors / officials / teams from various institutions to study the project and eventually adopted this idea as “*model sustainable village*”. The details of their visits are provided below.

**a) Mrs. Vijayalakshmi, IIT Madras (19<sup>th</sup> October 2019; Photo 3.23)**



**Photo 3.23: Visit by Mrs. Vijayalakshmi (w/o Prof. Bhaskar Ramamurty, Director, IITM)**

**b) Team from MRF Welfare (9<sup>th</sup> October, 2019; Photo 3.24)**



**Photo 3.24: Photographs taken during visit of the MRF team**

**c) MHRD official (24<sup>th</sup> October, 2019)**

MHRD official, Mr. Kesari visited Vichoor to assess the waste management and sanitation practices being followed in the village, especially regarding open defecation system, toilets, septic tanks and household hygiene. During the visit, he interviewed BDO and Panchayat Secretary and conducted a survey regarding the sanitation practices, subsidy for septic tank construction etc. in few households, schools and anganwadis (Photo 3.25).



**Photo 3.25: Photographs taken during the visit of MHRD official**

#### d) IAL Team (11<sup>th</sup> February 2020)

Officials from Indian Additives Limited (funding agency) visited the village, compost yard and treatment facility on 11<sup>th</sup> February 2020. IAL team interacted with the IIT Madras team and field workers regarding the progress of the project and upcoming activities planned (Photo 3.26).



**Photo 3.26: Photographs taken during the visit the officials from IAL**

### 3.12 MEASURES TAKEN DURING COVID-19 PANDEMIC

In order to fight against COVID-19, the state government has taken various initiatives through the panchayat. Close consultation with the state as well as district authorities was maintained to ensure the strict adherence of lock down conditions and social distancing to curtail the spread of disease. Food security assistance of Rs.1000/- and distribution of rice, tur dal, palm oil and sugar to all the family card holders through PDS shops were provided to all the beneficiaries in the villages. Also, the panchayat sealed the boundaries of the area in order to minimize the entry of people from other panchayats. The panchayat also took initiatives in sanitizing all the buildings of government institutions like schools, Anganwadi, Panchayat Office, VAO office and village community hall, houses and streets etc. Panchayat President also motivated the neighbouring panchayat to follow and support the initiative. He issued pamphlets for sensitizing people about Coronavirus and preventive

measures, etc. The Vichoor Panchayat had initiated some of the best practices based on the inputs by the state as well as central government as follows:

### 3.12.1 Social distancing and Containment

The Panchayat sanitary workers regularly monitored the public movement based on the directives given by the state government. The residents maintained social distancing while stepping out of the house for purchasing grocery items in the local provision stores or PDS Shops (Ration Shops) (Photo 3.27).



Photo 3.27: Practicing social distancing and containment in the village

### 3.12.2 Hygiene and Sanitation Activities

The Panchayat, with support from IIT Madras, provided free face masks to all the residents. Through the awareness banners, the village residents were instructed to wash hands with soap frequently, not to touch their eyes, nose and mouth and maintain personal distance (Photo 3.28 & 3.29).





Photo 3.28: Distribution of Free Face Mask to Sanitary Workers



Photo 3.29: Awareness banner

Mass cleaning and door to door disinfection was undertaken throughout the Vichoor panchayat. Disinfectant was sprayed in every house and it was made sure that they maintained health and hygiene. Sanitary workers were provided with the safety masks and gloves. Traditional Method of Disinfection i.e., spraying of water mixed with turmeric and Neem leaves was also carried out (Photo 3.30).



**Photo 3.30: Spraying of disinfectant all over the village**

### 3.12.3 Hand Wash Awareness

One of the most important ways to prevent the spread of a virus is to wash the hands frequently with soap and water. The panchayat created awareness through banners to show how to wash hands to prevent one from getting the infection of corona virus (Photo 3.31).



**Photo 3.31: Hand washing campaign**

### 3.12.4 Supplying Commodities through PDS Shop

Based on the state government directives, basic amenities such as rice, tur dal, palm oil and sugar and food security of Rs.1000 were provided to all the family card holders through PDS shops free of cost (Photo 3.32). Also, rice and mixed vegetables were provided to the residents at free of cost (Photo 3.33).



**Photo 3.32: Supplying basic commodities in PDS shop**



**Photo 3.33: Distribution of Free Rice (10 kg pack) and Mixed Vegetables (5 kg pack)**

### 3.13 NEW EQUIPMENT

New tricycle and shredding machine were bought for the ease IN solid waste collection and compostion (Photo 3.34).



**Photo 3.34: Photographs of New Tricycle and Shredder Machine**

### 3.14 FIELD SURVEY IN PHASE – II VILLAGES

Field survey was conducted in the village in order to assess waste generation & collection, usage of personal care products and intake of various medicines for chronic illness in the month of September 2020. A detailed survey was also undertaken to assess the willingness to pay for solid waste Management (Photo 3.35).



**Photo 3.35: Field survey conducted in the month of September 2020**

### 3.15 EXECUTION OF SMALL-BORE SYSTEM IN PHASE II VILLAGES

The pipeline work for underground sewer line network which facilitates the wastewater collection and treatment in at Phase II villages got completed (Photo 3.36). The IITM expert team used to visit during its construction and after completion, a water flow test was conducted using water tankers in order to ensure the wastewater flow by gravity. IITM team provided suggestions to improve the flow and that got accomplished in the later stage (Photo 3.37).



**Photo 3.36: Pipe Laying Work in Phase –II Villages**



**Photo 3.37: Flow test monitored by IITM team to ensure gravity flow of wastewater**

### 3.16 PERFORMANCE EVALUATION OF TREATMENT PLANT UNITS

Regular wastewater and compost sample collection and analyses were carried out to ensure quality of treatment. Once the elevated constructed wetland got operational, samples were collected for analysis (Photos 3.38 and 3.39). The treated water quality from both the constructed wetlands (Table 3.2) meet the discharge standards provided in Table 3.3. Hence the treated water is ready for reuse. In the compost yard, the treated water is used for watering the garden, flushing, cleaning the floor etc. and the rest of the treated water is send to the lake. Similarly compost samples were analysed for the quality on a routine basis (Photos 3.40). The organic compost from the yard meets not only national but also international stanadards and is given in Table 3.4.



**Photo 3.38: Weekly sample collection at existing constructed wetland**



**Photo 3.39: Composite sample collection at the constructed wetland**



**Photo 3.40: Sample collection from compost pits and daily temperature monitoring**

**Table 3.2 Treated water quality from individual treatment plant units**

Parameter	Raw wastewater	Septic tank Outlet	Settling Outlet	CW Outlet	Elevated CW Outlet
pH	7.15 ± 0.1	7.01 ± 0.2	7.17 ± 0.13	7.14 ± 0.32	7.87 ± 0.25
EC (µS/cm)	1325 ± 0.21	1109.2 ± 0.97	1115.4 ± 1.28	721.6 ± 0.56	768.5 ± 2.56
Turbidity (NTU)	18.32 ± 0.42	11.36 ± 1.08	11.88 ± 0.47	5.98 ± 1.27	7.77 ± 1.44
TSS (mg/L)	38.0 ± 2.83	27.1 ± 2.02	28.0 ± 0.81	11.4 ± 4.04	14.6 ± 2.95
TS (mg/L)	952 ± 0.94	796 ± 1.98	778 ± 0.24	546 ± 2.65	574 ± 5.21
BOD <sub>5</sub> at 20°C(mg/L)	208 ± 0.1	115 ± 2.4	120 ± 1.9	29 ± 1.1	35 ± 0.3
s-BOD <sub>5</sub> at 20°C(mg/L)	156 ± 2.3	92 ± 2.4	95 ± 3.5	21 ± 2.9	29 ± 0.9
COD (mg/L)	432 ± 4.07	240 ± 5.66	234 ± 1.36	48 ± 1.13	57 ± 0.12
s-COD (mg/L)	381 ± 3.08	201 ± 1.13	192 ± 2.92	40 ± 2.26	42 ± 2.4
TOC (mg/L)	63.8 ± 3.25	44.73 ± 3.39	42.41 ± 1.14	9.95 ± 0.47	11.43 ± 2.38
TN (mg/L)	27.55 ± 0.51	19.22 ± 0.25	19.55 ± 0.32	6.83 ± 0.85	7.59 ± 0.03
NH <sub>4</sub> -N (mg/L)	24.47 ± 1.61	17.46 ± 1.21	16.44 ± 1.09	4.35 ± 0.28	6.29 ± 0.00
NO <sub>3</sub> -N (mg/L)	1.52 ± 0.11	0.88 ± 0.06	1.00 ± 0.06	0.89 ± 0.01	1.09 ± 0.02
TP (mg/L)	7.83 ± 0.34	4.95 ± 0.30	5.11 ± 0.19	2.86 ± 0.05	3.52 ± 0.01
TC CFU/100mL	18*10 <sup>6</sup>	14*10 <sup>5</sup>	12*10 <sup>5</sup>	13*10 <sup>2</sup>	16*10 <sup>3</sup>

**Table 3.3 Recommended Guidelines for Treated Sewage if Discharged into Surface Water to be used as source of Drinking Water**

Parameter	MOEF Standards (A)	Recommended Values
BOD, mg/L	30	Less than 10
SS, mg/L	100	Less than 10
TN, mg/L	100	Less than 10
Dissolved P, mg/L	5	Less than 2
Faecal Coliforms, MPN/100 mL	Not specified	Less than 230

**Table 3.4 Compost sample analysis**

Parameters	City compost standard (FCO, 1985)	Final compost sample
Moisture, per cent by weight	15.0-25.0	23±1.0
Color	Dark brown to black	Dark brown to black
Odor	Absence of foul odor	Absence of foul odour
Particle size	>90% material should pass through 4 mm IS sieve	Passed through 4mm IS Sieve
Bulk density (g/cc)	<1.0	1.05±0.3
Total organic carbon), per cent by weight	>12.0	29.5±0.40
Total Nitrogen (as N), per cent by weight	> 0.8	1.60±0.05
Total Phosphates (as P <sub>2</sub> O <sub>5</sub> ), per cent by weight	>0.4	0.35±0.02
Total Potash (as K <sub>2</sub> O), per cent by weight	>0.4	2.0±0.2
C:N ratio	<20	17.1±0.5
pH	6.5 - 7.5	8.5±0.10
Conductivity (ds/m)	<4.0	4.0±0.05
Pathogens (MPN/100mL)	Nil	157
Tolerance limit (N+P+K) percent	>1.5	3.95±0.10
<b>Phytotoxicity test (standard based on Hong Kong Organic Resource Centre and Canadian Council of Ministers of the Environment)</b>		
Seed germination Index	>80%	110

## **CHAPTER 4**

### **PLAN FOR SUSTAINABLE OPERATION & MAINTENANCE**

The successful implementation of the waste management project in Vichoor Panchayat resulted in the generation of resources from waste streams: organic compost, dry recyclables and treated wastewater. In order to sustain the quality of work in the villages in future, public participation is very much essential. Though the panchayat can take over the responsibility in the coming future, public participation could be a game changer for nearby villages as well. To ensure public involvement and the cleanliness of the villages in future, a plan has been introduced for self-sustenance of the project.

Based on the project evaluation in the past three years, it was found that some income can be generated by selling the resources recovered from the waste. Details of the total amount of household waste generated, organic compost produced and dry recyclables obtained during the past few years is provided in Tables 4.1 and 4.2, for Phase I and II, respectively (during the year 2018- 2020). The revenue obtained through inorganics and organic compost sales are given in Tables 4.3 and 4.4. It shows that the income obtained by selling recovered resources from waste can meet the expenses incurred in paying for electricity, operation and maintenance and other miscellaneous items. However, this is not sufficient for paying the salaries of the sanitation workers employed for solid waste collection and compost yard operations. The salary expense can be met if each household pays a minimum of Rs. 100/- per month for the solid waste collection (Table 4.5). Their contribution would also give them a sense of ownership of the project and so they are more likely to ensure proper operation and maintenance. Though the public cannot participate directly due to their busy life schedule, by contributing they can indirectly get involved in development of a clean and healthy village.

Once, the waste management practice in both Phase - I and II got stabilized, a detailed survey (Table 4.6 & 4.7) was made to understand the willingness of households to pay for solid waste collection. About 580 households are willing to pay the tipping fee of Rs. 100/- p.m. When an income and expenditure balance is made, surplus amount is obtained (Table 4.5). The surplus amount can be kept for miscellaneous purposes. The Panchayat officials agreed to this plan and they arranged a meeting at Community Centre, Velavan Nagar, Vichoor Panchayat on 24-1-2021 for enabling the sustainability measures as a part the project in presence of the IITM team. The photographs taken during the meeting are given in Photo 4.1.



**Photo 4.1: Meeting held at Community Centre, Velavan Nagar Vichoor Panchayat on 24-1-2021 to discuss about the sustainability of the project (Resolved to collect Rs. 100 per month from each household)**

In order to ensure the money collection process in the panchayat, the IITM team has approached the Block Development Office (BDO), Sholavaram and Collectorate office, Tiruvallur for official approval to collect money from households (Photo 4.2). The draft of the official order that is going to be issued is shown in Fig 4.1 and 4.2. As the official order can be issued only after May 2021, an oral order has been issued for time being. The draft letter from PD is handed over to Mr. Sankar, Panchayat President for the initiation of money collection process by the Panchayat (Photo 4.3). After a detailed discussion with the panchayat officials, they agreed to recruit the sanitary supervisor Ms. Poongudi and sanitary worker Ms. Rekha as panchayat staffs to do the proper waste management practice in Phase I and II in Vichoor village. These two sanitary workers have been involved in the project for a long time and are well trained in all aspects of waste and wastewater management.



**Photo 4.2: Meeting with Ms. Porchelvi, BDO, Sholavaram regarding the money collection**



**Photo 4.3: Draft order from PD is handed over to Mr. Sankar, Panchayat President for the initiation of money collection process by the Panchayat**

அனுப்புநர்

திருமதி.க.லோகநாயகி.,பிஎஸ்சி, பிஎல்.,  
திட்ட இயக்குநர் / இணை இயக்குநர்,  
மாவட்ட ஊரக வளர்ச்சி முகமை,  
திருவள்ளூர்.

பெறுநர்

ஊராட்சி மன்ற தலைவர்,  
விச்சூர் ஊராட்சி,  
சோழவரம் -600103

ந.க.எண்.1259 /2018/அ5

நாள் . 03.2021

ஐயா,

பொருள்- திடக்கழிவு மேலாண்மை திட்டம் - திருவள்ளூர் மாவட்டம் -  
சோழவரம் -மாவட்ட ஊரக வளர்ச்சி முகமை - சோழவரம் ஊராட்சி  
ஒன்றியம் - விச்சூர் ஊராட்சியில் திடக்கழிவு மேலாண்மை திட்டம்  
மூலம் தூய்மை பணிகள் மேற்கொள்ளப்பட்டது - 3 மாத கால  
நீட்டிப்பு கோரியது - தொடர்பாக.

பார்வை- Mr. Ligy Philip, Department of civil engineering, IIT  
Madras, Lr dated.08.03.2021.

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பார்வை காணும் கடிதத்தில், திருவள்ளூர் மாவட்டம், சோழவரம் ஊராட்சி  
ஒன்றியத்தில் உட்பட்ட விச்சூர் ஊராட்சி Department of civil engineering, IIT  
Madras, மூலம் திடக்கழிவு மேலாண்மைத்திட்டம் வெற்றிகரமாக  
செயல்படுத்தப்பட்டுள்ளது. மேலும், இந்த ஊராட்சியில் திடக்கழிவு மேலாண்மை குறித்த  
விழிப்புணர்வு, கழிவுகளை பிரித்தல் குறித்த வீட்டுகளுக்கு மட்டுமல்லாமல் மற்ற  
ஊராட்சிகளுக்கும் முறையான திடக்கழிவு நிர்வாகத்தை அடைவதற்கான பயிற்சி  
அளிக்கவும், தயராக உள்ளது.

ஊராட்சிகளில் முறையான கழிவு மற்றும் கழிவு நீர் மேலாண்மை நடைமுறைகளை  
நிறைவேற்ற சுகாதார தொழிலாளர்களுக்கு நன்கு பயிற்சி அளிக்கப்பட்டுள்ளது.

The small bore system (கழிவு நீர் சேகரிப்பு) மற்றும் இயற்கை சுத்திகரிப்பு  
முறைகள் சிறப்பாக செயல்படுகின்றன. அதன் பின் திடக்கழிவுகளை பிரித்தல், முன்று  
சக்கர வண்டிகளை பயன்படுத்தி கழிவுகளை சேகரித்து உரம் மூலம் கரிம கழிவு  
சுத்திகரிப்பு மற்றும் மறு சூழற்சி செய்யக்கூடிய கனிமங்களை மீட்பது ஆகியவை சிறப்பாக  
செயல்படுகின்றன.

\\10.237.45.107\d\A5 New\2020\Letters\1259- T.K.Salary adjustment details letter.docx

Fig. 4.1: Draft order from Collector's office for solid waste collection fee (Pg. no. 1)

மேற்காணும் திட்டப்பணிகளை 31.03.2021 அன்று முடிவடைவதால், இத்திட்டம் தொடர்ந்து செயல்படுவதற்கும் இதன் மூலமாக அவ்வூராட்சி தொடர்ந்து தூய்மையாக பராமரிக்கவும் விசீஞர் ஊராட்சி நிர்வாகம் மூலம் மேற்கொள்ள இதன் மூலம் தெரிவித்துக்கொள்ளப்படுகிறது.

திட்ட இயக்குநர் / இணை இயக்குநர்,  
மாவட்ட ஊரக வளர்ச்சி முகமை,  
திருவள்ளூர்.

நகல்

1. வட்டார வளர்ச்சி அலுவலர்(கி.ஊ),  
சோழவரம் ஊராட்சி ஒன்றியம்,  
திருவள்ளூர் மாவட்டம்.
2. Dr. Lisy Philip,  
Dean Planning & Institute Chair, .  
Professor,  
Department of civil engineering,  
Chennai – 600 036.

**Fig. 4.2 Draft order from Collector's office for solid waste collection fee (Pg. no. 2)**

**Table 4.1. The total waste collected from PHASE I during June 2018 to June 2020**

Sl. No	MONTH	Vegetables in Kg	Carry Bag in Kg	Newspaper in Kg	Colour Paper in Kg	Card board in Kg	Milk cover in Kg	Water can in Kg	White sheet in Kg	Glass bottles in No. Pcs.	TOTAL in Kg
1	Jun-18	1353.32	27.65	22.9	23.74	107.88	25.84	81.35	49	96	1787.68
2	Jul-18	1342.54	23.66	26.91	29	96.46	25.09	80.27	0.00	95	1718.93
3	Aug-18	1258.74	17.95	22.03	23.51	90.4	21.48	73.68	120	110	1737.79
4	Sep-18	1221.48	7.33	19.25	21.72	178.96	20.07	179.37	0.00	120	1768.18
5	Oct-18	1297.59	6.2	20.47	25.76	171.88	23.59	144.88	139	185	2014.37
6	Nov-18	1069.24	7.22	17.64	21.51	87.08	21.85	73.53	46.97	117	1462.04
7	Dec-18	1195.2	7.27	19.8	26.35	46.71	26.9	69.14	74.8	182	1648.17
8	Jan-19	1164.4	4.6	17.7	22.1	27.06	29.36	45.59	61.62	147	1519.43
9	Feb-19	927.07	7.55	12.7	15.52	26.39	13.57	34.23	85.43	109	1231.46
10	Mar-19	957.72	3.08	29.83	13.34	25.12	16.63	36.06	38.16	130	1249.94
11	Apr-19	1112.84	1.19	11.66	18.33	32.51	44.21	27.8	50.22	103	1401.76
12	May-19	1089.06	1.93	12.57	16.87	34.79	50.89	18.98	55.69	110	1390.78
13	Jun-19	1299.52	4.4	18.94	24.19	125.97	31.27	126.95	19.78	38	1689.02
14	Jul-19	1116.22	0.87	11.79	16.44	37.77	40.95	20.59	55.7	159	1459.33
15	Aug-19	1016.67	0.56	10.36	13.87	34.04	44.74	16.1	43.52	163	1342.86

16	Sep-19	943.05	9.79	14.08	20.46	96.01	19.78	64.74	55.19	134	1357.1
17	Oct-19	1054.37	0.39	8.52	11.55	49.94	61.45	16.22	128.7	133	1464.14
18	Nov-19	1071.28	0.61	10.1	13.25	36.28	51.3	15.71	56.92	148	1403.45
19	Dec-19	1201.14	5.45	17.16	24.44	43.11	33.88	56.43	65.958	164	1611.57
20	Jan-20	1099.31	0.41	8.53	10.29	43.95	49.97	13.27	50.92	131	1407.65
21	Feb-20	1121.91	0.41	7.29	11.5	35.32	49.89	14.37	44.74	127	1412.43
22	Mar-20	1110.58	0.45	1.05	10.81	37.03	46.71	13.69	44.26	133	1397.58
23	Apr-20	969.71	0.52	5.35	8.57	30.69	32.16	11.34	37.75	126	1222.09
24	May-20	1035.04	0.46	5.17	7.64	32.43	31.91	15.17	34.86	26	1188.68
25	Jun-20	938.64	0.56	5.08	8.88	40.53	39.71	13.67	45.5	43	1135.57
	<b>TOTAL WEIGHT</b>	<b>27966.6</b>	<b>140.51</b>	<b>356.88</b>	<b>439.64</b>	<b>1568.31</b>	<b>853.2</b>	<b>1263.13</b>	<b>1404.69</b>	<b>3029</b>	<b>37022</b>

**Table 4.2. The total waste collected from PHASE II during June 2018 to June 2020**

Sl. No	MONTH	Vegetables in Kg	Carry Bag in Kg	Newspaper in Kg	Colour Paper in Kg	Card board in Kg	Milk cover in Kg	Water can in Kg	White sheet in Kg	Glass bottles in No. Pcs.	TOTAL in Kg
1	Jun-18	908.92	16.97	18.36	24.01	73.57	18.7	57.52	0	95	1213
2	Jul-18	1557.18	26.81	33.09	110.54	142.29	26.42	93.72	0	99	2089
3	Aug-18	1553.91	17.12	24.08	29.72	122.85	23.7	83.24	0	131	1986
4	Sep-18	1662.49	4.66	26.05	27.44	294.12	30.85	191.39	0	145	2382
5	Oct-18	2321.3	7.01	22.78	31.99	525.5	40.66	252.63	0	545	3747
6	Nov-18	1644.05	7.17	30.48	39.1	140.39	25.5	90.46	62.01	146	2185
7	Dec-18	2133.01	9.21	29.71	28.86	65.86	34.41	77.65	92.15	192	2663
8	Jan-19	1998.36	5.66	19.13	26.02	34.67	30.18	48.97	79.53	146	2389
9	Feb-19	1538.25	5.34	16.7	21.61	32.99	16.74	42.08	50.76	128	1852
10	Mar-19	1387.07	2.45	12.7	17.8	71.65	21.94	57.16	52.87	152	1776
11	Apr-19	1807.79	1.5	21.66	27.06	36.95	57.59	52.48	148.19	135	2288
12	May-19	1730.14	0.83	17.12	21.743	42.269	65.21	22.02	68.72	120	2088
13	Jun-19	1160.97	1.16	13.65	19.32	45.22	56.16	20.83	66.93	164	1548
14	Jul-19	1649.68	0.96	16.87	21.96	49.24	58.92	25.1	75.4	183	2081
15	Aug-19	1442.62	1.88	11.38	17.21	35.21	43.99	42.14	141.97	168	1904
16	Sep-19	1533.32	11.9	20.61	25.6	82.13	23.27	68.22	62.92	164	1992
17	Oct-19	1499.6	0.9	9.71	12.3	52.3	73.6	17.9	54.85	140	1861

18	Nov-19	1778.8	4.56	19.36	33.63	72.94	48.64	57.26	84.83	211	2311
19	Dec-19	1591.09	2.54	19.58	24.93	60.59	56.05	46.2	144.25	167	2112
20	Jan-20	1742.36	0.45	8.8	12.02	49.36	13.18	71.41	72.52	172	5034
21	Feb-20	1633.16	0.65	9.55	12.1	56.63	14.82	60.6	62.52	175	4663
22	Mar-20	1764.66	0.73	9.82	12.09	46.25	59.19	16.41	59.55	161	5117
23	Apr-20	1599.04	0.48	7.31	10.29	36.85	41.31	15.82	50.15	151	4727
24	May-20	1500.44	0.46	7.35	10.19	37.89	41.98	16.28	50.88	23	4690
25	Jun-20	1320.37	0.48	7.35	10.83	51.52	49.76	15.748	62.44	54	4499
	<b>TOTAL WEIGHT</b>	<b>40458.6</b>	<b>131.88</b>	<b>433.2</b>	<b>628.363</b>	<b>2259.24</b>	<b>972.77</b>	<b>1543.24</b>	<b>1543.44</b>	<b>3967</b>	<b>69197</b>

**Table 4.3. The revenue generated from inorganics (dry recyclables) sales during June 2018 to June 2020**

<b>Inorganic waste sold out</b>	
<b>Date</b>	<b>Amount in Rs.</b>
29.06.18	3829
25.08.18	8740
28.10.18	10329
08.02.19	13190
30.03.19	5023
10.05.19	8350
12.07.19	10236
26.08.19	6758
04.10.19	5434
26.12.19	12809
10.02.20	4919
11.06.20	8890
<b>Total</b>	<b>98507</b>

Annual revenue generated from inorganics sale = Rs 49254/-

Monthly revenue generated from inorganics sale = Rs 4105/-

**Table 4.4. The revenue generated from organic compost sale during June 2018 to June 2020**

<b>ORGANIC COMPOST SELL / BUY DETAILS</b>					
<b>Date</b>	<b>Name</b>	<b>ADDRESS</b>	<b>Qty. in Kg</b>	<b>Rate/kg</b>	<b>Amount in Rs.</b>
07.06.2018	SOLD OUT IN CHURCH	INFANT CHURCH	40	20	800
10.06.2018	NISHA	JAGAN NAGAR	1	20	20
10.06.2018	GOWRI	EZHIL NAGAR	1	20	20
22.06.2018	KATHIRVEL	IIT MADRAS	2	20	40
23.06.2018	VALLI	EZHIL NAGAR	2	20	40
02.07.2018	SOLD OUT IN CHURCH	INFANT CHURCH	45	20	900
05.07.2018	SASIKALA	VELAVAN NAGAR	2	20	40
11.07.2018	ROSELY	LAKSHMI NAGAR	2	20	40
17.07.2018	POONGODI	SRI RAM NAGAR	1	20	20
23.07.2018	INDUSTRY	VICHOOR	25	20	500
04.08.2018	SOLD OUT IN CHURCH	INFANT CHURCH	41	20	820
09.08.2018	KAVERY	EZHIL NAGAR	2	20	40
13.08.2018	KALPANA	SRI RAM NAGAR	1	20	20
21.08.2018	SUGUNA	GANAPATHI NAGAR	1	20	20
06.09.2018	SOLD OUT IN CHURCH	INFANT CHURCH	38	20	760
04.10.2018	SOLD OUT IN CHURCH	INFANT CHURCH	16	20	320
16.10.2018	KALAIVANI	IIT MADRAS	2	25	50
17.10.2018	BINDHU	IIT MADRAS	1	25	25
22.10.2018	unknown	IIT MADRAS	1	25	25
01.11.2018	SOLD OUT IN CHURCH	INFANT CHURCH	18	20	360
06.12.2018	SOLD OUT IN CHURCH	INFANT CHURCH	10	20	200
06.12.2019	Samples to Nursery Garden	FREE	15	0	0
03.12.2018	Mr. Christian	Panchayat secretary	15	0	0

03.12.2019	Samples to Nursery Garden	FREE	5	0	0
20.12.2018	IITM for analysis	samples for lab	1	0	0
03.01.2019	SOLD OUT IN CHURCH	INFANT CHURCH	9	20	180
07.02.2019	SOLD OUT IN CHURCH	INFANT CHURCH	15	20	300
07.03.2019	SOLD OUT IN CHURCH	INFANT CHURCH	49	20	980
04.04.2019	SOLD OUT IN CHURCH	INFANT CHURCH	45	20	900
05.04.2019	POONGODI	GANAPATHI NAGAR	2	20	40
23.04.2020	BEGAM	EZHIL NAGAR	20	15	300
24.04.2019	EZHUMALAI	VICHOOR	54	15	810
04.04.2019	RAMYA	GANAPATHI NAGAR	1	20	20
04.04.2019	ANITHA	GANAPATHI NAGAR	1	20	20
04.04.2019	MUNIYAMMAL	GANAPATHI NAGAR	1	20	20
04.04.2019	DILLIBABU	JAGAN NAGAR	1	20	20
05.04.2019	KANNAN	GANAPATHI NAGAR	3	20	60
02.05.2019	SHANTHI	EZHIL NAGAR	3	20	60
10.04.2020	BHAVANI	JAGAN NAGAR	1	20	20
04.05.2019	SOLD OUT IN CHURCH	INFANT CHURCH	50	20	1000
06.06.2019	SOLD OUT IN CHURCH	INFANT CHURCH	38	20	760
05.07.2019	SOLD OUT IN CHURCH	INFANT CHURCH	25	20	500
01.08.2019	SOLD OUT IN CHURCH	INFANT CHURCH	40	20	800
14.08.2019	SOLD OUT IN households	EZHIL NAGAR	25	18	450
21.08.2019	SOLD OUT IN NURSERY	MINJURE	50	12	600
05.09.2019	SOLD OUT IN CHURCH	INFANT CHURCH	20	20	400
04.10.2019	SOLD OUT IN CHURCH	INFANT CHURCH	15	20	300
17.10.2019	RAJU HOSPITAL	T -NAGAR	500	10	5000
17.10.2019	NURSERY GARDEN	IIT MADRAS	500	10	5000

07.11.2019	SOLD OUT IN CHURCH	INFANT CHURCH	15	20	300
05.12.2019	SOLD OUT IN CHURCH	INFANT CHURCH	15	20	300
22.01.2020	Prof.B.S. Murty	IIT MADRAS	1	20	20
06.02.2020	SOLD OUT IN IIT	IIT MADRAS	1000	10	10000
10.02.2020	SOLD OUT IN CHURCH	INFANT CHURCH	31	20	620
20.05.2020	SOLD OUT IN VICHOOR	VICHOOR	15	20	300
19.06.2020	SOLD OUT	VICHOOR	4	20	80
<b>TOTAL</b>			<b>2837</b>		<b>35220</b>

Annual revenue generated from inorganics sale = Rs 17610/-

Monthly revenue generated from inorganics sale = Rs 1468/-

**Table 4.5: Income - Expenditure balance for executing the sustainability plan**

<b>Item</b>	<b>Expenditure (Rs.)</b>	<b>Item</b>	<b>Expected Income (Rs.)</b>
Salary for sanitary workers (6 No. s)	54780/-	Compost sale	1468/-
Electricity bill	870/-	Inorganic sale	4105/-
Maintenance	260/-	Tipping fee collection from households (580 no. s)	58000/-
Miscellaneous	2000/-		
<b>Total expenditure</b>	<b>57910/-</b>	<b>Total income</b>	<b>63573/-</b>

**Table 4.6. Survey details conducted in Phase I for tipping fee collection**

<b>Sl.no.</b>	<b>Name</b>	<b>Address</b>	<b>Yes/No (Rs.100)</b>	<b>Remarks</b>
1	Dilli Krishnan	6/195, Ezhil nagar	Yes	
2	Vijaya	6/194, Ezhil nagar	Yes	
3	Joseph penadik	9/107, Ezhil nagar	Yes	
4	Sowndhari	9/101, Ezhil nagar	Yes	
5	Janagiraman	Plot NO:73, Ezhil nagar	No	Financial Problem
6	R.Gopal	Plot NO:72, Ezhil nagar	Yes	
7	Nadimuthu	9/51, Ezhil nagar	Yes	
8	Alphones	9/35, Ezhil nagar	Yes	
9	Saraswathi	9/34, Ezhil nagar	No	Financial Problem
10	Sarasam	9/36, Ezhil nagar	No	Financial Problem
11	Sreenivasan	9/37, Ezhil nagar	Yes	
12	Kanimozhi	9/37A, Ezhil nagar	No	Financial Problem
13	Jaisankar	9/40, Ezhil nagar	Yes	
14	Jelastin	Plot No:81, Ezhil nagar	Yes	
15	Santhi	9/43, Ezhil nagar	Yes	
16	Savari muthu	9/42, Ezhil nagar	Yes	
17	Joseph	Plot No:80, Ezhil nagar	No	Financial Problem
18	Anjugam	9/38, Ezhil nagar	Yes	
19	Rajasekar	9/37, Ezhil nagar	No	Financial Problem
20	Stella	9/52, Ezhil nagar	Yes	

21	Vetrivel murugan	Plot No:7, Ezhil nagar	Yes	
22	Velmurugam	9/36A, Ezhil nagar	Yes	
23	Mahesh	Plot No:14, Ezhil nagar	Yes	
24	Murugan	Plot No:14, Ezhil nagar	Yes	
25	Naga jothi	Plot No:14, Ezhil nagar	Yes	
26	Sagaya Rani	9/54, Ezhil nagar	Yes	
27	P.Amirtha lingam	47-A, Ezhil nagar	Yes	
28	Joseph	9/55, Ezhil nagar	No	Financial Problem
29	N.Baskar	9/56, Ezhil nagar	Yes	
30	Mohan	9/57, Ezhil nagar	Yes	
31	Chitra	9/58, Ezhil nagar	Yes	
32	Sowndharajan	9/59, Ezhil nagar	Yes	
33	Gopu kumar	Plot No:23, Ezhil nagar	Yes	
34	Vinayaga moorthy	Plot No:24, Ezhil nagar	Yes	
35	Kumar	9/64, Ezhil nagar	No	Financial Problem
36	Latha	9/65, Ezhil nagar	Yes	
37	Chitra	Plot No:26, Ezhil nagar	No	Financial Problem
38	Mala	9/94, Ezhil nagar	Yes	
39	Ramya	9/94, Ezhil nagar	Yes	
40	Anitha	9/94, Ezhil nagar	Yes	
41	Muniyammal	9/94, Ezhil nagar	Yes	
42	Manjula	9/95, Ezhil nagar	Yes	
43	Janagi	9/96, Ezhil nagar	Yes	
44	Ravi	Plot No:48, Ezhil nagar	Yes	
45	Anthonyammal	9/97, Ezhil nagar	Yes	
46	Santhi	9/81, Ezhil nagar	Yes	
47	Latha	9/79, Ezhil nagar	Yes	
48	Arokiyaraj	Plot NO:51, Ezhil nagar	Yes	
49	Sivakami	9/76, Ezhil nagar	Yes	
50	Rose	9/82, Ezhil nagar	Yes	
51	T.saravanan	9/83, Ezhil nagar	Yes	
52	Ashok kumar	Plot NO:76, Ezhil nagar	Yes	
53	Devi	Plot NO:76, Ezhil nagar	Yes	
54	Irudhaya merry	Plot No:34, Ezhil nagar	Yes	
55	Samy dhurai	Plot No:71, Ezhil nagar	Yes	

56	Tamilselvam	9/88, Ezhil nagar	Yes	
57	Vijaya	Plot No:32, Ezhil nagar	Yes	
58	Joseph	plot NO:93, Ezhil nagar	Yes	
59	Vijaya	9/31, Ezhil nagar	Yes	
60	P.Mariyappan	9/84, Ezhil nagar	Yes	
61	Braight	9/24, Ezhil nagar	Yes	
62	Ramisha	9/30, Ezhil nagar	Yes	
63	Pavithra	Plot No:13, Ezhil nagar	No	Financial Problem
64	Jeganathan	Plot No:14, Ezhil nagar	Yes	
65	Paulraj	Plot No:13, Ezhil nagar	No	Financial Problem
66	Kanigammal	9/39, Ezhil nagar	No	Financial Problem
67	Rajeswari	9/27, Ezhil nagar	Yes	
68	Jamuna	Plot No:14, Ezhil nagar	Yes	
69	Martina	9/23, Ezhil nagar	Yes	
70	Selvi	Plot No:16, Ezhil nagar	Yes	
71	Selvam	9/21, Ezhil nagar	Yes	
72	Revathi	Plot No:17-A, Ezhil nagar	Yes	
73	Gnasekar	Plot No:18, Ezhil nagar	Yes	
74	Subramani	9/17, Ezhil nagar	Yes	
75	Kalaivani	Plot No:17, Ezhil nagar	Yes	
76	Berlin	Plot No:32, Ezhil nagar	Yes	
77	Pedrishiya	Plot No:32, Ezhil nagar	Yes	
78	Nasir Basha	9/92, Ezhil nagar	Yes	
79	Maheswari	Plot No:29, Ezhil nagar	Yes	
80	Kalaivani	Plot No:29, Ezhil nagar	Yes	
81	Selvi	9/18, Ezhil nagar	Yes	
82	Komala	9/17,Ezhil nagar	Yes	
83	Subramani	9/17,Ezhil nagar	Yes	
84	Mondiyammal	9/17,Ezhil nagar	No	Financial Problem
85	Rangan	9/14, Ezhil nagar	Yes	
86	Kasbha	9/16, Ezhil nagar	Yes	
87	Kalavathi	Plot No:22, Ezhil nagar	Yes	
88	Mohan	9/12, Ezhil nagar	Yes	
89	Sathyanarayanan	9/12, Ezhil nagar	Yes	
90	Kowri	9/13, Ezhil nagar	Yes	

91	Vasini	9/10,Ezhil nagar	Yes	
92	Mohanammal	9/11,Ezhil nagar	Yes	
93	Chinnaiya	9/8, Ezhil nagar	No	Financial Problem
94	Lagina	9/7A, Ezhil nagar	Yes	
95	Suresh	9/33, Ezhil nagar	Yes	
96	Peter Maheshwari	9/8, Ezhil nagar	Yes	
97	Boobalan	9/8, Ezhil nagar	Yes	
98	Sathya	9/8, Ezhil nagar	Yes	
99	Kajenthiran	9/6, Ezhil nagar	Yes	
100	Muniasamy	9/5, Ezhil nagar	Yes	
101	Fathmavathy	Ezhil nagar	Yes	
102	Anandhi	Ezhil nagar	Yes	
103	V.Sankar	Plot No:37,Ezhil nagar	No	Financial Problem
104	Simi	9/71, Ezhil nagar	No	Financial Problem
105	Krishnamoorthy	9/71, Ezhil nagar	No	Financial Problem
106	Kunasekaran	Plot No:38, Ezhil nagar	Yes	
107	Yuvaraj	Plot No:39, Ezhil nagar	Yes	
108	Chitra	9/71, Ezhil nagar	No	Financial Problem
109	Sumathi	Plot No:71, Ezhil nagar	No	Financial Problem
110	Biruntha	Plot No:69, Ezhil nagar	No	Financial Problem
111	Kamala kannan	Plot No:57, Ezhil nagar	No	Financial Problem
112	Gijenthiran	Plot No:66, Ezhil nagar	No	Financial Problem
113	Srinivasan	9/72, Ezhil nagar	Yes	
114	Usha	9/72, Ezhil nagar	Yes	
115	Kuppusamy	9/72, Ezhil nagar	Yes	
116	Amutha	9/72, Ezhil nagar	Yes	
117	R.Radhakrishnan	Plot No:40, Ezhil nagar	No	Financial Problem
118	S.George	Plot No:40, Ezhil nagar	No	Financial Problem
119	S.Sudhakar	Plot No:40, Ezhil nagar	No	Financial Problem
120	V.Ravikumar	Plot No:40, Ezhil nagar	No	Financial Problem
121	Muhateen	9/25, Ezhil nagar	No	Financial Problem
122	Ayya durai	9/88, Ezhil nagar	No	Financial Problem
123	Dinesh	9/88, Ezhil nagar	No	Financial Problem
124	Ravikumar	Plot No:43, Ezhil nagar	Yes	
125	Senthil	Plot No:50, Ezhil nagar	Yes	

126	Selvakumar	Plot No:57, Ezhil nagar	Yes	
127	Dhanam	9/82, Ezhil nagar	Yes	
128	Micheal Raj	Plot No:51, Ezhil nagar	Yes	
129	Trance	9/78, Ezhil nagar	No	Financial Problem
130	Lakshmi	9/77, Ezhil nagar	No	Financial Problem
131	Kala	Plot No:59, Ezhil nagar	No	Financial Problem
132	Jegan	Plot No:61-A, Ezhil nagar	No	Financial Problem
133	Mahendhiran	Plot No:49A, Ezhil nagar	No	Financial Problem
134	Kaliraj	Plot No:49B, Ezhil nagar	No	Financial Problem
135	Prabhakaran	Plot No:49, Ezhil nagar	No	Financial Problem
136	Mahadevan	9/75, Ezhil nagar	Yes	
137	Kumari	9/74, Ezhil nagar	Yes	
138	Muniyammal	9/73, Ezhil nagar	Yes	
139	Satish	9/71, Ezhil nagar	Yes	
140	Kuppusamy	9/76, Ezhil nagar	Yes	
141	Suresh	9/76, Ezhil nagar	Yes	
142	PlusRaja	9/79, Ezhil nagar	Yes	
143	Ravikumar	Plot NO:73, Ezhil nagar	Yes	
144	Ramesh	9/93, Ezhil nagar	Yes	
145	Saravan	6/185, Ezhil nagar	Yes	
146	Rajesh	6/185, Ezhil nagar	Yes	
147	Sagaya Rani	Plot No:43, Ezhil nagar	Yes	
148	Arumugam	Plot No:43, Ezhil nagar	Yes	
149	Ravi	Plot No:43, Ezhil nagar	Yes	
150	Sankar	9/1, Ezhil nagar	No	Financial Problem
151	Velu	9/1, Ezhil nagar	No	Financial Problem
152	Manikandan	9/47A, Ezhil nagar	Yes	
153	Tanvir	9/113, Ezhil nagar	No	Financial Problem
154	Rajesh	9/45, Ezhil nagar	Yes	
155	Krishnan	9/21, Ezhil nagar	Yes	
156	Manikandan	9/101, Ezhil nagar	No	Financial Problem
157	Chinraj	9/101, Ezhil nagar	No	Financial Problem
158	Kabali	6/196, Ezhil nagar	Yes	
159	Murugan	6/196, Ezhil nagar	No	Financial Problem
160	Soma sundarm	6/196, Ezhil nagar	No	Financial Problem

161	Neelish	9/102,Ezhil nagar	No	Financial Problem
162	Ganesh	9/102,Ezhil nagar	No	Financial Problem
163	Vinoth	9/41,Ezhil nagar	No	Financial Problem
164	Denis	9/15,Ezhil nagar	Yes	
165	Elumalai	9/287, Ezhil nagar	No	Financial Problem
166	Muthu lingam	Plot No: 15, Ezhil nagar	No	Financial Problem
167	Kulsambi	9/113,Ezhil nagar	No	Financial Problem
168	Sivakami	9/47B,Ezhil nagar	Yes	
169	Susai nadhan	9/46,Ezhil nagar	Yes	
170	Manikandan	9/48, Ezhil nagar	Yes	
171	Lovel Morrison	9/15,Ezhil nagar	Yes	
172	Shis	9/91,Ezhil nagar	Yes	
173	Kangatharan reddy	9/91,Ezhil nagar	Yes	
174	Jeyabal	9/92,Ezhil nagar	Yes	
175	Munisamy	9/92,Ezhil nagar	Yes	
176	Pakkiya Raj	9/19B, Ezhil nagar	Yes	
177	Ayyan raj	9/19B, Ezhil nagar	Yes	
178	Muthu raman	9/19B, Ezhil nagar	Yes	
179	Kumar	9/81,Ezhil nagar	Yes	
180	Natarajan	9/57,Ezhil nagar	No	Financial Problem
181	Suresh	9/14, Ezhil nagar	Yes	
182	Balaji	Plot No:13, Ezhil nagar	Yes	
183	Charles	9/17B,Ezhil nagar	No	Financial Problem
184	Mahendhiran	Plot No:17-B,Ezhil nagar	Yes	
185	Kalayana sundram	Plot No:17-B,Ezhil nagar	Yes	
186	Devi	Plot No:69,Ezhil nagar	Yes	
187	Raja	9/109,Ezhil nagar	Yes	
188	Ramu	9/106,Ezhil nagar	Yes	
189	Nahoor miran	Plot NO:73, Ezhil nagar	Yes	
190	Santhanam	Plot NO:73, Ezhil nagar	Yes	
191	Ilaya raja	9/38,Ezhil nagar	Yes	
192	Ganesh	9/38,Ezhil nagar	Yes	
193	Prabhakaran	9/55, Ezhil nagar	No	Financial Problem
194	Saga Devan	9/23A,Ezhil nagar	Yes	
195	Amir	Plot No:80, Ezhil nagar	Yes	

196	Sagaya raj	9/50,Ezhil nagar	Yes	
197	Govindha raj	9/50,Ezhil nagar	No	Financial Problem
198	Velu	9/87,Ezhil nagar	Yes	
199	Balaji	9/16,Ezhil nagar	Yes	
200	Kalaiselvi	Plot No:29, Ezhil nagar	Yes	
201	Kannan	Plot No:23-E, Jegan Nagar	Yes	
202	Perumal	Plot No:23-D, Jegan Nagar	Yes	
203	Wilson	Plot No:24, Jegan Nagar	Yes	
204	Anju Muthu	Plot No:24, Jegan Nagar	Yes	
205	Balaji	Plot No:28, Jegan Nagar	Yes	
206	Alexander	Plot No:29,Jegan Nagar	Yes	
207	Srinivasan	Plot No:60-E, Jegan Nagar	Yes	
208	Ranganathan	11/45, Jegan Nagar	Yes	
209	Neela Narayanan	Plot No:26-B, Jegan Nagar	Yes	
210	Pachayppan	Plot No:28, Jegan Nagar	Yes	
211	Dhana Sekar	Plot No:28, Jegan Nagar	Yes	
212	Arumugam	Plot No:28, Jegan Nagar	Yes	
213	Lal singh	Plot No:17, Jegan Nagar	Yes	
214	Mathi	Jegan Nagar	Yes	
215	Hari Krishnan	11/43, Jegan Nagar	Yes	
216	Vimal	11/43, Jegan Nagar	Yes	
217	Lenin	11/43, Jegan Nagar	Yes	
218	Jeya sheelan	11/41, Jegan Nagar	yes	
219	George	11/40, Jegan Nagar	No	Financial Problem
220	Munuamy	Plot No:36, Jegan Nagar	No	Financial Problem
221	Peter	Plot No:36, Jegan Nagar	No	Financial Problem
222	Ambi	Plot No:36, Jegan Nagar	No	Financial Problem
223	Mahendhiran	Plot No:37-A,Jegan Nagar	Yes	
224	Sagul	Plot No:8,Jegan Nagar	No	
225	Bhavani	Plot No:8,Jegan Nagar	Yes	
226	Jeya Kumar	Plot No:6, Jegan Nagar	Yes	
227	Prakash	Plot No:43, Jegan Nagar	Yes	
228	Jeyaraman	Plot No:43, Jegan Nagar	Yes	
229	Balakrishnan	Plot No:4, Jegan Nagar	Yes	Financial Problem
230	Sifu	Plot No:3, Jegan Nagar	Yes	

231	Rajeshwari	Ezhil nagar	No	Financial Problem
232	Jeganathan	Ezhil nagar	No	Financial Problem
233	HariGobal	Plot No:47-B, Ezhil nagar	Yes	
234	eswari	75 Ezil Nagar	Yes	
235	kokila	09/049 Ezil Nagar	Yes	
236	subadhra devi	09/048	Yes	
237	J.Nadimuthu	09/051	Yes	
237	anthiny ammal	09/097	Yes	
239	rajama	09/098	Yes	
240	Kripacharya	12 Ezil Nagar	Yes	
241	Ramachandran	13 Ezil Nagar	Yes	
242	pakir samy	72 Ezil Nagar	No	Financial Problem
243	s.janakiraman	73 Ezil Nagar	Yes	
244	Rajeswari	(9/72) Ezil Nagar	Yes	
245	Rajini	(9/72A) Ezil Nagar	Yes	
246	Kumar	9/81 Ezil Nagar	Yes	
247	Sudha	(9/81A) Ezil Nagar	Yes	
248	Latha	(9/79) Ezil Nagar	No	Financial Problem
249	Angel costa	(9/78) Ezil Nagar	Yes	
250	Kaveri	(9/83) Ezil Nagar	Yes	
251	Gunasekaran	53 Ezil Nagar	Yes	
252	Thangam	55 Ezil Nagar	Yes	
253	Laxshmi	(9/77) Ezil Nagar	Yes	
254	Selva Kumar	(57/A) Ezil Nagar	Yes	
255	Kamalakannan	57 Ezil Nagar	Yes	
256	Shanmugam	(9/88A) Ezil Nagar	Yes	
257	Laxshmi	(9/88) Ezil Nagar	Yes	
258	surendran	18 Ezil Nagar	Yes	
259	E.Renganathan	59 Ezil Nagar	Yes	
260	P.Kannan	23E Ezil Nagar	yes	
261	V.Balaji	23/a Ezil Nagar	No	Financial Problem
262	brinda	23 Ezil Nagar	Yes	
263	ganesh	011/043 Ezil Nagar	Yes	
264	lenin	011/043A Ezil Nagar	Yes	
265	tamilselvi.s	041/011 Ezil Nagar	Yes	

266	T.Selvakalanchiyam	36/a Ezil Nagar	Yes	
267	T.Duraisamy	36 Ezil Nagar	Yes	
268	S.Kalpana	39 Ezil Nagar	Yes	
269	M.Nagalakshmi	8 Ezil Nagar	Yes	
270	N.Palani	011/013 Ezil Nagar	Yes	
271	E.R.Muthu	011/065 Ezil Nagar	Yes	
272	K. Arjunan	18 Ezil Nagar	No	Financial Problem
273	V. Thanikachalam	19 Ezhil nagar	No	Financial Problem
274	Lal keshwar	22 Ezil Nagar	Yes	
275	Mrs.priya	11/13a Ezil Nagar	Yes	
276	mustafa	11/15b Ezil Nagar	Yes	
277	raja	011/015 Ezil Nagar	Yes	
278	m.tamilarasi	011/015a Ezil Nagar	Yes	
279	gopinathan	011/016 Ezil Nagar	Yes	
280	s.mala	053/011 Ezil Nagar	Yes	
281	A.Anandan	011/012 Ezil Nagar	Yes	
282	S.B.Prakash	014/b Ezil Nagar	Yes	
283	thanagaraj	014/a Ezil Nagar	Yes	
284	P.Devaraj	14 Ezil Nagar	Yes	
284	k.chandramohan	6/239 Ezil Nagar	Yes	
286	Murali Francis	15 Ezil Nagar	Yes	
287	Muthukumar	19/1 Ezil Nagar	Yes	
288	kamatchi	26b Ezil Nagar	Yes	
289	nevey	37a Ezil Nagar	Yes	
290	sivagami	67e Ezil Nagar	Yes	
291	jaya	25e Ezil Nagar	Yes	
292	jennifer	24e Ezil Nagar	Yes	
293	p.ratchagadass	25e/1 Ezil Nagar	Yes	
294	V. Thanikachalam	27A Ezil Nagar	Yes	
295	Lal keshwar	27A Ezil Nagar	Yes	
296	Murali Francis	11/29 Ezil Nagar	Yes	
297	Muthukumar	12/A Ezil Nagar	Yes	
298	Jayapaul	13 Ezil Nagar	Yes	
299	Krishnasamy	14 Ezil Nagar	Yes	
300	Raman	15 Ezil Nagar	Yes	

**Table 4.7. Survey details conducted in Phase II for tipping fee collection**

<b>Sl.no.</b>	<b>Name</b>	<b>Address</b>	<b>Yes/No (Rs.100)</b>	<b>Remark</b>
1	Rathinam	11/27, Ganabathi Nagar	Yes	
2	Thannikkachalam	11/27, Ganabathi Nagar	Yes	
3	Gowri	Plot No:21, Ganabathi Nagar	Yes	
4	Shobana	Plot No:21, Ganabathi Nagar	Yes	
5	Karpagam	Plot No:21, Ganabathi Nagar	Yes	
6	Rajeshwari	Plot No:30, Ganabathi Nagar	Yes	
7	Mohana	Plot No:30, Ganabathi Nagar	Yes	
8	Parvathy	Plot No:25, Ganabathi Nagar	Yes	
9	Parmila	Plot No:25, Ganabathi Nagar	Yes	
10	Kalpana	11/22, Ganabathi Nagar	Yes	
11	Sulochana	11/22, Ganabathi Nagar	Yes	
12	Vijayakumari	11/23, Ganabathi Nagar	No	Financial Problem
13	Agaththammal	Plot No:29, Ganabathi Nagar	N0	Financial Problem
14	Bosco	Plot No:28, Ganabathi Nagar	Yes	
15	Faruk	Plot No:28, Ganabathi Nagar	Yes	
16	Vijayalakshmi	Plot No:33, Ganabathi Nagar	Yes	
17	Senjulakshmi	Plot No:27B, Ganabathi Nagar	Yes	
18	Ravi	Plot No:246, Ganabathi Nagar	Yes	
19	Raj	Plot No:246, Ganabathi Nagar	Yes	
20	Shanmugavalli	11/18, Ganabathi Nagar	Yes	
21	Sirajunisha	Plot No:43, Ganabathi Nagar	Yes	
22	Visuvasam	Plot No:43, Ganabathi Nagar	Yes	
23	Kannikammal	Plot No:43, Ganabathi Nagar	Yes	
24	Usha	Plot No:43, Ganabathi Nagar	No	Financial Problem
25	Nadhiya	plot No:44, Ganabathi Nagar	Yes	
26	Kasdhuri	plot No:44, Ganabathi Nagar	Yes	
27	Kasdhuri	plot No:44, Ganabathi Nagar	Yes	
28	Visalachi	Plot No:17, Ganabathi Nagar	Yes	
29	Sarala	Plot No:18, Ganabathi Nagar	No	Financial Problem
30	Mala	Plot No:19, Ganabathi Nagar	No	Financial Problem
31	Selvi	Plot No:19, Ganabathi Nagar	No	Financial Problem

32	Sumathi	Plot No:46,Ganabathi Nagar	Yes	
33	Anith	Plot No:46,Ganabathi Nagar	Yes	
34	Karthika	Plot No:24,Ganabathi Nagar	Yes	
35	Dhanam	Plot No:24, Lakshmi nagar	Yes	
36	Santhi	Plot No:24, Lakshmi nagar	Yes	
37	Priya	Plot No:24, Lakshmi nagar	Yes	
38	Krishnan	Plot No:4, Lakshmi nagar	NO	Financial Problem
39	joseph	plot No:11, Lakshmi nagar	NO	Financial Problem
40	Kumari	plot No:11, Lakshmi nagar	Yes	
41	Bafhi	plot No:11, Lakshmi nagar	Yes	
42	Kutty	Plot No: 5, Lakshmi nagar	Yes	
43	Sarumathi	Plot No: 5, Lakshmi nagar	Yes	
44	Rajeshwari	11/4, Lakshmi nagar	Yes	
46	Ramani	Plot No:18 Ganabathi Nagar	Yes	
48	Babu	11/8, Ganabathi Nagar	Yes	
49	Lalitha	6/23, Ganabathi Nagar	Yes	
50	Subha	11/11, Ganabathi Nagar	Yes	
51	Sasikala	11/12, Ganabathi Nagar	Yes	
52	Parimala	11/14, Ganabathi Nagar	Yes	
53	Karpagam	11/14, Ganabathi Nagar	Yes	
54	Meena	11/14, Ganabathi Nagar	Yes	
55	Palani	11/13, Ganabathi Nagar	Yes	
56	Madhanraj	11/13, Ganabathi Nagar	Yes	
57	Tamilarasi	11/15, Ganabathi Nagar	Yes	
58	Raju	11/15, Ganabathi Nagar	Yes	
59	Jeyaraman	11/16, Ganabathi Nagar	Yes	
60	Akila	11/16, Ganabathi Nagar	Yes	
61	Rohini	11/16, Ganabathi Nagar	Yes	
62	Manimegalai	5/11, Ganabathi Nagar	No	Financial Problem
63	Thangalakshmi	Plot No:40 Ganabathi Nagar	No	Financial Problem
64	Jothi	Plot No:40 Ganabathi Nagar	No	Financial Problem
65	Neelavathi	Plot No:41 Ganabathi Nagar	No	Financial Problem
66	Dulasiraman	Plot No:42 Ganabathi Nagar	No	Financial Problem
67	Ayyadurai	Plot No:18, Ganabathi Nagar	Yes	
68	Maheshwari	Plot No:13 Ganabathi Nagar	Yes	

69	Thatsayani	Plot No:14 Ganabathi Nagar	Yes	
70	Shakila	Plot No:14 Ganabathi Nagar	Yes	
71	Indhira	10/27, Ganabathi Nagar	Yes	
72	Jeyakrishnan	11/60, Lakshmi nagar	No	Financial Problem
73	Bathbhanaban	11/60, Lakshmi nagar	No	Financial Problem
74	Velmurugan	11/61, Lakshmi nagar	No	Financial Problem
75	Sureshkumar	11/61, Lakshmi nagar	No	Financial Problem
76	Suguna	11/61, Lakshmi nagar	No	Financial Problem
77	Manjula	PlotNo:5, Lakshmi nagar	No	Financial Problem
78	Jhon ryan	PlotNo:5, Lakshmi nagar	No	Financial Problem
79	Kamatchi	Lakshmi nagar	No	Financial Problem
80	Sundhari	11/67, Lakshmi nagar	No	Financial Problem
81	Kavitha	Lakshmi nagar	Yes	
82	Kamatchi	Lakshmi nagar	Yes	
83	Sathish	Lakshmi nagar	Yes	
84	Mala	11/73, Lakshmi nagar	Yes	
85	Santha	Plot No:43, Lakshmi nagar	Yes	
86	Suguna	11/72, Lakshmi nagar	Yes	
87	Kamatchi	Plot No:4, Lakshmi nagar	Yes	
88	Ramalakshmi	Plot No:17, Lakshmi nagar	No	Financial Problem
89	Suganthi	Plot No:17, Lakshmi nagar	No	Financial Problem
90	Sopna	12/16, Lakshmi nagar	No	Financial Problem
91	Mariyammal	Plot No:19, Lakshmi nagar	No	Financial Problem
92	Chandhirakala	Plot N0:21, Lakshmi nagar	Yes	
93	Deepa	Plot N0:21, Lakshmi nagar	Yes	
94	Mahadevi	Plot No:5, Lakshmi nagar	No	Financial Problem
95	Bharathi	Plot No:5, Lakshmi nagar	Yes	
96	Saranya	Plot No:5, Lakshmi nagar	No	Financial Problem
97	Giri	12/20, Lakshmi nagar	Yes	
98	Lakshmi	12/20, Lakshmi nagar	Yes	
99	viji	12/8, Lakshmi nagar	No	Financial Problem
100	Ankammal	12/12, Velavan Street	Yes	
101	Bhavani	12/12, Velavan Street	No	Financial Problem
102	Kalavathi	12/10, Velavan Street	Yes	
103	Malliga	12/9, Velavan Street	No	Financial Problem

104	Sumathi	12/9, Velavan Street	Yes	
105	Usha	12/11, Velavan Street	No	Financial Problem
106	Neelavathi	12/7, Velavan Street	No	Financial Problem
107	Sobhana	12/6, Velavan Street	Yes	
108	Prabhavathy	Plot No:5, Velavan Street	Yes	
109	Sakila Banu	12/5, Velavan Street	Yes	
110	Kujila	Plot No:15, Velavan Street	Yes	
111	Dhanasekar	12/4A, Velavan Street	Yes	
112	Dulasiraman	12/4B, Velavan Street	Yes	
113	Sreenivasan	12/4C, Velavan Street	No	Financial Problem
114	Kanchana	12/4D, Velavan Street	No	Financial Problem
115	Usha	12/4, Velavan Street	No	Financial Problem
116	Malliga	Plot No:1A Velavan Street	Yes	
117	Sangeetha	Plot No:1A Velavan Street	Yes	
118	Jeyalakshmi	12/2, Velavan Street	Yes	
119	Suppirija	12/2, Velavan Street	Yes	
120	Manjula	12/2, Velavan Street	Yes	
121	Dhandayudhabani	10/13, Samiyar madam	No	Financial Problem
122	Venkatesh	plot No:9 Samiyar madam	No	Financial Problem
123	Manjula	10/8, samiyar madam	No	Financial Problem
124	Shanmugavalli	10/9, Samiyar madam	Yes	
125	Jothilakshmi	10/23, Samiyar madam	Yes	
126	Kalairasi	10/23, Samiyar madam	Yes	
127	kalvikkurasi	10/23, Samiyar madam	Yes	
128	Gobi	10/27, samiyar madam	Yes	
129	Selvam	10/27, samiyar madam	Yes	
130	Pancharavanam	10/22, samiyar madam	Yes	
131	Syed	11/103, lakshmi nagar	No	Financial Problem
132	Ayyanar	11/103, lakshmi nagar	No	Financial Problem
133	Raju	11/103, lakshmi nagar	No	Financial Problem
134	Peter	Plot NO:17, lakshmi nagar	No	Financial Problem
135	Vasanthakumari	11/100, lakshmi nagar	No	Financial Problem
136	Hemalatha	11/96, lakshmi nagar	No	Financial Problem
137	Murugesan	11/98, lakshmi nagar	Yes	
138	Preethi	11/97, lakshmi nagar	Yes	

139	Manjula	11/96, lakshmi nagar	No	Financial Problem
140	Seetharaman	11/95, lakshmi nagar	No	Financial Problem
141	Bathma	11/95, lakshmi nagar	Yes	
142	Albert	11/94, lakshmi nagar	No	Financial Problem
143	Simon	11/93, lakshmi nagar	Yes	
144	Selvi	Plot No:15, lakshmi nagar	No	Financial Problem
145	Saravanan	Lakshmi nagar	No	Financial Problem
146	Gomathi	Plot No:2 lakshmi nagar	Yes	
147	Parasuraman	11/92, lakshmi nagar	No	Financial Problem
148	Sundhari	11/92, lakshmi nagar	Yes	
149	Meena	11/92, lakshmi nagar	Yes	
150	Maria messi	11/92, lakshmi nagar	No	Financial Problem
151	Sheela	Plot No:1A, Lakshmi nagar	No	Financial Problem
152	Pavithra	Plot No:1B, Lakshmi nagar	No	Financial Problem
153	Rosely	Plot No:2, lakshmi nagar	No	Financial Problem
154	Kamatchi	Plot No:1, Sriram nagar	Yes	
155	Santhi	11/91, Sriram nagar	Yes	
156	Chitra	Plot No:2, Sriram nagar	Yes	
157	Lakshmi	Plot No:2, Sriram nagar	Yes	
158	Vedhavalli	Plot No:4, Sriram nagar	Yes	
159	Maheshwari	Plot No:5, Sriram nagar	Yes	
160	Dilagavathi	Plot No:4, Sriram nagar	Yes	
161	Chitra	11/90, Sriram anagar	Yes	
162	Latha	11/89, Sriram nagar	No	Financial Problem
163	Sundari	11/88, Sriram nagar	No	Financial Problem
164	Dulasi	Plot No: 6, Sriram nagar	No	Financial Problem
165	Madubala	11/87, Sriram nagar	No	Financial Problem
166	Devi	Plot No:8, Sriram nagar	No	Financial Problem
167	Rajeshwari	Plot No:8, Sriram nagar	No	Financial Problem
168	Kumari	Plot No:8, Sriram nagar	No	Financial Problem
169	Kayalvizhi	Plot No:7, Sriram nagar	Yes	
170	Pakkiya lakshmi	Plot No:2, Sriram nagar	Yes	
171	Poongodi	Plot No:2, Sriram nagar	Yes	
172	Gomathi	Plot No:2, Sriram nagar	Yes	
173	Thenmozhi	Plot No:2, Sriram nagar	Yes	

174	Chitra	Plot No:18, Sriram nagar	Yes	
175	Usha rani	Plot No:14, Velavan nagar	No	Financial Problem
176	Santhi	12/14, Velavan nagar	Yes	
177	Jesindha merry	12/14, Velavan nagar	No	Financial Problem
178	Jeya	Plot No:17, Velavan nagar	No	Financial Problem
179	Maheshwari	Plot No:17, Velavan nagar	Yes	
180	Vijayalakshmi	12/13, Velavan nagar	No	Financial Problem
181	Radha krishnan	Plot No:9, Velavan nagar	Yes	
182		12/15, velavan nagar	No	Financial Problem
183	Alamelu	Plot No:5, velavan nagar	Yes	
184	Santha	Plot No:5, velavan nagar	No	Financial Problem
185	Valli	Plot No:20, Velavan nagar	Yes	
186	Anthonymmal	Plot No:33, Velavan nagar	No	Financial Problem
187	Gnammal	12/33, Velavan nagar	No	Financial Problem
188	Sumathi	plot No:44, Velavan nagar	No	Financial Problem
189	Venu	plot No:35, Velavan nagar	No	Financial Problem
190	Sasikala	Plot No:32, Velavan nagar	Yes	
191	Nirmala	12/30, Velavan nagar	Yes	
192	Parameshwari	12/31, Velavan nagar	Yes	
193	Latha	12/31, Velavan nagar	Yes	
194	Ramaiyah	Plot No:30, Velavan nagar	Yes	
195	Kaandha	Plot no:44, Velavan nagar	Yes	
196	Dholraman	Plot no:44, Velavan nagar	Yes	
197	Magi	12/28, Velavan nagar	Yes	
198		12/28A, Velavan nagar	Yes	
199	Sivaprakasham	Velavan nagar	Yes	
200	Amudha raman	12/27, Velavan nagar	Yes	
201	Mamdha	12/27, Velavan nagar	No	Financial Problem
202	Lavanya	12/27, Velavan nagar	No	Financial Problem
203	Nirmala	12/26, Velavan nagar	No	Financial Problem
204	Priya	Plot No:1, Velavan nagar	Yes	
205	Nadhiya	Plot No:1, Velavan nagar	Yes	
206	Malathi	Plot No:26, Velavan nagar	Yes	
207	Seetha	Plot No:26, Velavan nagar	Yes	
208	Divya	Plot No:26, Velavan nagar	Yes	

209	Samanthi	12/22, Velavan nagar	Yes	
210	Deepa	Plot No:21, Velavan nagar	Yes	
211	Chandhira	Plot No:21, Velavan nagar	Yes	
212	Vanaja	Plot No:61, Subramani nagar	Yes	
213	Pooja	12/94, Subramani nagar	Yes	
214	Lakshmi	Plot no:16, Subramani nagar	Yes	
215	Suresh	Subramani nagar	Yes	
216	Babu	Subramani nagar	Yes	
217	Sivakami	12/76, Subramani nagar	Yes	
218	Sarasu	Subramani nagar	Yes	
219	Saratha	Plot No:10A Subramani nagar	Yes	
220	Amudha	Plot No:12B, Subramani nagar	No	Financial Problem
221	Vinodha	Plot No:23, Subramani nagar	No	Financial Problem
222	Selvakumari	Plot No:21A, Subramani nagar	No	Financial Problem
223	Siyamala	Plot No:21B, Subramani nagar	No	Financial Problem
224	Ajintha	Plot No:21, Subramani nagar	No	Financial Problem
225	Chandhira	Plot No:32, Subramani nagar	No	Financial Problem
226	Anitha	Plot No:32, Subramani nagar	No	Financial Problem
227	Kala	Plot No:89, Subramani nagar	No	Financial Problem
228	Rani	Plt No:48, Subramani nagar	No	Financial Problem
229	Jothikala	12/59, Sivakumar anagar	No	Financial Problem
230	Maragatham	Plot No:9, Sivakumar nagar	Yes	
231	Sathya	Plot No:9, Sivakumar nagar	No	Financial Problem
232	Chandhira	Plot No:9, Sivakumar nagar	No	Financial Problem
233	Kavitha	Plot No:9, Sivakumar nagar	No	Financial Problem
234	Gayathiri	Plot No:3, Sivakumar nagar	Yes	
235	Dhanalakshmi	12/63, Sivakumar nagar	Yes	
236	Senthamarai	Plot No:21, Sivakumar nagar	Yes	
237	Jeyanthi	Plot No:20, Jeyalakshmi nagar	No	Financial Problem
238	Gayathiri	Plot No:20, Jeyalakshmi nagar	No	Financial Problem
239	Pradeebha	Plot No:20, Jeyalakshmi nagar	Yes	
240	Jamuna rani	12/106, Subramani anagr	Yes	
241	Anjula	12/16, Subramani nagar	Yes	
242	Chandhira	12/95, Subramani nagar	Yes	
243	Manormani	12/95, Subramani nagar	Yes	

244	Kaliyammal	Plot No:78, Subramani nagar	Yes	
245	Devagi	Plot No:30, Subramani nagar	Yes	
246	Surya kala	12/109, Subramani nagar	Yes	
247	Allirani	Plot No:47, Subramani nagar	Yes	
248	Rekha	Plot No:71, Subramani nagar	Yes	
249	Anjula	Plot No:73, Subramani nagar	Yes	
250	Petchiyammal	Plot No:75, Subramani nagar	No	Financial Problem
251	Suguna	12/98, Subramani nagar	No	Financial Problem
252	Sindhu	Plot No:67, Subramani nagar	No	Financial Problem
253	Sangeetha	12/98A, Subramani nagar	No	Financial Problem
254	Narmatha	12/98A, Subramani nagar	No	Financial Problem
255	Kanniyammal	12/98A, Subramani nagar	No	Financial Problem
256	Valli	12/98B, Subramani nagar	No	Financial Problem
257	Dhavamani	Plot No:66, Subramani nagar	No	Financial Problem
258	Lakshmi	Plot No:7, Subramani nagar	No	Financial Problem
259	Ramesh	12/92, Jeyalashmi nagar	Yes	
260	Monikka	12/91, Jeyalashmi nagar	Yes	
261	Revathi	12/91, Jeyalashmi nagar	Yes	
262	Janaki	Plot No:12, Jeyalashmi nagar	Yes	
263	Lakshmi	12/90, Jeyalashmi nagar	Yes	
264	Jhon Bosco	Plot No:40, Jeyalashmi nagar	Yes	
265	Dinesh raj	Plot No:14, Jeyalashmi nagar	Yes	
266	Balaguru	186/16, Jeyalashmi nagar	Yes	
267	Steephan	Plot No:7, Jeyalashmi nagar	Yes	
268	Srimathi	Plot No:69, Jeyalashmi nagar	No	Financial Problem
269	Rajan	11/50, Sriram nagar	No	Financial Problem
270	Joseph	12/50, Sriram nagar	No	Financial Problem
271	Stalin	12/50, Sriram nagar	No	Financial Problem
272	Ravi	12/49, Sriram nagar	No	Financial Problem
273	Kanchana	Plot No:62, Sriram nagar	Yes	
274	Jeya lakshmi	12/46, Sriram nagar	Yes	
275	Balaraman	12/45, Sriram nagar	Yes	
276	Lakshmi	12/44, Sriram nagar	Yes	
277	Devi	12/41, Sriram nagar	Yes	
278	Nandha kumar	Plot No:31, Sriram nagar	Yes	

279	Kala Rani	12/32, Sriram nagar	Yes	
280	Krishna Veni	36/17, Sriram nagar	Yes	
281	Sundhari	12/36, Sriram nagar	Yes	
282	Suseela	12/36, Sriram nagar	No	Financial Problem
283	Rajasekar	12/36, Sriram nagar	No	Financial Problem
284	Rama moorthy	12/37, Sriram nagar	No	Financial Problem
285	Nadhiya	Plot No:49, Sriram nagar	No	Financial Problem
286	Sagaya merry	Plot No:30, Sriram nagar	No	Financial Problem
287	Ravi	Plot No:41, Sriram nagar	No	Financial Problem
288	Rani	Plot No:31, Sriram nagar	No	Financial Problem
289	Apponce	Plot No:19, Subramani nagar	No	Financial Problem
290	Malaar	Plot No:18, Subramani nagar	No	Financial Problem
291	Lavanya	12/67, Subramani nagar	No	Financial Problem
292	Yesodha	12/67, Subramani nagar	No	Financial Problem
293	Varadharaj	Plot No:10, Subramani nagar	No	Financial Problem
294	Dhara	Plot No:44, Subramani nagar	No	Financial Problem
295	Jothi	Plot No:44, Subramani nagar	No	Financial Problem
296	Sundar	Plot No:32, Subramani nagar	No	Financial Problem
297	Kajababu	12/103, Subramani nagar	Yes	
298	Renuga	Plot No:61, Subramani nagar	Yes	
299	Revathi	Plot No:30, Subramani nagar	Yes	
300	Vijaya	12/44, Subramani nagar	Yes	
301	Amsha	Plot No:7, Subramani nagar	Yes	
302	Sumathi	Plot No:29, Sivakumar Nagar	Yes	
303	Priya	Plot No:29, Sivakumar Nagar	Yes	
304	Surya	Plot No:29, Sivakumar Nagar	Yes	
305	Anjali	Plot No:29, Sivakumar Nagar	Yes	
306	Nadhiya	Plot No:29, Sivakumar Nagar	Yes	
307	Ammu	Plot No:29, Sivakumar Nagar	Yes	
308	Malathi	Plot No:29, Sivakumar Nagar	Yes	
309	Muthiyalu	12//58, Sivakumar Nagar	Yes	
310	Sridevi	Plot No:27, Sivakumar Nagar	Yes	
311	Jeya	12/42, Sivakumar Nagar	No	Financial Problem
312	Dhanam	12/43, Sivakumar Nagar	No	Financial Problem
313	Renuga	12/40, Sivakumar nagar	No	Financial Problem

314	Prema	12/61, Aram nagar	No	Financial Problem
315	Loganayagi	12/61, Aram nagar	No	Financial Problem
316	Revathi	12/61, Aram nagar	No	Financial Problem
317	Sridevi	12/61, Aram nagar	No	Financial Problem
318	Suguna	12/62, Aram nagar	No	Financial Problem
319	Nirmala	12/65, Aram nagar	No	Financial Problem
320	Anushiya	Plot No:5, Aram nagar	No	Financial Problem
321	Sargunam	12/38, Aram nagar	No	Financial Problem
322	Lurdhu samy	Plot No:3, Aram nagar	No	Financial Problem
323	Soma sekar	Plot No:49, Aram nagar	No	Financial Problem
324	Porkodi	Plot No:44, Sriram nagar	No	Financial Problem
325	Jennifer	Plot No:44, Sriram nagar	No	Financial Problem
326	Sathish	Plot No:44, Sriram nagar	No	Financial Problem
327	Santhi	Plot No:44, Sriram nagar	No	Financial Problem
328	Prabha	Plot No:44, Sriram nagar	No	Financial Problem
329	Manimegalai	Plot No:44, Sriram nagar	No	Financial Problem
330	Ravi	Plot No:41, Sriram nagar	No	Financial Problem
331	Saravana kumar	Plot NO:39, Srinivasa nagar	Yes	
332	Salaman	Plot NO:4, Srinivasa nagar	Yes	
333	Malliga	Plot No:38, Srinivasa nagar	Yes	
334	Sangeetha	Plot No:37/3, Srinivasa nagar	Yes	
335	Chitra	Plot No:36/3, Srinivasa nagar	Yes	
336	Sadhasivam	Plot No:5, Srinivasa nagar	Yes	
337	Saraswathi	Plot No:6, Srinivasa nagar	Yes	
338	Kanchana	Plot No:7, Srinivasa nagar	Yes	
339	Rosi	Plot No:46, Srinivasa nagar	Yes	
340	Muthukumar	2/63, Srinivasa nagar	Yes	
341	Unnamalai	2/64, Srinivasa nagar	Yes	
342	sankar	2/65, Srinivasa nagar	Yes	
343	Malar	43/16 Srinivasa nagar	Yes	
344	Velankanni	44/16, Srinivasa nagar	Yes	
345	Kumar	42/16, Srinivasa nagar	Yes	
346	Anthony samy	41/17, Srinivasa nagar	Yes	
347	Divya	40/16, Srinivasa nagar	Yes	
348	Rani	Plot No:96/4, Srinivasa nagar	Yes	

349	Saranya	72/10, Srinivasa nagar	Yes	
350	Rani	73,10, Srinivasa nagar	Yes	
351	Prasanth	74/10A, Srinivasa nagar	Yes	
352	Kamatchi	74/10B, Srinivasa nagar	Yes	
353	Balamurugan	76/8A, Srinivasa nagar	Yes	
354	Vaikunda Samy	76/8B, Srinivasa nagar	Yes	
355	Asha	78/8C, Srinivasa nagar	Yes	
356	Renuga	77/8, Srinivasa nagar	Yes	
357	Laila	79/8, Srinivasa nagar	Yes	
358	Selvi	79/8, Srinivasa nagar	No	Financial Problem
359	Lisi	105/15, Srinivasa nagar	Yes	
360	Josephine	104/15 Srinivasa nagar	No	Financial Problem
361	Sekar	104/15A Srinivasa nagar	No	Financial Problem
362	Mahimai merry	104/15B Srinivasa nagar	Yes	
363	Porkodi	103/15, Srinivasa nagar	No	Financial Problem
364	Ramesh	Plot No:40, Srinivasa nagar	No	Financial Problem
365	Parimala	12/110, Srinivasa nagar	No	Financial Problem
366	Poonkodi	12/110, Srinivasa nagar	Yes	
367	Selvi	12/110, Srinivasa nagar	Yes	
368	Raji	12/110, Srinivasa nagar	Yes	
369	Krishnan	12/40, Srinivasa nagar	No	Financial Problem
370	Arun	12/40A, Srinivasa nagar	Yes	
371	Kalaivani	6/261, Sriram nagar, 1st street	Yes	
372	Fathima	6/261, Sriram nagar, 1st street	Yes	
373	Keerthi	6/261, Sriram nagar, 1st street	No	Financial Problem
374	Kalpana	Plot No:14, Sriram nagar, 1st street	No	Financial Problem
375	Poshiniya	11/31, Sriram nagar, 1st street	No	Financial Problem
376	Kalaivani	11/29, Sriram nagar, 1st street	No	Financial Problem
377	Rajeshwari	11/29, Sriram nagar, 1st street	No	Financial Problem
378	Lilly	11/29, Sriram nagar, 1st street	No	Financial Problem
379	Keerthika	11/29, Sriram nagar, 1st street	No	Financial Problem
380	Neepul	Plot No:18, Sriram nagar, 1st street	No	Financial Problem
381	Girija	Plot No:5A,Sriram nagar, 1st	No	Financial Problem

		street		
382	Sunila	11/28, Sriram nagar, 1st street	No	Financial Problem
383	Stella	11/84, Sriram nagar, 1st street	Yes	
384	Bensi	11/85, Sriram nagar, 1st street	Yes	
385	Asmith	Plot No:31,Sriram nagar, 1st street	Yes	
386	Navaneetha merry	11/83, Sriram nagar, 1st street	Yes	
387	Melditta meery	11/83, Sriram nagar, 1st street	Yes	
388	Asha	11/83, Sriram nagar, 1st street	Yes	
389	Raja	11/83, Sriram nagar, 1st street	Yes	
390	Logu	11/83, Sriram nagar, 1st street	Yes	
391	Vilva merry	11/83, Sriram nagar, 1st street	Yes	
392	Lakshmi	Plot No:29, Sriram nagar, 1st street	Yes	
393	Pakkiya lakshmi	Plot No:39,Sriram nagar, 1st street	Yes	
394	Devi	11/80, Sriram nagar, 1st street	Yes	
395	Vinith	Plot No:38,Sriram nagar, 1st street	Yes	
396	Gayathiri	Plot No:38,Sriram nagar, 1st street	Yes	
397	Indra Fagathur	11/76,Sriram nagar, 1st street	Yes	
398	Merry	11/29,Sriram nagar, 1st street	Yes	
399	Renuga Devi	Plot No:26,Sriram nagar, 1st street	Yes	
400	Santhosh	Plot No:26,Sriram nagar, 1st street	No	Financial Problem
401	Priya	Plot No:39A,Sriram nagar, 1st street	No	Financial Problem
402	Lakshmi	Plot No:39A,Sriram nagar, 1st street	No	Financial Problem
403	Suguna	11/78,Sriram nagar, 1st street	No	Financial Problem
404	Manormani	11/77,Sriram nagar, 1st street	Yes	
405	Kavitha	Plot No: 44,Sriram nagar, 1st street	Yes	

406	Kamatchi	Plot No: 44,Sriram nagar, 1st street	Yes	
407	Ashok	81 Velavan Nagar	Yes	
408	Inanasekaran	(9/82) Valavan Nagar	No	Financial Problem
409	Rose	(9/82) Velavan Nagar	Yes	
410	Tamilarai	(9/82) Velavan Nagar	Yes	
411	R.B.Rukanagathan	(11/96) Velavan Nagar	Yes	
412	P.Ranganathan	(11/97) Velavan Nagar	Yes	
413	Alamelu	(11/98) Velavan Nagar	Yes	
414	Vasanthakumari	(11/100) Velavan Nagar	Yes	
415	Syed Sarfaraz	(12/101) Velavan Nagar	Yes	
416	Suresh Kumar	(11/99) Velvan Nagar	Yes	
417	Kasthuri	44 Velavan Nagar	Yes	
418	Thingalselvan	(11/50) Velavan Nagar	Yes	
419	Sarala	51 Velavan Nagar	Yes	
420	Manju	54 Velavan Nagar	No	Financial Problem
421	Laxshmi	(11/60A) Velavan Nagar	No	Financial Problem
422	Jeyakrishnan	(11/60) Velavan Nagar	Yes	
423	B.Shanthi	24 Velavan Nagar	Yes	
424	s.janakiraman	73 Velavan Nagar	Yes	
425	Rajeswari	(9/72) Velavan Nagar	Yes	
426	Rajini	(9/72A) Velavan Nagar	Yes	
427	Kumar	(9/81) Velavan Nagar	Yes	
428	Sudha	(9/81A) Velavan Nagar	Yes	
429	Latha	(9/79) Velavan Nagar	Yes	
430	Angel costa	(9/78) Velavan Nagar	Yes	
431	Kaveri	(9/83) Velavan Nagar	Yes	
432	Gunasekaran	38 Velavan Nagar	Yes	
433	Thangam	55 Velavan Nagar	Yes	
434	Laxshmi	(9/77) Velavan Nagar	Yes	
435	Selva Kumar	(57/A) Velavan Nagar	Yes	
436	Kamalakaran	57 Velavan Nagar	No	Financial Problem
437	Shanmugam	(9/88A) Velavan Nagar	No	Financial Problem
438	Laxshmi	(9/88) Velavan Nagar	No	Financial Problem
439	surendran	18 Velavan Nagar	No	Financial Problem

440	E.Renganathan	59 Velavan Nagar	Yes	
441	P.Kannan	23E Velavan Nagar	No	Financial Problem
442	V.Balaji	23/a Velavan Nagar	Yes	
443	brinda	23 Velavan Nagar	No	Financial Problem
444	ganesh	011/043 Velavan Nagar	Yes	
445	lenin	011/043A Velavan Nagar	Yes	
446	tamilselvi.s	041/011 Velavan Nagar	No	Financial Problem
447	T.Selvakalanchiyam	36/a Velavan Nagar	No	Financial Problem
448	T.Duraisamy	36 Velavan Nagar	No	Financial Problem
449	S.Kalpana	39 Velavan Nagar	Yes	
450	M.Nagalakshmi	8 Velavan Nagar	Yes	
451	N.Palani	011/013 Velavan Nagar	Yes	
452	E.R.Muthu	011/065 Velavan Nagar	Yes	
453	Inanasekaran	(9/82) Velavan Nagar	Yes	
454	Rose	(9/82) Velavan Nagar	Yes	
455	Tamilarai	(9/82) Velavan Nagar	Yes	
456	Mrs.priya	11/13a Velavan Nagar	Yes	
457	mustafa	11/15b Velavan Nagar	Yes	
458	raja	011/015 Velavan Nagar	Yes	
459	m.tamilarasi	011/015a Velavan Nagar	Yes	
460	gopinathan	011/016 Velavan Nagar	No	Financial Problem
461	s.mala	053/011 Velavan Nagar	Yes	
462	A.Anandan	011/012 Velavan Nagar	Yes	
463	S.B.Prakash	014/b Velavan Nagar	Yes	
464	thanagaraj	014/a Velavan Nagar	Yes	
465	P.Devaraj	14 Velavan Nagar	Yes	
467	k.chandramohan	6/239 Velavan Nagar	Yes	
468	Kasthuri	6/240 Velavan Nagar	Yes	
469	Thingalselvan	6/241 Velavan Nagar	Yes	
470	kamatchi	26b Velavan Nagar	Yes	
471	nevey	37a Velavan Nagar	No	Financial Problem
472	sivagami	67e Velavan Nagar	No	Financial Problem
473	jaya	25e Velavan Nagar	No	Financial Problem
474	jennifer	24e Velavan Nagar	No	Financial Problem
475	p.ratchagadass	25e/1 Velavan Nagar	No	Financial Problem

476	K.Gopi	09/079 Velavan Nagar	No	Financial Problem
477	valli	011/035 Velavan Nagar	No	Financial Problem
478	Sarala	011/025 Velavan Nagar	Yes	
479	Manju	011/01 Velavan Nagar	Yes	
480	muragadoss	06/228 Velavan Nagar	Yes	
481	George	Flat no - 40 Velavan Nagar	Yes	
482	B. Shankar	Flat no - 40/A Velavan Nagar	Yes	
483	P. Radhakrishnan	Flat no - 40/ B Velavan Nagar	Yes	
484	Ravikumar	Flat no - 40/C Velavan Nagar	Yes	
485	Murthy	Flat no - 40/D Velavan Nagar	Yes	
485	R.B.Rukanagathan	Flat no - 41 Velavan Nagar	Yes	
487	P.Ranganathan	Flat no - 42 Velavan Nagar	Yes	
488	Alamelu	Flat no - 43 Velavan Nagar	Yes	
489	Laxshmi	Flat no - 44 Velavan Nagar	No	Financial Problem
490	Jeyakrishnan	Flat no - 45 Velavan Nagar	No	Financial Problem
491	S.C. Navamani	9/76 Velavan Nagar	Yes	
492	Kripacharya	9/76 Velavan Nagar	Yes	
493	Ramachandran	9/76 Velavan Nagar	Yes	
494	Kanimozhi	9/76 Velavan Nagar	Yes	
495	Roja	9/82 Velavan Nagar	Yes	
496	Tamilarasi	9/82 Velavan Nagar	Yes	
497	Arul Mary	9/82 Velavan Nagar	Yes	
498	Vijayalakshmi	9/73 Velavan Nagar	Yes	
499	V. Thanikachalam	27A Velavan Nagar	Yes	
500	Lal keshwar	27A Velavan Nagar	Yes	
501	Amudha	28 Velavan Nagar	Yes	
502	T.Parasuraman	28/A Velavan Nagar	Yes	
503	Rajkumar	28/B Velavan Nagar	Yes	
504	S.Geetha	29 Velavan Nagar	Yes	
505	Dhinakaran	Flat no - 40 Velavan Nagar	Yes	
506	T.Parasuraman	42/A Velavan Nagar	Yes	
507	Rajkumar	42/C Velavan Nagar	Yes	
508	S.Geetha	44 Velavan Nagar	Yes	
509	Dhinakaran	48 Velavan Nagar	Yes	
510	S.Suresh	49 Velavan Nagar	Yes	

511	S.C. Navamani	9/76 Velavan Nagar	Yes	
512	Kripacharya	9/76 Velavan Nagar	Yes	
513	Ramachandran	9/76 Velavan Nagar	Yes	
514	Kanimozhi	9/76 Velavan Nagar	Yes	
515	Roja	9/82 Velavan Nagar	Yes	
516	Tamilarasi	9/82 Velavan Nagar	Yes	
517	Arul Mary	9/82 Velavan Nagar	Yes	
518	Vijayalakshmi	9/73 Velavan Nagar	Yes	
519	V. Thanikachalam	27A Velavan Nagar	Yes	
520	Lal keshwar	27A Velavan Nagar	Yes	
521	Murali Francis	11/29 Velavan Nagar	Yes	
522	Muthukumar	11/29 Velavan Nagar	Yes	
523	Jayapaul	11/29 Velavan Nagar	No	Financial Problem
524	Krishnasamy	11/29 Velavan Nagar	No	Financial Problem
525	Lalitha	30 Velavan Nagar	No	Financial Problem
526	Inanasekaran	(9/82) Velavan Nagar	No	Financial Problem
527	Rose	(9/82) Velavan Nagar	No	Financial Problem
528	Tamilarai	(9/82) Velavan Nagar	No	Financial Problem
529	R.B.Rukanagathan	(11/96) Velavan Nagar	Yes	
530	P.Ranganathan	(11/97) Velavan Nagar	Yes	
531	Alamelu	(11/98) Velavan Nagar	No	Financial Problem
532	Vasanthakumari	99 Velavan Nagar	Yes	

## Annexure

**Table A1: Data on Solid waste collection during the past one year (June-2019 to October-2020)**

MONTH	Weight of each category in kg										TOTAL in kg
	Vegetables	Plastic Carry Bag	Newspaper	Color Paper	Card board	Milk cover	Plastics & water can	White sheet	Wastages goes to land fill	Glass bottle in No. Pcs.	
June-19	1160	1	14	19	45	56	21	67	1922	164	3470
Jul-19	1649	1	17	22	49	59	25	75	2497	183	4578
Aug-19	1442	2	12	17	35	44	42	142	2040	168	3944
Sep-19	1533	12	21	26	82	23	68	63	1787	164	3159
Oct-19	1450	1	10	13	53	74	18	55	2739	140	4601
Nov-19	1779	5	20	34	73	49	58	85	2231	211	4543
Dec-19	1592	3	20	25	61	57	47	145	2073	167	4186
Jan-20	1743	1	9	13	50	14	72	73	2892	172	5035
Feb-20	1634	1	10	13	57	15	61	63	2638	175	4664
Mar-20	1765	1	10	13	47	60	17	60	2987	161	5117
Apr-20	1600	1	8	11	37	42	16	51	2815	151	4728
May-20	1501	1	8	11	38	42	17	51	3002	23	4691
Jun-20	1321	1	8	11	52	50	16	63	2927	54	4500
Jul-20	1536	1	8	12	50	50	19	56	3008	65	4801
Aug-20	1498	1	8	16	75	61	19	65	2984	106	4831
Sep-20	1672	1	8	12	64	63	16	68	2943	124	4970
Oct-20	1762	1	8	15	62	67	17	68	3046	127	5171
<b>TOTAL WEIGHT (kg)</b>	<b>26637</b>	<b>35</b>	<b>199</b>	<b>283</b>	<b>930</b>	<b>826</b>	<b>549</b>	<b>1250</b>	<b>44531</b>	<b>2355</b>	<b>76989</b>

**Table A2: Revenue obtained from the sale of inorganic waste**

<b>Date</b>	<b>Amount in Rs.</b>
28.05.17	1,361.00
12.06.17	1,305.00
14.07.17	551.00
02.08.17	487.00
12.08.17	186.00
26.08.17	363.00
01.09.17	178.00
27.09.17	604.00
24.10.17	935.00
28.11.17	495.00
22.01.18	2,291.00
02.03.18	2,207.50
10.04.18	1,970.60
30.05.18	3,520.00
29.06.18	3,829.00
25.08.18	8,740.00
28.10.18	10,329.00
08.02.19	13,190.50
30.03.19	5,023.00
10.05.19	8,350.00
12.07.19	10,236.00

26.08.19	6,758.00
04.10.19	5,434.30
26.12.19	12,809.00
10.02.20	4,919.00
11.06.20	8890.00
04.10.20	9600.00
01.02.21	26,914.00
<b>Total</b>	<b>1,51,475.90</b>

**Table A3: Amount obtained from the sale of compost**

Date	Name	ADDRESS	Qty. in Kg	Rate (Rs/kg)	Amount in Rs.
18.07.2017	KURALARASAN	NUNGAMBAKKAM	2	20	40.00
06.09.2017	VIJAYAKUMARI	EZHIL NAGAR	1	20	20.00
06.09.2017	KAVERY	EZHIL NAGAR	1	20	20.00
06.09.2017	LAKSHMI	EZHIL NAGAR	1	20	20.00
06.09.2017	VICTORIYA	EZHIL NAGAR	1	20	20.00
06.09.2017	LOYOLA	JAGAN NAGAR	1	20	20.00
06.09.2017	CHANDHIRA	JAGAN NAGAR	1	20	20.00
06.09.2017	PONPRIYA	EZHIL NAGAR	1	20	20.00
06.09.2017	WILLSON	JAGAN NAGAR	1	20	20.00
07.09.2017	KASTHURI	EZHIL NAGAR	10	20	200.00
07.09.2017	SUGUNA	JAGAN NAGAR	2	20	40.00
07.09.2017	VIJAYA	EZHIL NAGAR	1	20	20.00
07.09.2017	SOLD OUT IN CHURCH	INFANT CHURCH	30	20	600.00
12.09.2017	KANNAN	EZHIL NAGAR	5	20	100.00
14.09.2017	RAJAMMAL	EZHIL NAGAR	3	20	60.00

19.09.2017	YASODHA	EZHIL NAGAR	1	20	20.00
23.09.2017	JOSHEPH	JAGAN NAGAR	1	20	20.00
12.10.2017	MOHAN	EZHIL NAGAR	2	20	40.00
14.11.2017	KALAIVANI	IIT MADRAS	3	20	60.00
07.12.2017	SOLD OUT IN CHURCH	INFANT CHURCH	47	20	940.00
07.12.2017	KALISHWARAN	EZHIL NAGAR	3	20	60.00
04.01.2018	SOLD OUT IN CHURCH	INFANT CHURCH	46	20	920.00
09.01.2018	NADIMUTHU	EZHIL NAGAR	3	20	60.00
19.01.2018	DHANASEKAR	JAGAN NAGAR	2	20	40.00
11.02.2018	AZHAGAMMAI	JAGAN NAGAR	4	20	80.00
01.03.2018	SOLD OUT IN CHURCH	INFANT CHURCH	48	20	960.00
01.03.2018	BHUVANA	EZHIL NAGAR	4	20	80.00
01.03.2018	MUNIYAMMAL	JAGAN NAGAR	2	20	40.00
01.03.2018	KEERTHANA	EZHIL NAGAR	2	20	40.00
03.05.2018	CHURCH	INFANT CHURCH	50	20	1,000.00
07.06.2018	CHURCH	INFANT CHURCH	40	20	800.00
10.06.2018	NISHA	JAGAN NAGAR	1	20	20.00
10.06.2018	GOWRI	EZHIL NAGAR	1	20	20.00
22.06.2018	KATHIRVEL	IIT MADRAS	2	20	40.00
23.06.2018	VALLI	EZHIL NAGAR	2	20	40.00
02.07.2018	SOLD OUT IN CHURCH	INFANT CHURCH	45	20	900.00
05.07.2018	SASIKALA	VELAVAN NAGAR	2	20	40.00
11.07.2018	ROSELY	LAKSHMI NAGAR	2	20	40.00
17.07.2018	POONGODI	SRI RAM NAGAR	1	20	20.00
23.07.2018	INDUSTRY	VICHOOR	25	20	500.00
04.08.2018	SOLD OUT IN CHURCH	INFANT CHURCH	41	20	820.00
09.08.2018	KAVERY	EZHIL NAGAR	2	20	40.00
13.08.2018	KALPANA	SRI RAM NAGAR	1	20	20.00
21.08.2018	SUGUNA	GANAPATHI NAGAR	1	20	20.00

06.09.2018	SOLD OUT IN CHURCH	INFANT CHURCH	38	20	760.00
04.10.2018	SOLD OUT IN CHURCH	INFANT CHURCH	16	20	320.00
16.10.2018	KALAIVANI	IIT MADRAS	2	25	50.00
17.10.2018	BINDHU	IIT MADRAS	1	25	25.00
22.10.2018	unknown	IIT MADRAS	1	25	25.00
01.11.2018	SOLD OUT IN CHURCH	INFANT CHURCH	18	20	360.00
06.12.2018	SOLD OUT IN CHURCH	INFANT CHURCH	10	20	200.00
-	Samples to Nursery	-	15	Free	free
03.12.2018	Mr. Christian	Panchayat secretary	15	Free	free
-	Samples to Nursery	-	5	free	free
20.12.2018	Anu	Samples for lab testing	1	Free	free
03.01.2019	SOLD OUT IN CHURCH	INFANT CHURCH	9	20	180.00
07.02.2019	SOLD OUT IN CHURCH	INFANT CHURCH	15	20	300.00
07.03.2019	SOLD OUT IN CHURCH	INFANT CHURCH	49	20	980.00
04.04.2019	SOLD OUT IN CHURCH	INFANT CHURCH	45	20	900.00
05.04.2019	POONGODI	GANAPATHI NAGAR	2	20	40.00
23.04.2020	BEGAM	EZHIL NAGAR	20	15	300.00
24.04.2019	EZHUMALAI	VICHOOR	54	15	810.00
04.04.2019	RAMYA	GANAPATHI NAGAR	1	20	20.00
04.04.2019	ANITHA	GANAPATHI NAGAR	1	20	20.00
04.04.2019	MUNIYAMMAL	GANAPATHI NAGAR	1	20	20.00
04.04.2019	DILLIBABU	JAGAN NAGAR	1	20	20.00
05.04.2019	KANNAN	GANAPATHI NAGAR	3	20	60.00
02.05.2019	SHANTHI	EZHIL NAGAR	3	20	60.00
10.04.2020	BHAVANI	JAGAN NAGAR	1	20	20.00
04.05.2019	CHURCH	INFANT CHURCH	50	20	1,000.00

06.06.2019	CHURCH	INFANT CHURCH	38	20	760.00
05.07.2019	CHURCH	INFANT CHURCH	25	20	500.00
01.08.2019	CHURCH	INFANT CHURCH	40	20	800.00
14.08.2019	households	EZHIL NAGAR	25	18	450.00
21.08.2019	NURSERY	MINJURE	50	12	600.00
05.09.2019	CHURCH	INFANT CHURCH	20	20	400.00
04.10.2019	CHURCH	INFANT CHURCH	15	20	300.00
17.10.2019	RAJU HOSPITAL	T -NAGAR	500	10	5,000.00
17.10.2019	NURSERY	IIT MADRAS	500	10	5,000.00
07.11.2019	CHURCH	INFANT CHURCH	15	20	300.00
05.12.2019	CHURCH	INFANT CHURCH	15	20	300.00
22.01.2020	Prof.B.S. Murty	IIT MADRAS	1	20	20.00
06.02.2020	IIT	IIT MADRAS	1000	10	10,000.00
10.02.2020	CHURCH	INFANT CHURCH	31	20	620.00
20.05.2020	VICHOOR	VICHOOR	15	20	300.00
19.06.2020	SOLD OUT	VICHOOR	4	20	80.00
08.07.2020	SOLD OUT	VICHOOR	22	20	440.00
03.10.2020	IIT	IIT MADRAS	1400	10	14000.00
13.11.2020	SOLD OUT	VICHOOR	20	20	400.00
10.12.2020	SOLD OUT	VICHOOR	10	20	200.00
<b>TOTAL</b>			<b>4568</b>		<b>55,840.00</b>