

# ***Impact of Vermicomposting Training Programme on Production, Economics and Employment Generation of Farmer – A Case Study***

## **ABSTRACT**

The technologies available at present in the field of agriculture have no relevance whatsoever if these were not reached and adopted by the farmers for the improvement of crop productivity. Keeping this in view, the present study was undertaken to peg the impact of vocational trainings in specific relevance to vermicomposting technology provided to the intended clientele group during 2012. The crux of the study was focused on the impact indicators like a) change in level of production b) economics c) additional employment generated etc., on the intended clientele group. The present research study was confined to the operational cum jurisdictional area catered by Krishi Vigyan Kendra of Cuddalore district in the state of Tamil Nadu, India. The Krishi Vigyan Kendra is a district level knowledge centre formed under the policy guidance of Indian Council of Agricultural Research (ICAR) and which acts as the apex body to govern the Transfer of Technology (TOT) across the nation. One of the mandates of such district level knowledge centre is to provide vocational trainings to the farming individuals' viz. farmer, farm women, rural youths, and unemployed school drop-outs. Vermicomposting technology is a simple and quick process of converting farm waste into valuable compost which in-turn acts as a source of organic amendment for improving soil health enhancing crop production. The farmers can learn the vermicomposting technology through hands on training and take-up this as a venture for additional income generation apart from crop husbandry and make this as one of the component in Integrated Farming System (IFS) for creating employment. One of the farmer by name Mr.V. Sekar of Kodukoor village in Cuddalore district attended the vocational training on vermicomposting organized by ICAR- KVK Cuddalore during 2012. Mr.V.Sekar got motivated and started a vermicomposting unit of size 6 x 2 x 2 feet with the technical guidance from KVK Cuddalore. The scientific validation of study result revealed that, Mr.V.Sekar was earning a net annual income of Rs. 1,15,500/- through sale of vermicompost and vermi worms, thereby generating an additional employment of 426 man days per year. Thus it was concluded that, the vocational training and technical backstopping extended by the KVK Cuddalore was most viable technology transformation tool in enhancing farmers' income and employment generation.

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

## INTRODUCTION

Over past few decades, chemical fertilizers have widely spread throughout the world with a focus that, the soil is an 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]. The harmful result of excess application of nitrogenous fertilizers results in emissions of green house gases like nitrous oxide ( $\text{N}_2\text{O}$ ) and ammonia ( $\text{NH}_3$ ) which in-turn affect the natural ecosystem and food chain [7]. Besides this, nitrogenous fertilizers over long run increases the soil acidity and resulting in newer bio types of insect pest and diseases damaging the crop and economic returns to the farmers [4]. To overcome such problems, farmers are advised to use organic manures along with judicious cum recommended dose of inorganic fertilizers.

The reasons like high water content of up to 99% (wet weight) in liquid manure and 70% in solid manure, long range haulage of fresh manure from a livestock makes its uneconomical for direct application in soil as soil amendment [6]. 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. 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 farm waste as well as the most needed plant nutrients for sustainable productivity[9].

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, since it is rich in nutrients, growth promoting substances, beneficial soil micro flora, having properties of inhibiting pathogenic microbes and synergistic relationship in plant rhizospheres [3]. The scientific facts reveals 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, KVK Cuddalore organized several on-campus and vocational training programmes to promote the production of vermicompost at farmers' site. The objective was to enhance farm income and employment to the intended clientele group. The present case study was under taken to enumerate the level of adoption of vermicompost production technology and its impact on income cum employment generation of farmer. The case study was confined to Mr.V.Sekar, one of the KVK

trained farmer during 2012 and the parameters like change in level of production, economics, additional employment generated etc. were assessed.

## METHODS AND MATERIALS

A case study was conducted to discover the effect of training on income and employment generation as a result of adopting vermicomposting production technology by the KVK trained farmer Mr. V. Sekar. He hails from Kodukoor village of Cuddalore district of Tamil Nadu, India. Agriculture is the main occupation for his livelihood and earning an annual income of Rs.78000/- with an average BC ratio of 1.98. During 2012, Mr.V.Sekar approached KVK Cuddalore and underwent a vocational training on vermicomposting production technology, with the technical guidance of KVK he started the two units of vermicompost unit of size 6 x 2 x 2 feet during 2012. During 2013 gradually he expanded number of production units to four numbers with a production of 1.5 t/unit in his farm and producing over 36 tons of quality vermicompost per annum. After getting expected momentum, he started to supply surplus amount vermicompost to the nearby farmers directly and through local Non-Governmental Organizations (NGO). 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. The farm waste and other organic waste like press mud (A by-product of sugar industry), cow dung and chopped dried leafy materials such as sugarcane trash, coconut fronds were mixed in the proportion of 1:3:1 and Effective Microorganism (EM) @2 lit/ton 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 tonnes of raw material. After the preparation of vermicomposting beds, 10 kg of *Eudrilus eugeniae* (night crawler) was 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 weekly harvest 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. The harvested vermicompost was analysed and their nutrient status was shown Table1.

### Preventive measures adopted during production:

- To prevent downward migration of worms, a cement floor was laid-out at the bottom of each vermicompost bed or unit
- To provide cool, moist and shady environment, coconut fronds thatched sheds was established
- To avoid death of worms as a result of heat generation during degradation, use of fresh dung and fresh leaves was avoided
- The harmful materials like plastics, glass, stones, chemicals, pesticides and metals etc was removed from the base material before laying-out vermicompost bed or unit
- To promote ideal growth and multiplication of earthworms, proper aeration was ascertained.
- Preventive measures were taken to protect worm from ant, rat and birds.

### RESULTS AND DISCUSSION

The success of any production system is basically depend on need, availability of inputs and marketing channels by which one can marketed with remunerative price by using locally available resources. The key to the success of organic farming system is the production of all inputs like, manures, plant protection etc., and on-farm utilizing the local resources wherein animal husbandry plays a catalytic role [2]. The study on economics of vermicompost production indicated that direct marketing of vermicompost from producer to consumer was found to be the strongest marketing channel however marketing through cooperatives and trader was also found in few instances. Economics of vermicompost production was arrived to compare benefit cost ratio and it was observed that the BC ratio was around 2.19 from vermicompost production alone and it was 2.40 while including sale of earthworm. Figures in Table-2 shows that adoption of vermicompost provides an annual net income of Rs.115500/-. The results also indicated that, the production of vermicompost provided about 426 man days throughout the year, which helped in reducing migration of rural youth to urban areas. The finding of the present study is in accordance with the findings reported by [1, 7]. This might be due to the need based skill oriented training programmes and technical backstopping extended by the KVK, which enhanced the knowledge level of the farmer and resulted in adoption level. The results were in tune with the finding of [5].

**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 iron (ppm)      | 0.8496           |
| 8.    | Total manganese (ppm) | 100.62           |
| 9.    | Total zinc (ppm)      | 42.39            |
| 10.   | Total Copper (ppm)    | 12.05            |

**Table-2. Income and employment generation through vermicompost production.**

| S.N o. | 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              | 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. From the results, it is evident that, the farmer earning an annual income of Rs.78000/- with a average BC ratio of 1.98 through agriculture, but after undergoing vocational training and with technical backstopping from KVK, he established vermicomposting unit resulting in change of annual income to Rs.193500/- with a average BC ratio of 2.19, and in addition generated 426 man days employment to the farmer. Thus it can be concluded that, an organized and systematic training cum learning of technology with necessary technical guidance from knowledge centers like KVK can uplift the farmers to very great height and attain desirable changes. Some of the teething issues like marketing and linkages must be formulated by the policy makers to promote marketing of such farm products to sustain the farmers' income and soil health in future so as to maintain nature ecology intact.

## REFERENCES

- Bharti Baghel<sup>1</sup>, Rahul Sahu and Dushyant Pandey. 2018. Vermicomposting an Economical Enterprise for Nutrient and Waste Management for Rural Agriculture . *Int.J.Curr.Microbiol.App.Sci.* **7(2)**: 3754-3758 3754
- Das Ajay Kumar, Prasad Birendra, Singh R.S and Kumari Basanti. 2017. Vermicomposting: Success story of farmer for revenue and employment generation. *International Journal of Agricultural Sciences.* **9(41)**: 4664-4666.
- Gomez-Brandon M, Lazcano C, Domínguez J. 2008. The evaluation of stability and maturity during the composting of cattle manure. *Chemosphere.* **70**: 436-444.
- Jhan, G.C., Almazan, L.P., and Pacia, J. 2005. Effect of nitrogen fertilizer on the intrinsic rate of increase of the rusty plum aphid, *Hysteroneura setariae* (Thomas) (Homoptera: Aphididae) on rice (*Oryza sativa* L.). *Environmental Entomology.* **34 (4)**: 938-943.
- Kashmanian, R. M. and Rynk, R. F. 1998. Creating positive incentives for farm composting. *Am. J. Altern. Agric.* **13**: 40–45.
- Ke Song, Yong Xue, Xianqing Zheng, Weiguang Lv, Hongxia Qiao, Qin Qin, and Jianjun Yang. 2017. Effects of the continuous use of organic manure and chemical fertilizer on soil inorganic phosphorus fractions in calcareous soil. *Sci Rep.* **7**: 1164.
- Lague, C., Landry, H. and Roberge, M. 2005. Engineering of land application systems for livestock manure: A review. *Can. Biosyst. Eng.* **47**: 617–628.
- Morteza Siavoshi, Alireza Nasiri and Shankar. L. Laware. 2011. Effect of Organic Fertilizer on Growth and Yield Components in Rice (*Oryza sativa* L.). *Journal of Agricultural Science.* **3(3)**: 217-224.
- Yadav S.K., Babu S., Yadav M.K., Singh K., Yadav G.S. and Pal S. 2013. A review of organic farming for sustainable agriculture in northern India. *International Journal of Agronomy.*:1-9.