2012 International Conference on Economics, Business and Marketing Management
IPEDR vol.29 (2012) © (2012) IACSIT Press, Singapore

Forming Community Enterprises using Vermicomposting as a tool for Socio-Economic Betterment

Rajanita Das Purkayastha[1+]

[1]Centre for Social Entrepreneurship, Binary University College, Malaysia

Abstract. Vermicomposting has been used as an effective tool for organic waste management in many communities and geographies who are largely agro-based. Lately, this technique has also been extended to many semi-urban and urban areas for better waste management. However, vermicomposting as one of the methods of generating additional source of income, economic empowerment and assuring sustainable livelihood approach along with the already known environmental benefits, has been newly found to be one of the most appropriate and successful models for the rural or not so socio-economically resourceful communities. The actual case study involves one such rural community in south of West Bengal, India, where complex problems of poverty, marganilisation, low hygiene, poor waste management, lack of enterprising skills and corroding social structures and the intention of solving their hardships using a very people centric and participatory approach which is not only environmentally sustainable but also guarantees socio-economic betterment and poverty reduction. There were plans of extending the study to the same and other similar communities with the ultimate formation of a community based enterprise. These enterprises based on vermicomposting and vermiculture operations have been identified as one of the best strategies to tackle some of the inherent problems in marginilised communities as it rightfully uses the 3 Pillars (People, Planet & Profit) of social economy. While a narrowly based economic perspective limits the scope of any development activity, a wider and a wiser developmental initiative renders reverence to a healthy co-existence with nature.

Keywords: vermicomposting, sustainable livelihood, community enterprise, socio-economic betterment.

1. Introduction

Following UNCED directive of Agenda 21, which emphasized the need for ecological and social equity for a sustainable future, the growing concern for environmentally sustainable technologies came to an advent. In view of this, vermicomposting offers immense scope to small and marginal farmers in creating their own organic manurial resources and ways to generate alternative income. “Vermi” stands for earthworms. The entire pile of organic wastes when subjected to decomposition using earthworms generates a resultant product of “vermin compost”. The earthworms consume the soil along with various organic materials which undergoes a series of biochemical changes in their guts and gets transformed into a granular mass. There are certain vivid advantages of adopting the process of vermicomposting over the use of chemical fertilizers. Advantages include:

- Improved physico-chemical and biological properties of soil
- Enhancement of the interfacial surface area for better microbial processing.
- Production of beneficial enzyme biomolecules for improved soil fertility.
- Enrichment of the soil with balanced plant nutrients, vitamins, enzymes and plant growth hormones
- Improved production of fruits and vegetables using the nutrient rich vermin cast.

The multifunctional role of vermicompost is definitely a preferred choice among the land cultivators who want to save the drain of huge amounts of money spent for buying chemical fertilizers. They, unknowingly to a large extent, are additionally welcoming the problem of persistent land pollution and degradation. Concerted efforts of carrying out this endeavour through micro-enterprises not only enables their pre-

+ Corresponding author.
E-mail address: rajanitadas@gmail.com.

dominant form of livelihood to be transformed into sustainable agriculture but also to enables an inter-generational empowerment, including women. The vermicompost micro-enterprises of this kind are instrumental in socio-economic development of rural communities with a sustainable livelihood and ensuring the integrity of soil and natural resources at the same time.

Again, local circumstances and their adaptations directly affect project interventions and livelihood outcomes. Communities and households are complex, and they can respond in surprising ways to interventions (Easterly, 2006; Scott, 1998). The challenge is to assess the likelihood of success of interventions using techniques that takes into account the particulars of the community in which the intervention will be introduced but that do not create prohibitive or intrusive demands for data (Bharwani, 2006; Newton et al., 2006). While the rural agricultural communities suffer from poverty, sometime hardcore, which is much complex in nature and impacts upon their lives directly or indirectly, they also practice improper land use patterns and unsustainable agricultural practices which have a hampering effect on their socio-economic and environmental development. A sustainable livelihood outcome should deliver more benefits by increasing socioeconomic and environmental services, reducing agricultural depletion and pollution as well as decreasing negative impacts on other systems dependant on it. When the community members executive collective effort to solve their problems and create a solution, it is the most successful of all its forms. Most small scale green businesses do not materialize owing to the unavailability of adequate capital along with solidarity on terms. Here comes the need of designing such projects which are low on capital, executing plurality in efforts and extremely fruitful in terms of return on the investment.

2. Materials and Methods

2.1. Site Selection

Site selection is a very important part of the entire study. A representative site where the local community suffers from socio-economic problems due to inadequate livelihood patterns but there are good potential for enhancement and development within the local environment was selected. Agriculture did fairly well in West Bengal, especially southern part, upto the mid-1990s in terms of production. Thereafter, the cost of production went up because of withdrawal of subsidies but the prices of agricultural products did not go up simultaneously. There are indications that for small and marginal farmers land is no longer viable in West Bengal. South Bengal's density of population is very high and that led to fragmentation of holdings. Though the fertility of land is high in this part, because of rise in input costs, peasants just do subsistence farming and do not opt for multiple cropping. It is because of the poor state of affairs in agriculture in this region, out-migration to other Indian States in search of livelihood is gaining momentum, especially among the youth. The farmers do not want their next generations, who have education, to pursue farming because cultivation no longer pays. Again, industrialisation venture of the government, has led to tremendous middle-class pressure and the government has to take care of the multi-class social formation.

2.2. Assessing the socio-economic problems of the community

The rural community in a particular village in the south of West Bengal mainly practice farming and to some animal husbandry to make a living for themselves. However, the present form of livelihood is not enough to make both ends meet. That is the reason that the educated youth of almost every family has migrated to other urban habitats in search of an additional source of income .While these migrants contribute to the population of urban poor in the cities, their female counterparts adhere an aspect of feminization to the concept of poverty in the villages. After a series of discussions with some of the members of the community, mostly women, it was quite evident that the communities were not readily penetrative for any sort of intervention along with the expectation of a blue-print ridden and supply driven exercise that the project would embody. Specifically, the following kind of data was generated:

1. A micro-demographic assessment was performed in order collect the basic informations related to the community in terms of age, gender, individual family income, educational background, skills and training, income and expenditure per family, fixed assets (if any), access to capital etc.
2. The second level of data collection was the surveying on identification of the local resources available to the community. This part of the study was intended to assess the impact of locally

appropriate resources in devising an environmental sustainable technology and the aspect of livelihood enhancement for the target group. The three major elements that were identified were,

a) Firstly, availability of enough of agricultural wastes which are mostly dumped or find their way into the municipal vans.

b) Secondly there are descent numbers of *Eucalyptus* plantations nearby to the agricultural fields. These trees were planted as a part of the social forestry programme in order to reclothe the deduded waste lands. Until recently, it was not known that *Eucalyptus* poses two major environmental problems of affecting the water table due to its extreme hydrological requirements and also the falling leaves of the tree being allelopathic by nature deter the growth of germinating seedlings in the close vicinity.

c) Thirdly, there is also considerable availability of cowdung owing to the presence of cows almost in every household, including the stray ones.

3. The third level of study mainly involved focus group based discussions, counselling sessions, with the women members of each family about gaining their confidence on getting involved into a part time act in additional to their household chores for generating an additional source of income. They needed to be intimated about the potential of vermicomposting and the ease of operating a unit per home basis. They were also made to be aware of the locally available materials in their neighbourhood which were otherwise wasted but could be put to a worthwhile usage.

3. Vermicomposting Test Stages

After performing the initial round of community based study, it was necessary to ascertain the probability of generating the organic manure (vermicast) using all locally identified resources on site as a pilot scheme test. A small amount of all such materials were subjected to the technique of vermicomposting under laboratory based test conditions.

3.1. Waste Composition

The entire waste mixture comprised of *Eucalyptus* leaves (30% by weight of the total mixture), banana leaves, restaurant wastes and cow dung (rest 70% of the waste mixture).A extended inoculant of “Effective Microorganisms” (which is a mixed culture of beneficial and naturally-occurring microorganisms) was sprayed throughout the test stages to enhance the decomposition process.

3.2. Stages of the test

Stage 1: Pre-compost of the waste mixture

In the first stage of the test under laboratory conditions, the entire waste mixture was left to decompose over a period of 3-4 weeks. This was to ensure that the material turns ideal as a worm feed in the second stage of the test.

Fig 1:Pre-composting of the waste mixture over a period of 3-4 weeks days

Stage 2: Bedding preparation and laying worms

Thereafter, the pre-composted material was spread out over a layer of coconut husk and months old garden soil, before introducing the worms, Perionyx sp into the waste pile for setting in the in vivo process. The worms consumed the feed and converted the entire mass of waste into vermin casts.

Fig 2: The decomposed material generated using EM for worm feed

Stage 3: Harvesting and collection of Vermi cast

In the final stage for collection of worms and vermi cast, the pilot test vial was exposed to sunlight for the worms to recede from the generated castings and the facilitate collecting the produce.

Fig 3: Production of Vermi cast at the end of the test

3.3. Scientific Analysis

A series of scientific analysis were performed to estimate the difference in count of physico-chemical parameters before the beginning and the end of the test. The biological parameter, i.e., number of worms, was also calculated to calculate the difference in their number over a period of time.

4. OBTAINED RESULT

Two kinds of data were generated from this particular survey. One is the scientific result on the content and the quality of the organic material generated under pilot test conditions and another is the socio-economic information on the community in terms of their vulnerability, access to assets and the policies, institutions and processes (PIPs) which are affecting their day-to-day lives. Accordingly, the data has been classified into two major groups, scientific and socio-economic.

4.1. Scientific Data Generated

The summary of the scientific analysis (in their standard units) has been mentioned as below:

	Readings		
No.	Parameters	Pre-Compost	Compost
Physical			
1	pH	7.02	7.23
2	Conductivity (mS)	1.483	1.53
3	Temperature (^{o}C)	29	30.5
4	Moisture Content (%)	85.92	33.852
Chemical			
5	Inorganic Nitrogen (N) (%)	0.014	1.042
6	Available Phosphorous (P) (%)	0.000158	0.0000943
7	Total Potassium (K) (%)	0.88	0.6655
8	Organic Carbon (C) (%)	71.4	51.33
Biological			
10	No. Of Worms	62	87

4.2. Socio-Economic Analysis

On the basis of participatory level of interactions with the women community in the village, it was broadly interpreted that there are adequate scopes for enhancing their present form of livelihood, which is mostly agriculture, by forming vermicompost units. They were also convinced that this activity can be best executed through the formation of a community based enterprise in which individual members share profits and risks for operation. Reliable data sources were indicative of the fact that the initial round of seed investment could be recovered within the first financial cycle and the maintenance and operation of the units

is a manageable task which the women are capable of executing in addition to their usual household works. With proper eco-labelling and marketing effort, a continuous cash flow is possible throughout the year.

5. CONCLUSION

Community engaging micro-enterprises based on vermicomposting and vermiculture have been proven to be working successfully once implemented. Such units can be set up in more numbers adapted to local needs and resource bases available to the rural community, in order to ensure sustainability of livelihood. Creating sustainable livelihoods through locally appropriate and environmentally sustainable technologies is one of the most challenging yet best accepted modes of devising development for any underprivileged section of the society. It is extremely people-centric modes of development approaches wherein every member of the community is involved in a participatory level of activity for generating income. A portion of a profit always retraces back into the financial system for sustaining the business unit and the excess is distributed equally among all participants. The small scale, labour intensive projects, controlled by the local community might be a not much sophisticated in terms of technology usage and modernism. However, they employ much simpler and cost effective technologies to engage local communities and are emerging to be less volatile in economic downturns. Such emerging green enterprises hold immense promise for not only reinvigorating distressed local communities but also creating some of the green-collar non-farm based employments on a large scale. It is becoming a worldwide practice to use organic waste for agricultural purposes, because it not only helps reduce the volume of landfilled waste and Green House Gas (GHG) emissions but also provides a valuable agronomic resource. Vermicomposting also helps reduce the problems of chemical fertilizers which are dangerous to soils, crops and even human health. As it is easier to set up a vermicompost unit, more and more agri-based communities need to be involved in such projects which not only would solve the problems of waste management and chemical pollution but also is a source of income for the producers which can be sold after being properly packaged and labelled.

6. References

[1] Bennett, N. “Sustainable Livelihoods from Theory to Conservation Practice: An Extended Annotated Bibliography for Prospective Application of Livelihoods Thinking in Protected Area Community Research”. Protected Area and Poverty Reduction Alliance Working Paper No. 1. Victoria, Canada: MPARG (UVic); PAPR (VIU), 2010.

[2] Bharwani, S. "Understanding Complex Behavior and Decision Making Using Ethnographic Knowledge Elicitation Tools (KnETs)". Social Science Computer Review, 24(1), 78–105, 2006.

[3] Bhimawat B S, Punjabi N K and Singh Karan. “Adoption of vermiculture technology by tribal farmers in Udaipur district of Rajasthan”, International Journal of Rural Studies (IJRS), vol. 15 no. 1, April, 2008.

[4] Das Purkayastha Rajanita. “Studies on Vermicomposting of Restaurant Wastes and Leaves of Eucalyptus (Mysore Gum) with the help of microbes and Indigenous Perionyx sp”, 2009.

[5] Girard Bruce and Siochr O Sean. “Community-based Networks and Innovative Technologies: New models to serve and empower the poor”, A report for the United Nations Development Programme, UNDP, New York, 2005.

[6] Jalil Abdul Md. “Sustainable Development in Malaysia: A Case Study on Household Waste Management”, Journal of Sustainable Development, Vol 3, No 3, September 2010.

[7] Matin Nilufar, Krittasudthacheewa Chayanis, Rosa la de Elnora, Bharwani Sukaina and Benedict- Kemp Eric. "Assessing Water-related Poverty Using the Sustainable Livelihoods Framework", Stockholm Environment Institute, Working Paper, Stockholm, 2009.

[8] Medany Mahmoud and Yahia Elhadi. “Vermiculture in Egypt – Current Development and Future Potential”, FAO, Cairo, Egypt, 2011.

[9] Newton, A. C., Marhsall, E., Schreckenberg, K., Golicher, D. te Velde, D. W., Edouard, F., Erik A, "Use of a Bayesian Belief Network to Predict the Impacts of Commercializing Non-timber Forest Products on Livelihoods". Ecology and Society, 11(2), 24 [online] http://www.ecologyandsociety.org/vol11/iss22/art24, 2006.

[10] Scott, J. C."Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed". New Haven, Connecticut: Yale University Press, 1998.