

METHODOLOGY

Waste is a severe threat to public health and cleanliness. In India, especially in rural areas, waste generated is predominantly organic and biodegradable yet becomes a major problem to the overall sustainability of the ecological balance. It is estimated that the rural people in India are generating liquid waste of the order of 15,000 to 18,000 million litres and solid waste (organic recyclable) 0.3 to 0.4 million metric tonnes per day (UNICEF, 2012). As a result, the improper disposal of solid and liquid waste, leads to vector borne diseases and water borne infections. Close to 88 per cent of the total diseases is due to lack of clean water and sanitation and improper solid and liquid waste management which intensify their occurrence.

Therefore, it is an absolute necessity to improve the waste management practices. Hence the study on **“Techno – Transfer through Intervention on Biodegradable Waste Management in Rural Settings”** was undertaken with a vision to improve the fertility of soil, environmental sanitation and health status of the family members by introducing biodegradable household waste management techniques. The methodology framed for the study comprised the following phases:

Phase I.

- ❖ Household Survey

Phase II

- ❖ Training on Biodegradable Waste Management and

Phase III

- ❖ Evaluating the Impact of the Training programme conducted

The schematic representation of the research design is given in Figure 1.

“A human being has a natural desire to have more of a good thing than he needs.”

- Mark Twain, 2012

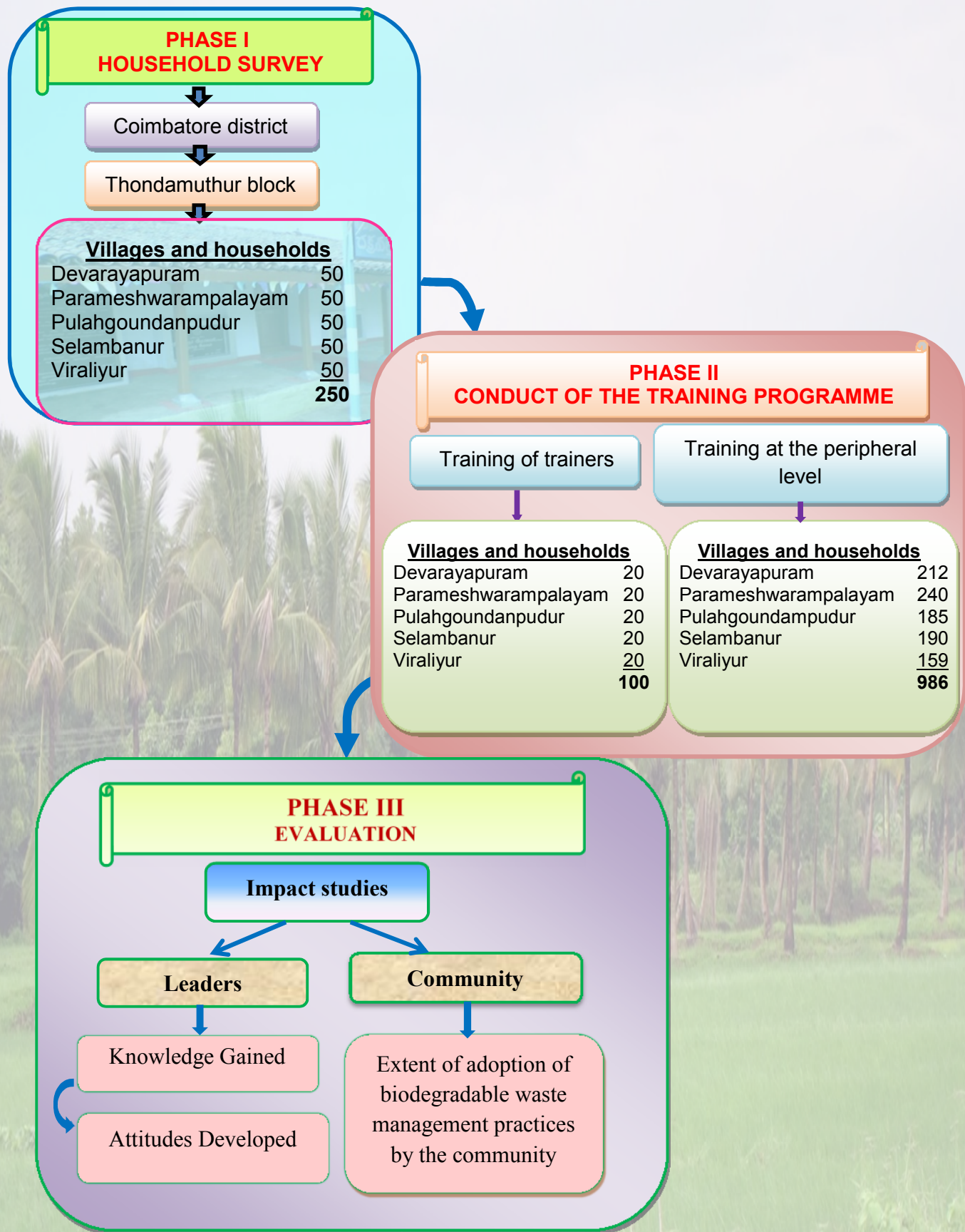


Figure 1
Schematic Representation of the Research Design

Phase I

Household Survey

Data is the most basic requirement which paves way for further investigation. In order to gather relevant information from the selected households on aspects pertaining to the study, a survey was found necessary (Kothari, 2012).

In survey, data are collected from a universe in which the individual effect of various factors affecting the phenomenon under study cannot be controlled or isolated (Elhance, 2000). The reality is that not all the data needs of a country can be met through census-taking; therefore, household surveys provide a mechanism for meeting the additional and emerging needs on a continuous basis. The flexibility of household surveys makes them excellent choices for meeting data users' needs for statistical information which otherwise would not be available or are insufficient.

Accordingly, a household survey was conducted to gather information on socio-economic background of the selected farm households, types of waste generated, disposal method adopted and problem faced at household level. The household survey included the following steps:

1. Selection of Area
2. Selection of Sample
3. Selection of method
4. Framing the research tool
5. Conduct of survey and
6. Analysis and interpretation of the data collected.

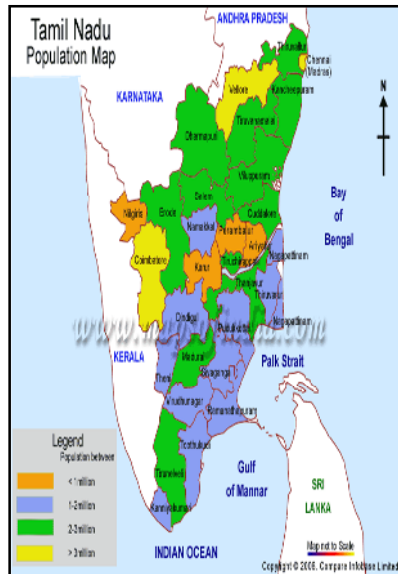
1. Selection of area

In Tamil Nadu, especially in rural areas, waste is a severe threat to public health and cleanliness. Solid waste in rural areas generally include- house sweeping waste, kitchen waste, garden waste, cattle dung and waste from cattle sheds, agro waste, broken glass, metal, waste paper, cloths, rubber waste from markets and shopping areas. The waste generated in rural areas are predominantly organic and biodegradable yet pose a major problem to the overall sustainability of the ecological balance (UNICEF, 2012).

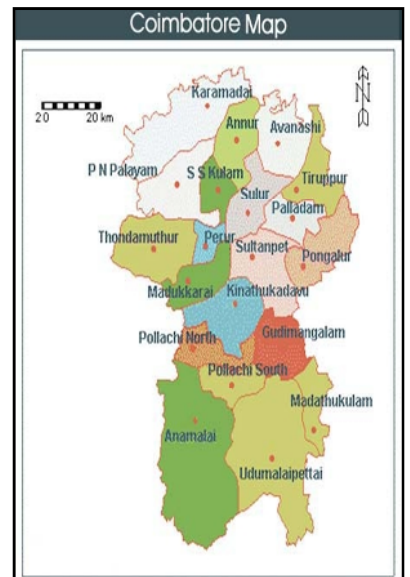
INDIA



STATE-TAMILNADU



DISTRICT- COIMBATORE



THONDAMUTHUR BLOCK



Figure 2

Locale of the Training Programme

Hence, the study was conducted in five villages namely Devarayapuram (V1), Parameshwarampalayam (V2), Pulahgoundampudhur (V3), Selambanur (V4) and Viraliyur (V5) of Thondamuthur block in Coimbatore District in the State of Tamil Nadu, India. These locale were identified and selected for this study as the researcher was acquainted with these areas (Figure 2). Besides these, feasibility of field trips, easy approachability, the support extended by the panchayat president, agriculture officers, field extension workers, self-help groups and cooperation and willingness extended by the members of the selected households were the other reasons.

The general profile of the Thondamuthur block and consolidated profile of the five selected villages are presented in Table I and Table II.

TABLE I
PROFILE OF THONDAMUTHUR BLOCK

S.No	Particulars		Total
1	Total number of villages		24
2	Total population		39,062
3	Total area (in hectares)*		41,450
4	Net area shown (in hectares)		12,641
5	Total cultivable area (in hectares)		12,588
6	Double/ multiple cropped area (in hectares)		556
7	Gross cropped area (in hectares)		13,197
8	Population		
	Male		30,000
	Female		28,610
	Total		58,610
9	Size of holdings (in hectares)		
	a.	Marginal farmers**	5,127
	b.	Small farmers***	1,512
	c.	Large farmers****	820
10	Total farmers population		7,459
11	Crops generally cultivated	Cereals : Paddy, ragi, jowar and corn Pulses : Black gram, green gram and red gram. Vegetables : Onion, bitter gourd, ladies finger, tomato and cucumber Nuts : Coconut	

Source : Annual credit plan 2005- 2006, Coimbatore District

*1 hectare – 2.47 acres

**Marginal farmers (Below 1 Hectare)

***Small farmers (1 to 5 Hectares)

****Large farmers (Above 5 Hectares)

TABLE II
CONSOLIDATED PROFILE OF THE SELECTED VILLAGES

S.No	Particulars				Total
1.	Total number of households				2,310
2.	Total population				8,139
3.	Total farmers				1,575
	a. Marginal				685
	b. Small				460
	c. Large				430
4.	Type of land (in acres)	Marginal	Small	Large	
5.	a. Dry land	715	640	475	1,830
	b. Wet land	385	730	1,050	2,165
	c. Garden land	165	295	415	875
	Total	1,265	1,665	1,940	4,870
6.	Area under cultivation (in acres)				
	a. Paddy	230	415	690	1,335
	b. Ragi	70	70	66	206
	c. Jowar	420	395	230	1,045
	d. Corn	125	125	100	350
	e. Green gram	95	130	95	320
	f. Red gram	75	90	103	268
	g. Black gram	65	95	85	245
	h. Onion	90	135	135	360
	i. Tomato	52	85	135	272
	j. Coconut	135	170	395	700
	k. Turmeric	80	140	145	365
	l. Fruits and vegetables	90	230	415	735

2. Selection of Sample

The success of any study depends on the careful selection of the sample. The choice of the sample must be decided based on factors such as nature of the study, size of the universe, size of the sample, degree of precision desired and availability of resources (Saravanel, 2010). A sample is a limited number of individuals selected to obtain information about some characteristics of the population from which it is drawn.

The elements of a sample constitute a subset or the set of population in the units selected for the survey.

According to Gupta (2009), purposive sampling is a technique in which desired number of sample units is selected deliberately or purposely depending upon the object of enquiry. Purposive sample technique is a non-random sample which is based on factors like convenience in data collection, budget and time constraints and so on. Purposive sampling helps to exercise good judgment and appropriate strategy to handpick the cases to be included in the sample that are satisfactory in relation to research needs (Saravanavel, 2012). For household survey, 50 households from each of the five chosen villages which constituted a total of 250 households were selected by using purposive sampling technique.

3. Selection of Method

Interview cum observation method was adopted for the collection of data. Interview is an art governed by certain scientific principles. Every effort should be made to create friendly atmosphere of trust and confidence, so that respondents may feel at ease while talking to and discussing with the interviewer (Kothari, 2007). Interview is a two-way method which permits exchange of ideas and information. It is a unique method in that it involves the collection of data through direct verbal interaction between the interviewee and the interviewer. This method offers greater depth, support, flexibility, clarity and stimulation to respondents to give valid answer (Saravanavel, 2010).

Observation method is subjected to check and control with respect to validity, reliability and precision. This technique is very useful in the extensive enquires and generally yields dependable and reliable results. A systematic observation during interview also help in the accuracy of the data. Therefore interview cum observation method was used for collecting details relevant for the study.

4. Framing of research tool

Schedule and questionnaire are the most important tools generally used in social research. Interview schedule contains standard observation to be asked to the interviewee for getting relevant information (Gupta, 2005). Kothari (2004) stated that a schedule helps collecting data, in which the enumerators along with schedules go to respondents, put forth questions from the proforma in the order the questions are listed and record the replies in a space meant for the same in the proforma.

An interview schedule is the tool selected for the interview. To collect details related to this study, it was necessary to include in the schedule questions which would help to elicit information on socio-economic profile of the sample, types of waste generated, knowledge and awareness on the problem related to environment pollution, household waste management practices, home composting, vermicomposting and organic gardening. The schedule was carefully drawn up to elicit the required information. To check the validity and reliability of the schedule, pretesting was done through a pilot study in 25 households.

As mentioned by Brog and Gall (1993); Hadjithoma (2007) the pilot study helps in improving data collecting routines, trying scoring techniques, revising locally developed measures and checking the appropriateness of standard measure. Pilot experiments are frequently carried out before large-scale quantitative research, in an attempt to avoid time and money being wasted on an inadequately designed project (Haralambos *et al.*, 2012).

Based on the experience gained during pretesting, the schedule was modified to avoid ambiguity and complexity. The schedule thus finalized is presented in Appendix I.

5. Conduct of Survey

The survey was carried out in 250 selected households using the structured schedule. Household chores are generally performed by the women and so they were target respondents for the household survey. The homemakers were contacted personally one at a time, at their convenience. Rapport was developed by explaining the purpose of the study. Confidence was thus instilled in the respondents. The required information was then elicited following the schedule and recorded side by side. Face to face contact with the homemakers helped to build confidence, developed good will, established rapport and explained the objectives of the study. Plate 1 exhibits the interaction with homemakers.

6. Analysis and interpretation of the data collected

Analysis of the data is the most powerful and skilled task of all stages of the research. The investigator analysed the surveyed form for completeness, accuracy, homogeneity and reliability. The data thus obtained were consolidated, tabulated and presented in Chapter IV results and discussion.



Plate 1 : Interaction with Homemakers

Training on Biodegradable Waste Management

The training programme is to educate, mobilize and involve the people in management and protection of the environment and also give guidelines on the ways to protect the environmental resources. Willingness to respect boundaries and protect natural resources should be increased (Lutz and Caldecott, 2004).

Public awareness and education is a prerequisite to good environmental quality and effective waste management. A trained public is capable of prompt action that can help to reduce and control waste generation. Other ways of increasing public awareness and education include integrating environmental concepts in the educational system, at elementary and secondary levels, and training village community (Thia-Eng Chua, 2008).

Creating awareness among the people and protecting the environment has become an imperative need. Environmental awareness and information on health risks due to deficient solid waste management are important factors which need to be continuously communicated to all sectors of the population. Continuous education and awareness campaign which are the regular “green and clean” campaign can promote environmental awareness (Zurbrugg, 2003 and Asnani, 2008).

After examining the problems experienced in household biodegradable waste management in the selected villages, it was decided to educate homemakers on household waste management practices. Realizing the importance of training on household biodegradable waste management, a training programme was organized. The steps included in the training programme were

1. Selection of women leaders
2. Formulation of the training curriculum
3. Organization of the training programme
4. Follow up of the training programme.

1. Selection of women leaders

Women are the nerve centre in any household and have a great responsibility to play as homemakers. In general, women are the transformers of the society and

specifically are the primary nurtures and educators of the family unit says, Venkatesan (2005). Women are directly affected and are aware of the ecological pillage. Considering the status of women in India, it is necessary to expose women to the critical issue of household waste management. If they are sensitized and engaged, changes will become inevitable.

Information obtained from the household survey also revealed that all the homemakers were mostly involved in household waste disposal and also interested to learn better waste management practices. Hence it was decided to select women as the target group for the training programme. Twenty women in each village of the five villages which constituted a total of 100 trainees (women leaders) were selected as sample for the training programme based on their participation in the community work, like noted individuals or well-known popular leaders like panchayat union leaders and self-help group leaders. Their initiation and willingness to popularize the knowledge acquired through training to other members, cooperation extended by them to the investigator were also taken into consideration.

2. Formulation of the training curriculum

Waste will always be around while human exist. It is just a matter of proper waste disposal along with a little care and encouragement to take initiative to give resolution to this underlying problem. We have to remember that the earth ticker, will not wait till we act. It is just a little awakening of responsibility and love for the environment, with a starting point of concern hoping, the end product will surely be “Zero waste society”. ***A little push in correct direction could make a big difference.***

Based on the problems in management of household waste in the selected villages, training curriculum was framed. The course content, plan of work and thrust areas covered were shown in Table III and Table IV. The course content was prepared as monograph and used during the training programme is given in Appendix II.

TABLE III

COURSE CONTENT AND PLAN OF WORK FOR THE TRAINING PROGRAMME

Day	Topic	Method / audio-visual aids used
Day - I	Environment : Meaning and importance of environment, Need for environmental sanitation and public awareness, Causes for environment degradation and its effect.	Lectures by subject experts and booklet
Day - II	Waste management: Classification of waste and methods of waste disposal, Importance of household waste management practices	Lectures using slides charts and booklet
Day- III	Composting: Segregation of household waste as biodegradable and non-biodegradable. Promoting safe disposal of household biodegradable waste through home composting, field composting and gardening.	Lectures cum demonstration, slides, booklet and charts Field visits and posters demonstration
Day - IV	Biodegradable waste as Botanical fertilizers, Pesticides and Insecticides: Preparation of botanical fertilizers, pesticides and insecticides by using biodegradable wastes.	Field visits and demonstration
Day – V	Health and Sanitation: Hazards of chemical residues from pesticides, insecticides and fertilizers in greens and vegetables and the benefits of consuming chemical free organically grown greens and vegetables.	Lectures with group discussions, field visits booklet

TABLE IV
THRUST AREAS COVERED

I. Bio-Degradable Waste As Fertilizer	
Aspects	Rationale
<p>Portable Methods of Home Composting</p> <p>a. Mud pot</p>	<p>A mud pot is 42 cm. height and 24 cm. wide. It is divided into two parts. Lower and upper part of it can be hold 15 kg waste each. For covering the compost, one round dome shape lid (with holes) was designed for better aeration because compost need humid atmosphere. The cost of the mud pot is Rs.1500/- (Plate- 2)</p>
<p>b. Plastic Container:</p>	<p>Collect the organic waste in the plastic container and cover the waste with the small amount of excavated soil every day in order to avoid foul odour from the waste. When the plastic container is full the it may be left undisturbed and the entire waste may be converted into manure due to anaerobic action. After filling the first one the homemakers are instructed to dispose the organic waste to a second plastic bin. The same plastic bins can be used for the next process. The plastic bin would serve for a family for period of two years and the cost of the plastic bin is ₹ 420/- (Plate 2).</p>
<p>FIELD COMPOSTING</p> <p>c. Silpaulin vermibed :</p>	<p>Vermicompost is a nutrient-rich organic fertilizer and soil conditioner in a farm that is relatively easy for plants to absorb. Worm castings are sometimes used as an organic fertilizer. Because the earthworms grind and uniformly mix minerals in simple forms, plants need only minimal effort to obtain them. The worms' digestive systems also add beneficial microbes to help create a "living" soil environment for plants. The sheet is made up of silpaulin material and the cost of the sheet is ₹ 3550/-. The total quantity of manure could be generated in one time is 1000 kg. from one vermibed (Plate 3).</p>

<p>Permanent methods:</p> <p>d. Compost pit</p>	<p>The compost pit is 90 cm x 90 cm x 1.5 m. Approximate cost of construction of the compost pit is ₹ 4650/. The size of the pit is based on the availability of the space (Plate 4).</p>
<p>II. Bio-Degradable Waste as Growth Booster and Botanical Pesticides</p>	
<p>a. Amuthakaraisal</p>	<p>10 litres of water is mixed with 2 kg. of cow dung, 2 liter of cow's urine and 250 gram of jaggery. Keep it for one day. Next day it is ready to use for the plant in the ratio of 1:10. One litre Amuthakaraisal with 10 litres of water is enough for spraying in one acre of land. The cost of 250 gram jaggery is ₹ 12.50/-. (Plate- 5).</p>
<p>b. Jivamrutham</p>	<p>For one acre of land the quantity of jivamrutham is required is 200 liters. For preparation of the mixture the 10 kg. of cow dung and 5 to 10 lit. of cow urine with 200 lit. of water, then add 2 kg. of jaggery, 2 kg. of any pulse flour and hand full of soil together. Stir the mixture clockwise for couple of minutes and this should be done 3 times a day. Allow the solution to ferment. Fermentation normally peaks with 48-72 hours. One mix is enough for an acre. This ensures sufficient mulch in the soil which results in healthy soil and thereby healthy plants and healthy crop. The cost of the jaggery 2 kg. ₹ 50/- and any pulse powder 2 kg. ₹ 100/- approximately ₹ 150/- for one mixture (Plate 5).</p>
<p>c. Neem leaf extract</p>	<p>10 - 12 kgs of Neem leaves are required for use in an acre of land. Pound the leaves gently and tie it loosely with a cotton cloth. Soak this overnight in a vessel containing 20 - 24 litres of water. After this, it is filtered. On filtering, 15 - 17 litres of extract can be obtained. About 500 - 1000ml of extract should be diluted with 9 to 9½ litres of water before spraying. (Plate 5).</p>

<p>d. Cow dung extract</p>	<p>Take 1 kg of dung and mix it with 10 litres of water. Filter the extract with a gunny cloth. Add 5 litres of water to the filtrate and again filter it with the same cloth. Spray the filtrate on the plant (Plate 6).</p>
<p>e. Neem kernel extract</p>	<p>3 - 5kgs of Neem kernel is required for an acre. Remove the outer seed coat and use only the kernel. If the seeds are fresh, 3kgs of kernel is sufficient. If the seeds are old, 5kgs are required. Pound the kernel gently and tie it loosely with a cotton cloth. Soak this overnight in a vessel containing 10 litres of water. After this, it is filtered. On filtering 6 - 7 litres of extract can be obtained. 500 - 1000ml of extract is used for one tank (a tank of 10 litre capacity). 500 - 1000ml of extract should be diluted with 9 to 9½ litres of water before spraying. The concentration of the extract can be increased or decreased depending on the intensity of the pest attack. The shelf life of this extract is one month (Pande, 2008) (Plate 6).</p>
<p>f. Seed treatment with cow's urine</p>	<p>500ml of cow's urine is diluted with one litre of water. The seeds that are to be sown should be soaked in this for half an hour. After this, the seeds are shade dried before sowing. Paddy seeds are normally soaked in water for a day or two days before sowing. Hence, the paddy seeds should be first treated with cow's urine and then soaked in water (Plate 6).</p>
<p>g. Organic farming</p>	<p>Biodegradable waste has been converted into fertilizer and pesticides and it is used for organic farming.</p> <p>Organic farming is more economical than the other farming techniques. Its range of benefits includes reduced soil erosion (retaining fertility and avoids the need for fertilizers and pesticides) and less use of water. Therefore, organic farming is more profitable.</p> <p>“A vegetable hand-picked from your own garden tastes better than anything you can buy in a store” (Plate 7).</p>

MUD POT



PLASTIC CONTAINER



Plate 2 : Home Composting - Portable Methods

SILPAULIN VERMIBED

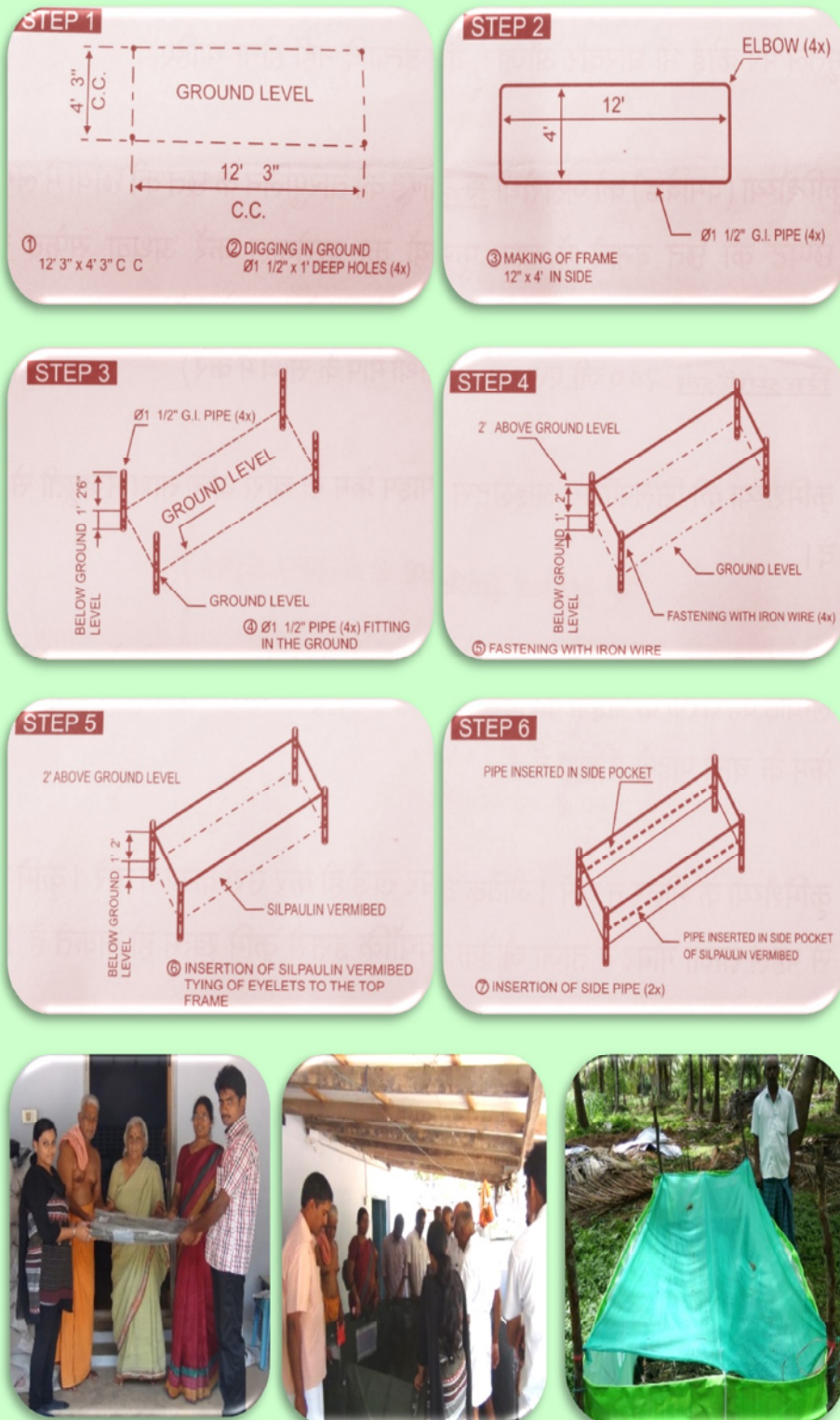


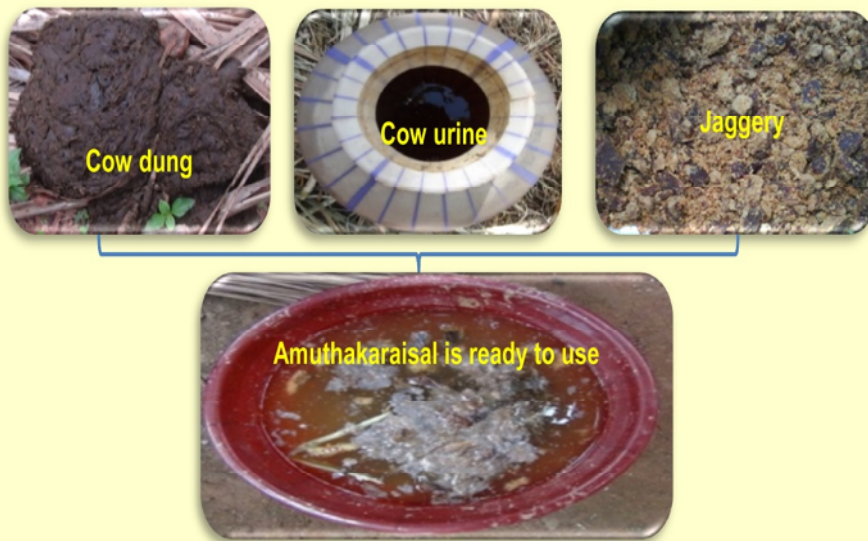
Plate 3 : Field Composting – Portable Method

COMPOST PIT



Plate 4 : Field Composting-Permanent Methods

AMUTHAKARAI SAL



JIVAMRUTHAM



Plate 5 : Biodegradable Waste as Growth Boosters

NEEM LEAF EXTRACT



NEEM KERNEL EXTRACT



COW DUNG EXTRACT



SEED TREATMENT WITH COW'S URINE



Plate 6 : Biodegradable Waste as Pesticides



Greens



Ladies Finger



Tomato



Brinjal



Bottle Gourd



Brinjal



Tomato and Brinjal Plants



Bitter Gourd

Plate 7 : Biodegradable Waste as Fertilizer - Vegetable Gardening

3. Organization of the training programme

A. Training of trainers

The training was given for a period of five days in each village. Of the five days, two days were allotted for giving factual information and three days for practical demonstration. Twenty trainees in each surveyed village were selected for training which constituted a total of 100 trainees. The purpose of the study and the training programme were explained to them and their co-operation was sought, for the success of the programme.

B. Training at the peripheral level

A camp was organized in the selected villages for five consecutive days for the community at the local schools by the trained trainers. The training programme highlighted on safe disposal of biodegradable waste. The investigator also involved in the conduct of the training. Suggestions were given to the trainers to make their training effective. All form of extension methods- individual, group and mass with different media of communication were coupled and used to create awareness among the people on biodegradable waste management and environment related issues.

The tools used for the training programme were special lectures, participatory discussion, exhibition and demonstration. The content of the message conveyed through the above tools are detailed below:

i) Special lectures:

Lectures were designed to make the trainees aware of the importance of household waste management, environment and health, need for home composting, kitchen gardening and methods to improve family income through utilization of household waste (Plate 8).

ii) Participatory discussion:

Discussion with the target group on all topics mentioned in the training schedule was held. Viable extension teaching methods and audio-visual aids were used (Plate 9) in this discussion. Discussions were centered on utilization of household biodegradable waste, home composting and kitchen gardening. Specially prepared booklets and pamphlet was also distributed during the discussion. Booklets and pamphlet distributed during the training programme is given in Appendix III.



Plate 8 : Special Lectures



Plate 9 : Audio-Visual Aids Used

iii) Demonstration / Exhibition

Methods of segregating household waste into biodegradable and non-biodegradable waste were taught to the trainees through lecture cum demonstration (Plate 10), knowledge on methods of home composting through mud pot, plastic bin, silpaulin sheet, compost pit, preparation of neem leaf extract and jivamrutham were also given. Posters (Plate 11), charts (Plate 12) and leaflets (Plate 13) were used as visual aids for better interaction among the participants.

C. Monitoring and guiding

Monitoring is important when a difficult job is to be carried out in any programme. For example, maintenance of the compost is important for ensuring hygiene conditions, improper disposal of waste without covering the bin with sand may lead to foul odour and attract waste flies and rodents.

The families were directed to maintain the compost properly and to keep the area around the compost neat and tidy. They extended their full cooperation to the investigator by following the instruction given by her. A good rapport has been produced with the homemakers by frequently visiting the families by the investigator. The families were visited periodically and instructed the do's and don'ts in home composting by the investigator. They were guided in all aspects related to safe disposal of biodegradable waste through home composting techniques. Implementation of the procedure, the drawbacks were also recorded and are presented under Chapter IV- Results and Discussion.



Plate 10 : Lecture cum Demonstration

POSTER 1



POSTER 2



POSTER 3



Plate 11 : Posters used during the Training Programme

CHART 1

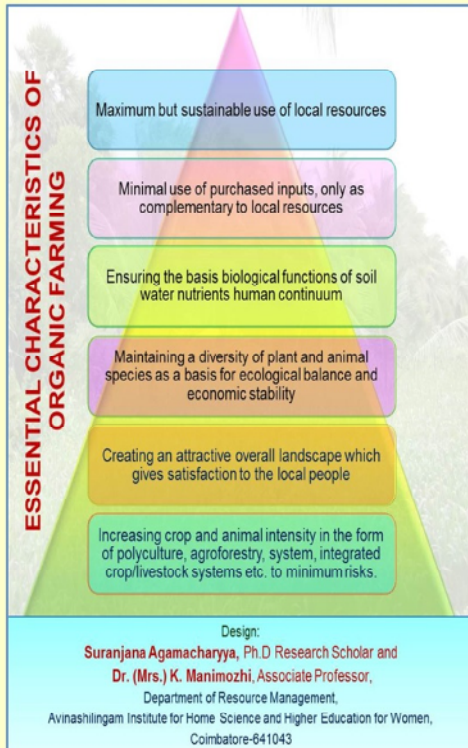


CHART 2

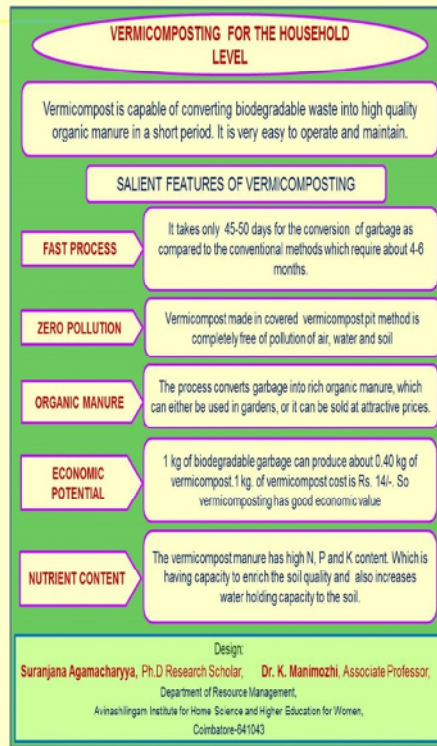


CHART 3



Plate 12 : Charts used during the Training Programme

IMPORTANT FACTS ABOUT VERMICOMPOSTING:

- ✦ The art of composting has been part of our global culture since ancient times.
- ✦ A worm has no arms, legs and eyes.
- ✦ There are approximately 2,700 different kinds of earthworms.
- ✦ Worms live where there is food, moisture, oxygen and a favorable temperature.
- ✦ In one area of land, there can be more than a million earthworms.
- ✦ Worms tunnel deeply in the soil and bring subsoil closer to the surface mixing it with the topsoil. Slime, a secretion of earthworms, contains nitrogen. Nitrogen is an important nutrient for plants. The sticky slime helps to hold clusters of soil particles together in formations called aggregates.
- ✦ Worms are cold blooded animals.
- ✦ Baby worms are not born. They hatch from cocoons smaller than a grain of rice.
- ✦ Even though worms don't have eyes, they can sense light, especially at their anterior (front end). They move away from light and will become paralyzed if exposed to light for too long (approximately one hour).
- ✦ If the worm's skin dries out, it will die.
- ✦ Worms are hermaphrodites. Each worm has both male and female organs. Worms mate by joining their clitella (swollen area near the head of a mature worm) and exchanging sperm. Then each worm forms an egg capsule in its clitellum.
- ✦ Worms can eat their weight each day.
- ✦ Vermicomposting is the easiest way to recycle biodegradable waste and is ideal for the people who do not have an outdoor compost pit.
- ✦ Composting with worms avoids the needless disposal of vegetative food wastes and enjoy the benefits of a high quality compost. It is done with "redworms or local earth worm" (*Eisenia Fetida*) who are happiest at temperature between 50° and 70° and can be kept indoors at home, schools or the office.
- ✦ Worms process biodegradable waste quickly and transform biodegradable waste into nutrient-rich castings.

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Plate 13 : Leaflet Distributed during the Training Programme

Phase III

Evaluating the Impact of the Training programme conducted

Evaluation is a relatively new technical term introduced to designate more comprehensive concept of measurement. The emphasis in evaluation is upon the broad changes and major objectives of a programme. This includes not only subject matter achievement but also attitudes, interests, ideas, ways of thinking and work habits (Kothari, 2007).

Impact or outcome evaluation is one of the most widely practiced types of evaluation. It is used to assess what changes can be attributed to the introduction of a particular intervention, programme or policy. It establishes causality between an intervention and its impact, and estimates the magnitude of the changes (Kumar, 2012).

Hence thez impact of the training programme was assessed under two aspects

1. Impact of the training on the women leaders and
2. Impact of the training on the community

1) Impact of the training on the women leaders:

Impact of training on biodegradable waste management practices on the women leaders was evaluated on the following lines:

- a) Knowledge gained and
- b) Attitudes developed

a) Knowledge gained

Knowledge was operationalized as the amount of information the women leaders possessed regarding biodegradable waste management practices both prior to and after the training. The extent of knowledge gained was assessed using a knowledge check/ inventory comprising questions related to various aspects on biodegradable waste management practices - such as effects of open dumping, odour, particulate matter emissions, seepage from landfills, greenhouse gas (GHS) emissions that leads to air pollution, surface and ground water pollution, food chain contamination, land area depletion, impacts on human health, environmental and animal life, composting and vegetable gardening. Appendix IV presents the knowledge check/ inventory used prior to and after the training which comprised of 38 questions.

The mean scores, pre and post, were recorded and ANOVA, ANACOVA, correlation and the “Paired t-test” value was calculated to test the significance between the two sets of exposures.

b) Attitudes developed

The attitude measurement consists of assessing an individual’s response to a set of social objects or situations (Devadas, 1987). This is done by observing a sample behaviour from an attitude universe. Each behavioural elements in the attitude universe is the response to a particular situations or objects.

In order to obtain the right reflection of the leader’s attitude towards biodegradable waste management practices, an attitude scale was developed based on Likert’s Summated rating scale techniques. Each item in the scale was provided with five response categories. These were: strongly favorable, favourable, neutral, unfavourable and strongly unfavourable with scores 5,4,3,2 and 1 respectively. Appendix V gives the attitude scale used prior to and after the training which comprised of 20 questions. Based on the responses obtained against each item, they were summated in order to obtain the total attitude score. ANOVA, ANACOVA, correlation and “Paired t-test” was done to find out any significant differences with regard to the attitude of women leaders at the pre and post training periods.

2. Impact of the training on the community

Impact of training on biodegradable waste management practices on the community

The impact of training on biodegradable waste management practices on the community was assessed in terms of, extent of adoption of biodegradable waste management practices in the selected households and environmental sanitation. The economic benefits in terms of manure produced and its money value was arrived in consultation with the experience of the head of the families and homemakers through case study.

Case study is an approach “in which a particular instance or a few carefully selected cases are studied intensively” (Gilbert, 2008). According to Grinnel (2013) “Case study is characterized by a very flexible and open ended technique of data collection and analysis”. Kumar (2012) stated that, a case could be an individual, a

group, a community, an instance, an episode, an event, a subgroup of a population, a town or a city. To be called a case study it is important to treat the total study population as one entity.

Five households representing each of small family (1 to 4 members), medium family (4 to 6 members) and large family (above 6 members) which constitutional a total fifteen households were selected for the case study because the quantity of waste generation differs according to the family size. The households were selected based on the willingness of the clientele.

The homemakers were distributed note book and were instructed to record the quantity of biodegradable waste disposed into the compost pit everyday, methods of adopting biodegradable waste management, the quantity of vegetables raised using compost and income generated. Apart from these, the investigator also collected responses from the households regarding the feasibility, acceptability of biodegradable waste management practices in terms of time taken for preparation of compost, work out put and cost.

Chapter IV deals with the findings of this study.