SOLID WASTE MANAGEMENT & SOCIAL ENTREPRENEURSHIP - *A key to sustainable development*

At

ExNoRa GREEN PAMMAL
&

SAM FOUNDATION

FOR ECO FRIENDLY ENVIRONMENT

By

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Roll No: 12 , **MPG-09 Batch**

In Partial Fulfillment of the Requirements for **Issue Based Internship** for the Award of

Masters Program in Government (MPG)

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CERTIFICATE

This is to certify that the report entitled ***"Solid Waste Management & Social Entrepreneurship- A key to sustainable development"*** is submitted by ***Mr. Divyesh Arora, Roll. No. 12, MPG-09*** for the award of ***Masters Program in Government (MPG)*** of the Institute embodies original work done by him under my supervision.

Signature : _____

Name of the Faculty: Mrs. Swadesin Mahapatra
Research Associate,
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Date: _____

DECLARATION

This is to declare that the report entitled ***"Solid Waste Management & Social Entrepreneurship-*** *A key to sustainable development* **"** has been submitted by me in partial fulfillment of the requirement for **Issue Based Internship** the award of **Masters Program in Government (MPG)**. The report has not been submitted for any other degree to any other university and is my original work.

Place: **Pammal, Chennai**

Date: **01st January, 2014**

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ACKNOWLEDGEMENT

It is a matter of great satisfaction and pleasure to present this report on "Solid Waste Management & Social Entrepreneurship - *A key to sustainable development*", I take this opportunity to owe my thanks to all those involved in this Internship Period.

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Chapter I Introduction

Managing the waste whether it is solid or liquid, is a major concern of today. Their crisis is apparent in nearly nook and corner of the Nation. Generating waste is as simple today because we live in the era of packing, where everything we buy from the market comes in a well maintained pack. And when we consume the thing, usually we do not ponder that where its packing material will go. We do not even bother to find whether it is recyclable or biodegradable or not. And that very thing creates pollution of our land, air and water which undermines the efforts to improve health and safeguard our environment.

Solid waste management is a biggest challenge to each and every society of the country. Not only rambling in urban areas but also in every part of rural area. The normal trend of the people living in the era of global warming and climate change is to intellectualize the problem at the macro level without even finding the solution of the problem at micro level. And thus this situation has even contributed more to the problem of global warming and allied issues.

However, solid waste management addressed many problems and offers endless opportunities for cleaning up our surroundings on effective methods by tackling the concern at the grassroots level which has alleviated the effects of the impact to whatever degree it can be.

In India, generation of Municipal solid waste, industrial waste, hazardous waste, biomedical waste have been increasing due to population growth, change in life style and economic development. On the other hand, the waste management responses have not been kept pace with the increasing quantities of waste generating and thus, resulting in accumulation of waste, due to poor ways of disposal and treatment.

Whereas, by implementing these projects created the opportunities for many to generate employment and generate income, and also making renewable source of energy. As concerns of environment and energy are very closely associated, if we are working one issue, other is automatically addressed. The utmost requirement is of generating awareness among people and sensitizing more on the issues of making a clean environment and also adopting ways and means to use renewable energy.

One such organisation is ExNoRa (Excellent Novel Radical) Green Pammal (EGP) and SAM Foundation which is functioning under the pioneering leadership of Mrs. Mangalam Balasubramanian, which is working on the Municipal Solid Waste. Municipal Solid Waste comprises of household waste, construction and demolition debris, sanitation residue, and waste from streets. EGP works includes door to door collections, segregation at source and resource recovery from waste collected.

History of Organisation

Mrs. Mangalam Balasubramanian came to Pammal from Delhi to settle down here. She loves to live socially, so some suggested her to start a kitty party. But she motivated everybody to start working on a social issue in wake of starting some kitty party. So they all came together, as a group of few ladies and came across a common problem of the area, i.e. disposal of solid waste. So she took an initiative to start weekly meetings on hygiene, waste, its management, cleanliness, etc. So as a group activity, they started going to streets of Pammal in order to create awareness in the locality for waste and hygiene. Saturday and Sunday were used to do folklores in the society. At that time there were 323 houses in Pammal, so they hired a rickshaw and they started collected waste from each one of the house and then they used to dump that material in to the bin which was of Panchayat. As Pammal was a Panchayat at that time.

But one a man came shouting to her at why do they dump the material in front of his house without realizing a fact that it was decided by her but by the Panchayat itself and he also constructed the new house their earlier it was a vacant plot only.

That day an idea struck to her to compost the biodegradable waste. So she decided to go and search ways and means to get the method. Two people who joined her sometime back used to create awareness and motivate people. And in the meantime she was putting her efforts on a small land of the nursery, to get the compost. And in 35 days she got the manure ready. And that was a great remarkable achievement for her. So she decided to call everybody from Pammal for a community food and showed her work done. Everybody was really impressed by her perseverance attitude. And the nursery people allowed doing composting in their area. That's where she was motivated to take it at a higher level.

So she decided to make Self Help Group- "mahila club" which comprised of 80 members. Saturday and Sunday they used to have meetings and talks with the people. Then they applied loan on behalf of their SHG and the loan was sanctioned of Rs. 42000. And with that money they constructed vermi-composting beds.

Sooner or later it became a very attractive point for all the dignitaries to show. Then they decided to organize Annual Fair for Community Gathering action. They used to charge minimum money in order to meet the expense. Till then the SHG was not registered as NGO. But then they used to call a public figure for that Fair.

In 2004, Pepsi Co. inquired and asked to come to visit the work of them without any prior information. On seeing their work he was really impressed and ask Mrs. Mangalam to accept the offer that Pepsi Co. would like to support them in their initiative and ask her to send the proposal to the Pepsi Co. and till then no such formal proposal was been made by her as she would have never thought of any help by somebody even though Mrs. Mangalam managed to send the proposal to the company. And to her surprise her proposal was accepted by the company. And they were given Rs.13 lakhs in order to construct composting yard.

So in order to fulfill that Municipality has to give them a piece of land. And ask to take 4 wards initially to clear it and collect the waste. And in 2006, Exnora Green Pammal was registered as a NGO. And slowly and steadily they were more responsibility. And again Pepsi Co. give them money and finally gave them a timeline for not supporting it further and now they have to manage the salary part of the manpower on their own but the promise to help in need and tide and in some project prospects.

In 2007, EGP signed a Memorandum of Understanding with Municipality saying EGP would get 95 paisa per household per day for cleaning and collecting the waste. But still there were operational problems created now and then. But whenever there was a problem Pepsi Co. used to be there like a shield to support them and bear the gap which was not been given by the Municipality.

In 2010, Pammal became the Municipality and they increased 10 paisa per household per day. But when new rules of Municipal Solid Waste came up, there was again a hue and cry for the whole issue. As Municipality was not at all ready to pay on household basis and they want to give on tonnage basis. There when practical problem came across functioning of EGP. As in order to meet the requirement of weight basis, every rickshaw has to be weighed off before disposal. So EGP came with a solution to hire trolleys and do secondary transportation. Still the problem of weighing is carried over as each trolley has to be weighed off thrice. And this reduces their motivation at times.

In between Pepsi Co. asked to start the project in Haryana. As the government in Haryana was not ready to fund the project so EGP carries over the work by people's participation. Each house pays their certain fixed amount of money on the basis of area of house. And that is how another model of people's participation came in front of us. Because of people's participation only EGP has been able to manage their work and sustaining with it.

And thus with the support of Pepsi Co. EGP has replicated its waste management model in over a dozen Indian localities in partnership with Municipality, local administrations and residents in the projects, thus improving public health, protecting the environment and at the same time making people empowered.

Thus, Exnora Green Pammal has become a well renowned role model for solid waste management, and won many accolades in due course of their journey up till now.

Vision

EGP envision India's Municipal solid waste minimized by motivated citizens preventing waste, and by exemplary decentralized recycling and composting services.

Mission

To minimize municipal solid waste by advocating the three Rs: Reduction, Reuse and Recycling, with a strong focus on people's participation.

To bring localities into compliance with the Government of India's Municipal Solid (Management and Handling) Rules, 2000.

Work Structures

The key objective of this project is to evolve a garbage free Pammal with extensive green cover. Pammal Municipality pays EGP Rs. 850 per ton of garbage collected from the wards and EGP deploys men, materials and vehicles for carrying out the process.

The strength of this project is the methodology adopted and the deployment of workers in doing the waste management programme. It includes door to door collection, lifting rain water canal and road side garbage, and utilizing it to its fullest and rest is disposed of by doing the land-filling. It is been ensured that land-filling is reduced as far as possible. At the same time awareness programmes are organized on themes related to segregation of mixed waste and organic waste, litter free and plastic free Pammal.

Programmes

EGP's focus areas are:-

- Environment Protection
- Social Entrepreneurship
- Empowerment for the disadvantaged
- Education

- Environment Protection – EGP is very much focused to protect environment so that future generations can share the same resources and living spaces that we currently share. And for that they solid waste management. It includes door to door collection, segregation at source, and recovery from the waste. Currently this programme is successfully implemented in the following places.
    1. Pammal Municipality, Chennai, Tamil Nadu
    2. Kalpakkam DAE Township, Tamil Nadu
    3. Sanghareddy, PothireddyPalli, Andhra Pradesh
    4. Kamarhati Municipality, West Bengal
    5. Panipat Municipality, Haryana
- Social Entrepreneurship – they believes in finding the good use for each waste stream, and works on source recovery by using simple science and technology and gives back the society as recycled, up-cycled and reusable products.

1. Waste to Energy Project
    - Community Bio Gas Plant – they have installed bio gas plant in Pammal which works on food waste.
    - Temple Green Plant, Arkeeswarar temple, Pammal – Here Bio gas is made to run on the waste generated in temple like flowers, milk, prasadham, fruits and cow dung.
2. Waste to Wealth Project
    - Briquettes making project at Pammal
    - Vermi Compost project at Pammal – it is a method by which they produce the organic manure.
    - Plastic Crushing Unit at Pammal – plastic is used in road making and also other building construction material. It has been well tried and tested.
    - Project Avthar Up- cycling Product, Natham Kariacheri – in this they prepare plastic-fabric and then they produce different products like all types of bags, wall hangings, mats, key holders, file covers, etc.
    - Inorganic Material recycling – they are sold to small vendors who use it further recycle the material.

- Empowerment of the disadvantaged – EGP employs the women and others in waste collection work, calls them Green Ambassadors.

  Secondly, facilitates those women who forms Self Help Groups and takes guarantee to those people in front of banks and thus bank gives loans to SHGs and they can start their new ventures.
- Education & Awareness –
    1. EGP conducts many training programmes with external SHGs on various income generation and livelihood options relating to waste, especially on vermi composting.
    2. EGP conducts summer camps for the children of the locality.
    3. Conducts awareness using folk lores and street shows and thus able to sensitize people on the issue of clean and green environment.
    4. EGP also encourages volunteering activities by corporate as CSR activity at the project sites and supports interns to do project work on any related topics.
    5. Also through volunteer programmes EGP regularly do tree samplings, park renovation work and de-silting of temple tanks using eco-friendly techniques.

Funding Agencies

- Pepsi Co.
- Municipality for waste collected in MT per day basis.

Chapter II Schedule

i. Schedule of each day.

Sr. No.	Date	Time		Work done/Activities
		In	Out	
1	23rd December	09:40 AM	01:00 PM	Introduction of organisation. Visit to community biogas plant.
		02:00 PM	05:40 PM	Discussion with mam & making of schedule.
2	24th December	09:30 AM	01:30 PM	Door to Door Collection and segregation at the source level by Green Ambassadors
		02:15 PM	05:40 PM	Resource Recovery and Visit to Compost Yard and saw vermi-composting and Plastic crushing.
3	25th December	07:30 AM	03:00 PM	DAE Township, Kalpakkam, Anupuram & Bhavini. Project Avthar Up-cycling unit, Natham Kariacheri
4	26th December	09:35 AM	05:40 PM	Discussed various issues for doing analysis and also Marketing of Avthar products. Visited compost yard and saw preparation of briquettes.
5	27th December	09:20 AM 02:20 PM	01:30 PM 05:35 PM	Visit to Compost yard and saw preparation of charcoal from coconut leaves. Taken into account the waste incoming in the yard. Discussion with the Director about history of the organisation.
6	28th December	09:35 AM	02:20 PM	Visit the Biogas Plant, Pammal. Talking to the operator of the Biogas. Talking to nearby residents of bio gas plant.
7	29th December			SUNDAY
8	30th December	09:40 AM	05:45 PM	Talking to the users of Biogas for cooking and using briquettes. Collecting the weekly data from all four zones and finding land filling.
9	31st December	09:30 AM	06:20 PM	Women Empowerment by facilitating loans by banks to SHGs
10	1st January	09:40 AM	01:00 PM	Presentation and Evaluation. Awarding the certificate. Concluding Session.

ii. Detailed Daily Report

Day 1 – 23rd December Time – 09:40 AM Place – Exnora Green, Pammal

Work Done /Activities

I was given a warm welcome by each and every member of the organisation. I was given the annual report to read till the time I was introduced to the organisation head. From that report I could make out the various activities this organisation is doing all these years.

It is a non-profit organisation based in four states – Haryana, West Bengal, Andhra Pradesh and Tamil Nadu, covering 500,000 of population on a daily basis and providing employment opportunities.

Then I met the head of the organisation. I was introduced to the organisation and the various works this organisation does. We also discussed about problems like segregation of waste material at source level due to lack of understanding the complexity of the issue and low involvement of people in such activities of segregation at individual level due to people's day to day life. The other big issue is to train the unskilled labour. It is the most important work as it creates hygiene at the first place but the paradox is that for doing this the labour comes forward is only unskilled.

In today's scenario there are challenges at various level of work like,

a. No recognition of work.
b. No appreciation
c. Various hurdles created by government due to less accountability. As Pammal dwindles between the responsibility and accountability of the Kancheepuram district and Chennai Municipal Corporation.
d. Low sensitization of the waste disposal issue and not finding solution at micro level policy framework.
e. Always going for big players and MNCs which does not bother for real solution of the problem rather seeks for ways and means to sell their machinery. It makes the problem to sustain for such small players in the competitive environment.
f. To manage human resource as most of the workers are from lower income group so if anyone offers them 10 rupees more they leave this organisation.
g. Private Contractors tend to work on the basis of amount of waste collected, transported and dumped. In such an arrangement, the waste manager looks ways and means to maximize, whereas need is to minimize it.

Visit to Community Biogas plant, Pammal.

Biogas plant is working on the simple principle of human digestion. It is a form of energy recovery. EGP engaged Biotech India to install the facilities to generate biogas from locally collected organic wastes in the Pammal region.

Biogas refers to a gas produced by the biological breakdown of organic matter in the absence of oxygen. Biogas is produced from organic waste by concerted action of various groups of anaerobic bacteria. The decomposition process can be divided into 4 steps with each of those accompanied by different bacterial groups. The biogas plant has three pre-digesters, three capsule digesters, a gas collection balloon, two slurry collection tanks, a gas scrubber system, a biogas generator, and two water/slurry tanks. The set up of the plant is reflected in the given photograph.

Fig 1 - Plant Set up.

The food which is wasted, in the restaurants, eateries, corporate canteens and slaughter houses, is collected and used as input for the first anaerobic pre-digesters along with the cow dung. The pre-digesters contain special filters which allow liquid and small solid to pass through to the first capsule digesters. There is no mixing or agitation in the system, the liquid flow occurs due to the design maintained by using gravity and displacement. Here, the first phase of anaerobic biodegradation takes place. During this process a small quantity of biogas is produced. It will pass into the non-return valve (NRV) system. The pre-digester allows only the liquid slurry portion of the pre-digested material into the main digester via specified perforated pipelines.

Once in the capsule digesters, further decomposition occurs and gas is collected. The residence time of the organic waste in the digesters is approximately 50 days, and then the cycle starts again. Here anaerobic digestion takes place through various microorganisms in four stages. During this process the pre-digested liquid is converted into biogas and bio-fertilizer. The biogas generated from the bio-digester passes to the NRV system.

Fig 2 – Anaerobic Pre-digesters & Bio reactors along with overhead tank.

Treated liquid slurry from the final capsule digester flows to the two slurry collection tank where through pump power it is cycled back to an overhead tank to be re-fed to the pre-digesters.

Gas Storage Balloon - The storage balloon stores the entire gas product from the NRV system. It has a capacity of 25 cubic meters. The balloon is flat when empty and rises as it fills. A weighted indicator on the outside drops as the balloon fills, indicating the volume of the gas inside.

Gas Scrubber Unit - This unit is used to enrich the raw biogas through the removal of the unwanted solid particles. It is nothing more than a raw gas purification system.

Inside the scrubber unit a flow of water down the column is met by a flow of gas coming up the column. Dust and other solid particles are thus washed out of the gas stream. Low concentrations of Hydrogen sulphide gas and a low percentage of Carbon dioxide are also removed through absorption by the water flow. The scrubber is connected to a pressure stabilizing unit that is similar in design to the NRV - a water volume with a headspace chamber.

Fig 3 – Gas Scrubber unit & Dehumidifier.

Dehumidifier - It removes water particles from the gas stream which would otherwise damage the internal components of the bio gas generator.

Fig 4 – Bio gas generator.

Thus, Biogas which is formed is utilized to produce electricity to illuminate three street lights and to produce cooking gas for SHG ladies to make papads and chips and also for nurse quarters adjacent to the plant site.

Fig 5 – Kitchen area for SHG ladies to use biogas and make papads and chips.

Observations

- It is not a rocket science but the simple usage of the basic concepts of science on not only the utilization of recourses but also the waste things like food, which people throw day in and day out.
- It produces a non-polluting and renewable source of energy and thus saves environment.
- It empowers the women who are being involved in making papads and chips and earn their livelihood. And also helps the nurses to meet out their LPG expenses.
- It produces enriched organic manure in liquid form, which can supplement or even replace chemical fertilizers.
- It disposes of food waste in usefully and in healthy manner.
- It significantly lowers the greenhouse effects on the earth atmosphere. The plant lowers methane emissions by entrapping the harmful gas.
- It reduces landfills. It also uses up waste material found in landfills, dump sites and even farms across the country, allowing for decreased soil and water pollution.
- The only disadvantage I came across is less reliable as it fluctuates with the kind of organic waste used in the feed. So it creates doubt to utilize it on a large scale.

Day 2 – 24th December Time – 09:40 AM Place–Ward 1, Shankar Nagar, Pammal

Visit to Door to door collection and segregation of waste procedure.

The sixteen wards of the Pammal Municipal Corporation with EGP are divided among four zones for the ease of the administration. And zone comes in the jurisdiction of 30 Green Ambassadors. Each Green Ambassadors has to collect garbage from 200 houses.

Fig 6 & 7 – Green Ambassadors collecting garbage in the community.

Observations:

- People are well aware of segregation at the source level. Almost 70% of the households do the same work. And the reason behind their doing is the hard work put in by EGP team in creating awareness in the households.
- EGP have distributed one jute sac to each and every house. The jute is to be utilized for collecting the dry waste i.e. Papers, plastics, cartoons, plastic containers, pet bottles- all the packaging material. Because it can be recycled.
- Whereas, the green ambassadors who uses his or her whistle to make alert the households that she or he has come, is also very expertise in her work. Although the households segregates but the green ambassadors further segregates the materials in different sections as been instructed by the EGP team.
- The motivation of the Green Ambassadors is the extra money which is been given to her as an incentive on daily basis by the collection of the recycled material. Each recycled material has some or the other value. On the basis of the rate list of the vendor, green ambassador is daily paid.
- On visiting the yard for the recycled material I realized the importance of the segregation of the waste at the source level. I was amazed to see how systematically all are kept. And once in 15 days they are been collected by the vendors.



Fig 8 – Different garbage Fig 9 – Recovery Yard Fig 10 – Types of wastes

Time – 02:15 PM Place– Resource Recovery Point, Office yard, Pammal

<u>Resource recovery procedure</u>

Observations:

- All the Green Ambassadors comes with their collection of garbage. They weigh it in front of the supervisor and paid accordingly on the basis of the rate list.
- Paying at the spot creates sense of instant satisfaction of getting the daily wage for the day spend for the lower economic group, who has to maintain the daily chores on the money earned daily.
- Having said that, it also creates sense of competitiveness in the green ambassadors to do the jobs better the next day. Thus better and effective segregation at the source level that in turn gives cleanliness in the locality.


Fig 11 – Recovery of types of wastes. Fig 12 – Green Ambassadors after work.

Visit to a Compost Yard of Pammal

Observations

- They have adopted windrow method for pre-curing the open area dry leaves waste and the segregated organic kitchen wastes in order to make organic compost.
- It is the method of producing the compost by pilling organic matter in long rows (windrows).
- After pilling it the water is sprinkled over it. Water is added again and again along with the cow dung. It is kept for almost 15-20 days. As the days pass on the amount of garbage reduces as it decomposes.
- Then it is been transferred into bins. And another layer of cow dung is added to it. It is mixed thoroughly and normal temperature is maintained. If the normal temperature is not achieved then it is kept for 3-4 days.
- On attaining normal temperature, earthworms are added to it. In 1 tonne bin capacity, 1to 1.5 kg of earthworms are added. The earthworms eat this waste and then they excrete. That which they excrete is good manure.

Fig – 13 Organic waste

Fig 14 – GA putting worms

- And after 10-15 days it is taken out, earthworms are removed and it is sieved. And then it is packed to sell it to the farmers or its users by the brand name ExOrCo – Exnora Organic Compost. Usually compost gets prepares in 40 to 45 days.

Fig 15 – Compost yard

Fig 16- Sieve

Fig 17 – ExOrCo

Plastic Crushing Unit at Pammal

- The thin plastic covers are not recycled, so instead disposing in incineration or land filling they are utilized either utilized in up-cycling product making or in road construction.
- Use of shredded thin plastic is been well tried and tested and has proved to be an eco-friendly way of road construction.
- The thin plastic covers are shredded in shredded machine and then mixed into bitumen to construct roads. It can also be utilized in making other construction materials.
- It reduces the cost of maintenance and has resistance to water.
- It increases the life of roads and also reduces the usage of bitumen.

Fig 18 – Plastic shredding machine

Fig 19 – Shredded Plastic

Day 3 – 25th December Time – 09:00 AM

Place – DAE Township, Kalpakkam, Anupuram and Bhavini.

Visit to door to door collection and segregation of waste procedure.

Work Activities – Visit to township area and observe the door to door collection of waste, segregation of waste and cleaning of the open area in and around township.
In Kalpakkam itself, there are 5500 households. In all the three townships 109 Green Ambassadors are deputed for work, which comprises maximum women. They daily collect the garbage from each one of them house intimating by whistling on her arrival. They have been provided with colour coded bins for collecting waste and segregating in their vehicle.
Due to more of the open area existing in the township, 60% of the Green Ambassadors are deputed for cleaning the open area and collect the organic waste which goes for manufacturing of the organic compost, 35% are deputed in collecting the waste from door to door and rest are involved in making the organic compost yard.

Observations

- All the Green Ambassadors were going enthusiastically towards their work of collecting the household waste from each house.
- They collect the waste and segregate it immediately according to the instructions given to them by their supervisors on the basis of organic and recyclable material.
- On comparing the ward of Pammal and township of Kalpakkam, I observed that people of Pammal are more sensitive towards the plight of Green Ambassadors for segregation of waste.
- But Green Ambassadors are expert in their work of collection and segregation. As all them are trained on site of collection with just prior knowledge of different types of waste.
- Green Ambassadors who are deputed for cleaning open area were also at work simultaneously. And whatever waste they were collecting was been transported to trolley.
- The recyclable material which is collected is transported to the compost yard initially and from there it is been sold off to the vendors on weekly basis.
- The organic waste is collected and used in making the organic compost.
- Thus, the combined effect of removing waste makes the place clean and clear.

Fig 20 – Green Ambassador at work

Fig 21 – Types of waste

Visit to Vermi-Compost Yard of Kalpakkam Township.

Observations

- Almost 11 MT to 12 MT of organic waste is collected in and around township on daily basis.

Fig 22 & 23 – Green Ambassadors collecting organic waste

- They have adopted windrow method for pre-curing the open area dry leaves waste and the segregated organic kitchen wastes in order to make organic compost.
- It is the method of producing the compost by pilling organic matter in long rows (windrows). This method is suited to producing the large volumes of compost.
- After pilling it the water is sprinkled over it. Water is added again and again along with the cow dung. It is kept for almost 25-30 days. Water is added again and again and kept for longer time because it is more of leaves shed by trees. As the days pass on the amount of garbage reduces as it decomposes.
- Then it is been transferred into bins. And another layer of cow dung is added to it. It is mixed thoroughly and normal temperature is maintained. If the normal temperature is not achieved then it is kept for 3-4 days.

- On attaining normal temperature, earthworms are added to it. The earthworms eat this waste and then they excrete. That which they excrete is good manure.
- And after 10-15 days it is taken out, earthworms are removed and then it is sieved. It is then packed to sell it to the farmers or its users by the same brand name ExOrCo – Exnora Organic Compost.
- Normally, it takes more time for producing the compost and that is almost 50 days.
- With almost 1 tonne garbage along with cow dung produces 250-300 Gms of manure.

Visit to Project Avthar Up-cycling Product Unit and Organic Farming, Natham – Kariacheri Village.

Up-cycling means adding value to the already used product to reuse it. This process makes products of enhanced quality and for better environmental value. This process rather delays the time of decay of that already used product, which otherwise would have hampered the environment by polluting the water-body or reduce the soil fertility. And it justified the name of the project category i.e. Waste to Wealth projects.

Observations

- They use water pouches and thin plastic bags in this process, which would have clogged the drainage or gone to landfills.
- Water pouches or thin plastic bags, which are collected from the solid waste management projects, are first washed by water, cleaned properly and then dried.
- Then they are been cut in such a manner that from then long strips are been formed. On making the long strips of almost 1-1.25 m.
- They are used along with bobbins and warping threads to make plastico-fabric through weaving machine.

Fig 24 – Thin Plastic strips

Fig 25 – Threads & Bobbins

- The plastico-fabric which is formed is tailored and designed to form various products, ranging from small pencil pouches to ladies bags, from lunch bags to children school bags. From pooja bags to file covers and laptop bags. And also table mats, dustbins, laundry bags, decorative pieces, etc.

Fig 26 – Weaving

Fig 27 – Stitching

- And the best part is that, it uses minimal to no power to make such items.
- It gives the dignified employment opportunity to the underprivileged class of the society.
- It also helps in reviving the handloom industry.
- Besides the weaving unit, there is a small farm in which they have done organic farming. And grown pumpkin, loci and red-pumpkin. They recently, harvested it.
- The night watch man of their unit looks after that and now sown the seed of watermelon.

Fig 28 – Organic Farm products

Day 4 – 26th December Time – 09:35 PM Place – Exnora Green, Office Pammal

Meeting with Director

- Discussed various parameters for further analysis.
- Also discussed the marketing strategy for Avthar up- cycled Products. They are planning to do online marketing of such products. So trying to explore the market.
- Then only the organisation will motivate to run in future and sustain comfortably.

Visit to Briquettes making yard at Pammal.

- The coconut leaves collected from ward areas are utilized in making briquettes, which are used for tea shops and ironing shops instead of coal. As they have high calorific value and keep burning for long time and non-polluting fuel, clean fuel.
- The coconut leaves are first dried by just keeping in open area.


Fig 29 – Dried Coconut leaves


Fig 30- Kiln


Fig 31 – Heated leaves

- The dried leaves are then charred in the kiln by using dried leaves itself as a fuel.
- After charring of leaves they are powdered.
- Then the powdered material is sieved properly in order to remove unwanted bigger size particles which are of any use. And in comparison of the material it is very small quantity.


Fig 32 – Crushing of leaves


Fig 33 – Sieving


Fig 34 – Mixing of powder

- It is then mixed with a binder, rice water, or some starchy material it is mixed to form thick paste.
- Then that thick paste is fed into the machine to get the cylindrical form briquette. This process continues till it gives the properly binded cylindrical piece.

Fig 35, 36 & 37 – Stages of Briquettes – fresh to dried

Day 4 – 27th December Time – 09:35 PM Place – Compost yard, Pammal.

Observations

- In compost yard they were making kiln ready to char the coconut leaves.
- Initially dried coconut leaves after weighing are kept in the kiln.

Fig 38 , 39 & 40 – Stages of heating the coconut leaves

- Then fuel is added from the below hole. The kiln has a division inside. It has a plate with holes which separates the feed and fuel.
- The fuel is also dried coconut leaves only. The fuel is ignited slowly with initially paper.
- Gradually smoke is seen from above. The top part of the kiln is not covered initially, so that they can see that there is a proper heating and no fire to take place.
- After some time top part of the kiln is been covered with conical head.

Fig 41, 42 & 43 – Procedure involved in heating of dried leaves in kiln

- It is left for 20-25 min. Until smoke is reduced.
- When smoke is reduced, then the top head is removed and small quantity of water is sprinkled over it. In order to reduce the temperature and ease to take out charred leaves.
- Charred leaves are taken out and crushed to make powder and then sieved.

- While being there in compost yard I also observed the trolley coming from the respective wards. As the green ambassadors collect the waste from the households by using their rickshaws and then they do secondary transportation to the trucks.
- As this type of transportation helps in noting the weight of the waste they collected from the ward area and accordingly the organisation is been paid by the Pammal Municipality.

Fig 44 – Silt for dumping from wards

Fig 45 – Organic waste

Place – Office, Exnora Green Pammal, Pammal Time – 03:30 PM

Discussion with Director of the organisation – Mrs. Mangalam Balasubramanian Ji

- I discussed with her the history of the organisation.
- She mentioned in that growth and development of the organisation with reference to timeline.
- How this organisation developed in due course of time and won so many accolades in between which motivated her and also the members associated with the organisation and now trying to make a self sustainable unit.
- While discussing about the future plans she mentioned that she would now try to sustain and would make more this organisation grow and basically work on training part and would not start something new as of now and would like to run whatever things are going on.
- She is now focusing on giving this organisation a professional touch. As she also knows without which it would be very difficult to make it a sustainable unit. Not on the point of making profit but on the part of efficient working.
- Most importantly she mentioned that she would like to make in difference in the approach of policy makers who has made the rules and regulations of MSW, where anybody is paid not on the basis of per household rather on the basis of tonnage. As it is a biggest hurdle in motivating people to do the work more effectively and resourcefully.

Day 6 – 28th December Time – 09:40 AM Place–Community Bio-gas Plant, Pammal

Observations

- Today, I reached the plant when they were feeding the food waste to the pre-digester.
- The collected food waste from various eateries of their corporate houses and after diluting with water the feeder fed into the pre-digester.


Fig 46 & 47 – Stages of feeding of food waste in pre-digester

- After that I inquired from her that what precautions she usually takes while being in the plant. So she answered rest of the other things takes place on its own but only if the gas collector indicator shows that it is full then she opens the valve to release the excess gas.
- After that I inquired from the nearby residents who were there outside the plant about any obnoxious odor they feel sometimes. About which they denied out rightly that they never felt such odor anytime.

Day 8 – 30th December Time – 09:40 AM Place – Pammal

Bio gas user – Nurse Quarters, Shankar nagar, Pammal

- They were using Bio gas from almost three years. And it was looking as it is like LPG gas burner with only difference in pipes arrangement.
- The system exists there when EGP installed the bio gas connection in their quarter, so only installation cost includes the cost of pipe arrangement.
- As compared to LPG, Bio gas is cost effective. Presently they are using biogas complementary to LPG and earlier they were using only LPG. So where only LPG works for one month, now it works for two to three years with bio gas.
- Bio gas is efficient as far as heating is concern as cooking food takes less time.

Briquette user – Washer Man, Pammal

- He told that he uses briquette with coal as when he only uses the briquette, more heat is generated and it might damage the cloth. It indicates that briquette has more calorific value which is been supported by the proximate data analysis or briquette and coal.
- It comes out to be cost effective. As the cost of briquette is less than coal.


Fig 48 & 49 – Briquettes used by washer man in ironing the clothes

Proximate Analysis: Briquette Vs Coal

Quantity	Value
Ash	8%
Moisture	(4 ± 2.8)%
Volatile matter	(81± 0.31)%
Fixed Carbon	(14.95±3.5)%
Calorific Value	5254 Kcal/kg

Table 1 – Proximate analysis of Briquette

Sample No.	Proximate Analysis				HGI	Gross Calorific Value (kcal)	Net Calorific Value (kcal)
	M (%)	VM(%)	A(%)	FC(%)			
1	4.5	25.04	34.56	24.6	68.54	3896	3596
2	6.65	28.25	26.92	34.92	59.22	4558	4258
3	5.24	25.01	33	37.1	65.203	4796	4496
4	5.09	26.06	43.18	25.32	62.50	4469	4169
5	6.64	33.82	25.67	38.23	58.62	4623	4323
6	5.39	28.86	34.85	30.9	76.09	3871	3571
7	8.24	33.96	8.84	53.16	61.23	4821	4521
8	13.15	24.95	33.57	28.38	48.69	4345	4045
9	11.18	25.07	39.85	24.58	65.93	4268	3968
10	4.45	27.87	36.19	31.51	60.37	5003	4703
11	6	26.74	28.1	39.16	57.49	4963	4663
12	5	29.01	37.6	28.7	70.32	3962	3662
13	2.4	23.27	52	22.6	57.28	3645	3345
14	4.45	25.01	44.02	26.68	76.65	3692	3392
15	8.39	31.4	33.42	27.81	52.33	4538	4238

Table 2 – Proximate analysis of different Indian coals samples (quoted from report – Assessment of Coal quality of some Indian Coals)

On analysis we can easily say that briquette is anytime better than Indian quality coal.

- Ash content in coal is very high as compared to the briquette. More the ash content less is the calorific value.
- Volatile matter is very high in briquette as compared to coal. As more the volatile material high is the calorific value.
- Calorific value is very high in comparison to any another Indian coal.

Potential of Briquette with EGP

- On analyzing the process, we can say that 40% of material lefts after heating of leaves in the kiln.
- And 50% material left after crushing and sieving. So with that left over material we can prepare briquettes.
- With 1 kg 20 pieces can be prepared of 4 cm size.
- And daily collection of coconut leaves is approximately 2.5 MT – calls for a huge potential of making briquettes.
- Only requirement is the touch of professionalism and proper monitoring of the process parameters.

Collected the weekly data from all four zones and finding land filling.

Waste Collection sample

	Decomposable		Recyclable waste							Inorganic waste			Land filling	Briquette	Total Waste
Date	Organic	Food	Plastics	Pet Bottles	More Scrap Value			others	Less Scarp Value	Thin Plastic	Thick Plastic	Card board	Silts	Coconut leaves	
		biogas			Glass	Rubber	Tin								
21-Dec	8.41	1.514	0.39	0.39	0.94	0.937	0.9	3.3	0.675	2.103	2.944	12.6	3.5	3.364	42.06
*22-Dec	4.77	0	0	0	0	0	0	0	0	1.278	1.79	7.67	0	0	15.51
23-Dec	7.81	1.561	0.311	0.31	0.75	0.745	0.7	2.1	0.505	1.335	1.869	8.01	10	2.968	41.163
24-Dec	7.82	1.564	0.311	0.31	0.75	0.745	0.7	5	0.507	1.338	1.873	8.03	7.2	2.972	44.065
25-Dec	7.92	1.583	0.318	0.317	0.75	0.747	0.3	3.4	0.537	1.369	1.916	8.21	9.5	2.707	42.974
26-Dec	8.13	1.626	0.323	0.322	0.78	0.775	0.8	2.4	0.52	1.391	1.947	8.35	10.3	3.091	43.061
27-Dec	7.99	1.598	0.319	0.317	0.77	0.763	0.8	2.2	0.514	1.363	1.908	8.18	10.2	3.037	42.202
Average	7.6	1.349	0.282	0.281	0.7	0.67	0.6	2.6	0.465	1.45	2.04	8.7	7.24	2.5913	38.719

Table 3 – Weekly Data collected on waste collection from all 4 zones of Pammal Municipality

Note* – 22nd December was a Sunday, so there was no door to door collection and only streets sweeping and cleaning was carried over.

With average data taken into consideration, graph is drawn.

Type of waste	%	Wt. (tons)
Organic	20.8	7.6
Food	3.8	1.4
Plastics	0.8	0.3
Pet bottles	0.8	0.3
Glass	1.9	0.7
rubber	1.8	0.7
tin	1.7	0.6
others	7.1	2.6
less scrap value	1.3	0.5
thin plastic	4.0	1.5
thick plastic	5.6	2.0
card board	23.8	8.7
silts	19.8	7.2
coconut leaves	7.1	2.6

Table 4 – Variety of waste collected

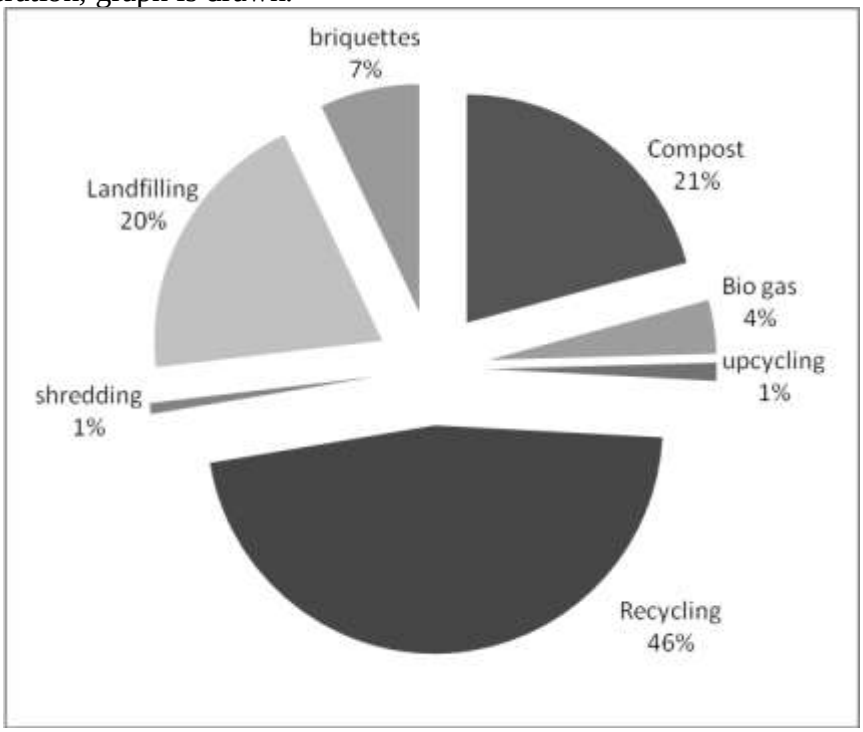

Chart 1 – Uses of waste

On analyzing the data, we can conclude that variety of wastes is collected and there is a scope of reducing the land-filling. Secondly, if we reduce the recycling which we give to vendors then shredding and up-cycling has a huge potential, whereas new buyers can be searched for and briquettes manufacturing can be increased.

Day 9 – 31th December Time – 09:40 AM Place – Pammal

Meeting with Mrs. Rehmat – SHG Co-ordinator

Women Empowerment by facilitating loans by banks to SHGs

- EGP facilitates those women who forms Self Help Groups and takes guarantee to those people in front of banks and thus bank gives loans to SHGs and they can start their new ventures.
- SHG can be formed with 15-20 members. So they motivate to form group and sometimes groups also comes to them asking them for monetary support. So they don't give loan to themselves rather helps to take loan from bank on the basis of individual savings.
- There are different terms and conditions for different level of loans like if they are successful in repayment of their previous loan so they get the next loan.
- Women SHGs works in different areas like preparing idli-dosa mix, tailoring, vegetable shops, flower making shops, or flower selling shops, Tiffin centers, water cans distribution, saree preparation work and many more.

Women Empowerment by training SHGs

- Various trainings for plastic bags shredding, briquettes making, aricanut plate making, mushroom cultivation, recycled paper making and vermi composting techniques are give to SHGs as per requirement and needed.
- At various point of time camps are put up in order to impart such training to SHGs.

iii. Overview of Internship

I came here with the objective of learning ways and means of methods of waste management. And my overall experience here with EGP is exceptionally good. Because first of all the kind of treatment they furnish me was exceptionally wonderful so it motivates me to learn more and more.

Secondly, they showed me all their works which actually touched me from inside that by thinking so simple we can actually give solutions to big problems.

The director of the organisation helped me profoundly in making the schedule of my internship. It included over view of the activities and also critically analysis of their activities.

So I went on meticulously following my plan of action in the first phase of internship and then in later phase I got sufficient time to analyze the activities effectively and comprehend at the end.

During the time of training I came across so many things which I usually ignore at first place, so this also helped me in building my perspective.

Finally, at the end it gave a great insight to think positively on whatever existing in our environment and from there only the solution of problem can be sought out. So I can proclaim that it was a perfect experiential learning.

Chapter III – Case Studies

1. Mrs. & Mr. Prassana – one of the residents of the 23rd Street, Shankar Nagar, Pammal.

They are living in this locality from their birth. Mr. Prassana is an employee of Government of India and his wife is a housewife. On asking them that do they find any difficulty in segregating the daily waste, I get to know that initially they do face some difficulty but now it is a part and parcel of life. Secondly, they feel elated that they do something great in saving the environment. Thirdly, they also remarked that Exnora Green Pammal is doing a remarkable work in cleaning and managing solid waste on day to day basis.

2. Mrs. Thilgavathy – Green Ambassador of Exnora Green Pammal.

She is working with EGP from past 10 years. She used to brew illicit drinks in the periphery area of Pammal. They used to earn but life was hell. Joining the EGP, transformed her life completely. She is a wife of drunkard. Being a wife of such a man, who himself drinks alcohol from his daily wage and also her daily wage, managing home and their two children used to be a difficult task. Working with EGP not only, made her live an empowered and dignified life, but also changed the life of their children. Today, her son is studying ITI and her elder daughter finished her graduation in commerce and will soon join some job.

Fig 50 – Thilgavathy in Resource recovery yard.

Fig 51 – Aarayi at work in her ward.

While working with EGP she gets a monthly salary for collecting and segregating the waste collected and also by bringing the recyclable material she is paid accordingly on daily basis, which helps her to manage her daily chores of house.

3. Mrs. Aarayi – Green Ambassador

She joined this organisation 7 months ago. She is a newly joined worker to them. But looking at her work it does not seems that she is a new comer. She is very expert in her work of segregation at the level of source, which makes the work accomplished easily.

Earlier she was doing the work of construction labour. But now with growing age she cannot manage to lift such load day in and day out. And this work is relatively easier than her earlier work. And she said that she is very satisfied with the kind of work she does here and also with the kind of remunerations and facilities she receives here.

4. Mr. Suresh – Supervisor in Compost yard, Pammal.

He joined this organisation 2 years back. His job responsibilities include having an account of how much organic waste enters into yard and how much the end product – ExOrCo is going out. Secondly, he also looks after all the other preparations like briquetting making and plastic shedding. Thirdly, manages all the Green Ambassadors working there.
Earlier he was working in Hotel as House-Keeping supervisor. He left that job because he is interested in doing this job as well as the earlier job was quite far. Although there is not much change in his economic condition but the kind of facilities this organisation provides and the helping nature of the head of the organisation motivates him to do his job efficiently and this inspires him for working more for this organisation.

Fig 52 – Mr. Suresh in compost yard

Fig 53 – Mr. Amrason in center & Mrs. Lakshmi at left

5. Mrs. Shakila – Green Ambassador, Compost yard, Kalpakkam.

She joined this organisation last year. Before joining this organisation she was a house-wife. But now she is a full time worker with this organisation handling the compost yard. So now she takes extra income to her family and feels empowered.
Earlier she was bit hesitant in handling the earthworms. But in due course of time now she manages it comfortably. And feels happy in getting herself employed and finds herself in better position to support her family.

6. Mr. Amrason – In-charge and weaver, Plastic-fabric weaving unit, Natham-Kariacheri

He is a skilled man. He used to weave silk sarees and used to travel a lot in search of selling it and receive a handsome amount.
Then he came across the Director of the organisation, so she shared her vision with him to weave plastic-fabric. So he was very much motivated and joined the organisation. Now he is happy to be a part of this team and feels elated. And he does not even have to go in selling its product. So in real terms its labour is respected and now lives a dignified life.

7. Mrs. Lakshmi – Weaver, Plastic-fabric unit, Natham-Kariacheri

Earlier she was an agricultural labour. And now from past three years she is working with EGP as a weaver. She says that she was sent for training by the organisation. And now she is happily doing weaving and enjoying her work. She has very high regards for the Director of the organisation as she motivates and inspires Mrs. Lakshmi and even everyone, time to time.

8. Smt. Sunderi – Resident, nearby biogas plant, Shankar Nagar, Pammal.

I inquired from her that about a notion that from biogas plant there is always a very bad odor in the nearby areas. So she denies the fact that there is no such odor that disturbs or irritates the nearby resident areas.

She also told that from biogas plant, electricity is produced which illuminates the street light bulbs every day.

Chapter IV – Observations & Analysis

Pammal is a semi-urban town which comes under the jurisdiction of Kancheepuram district of Tamil Nadu located nearby Pallavaram railway line and also NH 45. It has a total population of approximately 75,000 thousand people which is settled in 21 wards. It was also facing the problem of solid waste like any other town. But from last 19 years someone is taking due care of that problem and has proved the potential to create social entrepreneurship while saving energy and environment simultaneously. And that someone is Exnora Green Pammal who is maintaining its own pace to find out the solution of problem and vision to achieve sustainable on the lines of eco-friendly development.

ExNoRa Green Pammal (EGP) is an organisation working truly on what its name proclaims i.e. "Excellent Novel Radical", which means brilliantly working on innovative ideas which are very fundamental and deeply seated in nature and also essential in order to deal with up with the varying environment and can take any country to shine with its radiance.

It is basically working on fundamentals of science for sustainable development. As the biggest problem of any urbanized/ semi-urbanized/rural area is to manage solid waste and they are doing a wonderful job in not only managing but also finding new ideas to conserve energy and thus save the environment. Earlier it was a small initiative but gradually it has gathered a momentum and now finding own ways and means to sustain.

Its focus areas are waste collection, segregation at source, energy production, environment, organic farming, women empowerment and creating awareness.

EGP started as maintaining relations and rapport building and thus reduced the trust deficit and today they are working efficiently on their above mentioned areas of concern and also developing professionally.

EGP is utilizing simple principles of day to day life and science and making big things which can change the picture of the country in a big way. They are first collecting waste from door to door collection and from streets on daily basis and segregate the waste to recycle and reuse it, which has become the need of the hour.

Secondly, they do decomposition of collected organic waste to make compost which is good manure and can promote organic farming. Organic farming has its own so many advantages and the most importantly the saving environment and saving economy, as it reduces the pressure of producing the chemical fertilizers.

Thirdly, EGP is making energy from waste, which is the utmost demand of the era. If we somehow able to work it properly, and find a replacement of LPG, then we can do wonders because it can then reduce a load of the country's imports, thus reducing current account deficit

and making country economical viable, which is the biggest concern of policy makers today. And I feel privileged that EGP is doing this today. The biogas which they produce is been utilized mainly for cooking purposes, both in community bio gas plant and also temple bio gas plant. The difference in them making bio gas and others that EGP is using food waste which is high content in starch and that is why it is very reliable and also efficient for cooking purpose at the same time cost effective as told by the users.

Fourthly, waste to wealth is one of the novel and useful initiative in order to replace the coal which is the non-renewable source of energy. As they are manufacturing briquettes from dry coconut leaves and looking at the proximate analysis of the briquettes I could analyzed that it has all the essential things which make it competent with coal as a fuel. It is very cost effective with high calorific value as it has exceptionally high volatile material percentage and also less of ash content which makes it clean fuel and above all its manufacturing is utilizing waste from the environment.

Moreover, they are also making an excellent use of the thick plastic bottles by shredding them and using them in road construction while mixing it with bitumen and also making other construction materials. It has been tried, tested and proved to be an effective and an eco-friendly way of constructing roads with added advantage of increased life, resistance to water, reduced load of bitumen and last but not the least cost effective.

Another waste to wealth interesting project is up-cycling and making plastic-fibre. It is one of the best uses of thin plastic which would otherwise clog the drainage or pollute water or environment. And by doing this we can get a durable cloth. Another advantage of up-cycling is that it reviving the handloom industry.

On analyzing the data for waste collection for week and taking the average, I realized that almost 39 MT of solid waste is collected daily from the wards of Pammal. And utilizing maximum of the wastes in various areas like bio gas, vermi compost, briquettes, plastic pieces, EGP has reduced the land-filling to 20%. I think it is a commendable job as compared to the whole of the waste which would have degraded the environment otherwise.

Having said that, EGP still has a huge potential of making briquettes daily as almost 7% of the waste collected is the dry leaves which could have utilized in making the briquettes per day. Secondly, another huge potential in the working of EGP has unseen with recycling. If the percentage of recycling is diverted to shredding and crushing of plastics, then definitely shredding of plastics can be utilized effectively in making eco-friendly roads and other construction materials and also up-cycling products.

EGP is also facilitating women who forms Self Help Groups and takes guarantee to those people in front of banks and thus bank gives loans to SHGs and they can start their new ventures, which

is another good way to generate employment and a good indicator of leadership. Till date it has empowered almost 800 odd women. And to my surprise there is not even a single Non Performing Asset till date.

However, only thought to reciprocate is that the policy makers should ponder on the motivating factor of these organizations. As these organizations can only work and come up with such innovative things when their needs and desires of promoting them and helping them to sustain are been fulfilled. The biggest challenge pose to them is the payment on the basis of weight and not households by MSW rules. If house tax is not collected on the basis of number of people staying in the house then why to pay the waste collectors on the basis of weight rather than by each household. I definitely think there should be some logical parameters to comprehend on it.

Finally, I can say that EGP is working well on all the weakness of our society and making the best use of it to make them as our strengths. So I would really like to put forward a question to all the policy makers that why cannot such policy is been made where these efforts are more motivated and stimulated. If EGP in Pammal can do these efforts why cannot it can be used as a model and replicated and implemented in other municipalities as well. No doubt little modifications are always welcome with any project taking into consideration the physical and geographical limitations. But basic model can be adopted and very well implemented. As all big works begins from the pilot project only. And Pammal has proved on this part as it is been well recognized and the works of its pioneering leader Mrs. Mangalam Balasubramanian is very well ornamented with various accolades and by numerous organisation from time to time.

Chapter V – Conclusion

Key Learning & Experiences

My core objective of internship here in Pammal was to study waste management methods and what better it can be made from this waste. I came here as I came to know that here is one such organisation named Exnora Green Pammal, already working in such field.

My one of the basic learning from this internship is that we should apply basic logic and science for any sort of problem we come across in our life. If we do so we can come across many basic issues which we are struggling today and such issues are affecting society at large.

My first experience was making biogas with food waste. Earlier I studied for bio gas from municipal waste and from cow dung but not from food waste. And going into the procedure to manufacture it I realize it is not a rocket science but just going back to logics. Then there was a notion in my find that it would not be as effective and reliable. But to my surprise bio gas is as effective as LPG is and even more than that.

Then I came across the important aspect on which this organization grew up and that was bridging the trust deficit. Slowly and steadily it rose to a level and now shining. They basically won heart of everybody by their sheer hard work and dedication towards work.

Today they are working efficiently and gets everyone support because everybody has tested them and now they have good image even across all party lines. And even common man is happy with the kind of work they do as they are able to fulfill the needs of common man. If a common man is empowered he can do anything and does not aspects much. It is also very important learning and all political leaders should also understand this fact. Freebies can only give a common man satisfaction for a day or two but employment and skill development can be a gift for even ages or generations to come.

Another enlightened fact that if the waste which seems to be so much problematic for everyone, can even create bread and butter for many provided with our little efforts taken in proper guidance. And that calls for only segregation of waste at the source level. I was so astonished to see that it can be a huge business.

As the days were passing my perspective was completely changing. I used to deliberate on many issues with the Director of the organisation. And she used to satisfy my queries time to time. And it gave me better learning and comprehending on many issues. Then I came across the method of organic compost. It was one such practical learning which I used to study in my old science books. And yet very important in today's scenario where organic farming is coming up to solve the queries of many underlined issues prevailing in the society with using chemical fertilizers.

There was another very effective experience was when I actually came across the weaving unit of EGP. As they were not only using threads but also using water pouches and our thin plastic bags in making very attractive products. Then I realized that there are so many things which we actually don't even bother that it would be of any use in future or just treat it merely as a waste can be used to make such wonderful products.

Finally I came across EGPs another very innovative product which can be a substitute of coal in all times to come. And it was very difficult for me to believe that it is even better than coal in many parameters and I was very much bothered to get my answer. And I found it finally stating that it is better than coal. So that means we should also look for such products in our surroundings. It was a briquette which was been made by coconut leaves. If coconut leaves can produce it that means we should also try other leaves also provided our ecology is not affected at all.

Drawbacks/ limitations

There was no such drawback for me as their basic unit of execution exists in Pammal and it is a small town and even other two sites were not far. So I was able to be everywhere and have a good exposure.

Being just in Tamil Nadu I was not able to see other states projects but it was the replica of this unit only.

Overall Conclusion

The topic I selected here is *"Solid Waste Management & Social Entrepreneurship – A key to Sustainable Development"*. And I think I have been able to justify each word of the topic in my perception building first and then in my report writing.

I have been concentrated on how the NGO comes into existence, developed and finding out reasons how an NGO can actually sustain and fulfill the needs and desires which the other three institutions have left over. The other three institutions being the State, the Religion and the Market if all the three have been able to satisfy the needs and desires of the society I don't agree to the fact that then NGO would ever come into existence. An NGO can only come up with an issue which the other three prominent institutions have not been able to put forward a solution in front of the society.

The other area I was really focused was how small things can change or even revolutionize one's life and do wonders for not only the individual but also for the society he lives in and also for the Nation he belongs too.

So I was looking for even small initiatives and looking at their feasibility and also their competency in recommending their solution to the existing problem. Then only anybody can really envisage the life of approaching solution.

I would like to conclude by saying that we were from the ages and we can now also find out numerous solutions to ever growing problems from our surroundings only. The only requirement is the optimistic approach and also clear perspective to really do something great for the common good and not only on the individual basis. Then only Sustainable Development for an individual and for its society is assured.