P-ISSN: 2618-0723
E-ISSN: 2618-0731

NAAS Rating: 5.04
www.extensionjournal.com

International Journal of Agriculture Extension and Social Development

Volume 7; Issue 6; June 2024; Page No. 122-126

Received: 07-04-2024
Accepted: 11-05-2024

Indexed Journal
Peer Reviewed Journal

Constraints experienced by the Kangayam cattle farmers of Tamil Nadu in adopting vermicompost technology

[1]NV Kavithaa and [2]N Vimalrajkumar

[1]Assistant Professor, Kangayam Cattle Research Station, Baguthampalayam, Sathyamangalam, Tamil Nadu

[2]Associate Professor and Head, Farmers Training Centre, Theni, Tamil Nadu

DOI: https://doi.org/10.33545/26180723.2024.v7.i6b.677

Corresponding Author: NV Kavithaa

Abstract

Vermicomposting involves a basic biotechnological method of composting, employing specific earthworm species to facilitate waste conversion and yield a higher quality end product. A comprehensive cross-sectional study encompassed Coimbatore, Tirupur, Karur, and Erode districts of Tamil Nadu, involving a randomly selected sample of 240 Kangayam cattle farmers. Through collaboration with subject matter experts and drawing from previous studies, a list of 38 constraints across major domains *viz*., Technical, Economical, Institutional, Personal, and Social was compiled. Respondents were tasked with ranking these constraints based on perceived severity, utilizing the RBQ technique to identify the most critical constraint within each domain. A semi-structured interview schedule was developed to evaluate the challenges encountered by farmers, which underwent pretesting to ensure reliability and validity. Data collection relied on personal interviews and subsequent analysis was conducted using appropriate statistical methods. Among the five major constraint domains examined, Technical constraints emerged as the most significant (Mean RBQ value = 91.58) for Kangayam cattle farmers in adopting vermicomposting technology. Key challenges included the intricate nature of vermicompost technology requiring constant technical oversight, the financial burden associated with constructing vermicompost units and storage facilities, inadequate guidance/training on vermicomposting, the absence of a uniform and systematic training framework for vermicompost technology, and opposition from nearby farmers due to misconceptions about disease transmission and foul odors in vermicomposting sheds. Consequently, it is imperative to develop tailored extension programs to disseminate knowledge about vermicompost technology and enhance compost production in future farming conditions.

Keywords: Vermicompost, constraints, Kangayam cattle farmers

Introduction

Vermicompost, known as *"Manpuzhu Uram"* in Tamil, is a completely natural and cost-effective alternative to chemical fertilizers, proving to be more economical and profitable for farmers. Abundant in NPK, micronutrients, beneficial soil microbes, plant growth hormones, and enzymes secreted by earthworms, vermicompost is produced through the process of vermicomposting, which involves the biological degradation and stabilization of organic waste with the assistance of earthworms and various microbes (Joshi and Chauhan, 2006) [2]. In today's organic farming practices, vermicompost plays a vital role and poses no harm to crops. It takes the form of stable, fine granular organic matter that enhances soil aeration and facilitates the slow release of organic carbon, allowing crops or plants to absorb nutrients effectively (Allen, 2016) [1]. The dissemination of vermiculture technology has been remarkably successful and widely embraced by the farming community, leading to tangible improvements in their economic well-being and offering self-employment opportunities to young individuals. The adoption of vermicompost technology is an integral aspect of integrated farming systems.

Vermicomposting holds significant promise for transforming agricultural waste into valuable inputs for farming. By utilizing organic manures, crops can efficiently absorb chemical nutrients, thus enhancing soil health and mitigating the adverse effects of chemicals. The primary market for vermicompost lies within agriculture and horticulture. In India, there are over one lakh extension personnel and 45,000 agricultural scientists actively involved in disseminating innovations among farmers. However, despite these efforts, only 30 to 40 percent of recommendations are adopted by farmers (Kavithaa *et al.*, 2020) [3]. Recognizing the need for increased vermicompost production and the lack of empirical studies on constraints faced by Kangayam cattle farmers in Tamil Nadu, this study aims to identify the challenges hindering the adoption of vermicomposting technology from their perspective.

Materials and Methods

A cross-sectional study was carried out in Coimbatore, Tirupur, Karur, and Erode districts of Tamil Nadu, purposively selected due to their significance as the breeding grounds for Kangayam animals. Specifically, two taluks, namely Pollachi and Anaimalai, were chosen from the eleven revenue taluks in Coimbatore district. Similarly, from the nine taluks in Tirupur district, Kangayam and Dharapuram taluks were selected. In Karur district, two

taluks, Karur and Aravakurichi, were chosen from the seven available. Lastly, from the ten revenue taluks in Erode district, Gobichettipalayam and Sathyamangalam were selected. Thus, a total of eight taluks were randomly chosen for the study across the four districts. Within each of these selected taluks, 30 livestock farmers engaged in Kangayam cattle rearing for a minimum duration of ten years were randomly sampled, resulting in a total sample size of 240 Kangayam cattle farmers for the study.

In this study, constraints refer to the problems or challenges encountered by the respondents in the production and adoption of vermicompost technology. After consulting with subject matter experts and reviewing previous studies, a list of 38 constraints was developed under five major domains: Technical, Economical, Institutional, Personal, and Social constraints. The objective was to assess the severity of constraints faced by the respondents in vermicomposting. Respondents were asked to rank these constraints based on their perceived seriousness, and the RBQ technique was utilized to identify the most significant constraint within each domain. The ranks assigned by the respondents were converted into scores using the formula provided by Sabarathnam (2002) [7] as follows,

$$RBQ = \frac{\sum_{i=1}^{n} Fi(n+1-i)*100}{Nn}$$

Where,

F_i = Frequency of the respondents for the i th rank of the constraint.

N = Number of respondents

n = maximum number of ranks given for various constraints by a respondent

The scores against each statement were compared to rank the statements in each category and the results were interpreted.

Results and Discussion

Table 1: Constraints faced by the Kangayam cattle farmers in adoption of vermicomposting technology

n = 240

S. No	Major domains of constraints	Mean RBQ value	Rank
1	Personal constraints	83.71	3
2	Institutional constraints	82.08	4
3	Technical constraints	91.58	1
4	Financial constraints	88.16	2
5	Social constraints	80.73	5

A perusal of Table 1 indicates that, among the five major domains of constraints studied, Technical constraints were the most serious constraints (Mean RBQ value = 91.58) for the Kangayam cattle farmers in adoption of vermicomposting technology, followed by financial constraints (RBQ = 88.16), Personal constraints (RBQ = 83.47), Institutional (RBQ =82.08) and Social constraints (RBQ =80.76).

Table 2: Technical constraints faced by the Kangayam cattle farmers in adoption of vermicomposting technology

S. No	Technical constraints	RBQ value	Rank
1	Non-availability of technical labour especially to handle earthworms and also high labour requirement (Compatibility)	96.52	2
2	Complex nature of vermicompost production which demands constant technical supervision (Complexity)	97.81	1
3	Constraints in preparation of vermicompost bed (Moisture level, pH, etc.,) (Complexity)	90.52	9
4	The results of application of vermicompost are not readily observable (Observability)	94.46	5
5	Vermicomposting is a time consuming process (Trilability)	95.24	4
6	Vermicompost is less effective in comparison with application of chemical fertilizers. (Relative advantage)	93.46	6
7	Difficulties in separation of earthworm from vermicompost during harvesting	88.78	10
8	Mortality of earthworm during transfer and due to high temperature inside the bed	92.82	7
9	Difficulties in maintaining Moisture and pH of bedding materials	88.42	11
10	Unavailability of suitable species of earthworms	96.32	3
11	Drainage problems in pits/tanks	85.42	13
12	Smelling of vermin beds	91.24	8
13	Disturbance of beds and declining in worm population in bed	86.46	12
14	Incidence of pests and predators on worms	84.78	14
	Mean RBQ	91.58	

It could be observed from Table 2, that out of the 14 technical constraints enlisted, the Kangayam cattle farmers denoted the complex nature of the vermicompost technology which demands constant technical supervision as the foremost constraints in adopting it in their farm level with a RBQ value of 97.81 followed by the Non-availability of technical labour especially to handle earthworms and also high labour requirement (RBQ = 96.52). Earthworms, being very sensitive to moisture contents of bedding materials and sunshine, need proper care in their maintenance. Unavailability of suitable species of earthworms (RBQ = 96.32) was considered as third most constraints as in the field condition farmers are facing problems in getting the right species of earthworms in required quantity. The very basic nature of this technology which will extend for considerable period of time to harvest the end product was considered as the fourth constraints as the farmers opined that Vermicomposting is a time consuming process with a RBQ of 95.24. These findings are in line with Vaidya *et al.*, (2014) [4].

This was followed by the fact that the results of application of vermicompost are not readily observable (RBQ = 94.46)

means the farmers felt that this technology has low Observability value, Vermicompost is less effective in comparison with application of chemical fertilizers (RBQ = 93.46) means this technology has comparatively low relative advantage over the technology it supersedes and Mortality of earthworm during transfer and due to high temperature inside the bed (RBQ = 92.82) as Worms breathe through their skin which needs to be moist for better breathing. But if the beds become too dry, worms being not only dehydrating but also suffocating, will try to go away from the bed. These constraints were ranked from five to seven respectively.

Smelling of vermin beds (RBQ = 91.24) was the eighth constraints exposed by the respondents. Addition of excess water in vermicompost beds made in pits or tanks creates anaerobic condition due to less airflow and beds become sour and stinky, not favourable for worm health. Addition of more food than the consumption capacity of earthworms present in bed (overfeeding) will lead to rotting food and rancid smells might be the reason for smelling of vermin beds. This was followed by difficulties in in preparation of vermicompost bed with proper Moisture level, pH, *etc.*, (RBQ = 90.52) and Difficulties in separation of earthworm from vermicompost during harvesting (RBQ = 88.78) ninth and tenth level of constraints. These findings are in line with Sannigrahi (2016) [5].

Difficulties in maintaining moisture and pH of bedding materials (RBQ = 88.42), Disturbance of beds and declining in worm population in bed (RBQ = 86.46), Drainage problems in pits/tanks (RBQ = 85.42) and Incidence of pests and predators on worms (RBQ = 84.78) were the eleventh to fourteenth ranked technical constraints reported by Kangayam cattle farmers in adopting Vermicompost technology. Earthworms have a large amount of predators which include birds, fowl, rodents, frogs, toads, snakes, ants, leeches and flat worms. Declining of earthworm population in bed may be due to either eating by predators or deserting worms themselves for unfavourable living conditions.

Table 3: Financial constraints faced by the Kangayam cattle farmers in adoption of vermicomposting technology

S. No	Financial constraints	RBQ value	Rank
1	Lack of sufficient initial capital	89.70	3
2	High labour cost	91.94	2
3	Cost of construction of vermicompost unit and storage facilities	96.20	1
4	Constraints in access to credit	84.96	4
5	Cost of earthworms	84.00	5
6	Poor economical advantage of Vermicompost – considered as not at all cost-effective.	82.20	6
	Mean RBQ	88.16	

It is evident from the data presented in Table 3 that Kangayam cattle farmers considered the cost of construction of vermicompost unit and storage facilities (RBQ = 96.20) as the prime financial constraints in in adoption of vermicomposting technology. Even though the vermicompost technology doesn't required much investment, small and marginal farmers experienced difficulties in starting up of a permanent vermicompost production unit and are also not becoming interested to take risk on initial investment. This finding is similar to that of Varalakshmi *et al.,* (2012) [6]. High labour cost is considered as the second most important constraints (RBQ = 91.94) since for handling and management of worms and vermin beds, skilled laborers are required and obviously they are demanding more wages might be reason for this constraint. This was followed by lack of sufficient initial capital (RBQ = 89.70), constraints in access to credit (RBQ = 84.96) as banks are not showing much interest to give loan for mass production of vermicompost without becoming sure about returns, cost of earthworms (RBQ = 84.00) and poor economical advantage of vermicompost considered as not at all cost-effective (RBQ = 82.20) were the third to sixth financial constraints reported by the farmers.

Table 4: Personal constraints faced by the Kangayam cattle farmers in adoption of vermicomposting technology

S. No	Personal constraints	RBQ value	Rank
1	Lack of proper guidance / training regarding vermicompost	87.42	1
2	Lack of support or even oppose of family members for production of vermicompost	84.56	3
3	Over burdening in house and farm activities	82.44	4
4	Lack of knowledge and Skill in maintaining Moisture and pH of bedding materials	86.42	2
5	Appearance of earthworms, touch and feel of worms is attached with stereotypes and prejudices, unfounded fears as these worms look similar to other obnoxious harmful worms. Feeling of shy/hatred to work with earthworms	81.66	5
6	Lack of awareness and knowledge about profitability and benefits of vermicompost after a long period of time (Long term impact)	79.80	6
	Mean RBQ	83.71	

It could be observed from Table 4, lack of proper guidance / training regarding vermicompost was observed as the prime constraint (RBQ = 87.42) by the respondents followed by Lack of knowledge and Skill in maintaining Moisture and pH of bedding materials (RBQ = 86.42). Though training on vermicomposting is simple and suitable for all irrespective of trainee's age, educational qualification, employment status, economic condition or gender, people generally take it very lightly and do not consider vermicomposting as an important or essential activity for generating employment

and income. Some farmers feel training or research on vermicomposting is not at all required. Sannigrahi (2016) [5] also reported the same through his study. Lack of support or even in some time oppose of family members for production of vermicompost (RBQ = 84.56) was considered as the third personal constraint followed by over burdening in house and farm activities as fourth (RBQ = 82.44) since daily attention is very essential to maintain moisture in the beds and to protect earthworms from predator like frog, ant, rat, etc make it as a cumbersome process. Appearance of earthworms, touch and feel of worms is attached with stereotypes and prejudices, unfounded fears as these worms look similar to other obnoxious harmful worms. Feeling of shy/hatred to work with earthworms was considered as fifth constraint (RBQ = 81.66) and lack of awareness and knowledge about profitability and benefits of vermicompost after a long period of time (Long term impact) was the sixth personal constraint with a RBQ of 79.80.

Table 5: Institutional constraints faced by the Kangayam cattle farmers in adoption of vermicomposting technology

S. No	Institutional constraints	RBQ value	Rank
1	No uniform as well as systematic training system	84.60	1
2	Lack of laboratory facility for chemical analysis of processed vermicompost as well as Quality Certified Agency in rural setup	82.80	3
3	No systematic promotional approach from government or NGO side	83.54	2
4	Lack of Government's scheme, financing, training, subsidy etc	79.22	5
5	Lack of marketing / infrastructure facilities to procure input like earthworms and to sell excess vermicompost.	80.24	4
	Mean RBQ	82.08	

It could be understood from the data presented in Table 5 that there is no uniform as well as systematic training system prevailing for vermicompost technology (RBQ = 84.60). Many organizations, both governmental as well as NGOs conducting training programmes on Vermicompost technology but they are greatly differ in the techniques and methods of production of vermicompost which will ultimately creates confusion among the farmers. Hence this constraint was stated as the prime institutional based constraint by the Kangayam cattle farmers in adoption of vermicomposting technology. Further, there exists no marketing facility/infrastructure has been created by either Government or public sector for selling vermicompost. Interested unemployed youths or housewives face financial problem for starting vermicomposting due to lack of any formal Government support. Hence the respondents affirmed that the constraint of no systematic promotional approach from government or NGO side as the second constraint under this domain with a RBQ of 83.54. Vaidya *et al.*, (2014) [4] opined the same through their study. This was followed by lack of laboratory facility for chemical analysis of processed vermicompost as well as quality certified agency in rural setup (RBQ = 82.80), lack of marketing / infrastructure facilities to procure input like earthworms and to sell excess vermicompost (RBQ = 80.24) and Lack of Government's scheme, financing, training, subsidy *etc.*, (RBQ = 79.22) as third to fifth institutional constraints for the by the Kangayam cattle farmers in adoption of vermicomposting technology.

Table 6: Social constraints faced by the Kangayam cattle farmers in adoption of vermicomposting technology

S. No	Social constraints	RBQ value	Rank
1	Vermicomposting is considered to be attached with low esteem, low dignified work and least liked by family and society	80.67	2
2	Fear of hand and leg injuries due to presence of sharp objects in the farm yard waste	79.78	3
3	Opposition from the nearby farmers due to wrong belief of disease spreading and foul smelling in vermicomposting sheds.	81.76	1
	Mean RBQ	80.73	

It could be observed from Table 6, the opposition from the nearby farmers due to wrong belief of disease spreading and foul smelling in vermicomposting sheds was the major social constraint (RBQ = 81.76) experienced by the farmers in adopting vermicompost technology. Even though lot of efforts were taken for popularizing vermicompost technology, still many farmers feel that it would be an easier way to use the farm wastes as such. Moreover, working with the cattle dung is not be fond of many farmers. This was followed by viewing the vermicompost technology as a low esteemed, low dignified work (RBQ = 80.67) and the fear of hand and leg injuries due to presence of sharp objects in the farm yard waste (RBQ = 79.78) were the second and third social constraints expressed by the respondents.

Conclusion

From the findings, it can be concluded that, as far as the Farm waste management, Paradigm shift is the need of present time to look wastes as valuable resource materials for production of vermicompost. Each and every people as well as Government machinery in India have to be serious to remove constraints mentioned above and to spread Vermicomposting Technology at grass root level. More awareness programs in both Rural and Urban India with the help of Multi-Media as well as systematic Vermicomposting Training/Earthworm demonstration in block levels will help to remove psychological blocks from the minds of farmers. Efforts should be made to increase the awareness of farmers regarding advantages of vermicompost, training programmes should be conducted by State Government / SAUs regarding ideal vermicompost preparation, free of cost provision of literature pertaining to preparation of vermicompost to needy farmers, provision of excellent stains of worms at reasonable rate to needy farmers,

farmer's training and visits of successful vermicompost units, development of market infrastructure for vermicompost and financial support by Government for creation vermicompost sheds to small and marginal farmers.

References

1. Allen J. Vermicomposting. Corporate Extension Service, New Mexico State University, New Mexico, USA; c2016. Available from: http://aces.nmsu.edu/pubs/_h/H164.pdf
2. Joshi PC, Chauhan A. Composting of some organic materials using Eisenia foetida and conventional microbial methods: A comparative study. Uttar Pradesh Journal of Zoology. 2006;26:212-125.
3. Kavithaa NV, Vimalrajkumar N, Manivannan C, Manokaran S. Assessment of knowledge level and its determinants amongst Kangayam cattle farmers in vermicomposting. Int J Curr Microbiol App Sci. 2020;9(09):149-154.
4. Vaidya AC, Macwan AR, Patel DD. Constraints perceived by the farmers in preparation of vermicompost. Gujarat Journal of Extension Education. 2014;25(2):126-129.
5. Sannigrahi AK. Major constraints in popularising vermicompost technology in eastern India. Modern Environmental Science and Engineering. 2016;2(2):123-133.
6. Varalakshmi R, ArunaKumari K, Anangamathi E. Vermicompost as a micro-enterprise to improve the economic status of self-help group women. Current Biotica. 2012;5(4):487-499.
7. Sabaratnam M. IR in dialogue… but can we change the subjects? A typology of decolonising strategies for the study of world politics. Millennium. 2011 May;39(3):781-803.