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SUMMARY AND CONCLUSION

The study on "**Techno – Transfer through Intervention on Biodegradable Waste Management in Rural Settings**" was undertaken with the main objective of improving the knowledge and changing the attitudes of homemakers towards Biodegradable waste management to enhance the environmental conditions and economic status leading ultimately to healthy, happy and prosperous life.

Based on the biodegradable waste availability, five villages in Thondamuthur block of Coimbatore District was selected for this study which was conducted at three phases.

A. Household Survey

B. Training on Biodegradable Waste Management Practices

C. Evaluation of the impact of the training programme

A. Household Survey

A Household survey was conducted in 250 households with equal representation from each of the five chosen villages using purposive sampling technique. An interview schedule was framed to elicit information on the quantity of household waste generated, methods of biodegradable waste disposal, problems faced and prevailing environmental conditions.

B. Training on Biodegradable Waste Management Practices

Based on the problems faced and the areas of ignorance in management of household wastes, the training curriculum was framed and finalized to impart education on biodegradable waste management practices. In the first phase, a five day training on biodegradable waste management was given to 100 homemakers (trainees) who were willing to act as front line women leaders and deliver the messages learnt to their fellow members both men and women.

In the second phase, the training was given for a period of five days for the entire community. The communication methods used during the training

programmewerelectures, participatory discussion, practical demonstration, slide shows, public meeting and field visits. The Audio- Visual aids used during the training programme were charts, posters, pamphlet, booklets, leaflet and monograph.

C. Evaluation of the impact of the training programme

The impact of the training programme was evaluated in terms of knowledge gained, attitudes developed by the leaders and economic benefits accrued by adoption of biodegradable waste management practices by the selected households and the entire community.

The major findings are summarized below,

- A maximum of 45 per cent of the homemakers of the selected villages belonged to the age group of 40 to 50 years.

- According to HUDCO (2009) classification, 73 per cent of families from all the selected villages belonged to middle income group.

- Out of 250 homemakers, 37 per cent of homemakers were educated upto secondary education followed by 25 per cent of the homemakers holding higher secondary education. It is encouraging to note that all the homemakers in Pulahgoundanpudurvillage were literates

- For cent per cent of the homemakers from the selected five villages, agriculture was the main occupation and they were also involved in its allied business.

- Household survey revealed that the households possessed both dry and wet land. Eighty three per cent of households from the five selected villages possessed dry land while 62 per cent of the households possessed wet land.

- The average quantity of kitchen waste generated per day in the selected households were 0.144 kilogram of raw foods, 0.252 kilogram of vegetable peels, 0.080 kilogram of used left-over food, 0.221 kilogram of fruit peelings,0.042 kilogram of used tea and coffee powder, 0.086 kilogram of egg and coconut shells and 0.044 kilogram of bone and meat waste.

- The quantity of the general waste generated per day in the selected households were 0.150 kilogram of newspapers, 0.075 kilogram of tins/ bottle/ plastic container, 0.056 kilogram of magazines, 0.033 kilogram of packets/ paper bags/ polythene bags, and 0.016 kilogram of miscellaneous substances such as refill, match boxes, usedtooth paste tube.

- On an average, 1.160 kilograms of garden leaves, 10.8 kilograms of animal waste and 1.300 kilograms of miscellaneous waste such as stems of various plants, spoiled coconuts and vegetables were generated by the selected households as garden waste per day.

- On an average 13.384 kilograms of biodegradable wastes were generated by the selected households per day. This quantity of biodegradable waste generated every day makes the total average quantity to about 200.76 kilograms per month and 2409.15 kilogram per year.

- A Majority (61 per cent) of the households were collecting the waste in the plastic bin which may be attributed to the reasons like itseasy availability, less cost, easy handling and maintenance.

- Seventy two per cent of the homemakers were responsible for disposing the household waste. The result shows the significance of training women on biodegradable waste management to safeguard the environment and households.

- About 37 per cent of homemakers were using government dust bins. The study revealed that, around 22 per cent and 21 per cent of homemakers used to throw the household wastes on the road side and on nearby empty plots respectively. Burning of the waste near the houses were also still in practice by 12 per cent of the selected households that might increases the environmental pollution. Only four per cent of the selected households practice home composting and vermicomposting methods for disposing the biodegradable waste.

- Cent per cent of the homemakers from five selected villages faced problems due to accumulation of wastes like breeding of insects, mosquitoes, flies and rodents that causes unhygienic surroundings. The next major problemswere

unpleasant odour and polluted water supply as reported by 96 and 94 per cent of the homemakers respectively. Health problems, street dogs and overflowing of drainage were the other problems reported by the homemakers, due to accumulation of waste.

- Only eight per cent of the households were practicing composting/ vermicomposting methods and the rest 92 per cent homemakers mismanage the waste by throwing it in different places. It could also be seen that cent per cent were selling the newspapers and bottles to the vendors. About 86 per cent of homemakers expressed that they use bottles for storing household items. Cent per cent of the homemakers were reusing the plastic bags for various purposes like dustbins, storing vegetables and also used as carry bags.

- A majority (99 per cent)of homemakers expressed that contamination of surface water is an hazard to the existing environment. Raised atmospheric temperature, loss of biodiversity, increased generation of industrial/ commercial waste and air pollution were the other responses expressed by homemakers.

- Ninety Seven, 93 and 92 per cent stated that lack of knowledge on disposal of waste, indiscriminate throwing of waste and improper management of waste respectively as the major reason for environmental degradation.

- Garbage was the major pollutant which causes environmental hazards as indicated by the homemakers.

- Cent per cent of the homemakers from the five selected villages felt the need for a clean environment to ensure good health. Clean atmosphere and tidy surroundings, mental relaxation and life satisfaction were the other opinions expressed by the homemakers.

IMPACT OF THE TRAINING PROGRAMME

- Before the training programme there is no significant difference in the knowledge score by socio-demographic variables such as age, type of family, size of family, stages in family life cycle, monthly income and educational status.

- It is inferred that except in the case of variable – stages in family life cycle (knowledge score difference was significant at one per cent level), all the other

variables such as age, type of family, size of family, monthly income and educational status does not show any significant difference in knowledge score after the training programme.

- Before training, the mean score for knowledge was found to be 6.94 for the selected trainees. After training the same has increased to 33.87. The calculated t-value 102.716 is higher than the table value of 2.627 at 1% level of significance. Since the calculated value is higher than the table value it is inferred that the mean of knowledge scores differ significantly before and after the training and thus it proves the fruitful outcomes of the training programme on biodegradable waste management and also the interest of the women leaders to learn and adopt new concepts and technologywhich paves the way for changing the knowledge of the women leaders.

- The attitude score before the training programme does not vary by variables such as type of family, monthly income and educational status. Five per cent level of significance was observed in the attitude score before training in the variable – stages of family life cycle and one per cent level of significant difference in the attitude score was observed before training in the variables such as age and size of the family.

- It is revealed that the attitude scores by socio-demographic variables such as age, type of family, size of family, stages in family life cycle, monthly income and educational status does not vary significantly after the training programme.

- Before training, the mean score for attitude was found to be 34.95 for the selected trainees. After training the same has increased to 95.90. The paired t-test was applied to find out whether the mean of attitude scores differ significantly between before and after training. The calculated t-value is 66.943 which was higher than the table value of 2.627 at 1% level of significance. Since the calculated value is higher than the table value it is inferred that the mean of attitude scores differ significantly between before and after the trainingprogramme which emphasize that the training programme has a positive impact on the change of attitude of leaders in the adoption of biodegradable

waste management to protect environment for the betterment of the human living.

- Correlation – The correlation between knowledge and attitude score was found out to be (r -0.118). This shows that there is a negative correlation between knowledge and attitude scores. However the rvalue shows that there is less correlation between knowledge and attitude which is found to be not significant at 5% level.
- The participation ofwomen in the training programme was higher than men, youth and children.
- Cent per cent of homemakers in the selected five villages stated that the main factor influencing the adoption of home composting were its ease of adoption while 98 per cent felt that it is economical and durable. Self-interest, thirstfor knowledge and motivation, availability of green manure, to safeguard the environment and creating eco-friendly environment were the other opinions expressed by the homemakers as the factors influencing adoption of biodegradable waste management practices.
- None of them were adopting mud pot before training, 10 per cent had started adopting the method of home composting after undergoing the training programme. Before the training programme, 11 per cent of homemakers were practicing home composting techniques by using plastic container and after the training programme, 90 per cent started adopting the same.
- It is encouraging to note that 57 per cent and 43 per cent adopted silpaulinvermibed and compost pit respectively in the selected villages after undergoing the training programme.
- NPK content of compost made out of kitchen waste along with garden waste (animal waste) have an enhanced NPK value when compared to kitchen waste alone. However the NPK content of the compost prepared out of kitchen waste was good enough to help in the growth of the plants. Hence it could be concluded that we can use the compost prepared out of the kitchen waste alone which is almost equal to the animal waste.

- Cent per cent of the homemakers expressed that after attending the training programme they were adopting biodegradable waste management practices such as proper disposal of biodegradable waste, segregation of waste, adoption of home composting methods and setting up kitchen garden and collecting wastes in bins . Ninety eight per cent were growing greens and vegetables by using compost manure and about 95 per cent were using the waste water for their garden.

- Cent per cent of the homemakers from the selected villages opined that- adoption of biodegradable waste management practices provides compost for their kitchen garden, maintains the surrounding clean, creates eco-friendly environments and provides fresh greens and vegetables devoid of chemical residues.

CASE STUDY

Three household from each village belonging to small (1- 4 members), medium (4- 6 members) and large (above 6 members) families from five selected villages constituting fifteen households were selected for the case study. Willingness and co-operation of the homemakers werealso taken into consideration. The study was conducted for a period of six months.

The major findings of the Case Study is as follows,

- The results revealed that majority (87 per cent) of the households were in the expanding stage of family life cycle. Sixty seven per cent of them come under the high income category as per the HUDCO (2009) classification
- Per day on an average the small, medium and large families generate 10.456, 14.462 and 21.096 kilograms of biodegradable wastes respectively. The monthly generation of biodegradable waste was found to be 314.48, 433.86 and 632.88 kilograms by small, medium and large families respectively.

- On an average, small, medium and large families produced 399, 594 and 966 kilograms of vermicompost respectively within a period of three months. The money equivalent being ₹ 3,990/-, ₹ 5,940/- and ₹ 9,666/- generated by small, medium and large families respectively.

- The selected households were utilizing the available biodegradable waste such as cow dung, cow urine, fall-over neem leaves that enhanced the growth of the plants and vegetables. Neem leaf and neem kernel extract were used as insecticides that protected the plants. This helped the households to produce good quality vegetables and greens. This may help the family members of the selected households to lead a healthy and contented life.

- The feasibility in terms of work involved and cost, irrespective of the size of the family, all of them were highly satisfied with home composting. With regard to time involved in management of biodegradable waste all of them expressed only their satisfaction. They felt, the preparation of compost required more of their effective time.

- Biodegradable waste management practice - raising a kitchen garden derived economic benefits in the form of mean income generation once in three months of about ₹247/-, ₹945/- and ₹1527/- by the selected small, medium and large families, by producing vegetables such as brinjal, tomato, bitter gourd, bottle gourd and ladies finger they could earn this amount. By growing greens, mint, coriander and fenugreek,small, medium and large families could gain ₹276/-, ₹834/- and ₹1278/- respectively. In addition to the economic benefits gained, one should also consider the reduction in expenditure on vegetables and chemical fertilizers/ pesticides.

- On an average a large family might earn a maximum of ₹12,465/- in a period of three months through compost (₹9,660/-) and greens (₹1,278/-) and vegetables (₹1,527/-). However, on the whole a medium and small size family mightalso earn ₹7719/- and ₹4513/- respectively. Besides one also has to consider the amount they would have spent for pesticides/ growth boosters if they were growing in the usual way which will be about ₹ 1500/-, ₹ 2000/- and ₹ 3000/- by small, medium and large families respectively.

Hence it is proved that management of biodegradable waste will enhance their family income and improve the family health. This practice should be adopted and followed by the households at all levels to improve the family and protect the environment on the whole.

A journey of thousand miles will start from single step. Let us start this journey from this small step.

CONCLUSION

From the present study, it could be concluded that the village wide programme launched to educate, motivate and persuade the homemakers to adopt Biodegradable waste management practices was successful with a majority of home makers following the simple techniques with sound understanding which resulted not only in preventing environmental degradation but also provided subsidiary income and maintained the human health.

Since 1980s, agricultural scientists in the world have been realizing the limitations and problems of chemical fertilizers used for soil fertility management. While on one hand research is being initiated to improve the use efficiency of chemical fertilizers, on other hand alternative inputs are being considered. Recycling of Organic matter has been in use in India for centuries. Vermicomposting also is regaining strong foothold among the farmers due to its multifunctional roles and benefits in agriculture. Rising levels of gases in the Earth's atmosphere have the potential to cause changes in our climate. Some of these emission increases can be traced directly to solid waste that affectthe Earth's climate.

Thus, at the household-level proper segregation of waste has to be done and it should be ensured that all organic matter is kept aside for composting, which is undoubtedly the best alternative method to overcome all environmental and health issues and narrow down economic burden.

Recommendations emerged out of the present study:

1. There is a need for conducting need based and well tailored training programme related to environmental safety and vermicomposting for the rural households
2. Strengthen and revitalize the practices and bring into practice the indigenous sciences through research and community based activities such as NSS and CSS

3. The government should promote research on vermicomposting through various institutions
4. Subsidizing the cost towards capital in the initial years (the catch up years) to practice vermicomposting
5. Government can alleviate poverty, unemployment and under employment by establishing industries to process recyclable waste and manufacture vermicompost through engaging unemployed downtrodden people.
6. Bankers can provide more financial assistance to the farmers at low interest rates to initiate composting of biodegradable waste at large scale.
7. NGO's can encourage homemakers to form groups, collect kitchen waste from their street, produce compost and set up a garden that will fulfill their everyday vegetable needs thereby reducing their economic burden as well.
8. Youth clubs can be formed that can work on segregating and collecting recyclable waste and producing compost and supply them to the marginal farmers such that if fetches economic benefits either side.
9. Through practical demonstration of waste segregation, compost preparation and setting up of kitchen garden, interest could be initiated among students at schools and college level.
10. Popularize biodegradable waste management practices through print media, All India Radio, television and street plays.

"Recycling is a good thing to do. It makes people feel good to do it. The thing I want to emphasize is the vast difference between recycling for the purpose of feeling good and recycling for the purpose of solving the trash problem."

~Barry Commoner