Original Research Article

C0-COMPOST PRACTISING FARMERS IN THE NILGIRIS DISTRICT OF TAMILNADU: PROBLEMS AND PROSPECTS

ABSTRACT

Combining the human waste with the municipal waste would pave way to much needed solid waste managementstrategy in the urban areas. The co-compost produced out of this can be used successfully for crop production.The objective of this study is to study the benefits and constraints faced by the farmers in applying the co-compost in the field. This study investigates the advantages and constraints faced by the farmers in applying the co-compost in the field in Nilgiris District. 50 sample farmers who have been using the co-compost developed by the Rural Development Organization (RDO), coonoor were taken for this study. To examine the objectives.a well-structured interview schedule was employed and data were obtained through personal interviews. Garret ranking and Percentage analysis were the tools used for the study. This study envisaged that seed germination has increased and good plant growth with increase in quality of vegetables after using the co-compost. The study also found that weed growth and price of the co-compost are found to be high by the farmers after using the co-compost**.** Respondents were positive about the innovation's ability to become sustainable and scalable. The positive impact would largely influence food security, women accreditation, income advancement, and soil restoration for the entire region. The innovation also helped vegetable farmers by improving crop yield through co-compost application, resulting in higher sale prices in the markets.

Keywords: *Co-compost, Agriculture, faecal sludge, Vegetable waste*

1.INTRODUCTION

Co-composting is the one of the fiscal faecal sludge management option that allows recycling of municipal solid waste and human waste in a combined manner. Combining the human waste with the municipal waste would pave way to much needed solid waste managementstrategy in the urban areas. The co-compost produced out of this can be used successfully for crop production. A model for creating high-quality co-compost from wastewater and faecal sludge was developed by WASTE, a Dutch organization, in collaboration with the Rural Development Organization (RDO Trust), Nilgiris District, for the cultivation of exotic vegetables by women farmers in the District. WASTE used THE DIAMOND MODEL to provide instruments for private financing and prospective market linkage methods in addition to producing high-quality co-compost and making greywater accessible so that target consumers may purchase the co-compost. The concept got a monetary grant and support from Securing Water for Food (SWFF).The goal of the innovation is to create a scalable local circular economy model for sanitation in agriculture that enables women farmers to grow better crops with the application of high-quality compost and a longer growing season to promote green growth in the Nilgiris District. Faecal sludge is collected from private vacuum truck drivers, transported to the treatment facility, and then fed into the system as part of the WASTE intervention. Because co-compost from treated waste streams is less expensive than chemical-based fertilizers, farm households might use this strategy to boost their annual revenue. This is because many parties have an interest in treating sewage and faeces. The treatment of wastewater and faecal sludge is the responsibility of many nodal departments under various national and state level government programmes. Therefore, it is the responsibility of the relevant authorities to carefully oversee the treatment process. Through the construction of a regular and continuous supply chain for the output product in the form of co-compost, this approach

might assist the government and farmers. Farmers have begun employing co-compost that is created from both grey and black water produced by surrounding homes. RDO promotes trust in its dependability by selling co-compost at Rs. 6 per kilogramme together with lab test results. The demand for the Trust's co-compost has increased due to the crops' higher yield and better quality. The original innovation's goals were to assist growers in producing higher-quality exotic veggies, improve soil quality, and lower their costs of cultivation. It also aimed at conserving the resources like water.The Objectives of the study are:

- To study the various benefits obtained by the farmers in applying the co-compost in the study area and to analyse the constraints faced by the farmers while applying the co-compost.

2.MATERIALS AND METHODS

The questionnaire for the study included questions about livelihood, income, crop yield, innovation benefits, innovation accessibility, improvements in innovation, water use, agricultural inputs usage, and drawbacks and suggestions associated with the innovation. The study's approach is based on both primary and secondary data. But the research mostly depends on primary data obtained through a structured interview schedule. Rural Development Organization (RDO) keeps the coordinates of the Nilgiris District villages and a well-maintained database of the farmers who have used the innovation in the past. Farmers that had used the innovation was the primary filter because they may have better and specific knowledge of the innovation and thus can provide greater details. Of these villages, primary interviews were selected through a random sampling of the database provided by RDO. All interviews were conducted one-on-one with individual farmers to avoid as much bias as possible, such as a respondent with limited knowledge on a specific question looking to village level farming leaders to provide the exact answer for the respondent.

Convenience sampling, a non-probability sampling technique, was chosen as the sampling method. The sample size was 50, Data was collected through individual interviews with 50 farmers from the five villages spread across Nilgiris district: Semandhada, B.Manihetty, Gandhinagar, Thaampatti and Ketti Palada.

Tools for analysis

Percentage analysis, relative importance index and Garett ranking were the tools used in this study.

1. Percentage analysis was measured by using this below formula

$$\text{Percentage analysis} = \frac{Number\ of\ respondents}{Total\ sample\ size} \times 100$$

In this study, percentage analysis was used to determine the demographic characteristics of the respondents.

2. Garett ranking was measured by using this below formula

$$\text{Per cent position} = \frac{100\ X\ (Rij - 0.5)}{Nj}$$

Rij = Ranking given to the i^{th} attribute by the j^{th} individual

Nj = Number of attributes ranked by the j^{th} individual

In this study, Garrett ranking was used to identify problem faced by consumers while using the product.

3.ANALYSIS AND FINDINGS

Table 1.1 Demographic characteristics of Respondents (N=50)

Gender	No of Respondents	Percentage

Male	28	56.00
Female	22	44.00
Age (years)		
Below 30	9	18.00
Between 31 to 50	31	62.00
Between 51 to 70	10	20.00

(Source: primary data)

There was a mix of male and female respondents, although the majority was male. Of the 50 respondents, female respondents constituted 44 percent (22), while male respondents comprised of 56 percent (28).62% of respondents are between the age group of 31 to 50. (Table 1.1)

Table 1.2 Farm size of the sample Respondents

Most farmers in the region practice mid-scale agriculture, which was consistent with the farm sizes of those interviewed (table 1.2). **(N=50)**

Farm size	No of Respondents	Percentage
Less than 0.5 acre	10	20.00
0.5 to five acres	25	50.00
More than 5 acres	4	8.00
Leash lands	11	22.00

(Source: primary data)

The amount of land owned by the 50 respondents varied, with 20 percent of farms (10) equal to or smaller than 0.5 acre, 50 percent (25) larger than 0.5 acre and up to five acres. Only eight percent (4) of farmers own farms with an area equal to or greater than five acres. Additionally, 22 percent (11) of farmers did not own land (Table 1.3).

Table 1.3 Occupation of the sample Respondents

(N=50)

Occupation	No of Respondents	Percentage
Farming (primary occupation)	33	66.00
Retired government officials into farming, Cattle rearing, Daily wage labours.	17	34.00

(Source: primary data)

Table 1.3 Forty-nine of the 50 interviewees reported their primary occupation was farming. Most respondents (58 percent) have no source of household income other than farming. In other sectors of the economy, five farmers work as a daily wage labourer on a wealthy farmer's land when they cannot afford agri-inputs or during the dry season to ensure sporadic income in their household. Four farmers raise cattle during lean periods or the dry season and sell cow dung as manure to other farmers. An additional four farmers receive monthly pensions as retired government officials and now they are working in agriculture full-time. Three farmers have small enterprises to sell agri-inputs, such as fertilizers, pesticides, and herbicides to other farmers. Two farmers practice law in the afternoons and during time off as a side profession. Two farmers are employed as carrot washing executives for additional income, and one farmer practices tea farming in addition to agri-farming.

Table 1.4 Range of farmers used the Innovation (N=50)

Years of Innovation used	No of Respondents	Percentage
12 months or less	35	70.00
12 months to 24 months	10	20.00
24 months or more	5	10.00

(Source: primary data)

Of the Respondents, 68 percent have used the innovation (co-compost) for 12 months or less, 10 percent for more than 12 months but less than 24 months, and 20 percent for 24 months or more.(Table 1.4).

Table 1.5 Family size of the sample Respondents (N=50)

Family size	No of Respondents	Percentage
four or less than 4	33	66.00
four to six members	9	18.00
six or more members	8	16.00

(*Source: primary data)*

In total, 212 family members were represented within 50 families. Of these, 66 percent (33) had four or less members. Eighteen percent (9) had four to six members. Sixteen percent (8) had six or more members (Table 1.5).

Benefits obtained by the farmers in applying the co-compost

As perceived by the farmers, there are many positive impacts such as germination, yield, quality due to this co-compost application. The results obtained from the farmers are ranked below.

Table 2. Benefits obtained by using the co-compost

S.No	Factors	Mean score	Rank
1.	Seed germination was Good	73.67	**I**
2.	Good plant growth with increase in quality of vegetables	72.55	**II**
3.	Better moisture absorption	68.95	**III**
4.	Earthworm population increase	66.93	**IV**
5.	Immediate nutrient releasing	64.86	**V**
6.	Yield increase	63.13	**VI**
7.	Reduction in quantity of chemical	54.43	**VII**
8.	Less transport cost	47.53	**VIII**
9.	Loosening of soil and better aeration	41.76	**IX**
10.	Reduction in wastage of the produce	40.19	**X**
11.	Easy application	39.25	**XI**
12.	Reduction in crop duration	35.06	**XII**
13.	Better price for the produce	30.16	**XIII**
14.	Less weed growth	23.86	**XIV**

From the above Table 2,it was found that Seed germination was Good is the factor told by many farmers after using the co-compost which ranked first followed by Good plant growth with increase in quality of vegetables ranks 2. Farmers added that shining of vegetables and market value will be high compared to other fertilizer used vegetables. Better moisture absorption ranks 3 with high retention of water in the field. Earthworm population increase as the co-compost is rich in C:N ratio. Immediate nutrient releasing with the mean score of 64.86 ranks 5 followed by the increase in yield with all the advantages mentioned above. Price of the co-compost is high compared to other manures, so it ranked 13 with the mean score of 34.66.Weed infestation is more as the co-compost is nutrient enriched, so it got the least rank of 14 with a mean score of 23.86.

Constraints faced by the farmers in co-compost application

Besides, the advantages of co-compost, there are drawback as well while coming to its application in the field by the farmers. There are few constraints faced by the farmers in the field are given rank by its mean score in the table 3.

Table 3.Constraints faced by the farmers while applying the co-compost

S.No	Factors	Mean score	Rank
1.	Weed infestation is high	73.97	**I**

2.	Cost of co-compost is high	69.17	**II**
3.	Emergence of secondary crop	67.53	**III**
4.	Pest emergence	64.40	**IV**
5.	Dependence on monsoon	62.07	**V**
6.	Unavailability of co-compost	59.10	**VI**
7.	Lack of labours	56.73	**VII**
8.	Transportation problem	50.43	**VIII**
9.	Ignorance due to addition of faecal sludge	45.50	**IX**
10.	Storage facilities is poor	41.60	**X**

The table 3 showed that Weed infestation is high (73.97) after using the co-compost, as it is rich in Nitrogen and other essential nutrients. So the emergence of weeds is high. The cost of co-compost is high comparative to its conventional manures and other fertilizers, so it ranks second with the garret score of 69.17.One kg co-compost costs Rs.6/kg. Emergence of secondary crop (67.53) in the field due to the vegetable seed contamination while in the production of co-compost. Ignorance due to addition of faecal sludge (45.50) in the production of co-compost is one of the constraints faced by the farmers where most of them gave rank 9 for this factor. Storage facilities are poor ranked 10 as it is with the least garret score of 41.60.

4.Conclusion

Respondents were positive about the innovation's ability to become sustainable and scalable, even though there is a considerable amount of problems. This study concluded that Germination percentage has increased with better plant growth and quality of vegetables has also improved. The major constraints faced by the farmers are the Weed infestation in the main crop field is high due to its high nutritional content in the co-compost. Most of the Respondents felt the cost of co-compost is high comparing to other manures. With the introduction of the innovation, farmers could cultivate an additional part of their farmland. The positive impact would largely influence food security, women accreditation, income advancement, and soil restoration for the entire region. The innovation also helped vegetable farmers by improving crop yield through co-compost application, resulting in higher sale prices in the markets. The innovation answers the agriculture challenges of water scarcity and soil productivity in one single attempt. It addresses both major challenges and also solves the menace of solid and liquid waste management in the region, which is a win-win situation for all stakeholders.

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