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Vermicomposting Transformed Farmers Livelihood: A Case Study from the Cold Desert (Ladakh)

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ABSTRACT

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Vermicompost has adequate amount of micronutrient and macronutrients depending on sources of earthworm's feedstock. Earthworm promotes soil fragmentation and increase aeration of soil by volume 8-30 per cent. Vermicompost has at least four times more plant nutrients than conventional cattle dung compost. Vermicomposting is a source of creating self employment and revenue generation. This is an easy and faster process of converting organic matter into compost than other conventional methods. A farmer Shri Lobzang Thardot took skill development training under Vermicompost producer and adopted vermicomposting for his livelihood and started from a very small scale and became a successful producer of quality product. He argued that his product is demanded by nearby farmers, NGO's and government organizations of Ladakh. Moreover, he is encouraging interested farmers to prepare this multifunctional quality product on their own farms so that farming community can be benefitted. He became the role model cum master trainer for entire farming community of Ladakh.

Introduction

Vermicompost is an organic fertilizer obtained from the earthworms by passing out the organic wastes through the digestive systems. The process of preparation of this organic fertilizer may be called as vermicomposting. Earthworm improves and restores soil fertility and boost up crop productivity by the use of their excretory products known as vermicast. 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. Being stable, multifunctional organic manure which enriches the soil quality by improving physio-chemical and biological properties it must be promoted (Datta *et al.*, 2016; Jigmet Yangchan, *et al.*, 2019).

Vermicompost is becoming popular day by day as it provides quality products through major component of organic farming system (Yadav *et al.*, 2013).

Mixture of leguminous and non-leguminous crop residues enriches the quality of Vermicompost. Its moisture content remains in between 45- 65% which is ideal for land applied compost and pH values near neutral due to the production of CO₂ and organic acids. Other by products of microbial activities is also known which promote plant growth, disease antagonists and growth influencing substance like hormones.

Vermicompost is a safe, non-polluting and one of the most economical and convenient way of solving the waste disposal problems and recycling of organic waste. It is an excellent form of natural manure which is cost effective, easy to make, handling and contain high nutrients with growth hormones and are 4-5 times powerful growth promoter than all other organic fertilizers and over 30- 40% higher than the chemical fertilizer (Narkhede *et al.*, 2011; Attarde *et al.*, 2012). Various workers reported that Vermicompost contain 17-36 % Humic acid and 13-30% Fulvic acid of total concentration of organic matter.

Besides, Vermicompost has an adequate amount of micronutrient and macronutrients depend on sources of feedstock. Earthworms and vermi-compost can promote growth 50-100 per cent than compost and 30-40 per cent over chemical fertilizers (Sinha *et al.*, 2010). Keeping in view the above facts and properties of vermicompost Lobzang Thardot from Ayee Kubed Nubra, Leh one of the progressive farmer started his unit in Nubra after getting this one month skill development training on Vermicompost producers he transformed his life and livelihood, beside that he generated employment for numerous agro farmers of nearby area. Now, he became a role model / master trainer of Nubra village among farmers community.

Case Description

Success story of Lobzang Thardot S/o Padma Rinchen, born in 1972 and completed his education up to Matric, is resident of Ayee village under Sumor Tehsil block Panamik Nubra of Leh district

in Jammu & Kashmir, India. He opted the Agriculture occupation for his livelihood since 40 year. He came in contact with High Mountain Arid Agriculture Research Institute (HMAARI), SKUAST-K Leh in the year 2019 during Skill development programme of vermicompost. Till then he had been cultivating traditional crops of wheat, barley and some vegetable on a usual pattern and applied chemical fertilizer. After coming in contact with HMAARI scientists he took one month skill development training programme in Vermicompost producers and now started his own vermicompost unit at large scale on scientific basis.

Materials and Methods

After getting proper skill training on Vermicompost for a month in HMAARI SKUAST-K Leh, he was eager to do start up. So, under NABARD project on Dissemination of Vermicompost technology in Ladakh region he got opportunity to do his start up business with 2 bags of plastic vermibed and worms, His first emphasis and challenges was to make survive the worms in winter and get proper decomposed manure. Today with the help of that training and NABARD support he was succeeded to achieve his challenges and during this training he got benefit to make good linkages with other department also. Agriculture department gave three unit of large size cemented structure of 30 x 8ft sizes for Vermicompost production after seeing his enthusiasm on subsidy based. He played a role model for entire village and for Nubra region. Due to his Vermicompost unit, he is receiving more demand of Vermicompost manure not only from line departments but also from farmers and hotel owners. Within three cemented structure and two bag he earned Rs 94500/ and Rs 31500 from Vermicompost bag= in four months he harvest twice in year.

After getting training and vermibags from HMAARI SKUAST-K Leh he earned around Rs 252000/=per year. Now he spread his business to large scale and Dr Jigmet Yangchan not only trainings, and input for start-up but today she provide platform to this farmer with market linkage.

He is having his own agriculture land and a dairy farm with 10 cattle. He is also interested in raising crops in an organic way after successful capacity building through this training programme.

Ayee village soil is not so good because of salinity and hard crust and he is very satisfied with this technology because he is not only securing his livelihood but also sets an example for coming generation as well as for farmers community of Ayee. Through this training he got various training on different cash crop cultivation through Vermicompost manure.

He developed his farm by knowing organic farming through vermicompost in watermelon production, cucumber, mulching technology branjal, cucumber etc for army supply. Today he has become a role model cum master trainer in Ayee village as well as entire Nubra region in the field of Agriculture. Beside that he received Award from Progressive farmer Award by KVK SKUAST-K Leh during Kissan Mela 2022.

Results and Discussion

Under Ladakh condition when temperature variation is too high from -30°C to $+32^{\circ}\text{C}$ then epizoic species such as *Eisenia foetida* (Red earthworm) perform best for this region. As the mortality rate is too low during harsh winter. Rate of multiplication is 4-5 worms from each cocoon.

During summer season the rate of multiplication is too fast than winter season. It's taken normally three and half month in summer season and during winter around eight nine months for proper decomposition. Once it decomposed it perform best at field crop because Ladakh is already having low organic carbon and its boost the quality and fertility of the soil.

Data collected from farmer's field and its statistics is depicted in (Table 1) which clearly indicated that benefit and cost ratio is 1:2.2 which is profitable enough for farmers (Fig. 1-4). The success of any

production system basically depend on need, availability of inputs and marketing channels by which one can get the 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. The study on economics of vermicompost production indicated that it is 50-57% economical enterprise as compared to costly chemical fertilizers. Direct marketing of vermicompost from producer to consumer was found to be strongest marketing channel, however marketing through cooperatives and trader was also found in few instances. Economics of vermicompost production was carried out in Coorg district of southern Karnataka, India to compare benefit cost ratio and observed 1.78 and 1.52 for wet method and heap method, respectively (Reddy *et al.*, 2009).

Specialized market for vermicompost was not observed in the study area but obvious that about 85 % Vermicompost was marketed directly from producers to local consumers. 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 (Ranaivoarisoa *et al.*, 2016).

By this case study it can be concluded that farmers like Mr. Lobzang Thardot adopted vermicompost production, enhanced his livelihood status, improved soil health and conserved beneficial soil micro-organisms. He argued himself by his quality product which is demanded by nearby farmers, NGO's and government organizations of Ladakh. Moreover, he is encouraging interested farmers to prepare this multifunctional quality product on their own farms so that farming community can be benefitted. Data collected from farmer's field indicated that benefit and cost ratio (1:2.2) is significantly higher and can boost-up Ladakh economy which is today's essential need.

Table.1 Cost: Benefit ratio of Vermicompost

Cost of Vermicompost production per bag in 4 month (Rs.	Gross Income(Rs)	Net Income(Rs) Per bag	B.C. Ratio	Total 3 unit cement structure 30x 8ft produces 900kg/unit, 2 unit of vermin bag(4'x4'x2') produces 450kg/unit ,total compost produced-3600kg, sale of vermicompost@35/Kg
126000	22500	103500	1:2.2	

Fig.1



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