

Rural Entrepreneurship through Vermicomposting : Case Studies

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Abstract. Solid waste management continue to be a major challenge and permanent problem of urban as well as semi-urban areas of the country. A number of initiatives have been taken by several public and private sector organizations to overcome this serious problem. One such initiative taken at the Dev Sanskriti Vishwavidyalaya (DSVV), Haridwar has successfully turned the bio-degradable part of the solid waste into a thriving and profitable enterprise. DSVV has transferred this technology to a number of entrepreneurs through their on-going capacity development programmes for rural development and organic farming. The paper describes how DSVV continue to manage its solid waste of over 5 MT generated daily in the Campus as well as that of Shantikunj by converting it into valuable vermicompost and handmade paper, after segregation, and thus helping DSVV as well as Shantikunj to become completely organic in managing their total area of over 200 acres lush green campus. The paper also describes how rural entrepreneurship training on vermicomposting at DSVV has helped three entrepreneurs, besides many, to develop large commercial vermicompost units with attractive returns. The paper also highlight potential of vermicomposting in solid waste management, employment generation and organic farming with least damage to environment.

Keywords. Vermicompost, Earthworm, solid waste management, Self-employment, Organic farming

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Introduction

Solid Waste is generally referred to garbage or refuse a useless or unwanted material generated by human activities in residential, industrial and commercial areas. Solid waste material comprises of bio-degradable material and non-biodegradable material. Solid waste also include toxic or hazardous material such as paints, pesticides, used batteries, bio-medical waste, , flammable, radioactive, infectious waste etc. Besides, there is now growing concern about electronic waste viz. computers, mobiles, television and other electronic gadgets.

The solid waste generated in town, cities and metro is called Municipal Solid Waste (MSW) and ranges between 200 gram to 600 gram per person per day [1]. The waste produced in urban areas of India is approximately 170 000 tonnes per day, equivalent to about 62 million tonnes per year [1–3], includes plastic waste- 5.6 million tonnes, biomedical waste- 0.17 million tonnes, hazardous waste - 7.90 million tonnes, E-waste- 1.5 million tonnes). It is projected that by the year 2031 the MSW generation shall increase to 165 million tonnes [2].

However, solid waste generation is significantly lower in villages. Most of the farmers give away the left over food to their livestock or take such waste to their animal dung pit for conversion of waste into manure and therefore does not require much attention at present. It may be noted that with increased income and communication technology there is a gradual shift in rural consumer behaviour towards urbanisation.

The country is facing massive waste management challenge. Out of 62 million tonnes of municipal solid waste per annum. Only 43 million tonnes (MT) of the waste is collected, 11.9 MT is treated and 31 MT is dumped in landfill sites [1, 2].

The composition of MSW at generation varies greatly from place to place and it consists mainly of a large organic fraction (40–60%), ash and fine earth (30–40%), paper (3–6%) and plastic, glass and metals (each less than 1%). The C/ N ratio ranges between 20 and 30, and the lower calorific value ranges between 800 and 1000 kcal/kg [4]. MSW composition include bio-

degradable material (51%), plastic (10%) , paper (7%) and Other which include textile, glass, metal, drain silt, street sweepings, inert etc (32%)) [5].

Untapped waste can generate 439 MW of power from 32,890 TPD of combustible wastes including Refused Derived Fuel (RDF), 1.3 million cubic metre of biogas per day, or 72 MW of electricity from biogas; and 5.4 million metric tonnes of compost annually to support agriculture [2].

The solid waste management in India mainly focuses on 4-R principles viz. Reduce, Reuse, Recycle and Recovery [5] (Indiawaterportal.org). The important approaches used in MSW management include land filling, recycling of organic waste (composting), thermal treatment (incineration, gasification technology and Refuse Derived Fuel-RDF) and recovery of recycling material (about 13-20% of MSW) [6].

Major constituent of MSW is bio-degradable organic waste. The recycling of organic waste include aerobic composting, anaerobic composting, vermicomposting and digestion (biomethanation). The focuses of this paper is on vermicomposting.

Constraints in MSW Management

The major contributor to poor MSW management in the country is the limited environmental awareness and poor public support for separating dry (inorganic) and wet (biodegradable) waste. The other constraints in MSW management include lack of training, planning and motivation and accountability, availability of qualified waste management professionals, insufficient budgets poor compliance of regulatory provisions and absence of innovation and adoption of new technologies [7].

Dev Sanskriti Vishwavidyalaya (DSVV)

Yug Rishi Pt. Sri Ram Sharma Acharya, the Founder of YUG NIRMAN MISSION (The Mother Organisation of DSVV) has given significant importance to development and upliftment of Rural India in his YOJAA as solution to unemployment and eradication of poverty India in

his YOJNA . He said that “every village should be developed as the pilgrimage centre with objective of village upliftment and village Community service. Stern efforts be made in this direction treating this as the worship of village deity. Vision of YUGRISHI is the Guide line of the Department and to translate this vision into ground reality is the motto of the department.

A model of rural development which can solve the grass root problems and can meet the requirements of a village, has been named as Yurgrishi Ki Gram Teerth Yojna by the YUG NIRMAN MISSION. Which aims at developing a cultured, addiction-free, hygienic, healthy, educated, self-reliant village which is full of cooperation. This is a spiritual model of Rural India’s development.

Vision of YUGRISHI is the Guide line of the DSVV which was established in 2002 and its Department of Rural Studies and Sustainability is working towards translating this vision into ground reality.

Besides regular academic activities, the department has been focusing on capacity building by developing suitable human resource from in field of rural entrepreneurship and self-employment. The training design has six essentials for rural i. short duration training ii. local resources iii. minimum capital iv. local demand v. environment friendly and vi. labour based.

Solid waste management through vermicomposting at DSVV

Presently, over 5 MT of Solid Waste is generated daily in both the above organization. An efficient system has been placed to collect dry and wet garbage separately in green and blue bins respectively placed at convenient places in both the campuses. To facilitate the residents, blue and green garbage small bins have been provided to all residents.

The garbage so collected is taken to a central place for further sorting and processing. About one-third of the total solid waste collected daily is non-degradable and is sold to re-cyclers at frequent intervals on a regular basis. Remaining two-third material is taken to vermicomposting unit located adjacent to Gaushala. Cow dung is

an important ingredient used in vermicomposting.

Vermicomposting involves stabilization of organic waste through the joint action of earthworms and aerobic microorganisms. Initially, microbial decomposition of biodegradable organic matter occurs through extra cellular enzymatic activity (primary decomposition). Earthworms feed on partially decomposed matter, consuming almost equal to their body weight of organic matter per day and producing vermicompost about half of the eaten amount every day. The ingested food is further decomposed in the gut of the worms, resulting in particle size reduction. The worm cast is a fine, odorless and granular product. This product serves as a valuable manure for crop production.

The nutrients content in vermicompost vary depending on the waste material that is being used for compost preparation. If the waste material is heterogeneous, there will be wide range of nutrients available in the compost. And if the waste material is homogenous there will be only certain nutrients available. The common available nutrients in vermicompost are organic carbon,, nitrogen, phosphorous, potassium and other essential secondary and micro-nutrients.

Although, vermicomposting in the Shantikunj (parent organization of the University) started as early as in the year 2000 with earthworms received from Deola Par, Nagpur. The work on Vermicomposting at DSVV started from the beginning. Since 2003, vermicomposting has been major pillar of the solid waste management. The establishment of recycled handmade paper unit in 2012 has further helped in recycling of papers another major constituent of the solid waste generated on a continuous basis in the University and Shanti Kunj.

The Vermicompost has not only helped in solid waste management but provided other benefits such as: 1. Campus has turned to complete organic with zero use of chemical fertilizers. The campus has large area under medicinal and aromatic plants, orchards, lawns, flower beds and other ornamental plants. 2. Cost reduction with no expense on purchase of compost and chemical fertilizers. 3. It has helped increase area

under gardening and medicinal plant cultivation. 4. Clean Campus and environment. 5. Employment generation through vermicomposting unit. 6. Resulted in an economically viable venture

Centre for Recycling and Hand Made Product

To impart vocational training ‘Centre for Recycling and Hand Made Products’ has been established in the department. The training programmes are related to three areas 1. Agriculture (fruits and Vegetable processing and preservation, grains, legumes and oilseeds based products, medicinal and aromatic Plants etc) 2. Animal Husbandry (Cattle husbandry and Gaushala Management, cow based products production, composting , vermicomposting and 3. Cottage and home based industries (scented stick production, recycled handmade paper production, Handmade paper products, screen printing, jute products, handlooms, hosiery , dari and carpet weaving, soaps and detergents, wax etc.). About 1542 persons have received vocational training at the centre till 2019 which include training in vermicomposting. Many of them have turned entrepreneurs by taking up vermicompost production as a commercial venture. The case study of three such entrepreneurs is described in the following section.

Case Studies of Vermicompost Entrepreneurship

1. Ma Janki Vermicompost Udyog, kapsiya, Saharsa (Bihar)

Born in a poor family Shri Jaishankar Prasad Singh (64), after completing high school started working in a local shop in Saharsa (Bihar). Simultaneously also worked as taxi driver as part time job to meet his ends, It was not until the year 2000 when he visited Shantikunj, Haridwar and decided to under go an spiritual overhaul. After completing a basic course at Shant likunj, he decided to undergo a ‘six days training programme called ‘Richa’ on Svavlamban (self-employment) conducted by the ‘Rachnatmak Prakoshth’ (presently Department of Rural Studies and Sustanaibility at DSVV).

Since he did not have any money to procure earthworm on his own, he was provided by the ‘Rachnatmak Prakoshth’ with about quarter a kilo of earthworm (*Eisenia fetida*) at the end of the programme.

He started working with survived earthworms in the year 2000 with an initial investment of less than Rs. 500/-. With this investment he was able to earn around Rs. 20,000/- in the first year of his operation by selling earthworms as well as vermicompost on a pedal cycle from village to village. In 2005, the Government of Bihar launched a programme on ‘Jaivik Protsahan Yojna’. Vermicomposting was an integral part of this yojna. From 2005 onwards Shri Jaishankar Prasad Singh has been working like a crusader for promoting Vermicomposting in the state.

He is a recognized Master Trainer for the State Government programmes. He has trained so far over thousand of farmers and private entrepreneurs in vdermicomposting. Several of these people are producing and selling vermicompost in their area.

Shri Jaishankar is presently using water hyacinth (jalkumbhi) and cattle dung as raw material for vermicomposting. He has about 1.25 acres of land on which vermicomposting unit is located. He has received license for vermicompost production and marketing in 2019. Started with 50 kilo per day production of vermicompost in the first year, he has built up the production capacity of 400 quintal per month. His customers include various government agencies and local farmers. He has branded the compost as ‘Pragya Vermicompost’and is sold in 1 kg and 50 kg pack for local buyers and institutional buyers respectively.

On a turnover of about Rs. 15 lakh he earns about Rs. 7-8 lakh per year and has provided employment to 5-6 per persons in his enterprise. He has now built up a agri-input business and a dairy farm with the income generated from vermicomposting enterprise.

Contact

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2. Sajag International, Meerut, Uttar Pradesh

Amit Tyagi, a science graduate (48) took up vermicomposting as an alternative to his sales job in the year 2000 after completing an initial foundation course at 'Rachnatmak Prakoshth' of Shantikunj Haridwar with an initial investment of Rs. 10,000. He established the unit at his 3 acres of land in Kinanagar village, about 6 kilometer away from Meerut town. He also procured earthworms from the 'Rachnatmak Prakoshth' of Shantikunj Haridwar. Starting with production capacity of 3-5 tonne per month and turnover of Rs. 1 lakh in the first year, he worked hard to establish a market net-work for the vermicompost.

Over the time and with his sales skill he has increased his sales to 80-100 tonne per month with a turnover of over Rs 125 lakh,. The enterprise earns about Rs. 30-35 lakh per year. He and his son, an MBA graduate, run the enterprise in a professional manner. His enterprise was registered in 2019. He has built market all over the country. His regular customer include farmers, polyhouses, Agri-input dealers, nurseries, institutes and colleges, housing colonies etc. He sells vermicompost in 1 kg, 2 kg, 5 kg, 10 kg, 20 kg, and 40 kg packs.

He has been quality conscious since beginning. He monitors the quality of his produce through quality test report from government lab and customer feed back. His enterprise has provided employment to about 22 persons. He uses cow dung and rice straw as main raw material for composting. The material is procured through local suppliers, dairy farms or gaushalas.

He has received several awards including from KVIC, IIFSR, Horticulture Department, Agriculture Department etc. for his contribution in the field of vermicomposting. He has trained over 5000 farmers and private entrepreneurs free of cost. Many of them have established and running composting units of their own.

Contact

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3. Hivehoney, Saharanpur, Uttar Pradesh

Hivehoney is owned by Shri Devvrat Sharma, a post graduate (48) took-up vermicomposting as an additional venture alongwith his apiary activity in the year 2000 after completing an orientation in vermicomposting with an initial investment of Rs. 5,000. The vermicomposting unit was put up in about one and half acres of land of his 10 acres farm in Beerakheri village, about 4 kilometers away from Gangoh town in Saharanpur district.

Initially he started the production of 3-5 tonnes compost per month with a turnover of about Rs. 3 lakh per year. The present turnover of the unit is over Rs. 10 lakh. He uses cow dung and agricultural waste from his own cowshed and agricultural farm for production of vermicompost.

The enterprise earns about Rs. 3-5 lakh per year from vermicompost sale. His regular customer include farmers from NCR region whom he supplies in loose as well as in packing of 1 kg and 50 kg. He has his own quality control lab for testing of quality of compost produced at his unit. His unit provides employment to about 5 persons.

He has trained about 2000 farmers and private entrepreneurs free of cost and about two third of them are running own composting units.

Contact

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Conclusion

Vermicomposting can become an effective and viable part of the Solid Waste Management

at national level. It is the most suitable and feasible replacement of chemical fertilizers. Besides helping in keeping environment clean, it has potential to generate employment for 20 million people across the country. It will be greatly helpful in much desired and ambitious ‘Swachh Bharat Mission’.

Compliance with ethical standards Not required.

Conflict of interest The authors declare that they have no conflict of interest.

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