

Impact of Training Programmes on Vermicomposting; Production, Revenue and Employment Generation of Farmer

ABSTRACT

The technologies available at present in the field of agriculture have no relevance whatsoever if those were not reached and adopted by the farmers for the improvement of crop productivity. The current study was undertaken to know the impact of training and farmers awareness on production of vermicompost for generation of revenue and employment to the farmers. In order to enhance the income and employment opportunities for the farmers of Cuddalore district, ICAR-Krishi Vigyan Kendra, Vriddhachalam organized various training programmes on vermicomposting technologies. Vermicomposting is an easy and faster process of converting organic materials into valuable compost than other conventional methods and is a very good source for creating self employment and revenue generation. A farmer V. Sekar, Kodukoor Vriddachalam block of Cuddalore district attended the trainings organized by ICAR- Krishi Vigyan Kendra, Vriddachalam about vermicompost production technologies. He adopted vermicompost production in his farm for his own use and to get additional income from a very small scale. Now he became a successful producer of quality vermicompost and earthworm. He reported that his product is demanded by the farmers for paddy and vegetable cultivation, kitchen gardeners and NGO's in Cuddalore district. Moreover, he sold vermicompost alone or mixing with *Azospirillum*, *Phosphobacteria* and *T. viridie* based on the farmers need, so that farming community can be benefitted. He is earning an annual net income of Rs. 98,000/- from vermicompost alone and Rs.1,15,500/ year from vermicompost and earthworm. Also found that vermicompost is suitable for employment generation by provided about 426 mandays per year. It was concluded that training is the most viable technology transformation tool, which is effective in creating awareness, interest and adoption of improved technology.

Keywords: Vermicomposting; Awareness; Training; Farmer's Income and Employment Generation.

INTRODUCTION

In the past few decades, chemical fertilizers have widely spread throughout the world and focusing that the soil is inert medium for plant roots, rather than as a living biosphere in which the crop is only one of hundreds or thousands of interacting species. However, it is now realized that in field under intensive monoculture which receive heavy applications of chemical fertilizers alone, there is a slow decline in productivity [8]. Because, applications of nitrogeneous fertilizers are responsible for emissions of green house gases like nitrous oxide (N_2O) and ammonia (NH_3). Besides supplying nitrogen, ammonia can also increase soil acidity. Excessive nitrogen fertilizer applications lead to pest problems by increasing the birth rate, longevity and overall fitness of certain pests [4]. Excessive use of phosphotic fertilizers leads to accumulation of large amounts of P in the soil and it can leads plant toxicity and immobilization of trace elements in the soil, as well as ground and surface water pollution through runoff [7]. To overcome such kind of problems, farmers are advised to use organic manures along with recommended inorganic fertilizer.

Due to high water content (WC) of up to 99% (wet weight) in liquid manure and 70% in solid manure, long range haulage of fresh manure from a livestock operation is uneconomical. Therefore, most of the manures are applied in land at high application rates close to source, thereby diminishing its potential use as a soil amendment. High application rates of fresh manure are unsustainable in the long-term and lead to degradation of soil, water and air quality as well as public perception issues. Chemical, physical and biological properties of fresh manure are also highly variable, making its use in cropping systems more number of a challenge than commercial fertilizers [6]. Under such circumstances composting has gained increased attention as a means of reducing the environmental impact of livestock manure [5]. Composting is a simple biotechnological process, which could provide a 'win-win' solution to tackle the problem of safe disposal of waste as well as the most needed plant nutrients for sustainable productivity [10].

Vermicomposting is a simple biotechnological process of composting, in which certain species of earthworms are used to enhance the process of waste conversion and produce a better end product is also called as vermicast. Earthworms consume various organic wastes and reduce the volume by 40–60%. Each earthworm weighs about 0.5 to 0.6 g, eats waste equivalent to its body weight and produces cast equivalent to about 50% of the waste it consumes in a day. Vermicast is popularly known as Black gold, because of rich in nutrients, growth promoting substances, beneficial soil micro flora, having properties of inhibiting pathogenic microbes and synergistic relationship in plant rhizospheres [3]. Various workers reported that vermicompost contain 17-36 % humic acid and 13-30% fulvic acid of

total concentration of organic matter and vermicompost can promote growth 50-100 per cent than compost and 30-40 per cent over chemical fertilizers. Keeping in view the above facts and properties of vermicompost, Krishi Vigyan Kandra, Vriddachalam, Cuddalore district conducted several oncampus and vocational training programmes to promote the production of vermicompost in farmers field. The approach was also aims to increase income and employment generation by vermicompost production within the farm itself. The present study was under taken to know the adoption of vermicompost production and its impact on income and employment generation of progressive farmer Mr. V. Sekar, adopted vermicompost production as an occupation for his livelihood and generated employment for numerous agog farmers of nearby areas through training programmes.

METHODS AND MATERIALS

A study was conducted to discover the effect of training programme on income and employment generation of farmers by the adoption of vermicompost production at farm level. Mr. V. Sekar, S/o Velmurugan born in 1977 and completed his education up to M.Sc., in Microbiology, is resident of Kodukoor village under Vriddhachalam block of Cuddalore district, Tamil Nadu. Agriculture is a main occupation for his livelihood and is involved in cultivation of sugarcane and paddy at large scale and pulses at very small scale. He always tried to incorporate recent technologies in farm practice. During 2012, he approached our KVK to start vermicomposting production unit in his own farm. Then he attended a vocational training on vermicompost production and has initiated vermicompost unit with the incessant technical guidance of ICAR-KVK, Vriddachalam at very small level with 2 production units (size 6x2x2 feet) during 2012 and he expanded vermicompost production unit into 4 units with the capacity of 1.5 t/unit in his farm during 2013 and producing over 36 tons of quality vermicompost per annum. From 2013 onwards, he started to supply surplus amount vermicompost to the nearby farmers directly and through non-governmental organizations. Now, he is a leading farmer involving vermicompost production as well as biofertilizer production unit with the technical guidance of KVK, Vriddhachalam, Cuddalore district. His success story on vermicompost production is inspiring to the farmers working in agriculture and allied sectors. Keeping in view of his devotion and contribution, different funding agencies decided to give financial assistance in expanding vermicompost unit and biofertilizer production unit. Observations on income and employment generation by the adoption of vermicompost production were recorded as per the standard procedure.

Method adopted in vermicompost production

Vermicompost production unit (size 6x2x2 feet) was established in a cool, moist and shady place provided under thatched shed. Number of units increased according to availability of raw materials and requirements. Press mud (sugar industrial by product), cow dung and chopped dried leafy materials such as sugarcane trash, coconut fronds were mixed in the proportion of 1:3:1 and EM solution @2 lit/tonne was mixed and kept for 40-50 days for partial decomposition. During this period, heap was kept moist by sprinkling of water so that temperature can be favorable to worms. Each bed contained 1.5-2 tonne of raw material. Then 10 kg of *Eudrilus eugeniae* (night crawler) released on the upper layer of the pit/bed and covered with gunny bags so that worms can be saved from predators. Water sprinkled immediately after releasing worms and kept it moist by frequent sprinkling as per need. First harvesting of vermicompost was done on 20 days after the worms release, then subsequently every weeks harvesting was done according to the quantity of castings appeared on the surface of the bed. A reddish colour liquid, with an alkaline reaction having dissolved nutrients, called vermiwash also collected in the small chamber connected through drainage pipes fitted at the bottom of the bed. By this way vermicompost was collected and amounting by weight 55-60 per cent of the raw materials used. Harvested vermicompost was sent to the Department of Environmental Science, Tami Nadu Agricultural University, Coimbatore to know their nutrient status and presented in Table 1. For value addition of vermicompost, *Azospirillum*, *Phosphobacteria* and *Trichoderma viride* (each @ 1 kg/ tonne) added accordingly.

Preventive measures during production:

- To prevent downward migration of worms, cement floor was prepared.
- Coconut fronds thatched shed was established to provide cool, moist and shady environment.
- Fresh dung and fresh leaves was avoided because worms would die due to generation of heat during composting period.
- Plastics, glass, stones, chemicals, pesticides and metals etc were removed from organic materials for vermicompost production.
- Aeration was maintained throughout the period to boost up the growth and multiplication of earthworms.
- Preventive measures were taken to protect worm from ant, rat and birds.

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Table-1. Nutrient content of vermicompost

S.No.	Parameters	Nutrient content
1.	Organic Carbon (%)	12.6
2.	Total Nitrogen (%)	1.35
3.	Total Phosphorus (%)	0.48
4.	Total Potassium (%)	0.85
5.	Total Calcium (%)	1.65
6.	Total Magnesium (%)	0.52
7.	Total Fe (ppm)	0.8496
8.	Total Manganese (ppm)	100.62
9.	Total Zinc (ppm)	42.39
10.	Total Copper (ppm)	12.05

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136 **RESULTS AND DISCUSSION**

137 The success of any production system is basically depend on need, availability of
 138 inputs and marketing channels by which one can marketed with remunerative price by using
 139 locally available resources. The key to the success of organic farming system is the
 140 production of all inputs like, manures, plant protection etc., and on-farm utilizing the local
 141 resources wherein animal husbandry plays a catalytic role [2]. The study on economics of
 142 vermicompost production indicated that direct marketing of vermicompost from producer to
 143 consumer was found to be the strongest marketing channel however marketing through
 144 cooperatives and trader was also found in few instances. Economics of vermicompost
 145 production was calculated to compare benefit cost ratio and observed 2.19 in vermicompost
 146 alone and 2.40 including earthworm. Figures in Table 2 shows that adoption of vermicompost
 147 provides an annual net income of Rs.115500/-/year. [1] also stated that vermicompost
 148 production provide additional resources of income generation and boost their economic
 149 status. Specialized market for vermicompost was not observed in the study area but obvious
 150 that about 75 % vermicompost was marketed directly from producers to local consumers. The
 151 results indicated that production of vermicompost provided about 426 man days throughout
 152 the year, which helps in reducing migration of rural youth to urban areas. Data collected from
 153 farmer's field and its statistics is depicted in (Table-2) which clearly indicated that production
 154 and benefit and cost ratio is 2.19-2.40 which is profitable enough for farmers. This might be

due to the need based skill oriented training programmes had enhanced the knowledge level of farmers and resulted in adoption level. The results were in tune with the finding of [5]. Vermicompost is becoming popular day by day as it provides quality products through major component of organic farming system [10]. It is essential to clearly define a national policy on organic farming by supporting private sector groups, NGOs or associations and encouraging farmers to produce their own fertilizer in respective country [9].

Table-2 Benefit and Cost ratio of vermicompost production.

S.No.	Products	Quantity produced (kg/yr)	Production cost (Rs./yr)	Gross income (Rs./yr)	Net income (Rs./yr)	B.C. Ratio	Employment generation (man days/yr)
1.	Vermicompost	36000.0	82000.0	180000.0	98000.0	2.19	426
2.	Earthworm	50.0	-	17500.0	17500.0	-	-
	Total	36050.0	82000.0	197500.0	115500.0	2.40	426

CONCLUSION

The results of the current study revealed that benefit and cost ratio (2.19:1 to 2.40:1) of vermicompost production was significantly higher and can boost-up Indian economy which is today's essential need besides serving as an eco-friendly venture for rural populace. The study also inferred that, the technology transformation plays a central role in gain in knowledge, skill of farmers and adoption of vermicompost production. It is evident from the study it can be concluded that dashing people like Mr. V.Sekar are selecting vermicompost production, enhancing their livelihood status in both rural and urban area. This could be due to the transfer of technology mechanism played by the extension workers in the operational areas especially for the benefit of farmers. Some of the deal with the problem related to marketing of farmers produce is that policy must be formulated to create marketing channel by which one can marketed with remunerative price for their sustainable livelihood development.

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