Available in online @ www.iaraindia.com
RESEARCH EXPLORER-International Journal on Economics and Business Management
ISSN: 2250-1940 (P) 2349-1647 (O)
Impact Factor: 3.655(CIF), 2.78(IRJIF), 2.77(NAAS)
Volume XIV, Issue 46
January - March 2025
Formally UGC Approved Journal (63185), © Author

RECYCLE TECHNOLOGY ADOPTION OF FLORISTS FOR SUSTAINABILITY

Dr.M.PONNIEN SELVI
Associate Professor and Head,
Department of Commerce,
V.V.Vanniaperumal College for Women, Virudhunagar.

Dr.R.ATHEESWARI
Assistant Professor of Commerce
V.V.Vanniaperumal College for Women, Virudhunagar.

Abstract

The cultivation of flowers is highly remunerative compared to several foods and other non-food crops, generating a stream of income that aids farm households in buying their food and other household necessities. After going through the previous studied, the research gap was identified and the present title was formulated. The objectives of the study are framed about the flower waste recycle technology, profile of the respondents, awareness and adoption of flower waste recycle technology and offer suggestions. The area of the study is in Virudhunagar district. The sample of the respondents are 140 florists who are floral designer and trader in flowers. Percentage analysis, Association of Attributes and Ranking Techniques are used for analysis and interpretation. Finally, based on the findings of the study, offer suggestions to make the florists involve in flower waste recycling.

Key words Sustainability, Florists, and Flower Waste Recycling Technology

INTRODUCTION

Sustainable practices are ways of using resources wisely and conservatively to support the health of the environment, people, and economy. They include reducing waste, using renewable energy, and conserving water. Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. In India, various recycling processes can be done under the waste management are paper and cardboard, plastics,metals, electronic devices, wood,glass, cloth and bricks. Flower waste is one among them. The issue of floral waste management is growing rapidly, making it essential to understand how to handle flower byproducts effectively. Floral waste management specifically addresses the disposal and recycling of floral materials. Unfortunately, in many areas, flower waste disposal is often handled carelessly. However, recycling these floral byproducts into value-added solutions presents a promising opportunity. In this study focuses the awareness and adoption of flower waste recycling technologies by the florists for sustainable growth in Virudhunagar District.

STATEMENT OF THE PROBLEM

Solid Waste Management is a term that is used to refer to the process of collecting and treating solid wastes. It also offers solutions for recycling items that do not belong to garbage or trash. Solid waste disposal is major problem in the world. Agricultural residues, temple waste, domestic waste, non-edible oil cakes waste are enriched with carbon content. Flowers come as waste from hotels, wedding ceremony gardens, worship places and various civilizing and sacred ceremonies, which make them a usual source of floral waste. Land filling remediation approach is used for disposal of organic waste. Floral waste is one of the major concern. India produces large amounts of flower byproducts, creating a significant opportunity for growth in floral waste management. India's flower production was estimated at nearly 3 million metric tons in 2021. While the pandemic caused a slight decline, blooms like marigolds, lotuses, roses, and sunflowers still dominate the market. Alarmingly, the same volume of floral waste is discarded, equaling the amount produced, underscoring the urgent need for robust floral waste management strategies. Florists try to implement flower recycling technology such as compost bits, pooja products, fragrances and paper products enhances the circular economy at various places. In Virudunagar district, flowers play an important role in many ways. Hence the study has been taken in the title "RECYCLE TECHNOLOGY ADOPTION OF FLORISTS FOR SUSTAINABILITY".

OBJECTIVES OF THE STUDY

The following objectives of the study are

1. To describe the technologies for recycling floral waste.
2. To analyse the awareness about technologies for recycling floral waste among the respondents in the study area.
3. To mention base case studies related to recycling floral waste.
4. To suggest for creating awareness about technology and to motivate for technology adoption.

RESEARCH METHODOLOGY OF THE STUDY

1. **Sampling size**: Samples of 140 flower shopkeepers were selected by following convenience sampling method for the study.
2. **Period of the study:** The study was conducted during January 2025.
3. **Sources of Data:**
    a. The study is based on primary data. The primary data has been collected through interview schedule. The secondary data was collected from published reports, articles, text books, journals, magazines and websites, etc.,
4. **Geographical area**
    a. The study is confined to Virudhungar district flower business of Tamil nadu state.

LIMITATION OF THE STUDY

The study has been focused only on Virudhunagar flower business. The findings can be applicable only to that area where the geographical and demographical profiles coincide.

TECHNOLOGIES FOR RECYCLING FLORAL WASTE

The floral waste recycling entails a methodical approach to effectively gather, handle and convert floral waste into useful goods. The following are the technologies for recycling waste are:

- **Composting Floral Waste**
  An effective approach to handling floral waste is by creating compost from used blooms. These flowers can be transformed into nutrient-rich vermicompost through bioconversion, addressing solid floral refuse management with petals as a primary organic source.
- **Biogas and Bioethanol Production**

Abundant blooms across India are ideal feedstock for biogas generation. They provide substantial yields at a rapid rate, offering a significant advantage in waste management. Amid the ongoing energy crisis, bioethanol has become a promising alternative to fossil fuels. Microorganisms ferment sugars from various sources, including these blooms, into ethyl alcohol, emphasizing their role as essential raw materials in bioethanol synthesis. In regions like Maharashtra, Andhra Pradesh, and Chhattisgarh, tribal communities harvest mahua blossoms for traditional alcoholic beverages, utilizing them not only for alcohol but also for vinegar.

- Organic Acids – Oxalic Acid
  In India, sugarcane is the primary raw material for oxalic acid, but mahua flowers offer a promising alternative source for flower waste management and oxalic acid production due to their higher sugar content. Oxalic acid is widely used as a chelating agent and preservative in various industries.
- Dyes
- Marigold and rose flowers from temples serve as excellent sources for preparing biodegradable dyes. These eco-friendly colorants offer a sustainable alternative to synthetic options across various applications.
- Biosurfactant Production
  Biosurfactants exhibit strong antibacterial, antifungal, and antiviral activity. They also act as anti-adhesive agents to pathogens, making them valuable for treating various diseases and serving as therapeutic and probiotic agents.
- Incense Sticks from Floral Wastes
  Methods have been developed to create herbal incense using floral and flower waste.
- Fragrance from Waste Flowers
  Every flower has a distinct smell from unique chemicals that facilitate pollination and create delightful fragrances. We can process floral waste to manufacture fragrant perfumes and soaps.
- Floral Waste for Handmade Paper Production
  Floral waste management serves as an eco-friendly source for handmade paper production. This method effectively recycles and reuses floral waste, resulting in environmentally friendly paper.
- Biodegradable Thermocol from Flower Waste
  Florafoam provides a 100% biodegradable and sustainable alternative to harmful thermocol.

CASE STUDY

Flower Waste Recycling used at various places. There are

HelpUs Green Company, based in Uttar Pradesh, India, recycles floralwaste into useful products: charcoal-free incense, organic compost and a biodegradable packaging material. The founders of this green company, Ankit Agarwal and Karan Rastogi, have successfully trademarked the term Flowercycling® for their innovative technology. Starting activities in 2015, the company has achieved impacting results as 11, 060 tons of recycled flowers and 11 tons of pesticides eliminated. HelpUsGreen have a 21,000 sq. ft. plant with a 15-members team and also employs full time 73 women providing them with benefits such as provident funds, health insurance and transport to and from work. The company collects 8.4 tons of floral-waste from temples in Uttar Pradesh on a daily basis offering a profitable solution to the ‘temple-waste’ problem. Showering flowers (8 Million tonnes annually) at Temples/Mosques is a religious ritual in India. These sacred flowers end in nature or in the

Ganges and create havoc in the fragile ecosphere of the waterways and into the groundwater. Pesticides and insecticides used to grow flowers in the farms mixed with the river water make it highly poisonous and generate diseases that affect the population and are important causes of death.

It consists of the following stages: • Flowers waste is collected from the temples and brought to the company' facility. • Flowers are segregated by hand and plastics or paper are weeded out. • The organic bloculium created by the Company is sprayed on the flowers to offset the chemical residue. • Flowers are then carefully washed and the water is stored and used in composting. • Petals of each flower are broken and sun dried. However, in the short-term, Helpusgreen® is reducing the pollution generated by the flower-waste and their goal is to expand the impact of the activities. The company is also heavily investing in research and development to use the waste to make stationery and other products.

Phool is an innovative Indian startup tackling the significant issue of temple waste. They collect 8.4 tons of floral wastefrom temples in Uttar Pradesh daily. This material transforms into charcoal-free incense, promoting sustainability and minimizing environmental impact. Phool uses organic and eco-friendly packaging for all their products, ensuring they remain sustainable. Notably, all items are handcrafted by women, providing them with a source of income and healthy livelihoods. Furthermore, these artisans actively engage in the recycling process, creating Florafoam, a biodegradable alternative to traditional thermocol. Phool exemplifies how startups can effectively convert floral waste into valuable products while simultaneously empowering communities and fostering sustainability and floral waste management.

Holy Waste

Holy Waste converts floral waste into organic, child-safe lifestyle products for daily use. In addition to promoting sustainability, the company creates employment for women in target markets. In Hyderabad, an estimated 7,000 metric tons of garbage are generated daily, with around 1,000 metric tons of flowers entering the market each day. Unfortunately, this results in a similar amount of floral waste being discarded the next day after use. HolyWaste segregates flower waste from other refuse and processes it into eco-friendly products, such as natural fertilizers, incense, and soaps. The company actively explores various product possibilities with floral waste, and their commitment to sustainability positions them for continued growth in the eco-friendly market.

ANALYSIS AND FINDINGS

i. Demographic Profile of the Respondents

In the below descriptive/ percentage analysis table 1 shows the demographic profile of the respondents in Virudhunagar district florists should be clearly understood.

Table – 1

Demographic Profile of the Respondents

Profile	Group	Frequency	Percentage
Gender	Male	128	91
	Female	12	9
	Total	**140**	**100**
Age	30 – 40	51	36
	40 -50	60	43
	Above 50	29	21
	Total	**140**	**100**
Educational Qualification	Secondary	78	56
	College Level	19	14

	No Schooling	43	31
	Total	**140**	**100**
Marital Status	Married	122	87
	Unmarried	18	13
	Total	**140**	**100**
Type of Family	Nuclear family	63	45
	Joint family	59	42
	Total	**140**	**100**
Nature of Business	Seasonal	96	69
	Round the Year	44	31
	Total	**140**	**100**
Income	1, 00, 000 – 3, 00, 000	10	7
	3, 00, 000 – 5, 00, 000	39	28
	5, 00, 000 – 7, 00, 000	20	14
	Above 7, 00, 000	71	51
	Total	**140**	**100**
Experience in Business(in Years)	2-5	31	22
	6-10	64	46
	10 & above	45	32
	Total	**140**	**100**

Source: Primary Data

From Table – 1, it is understood that in Virudhunagar district, the florists belong to all categories of gender, age, education, marital status, types of family, nature of trade, annual income and experience in business.

a. Awareness of Technologies for Recycling Floral Waste

Effective floral waste management addresses disposal issues while paving the way for a thriving bioeconomy. Converting flower waste into useful products helps reduce pollution and creates eco-friendly business models. So, the respondents are asked about the awareness of Technologies for Recycling Floral Waste. Table 2 shows the details

Table – 2

Awareness of Technologies for Recycling Floral Waste

Awareness	Number	Percentage
With Awareness	43	31
Without Awareness	97	69
Total	**140**	**100**

Source: Primary Data

The table 2 shows that, out of 140 respondents, 43 (31%) are with awareness of Technologies for Recycling Floral Waste and 97 (69%) are without awareness of Technologies for Recycling Floral Waste.

b. Sources of Awareness about Technologies for Recycling Floral Waste

In this table shows the sources of awareness about technologies for recycling floral waste from Friends and Relatives, Family Members, Social Media, Experts and Peer Groups.

Table – 3

Sources of Awareness about Technologies for Recycling Floral Waste

Sources	Number	Percentage
Friends and Relatives	6	14
Family Members	1	2.3

Social Media	25	58.1
Experts	1	2.3
Peer Groups	10	23.3
Total	**43**	**100**

Source: Primary Data

From the table 3 shown that, out of 43 respondents, 25 (58.1%) are with awareness from social media, 10 (23.3%) are with awareness from Peer groups, 6 (14%) are with awareness from Friends and Relatives and 1(2.3%) are with awareness from Family members and Experts about Technologies for Recycling Floral Waste.

c. Adoption of Technologies into their Floristry

Recycled flower technology can make compost bits, scented candles, incense sticks and natural dyes. Turning wasted blossoms into useful commodities advances the circular economy. So, the respondents are asked about the adoption of technologies into their floristry. Table 4 shows the details

Table – 4

Adoption of Technologies into their Floristry

Adoption of Technologies	Number	Percentage
Adopted	6	
Not Adopted	37	
Total	**43**	**100**

Source: Primary Data

The table 4 shows that, out of 43 respondents, 6 respondents adopt of technologies into their floristry for sustainable growth and the rest of the respondents are not adopt of technologies into their floristry.

d. Reasons for not Adopting of Technologies into their Floristry

Out of 43 respondents, 37 respondents are not Adopting of Technologies into their Floristry. They were asked to rank the reasons. Table 5 shows the details.

Table – 5

Reasons for not Adopting of Technologies into their Floristry

Reasons	I Rank		II Rank		III Rank		Total Score		Mean Score	Rank
	Number	Score	Number	Score	Number	Score	Number	Score		
Lack of Awareness	12	36	29	58	2	2	37	96	2.6	**II**
High risk	5	15	15	30	24	24	37	69	1.9	**III**
Lack of Finance	30	90	8	16	5	5	37	111	3	**I**

Source: Primary Data

From the Table 5 shown that, the reason of 'Lack of Finance' has got first rank with the mean score of 3, 'Lack of Awareness' has got second rank with the mean score of 2.6 and 'High risk' has got third rank with 1.9.

ii. Association of Demographic Variables with the Awareness about Flower Waste Recycling Technologies

Yule's Coefficient of Association was applied to find out the extent to which

Level of Education'

Experience

Annual Income are associated with the Reasons for Adopting of Technologies into their Floristry.

Table – 6

Association of Demographic Variables with the Awareness about Flower Waste Recycling Technologies

Awareness Associated with	Yule's Coefficient	Interpretation
Gender	+0.30	Low Degree of Positive
Age	+0.83	High Degree of Positive
Annual Income	+0.81	High Degree of Positive
Educational Qualification	+0.34	Low Degree of Positive
Experience	-0.21	Low Degree of Negative
Nature of Business	-0.52	Moderate Degree of Negative

Source: Calculated Value

From the above calculation,

Demographic variable of 'Gender' is positively associated with the Awareness about Flower Waste Recycling Technologies.

Demographic variable of 'Age' is positively associated with the Awareness about Flower Waste Recycling Technologies.

Demographic variable of 'Annual Income' is positively associated with the Awareness about Flower Waste Recycling Technologies.

Demographic variable of 'Educational Qualification' is positively associated with the Awareness about Flower Waste Recycling Technologies.

Demographic variable of 'Experience' is negatively associated with the Awareness about Flower Waste Recycling Technologies.

Demographic variable of 'Nature of Business' is negatively associated with the Awareness about Flower Waste Recycling Technologies.

iii. Overall Opinion of respondents about the Technologies for Recycling Floral Waste

The respondents were asked about the Overall Satisfaction of respondents about the Technologies for Recycling Floral Waste. Table 6 shows the details.

Table – 6

Overall Satisfaction of respondents about the Technologies for Recycling Floral Waste

Opportunities	Strongly Agree		Agree		No Opinion		No Opinion	
	Number	%	Number	%	Number	%	Number	%
Gets Favourable Soil	74	53	30	21	36	26	140	100
Scope for Value Added Products	87	62	40	29	13	9	140	100
More Profit	57	41	50	36	33	23	140	100
Attract to the Customer	68	49	40	29	32	23	140	100
Sustainable Development	59	42	30	21	51	37	140	100

Source: Primary Data

From the above Table 6 proved that, 87(62%) respondents strongly agreed that the scope for Value Added Products by using of flower waste recycling technology.

SUGGESTIONS

Based on the findings of the study, the following suggestions are given by the researchers

1. Awareness must be given to female florists, illiterates florists, low income groups, low experience in years, full time workers and new entering florists.
2. Government Schemes in District Industries Centre and other banks are helpful to provide finance at a lower rate.

CONCLUSION

Value-added products from floral waste offer numerous benefits: compost enhances plant growth, biogas generates electricity, and food items provide nutrients and additives. Furthermore, Flower waste plays a vital role in solid waste management and positively contributes to the bioeconomy. Thus, with floral waste recycle technology can convert waste into wealth, showcasing the immense potential of floral materials as valuable resources for economic growth.