



VERMI COMPOSTING: A ‘DO ECOLOGY’ APPROACH: THE SUCCESS OF A ‘FARMER INTEREST GROUP’

Dr. Parveen Kumar*; Dr. Kunzang Lamo**; Dr. D. Namgyal**; Sonam Angchuk***

*Scientist (Ag. Extension and Vegetable Science), KVK-Leh

** Prof. & Head, KVK-Leh

*** Programme Assistant, KVK-Leh

Corresponding Author: pkumar6674@gmail.com

ABSTRACT: *The present research article is the success story of a Farmer Interest Group (FIG) of vermi compost from Sushoot village in district Leh of Union territory of Ladakh. A group of eight farmers four male and four female has been successfully turning all their farm waste into farm wealth making a case of sustainable agriculture. The group is growing wheat and vegetables using the vermi compost produced by recycling of waste. This has also reduced their cost of cultivation of wheat by rupees 3328 per hectare as the group does not need to spend amount on chemical fertilizers. Some members of the group are also selling this vermi compost thereby augmenting their income.*

Keywords: *Vermi compost, Farmer Interest group, sustainable*

Introduction:

Agriculture sector all across the globe is witnessing a paradigm shift from the chemical intensive agriculture to a sustainable one. Brundtland commission defines sustainable development as ‘development that meets the needs of the present without compromising the ability of future generations to meet their own needs’ (Brundtland report, 1987). The chemical intensive agriculture has no doubt made us self sufficient in food grains production; but this self sufficiency has been attained at the cost of an emerging ecological catastrophe. This calls for practices and approaches which do not pose a threat to the life on this planet and do not disturb the already fragile ecosystem. The living legend of Indian agriculture M.S. Swaminathan has advocated for a ‘Do Ecology Approach’ Referring to the incidences of life threatening pollution in National Capital Region of Delhi being attributed to stubble burning by farmers in Punjab and Haryana; he has asked to stop blaming farmers and instead advocated for methods which are economically and ecologically desirable. This he calls a ‘Do Ecology Approach’. A ‘Do Ecology Approach’ is based on recycling. For Swaminathan, M. S., The rice stubble burning can be



avoided if farmers are motivated to convert rice stubble into products including paper, cardboard and animal feed. This will increase their income rather than becoming agents of eco-disaster.

Vermi composting is another 'Do Ecology Approach' based on the principles of recycling. It costs nothing. The farm waste is used to create farm wealth. Animal dung, litter, leaves, kitchen waste, paper, cotton all can be converted to nutrient rich composition that when applied to fields increase yield, improves soil fertility and maintains soil health. This nutrient rich composition is called compost and when earth worms are used to make this, it is called as vermi compost. The worms are fed items like household kitchen scraps, animal dung, leaves, litter which they digest to create castings that are used for a variety of applications.

Benefits of Vermi composting:

This process has multiple benefits. Besides housing beneficial microorganisms, worm castings protect the plants. Root diseases are reduced due to the diversity of organisms present none of them becomes populous enough to cause damage. Vermi composting is less labour-intensive than traditional composting. Here instead of natural decomposition the worms do most of the job. Adding worms also improves soil structure. Due to the slime produced by worm bodies, nutrients stay in soil even after a good rain. Worm castings hold beneficial microorganisms longer than the traditional compost. Worms can eat up to half of their body weight per day and under optimal conditions reproduce quickly, making vermi culture a self-sustaining business. One worm can produce at least four worms.



Fig.1: Farmer Interest Group (Vermi Compost)



Fig. 2: vermi compost produced by a farmwoman



Fig. 3: Recycling dried leaves for vermi compost production



Nutrient composition:

The nutrient composition of vermi compost in relation to different manures is as:

Table 1: Nutrient composition of different manures Vermi compost

S. No	Nutrient (%)	Vermi compost	FYM	Bacterial compost
1	Nitrogen	2.1-2.6	1.1-1.5	1.2-1.5
2	Phosphorous	1.5-1.7	0.7-0.8	0.7-0.9
3	Potassium	1.4-1.6	0.6-0.7	0.6-0.7

(Rana, S.S)

Besides these three macro nutrients, it also contains micro nutrients like Calcium, Magnesium, Manganese, Iron and Zinc in varying quantities. Vermi compost is also rich in various microbes, enzymes and growth hormones

Initiative by KVK-Leh:

The Krishi Vigyan Kendra Leh under the administrative control of Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir took the lead in empowering women through this enterprise. As Leh consists mostly of peoples religiously affiliated to Buddhism and Islam there was an initial reluctance by them to take on this enterprise. But later on as a result of the motivation and awareness regarding its health and economical benefits they agreed to take on this. Krishi Vigyan Kendra-Leh has established about 135 vermi compost units in different villages under its jurisdiction in different villages of Leh district.

Vermi beds:

The readymade plastic vermi bed have dimension of 4*4*2 feet in dimension were provided to the farmers. These are mobile in nature, easy to use and handle and can be kept on the ground with the support of wooden pegs on its corners. In this plastic bed they have to only dump their animal dung, leaves and other rotten vegetation and other waste and keep it moist. Efficient worms (*Eisenia Fetida*) were also provided to them.



The worm (*Eisenia Foetida*):

Belonging to phylum Annelida and in the order Haplotaxida these are native to Europe, but have been introduced (both intentionally and unintentionally) to every other continent except Antarctica. It is known under various common names such as red worm, brandling worm, trout worm, tiger worm, red wiggler worm etc. This organism is a species of earthworm adapted to decaying organic material. These worms thrive in rotting vegetation, compost, and manure. They are epigeal living on or near the surface of earth. *Eisenia fetida* worms are used for vermi composting of both domestic and industrial organic waste.

The success of a Farmer Interest Group (FIG):

Krishi Vigyan Kendra-Leh formed a Commodity Interest Group of vermi compost producers in village Sushoot of district Leh. This group has eight members, four male and four female. This group was provided with vermi beds and necessary training and skills for making vermi compost. Permanent vermi beds were also constructed by KVK-Leh for two farmers. All of them have small size of land holding. Besides wheat and fodder all of them grew some vegetables. They had to spend a lot on the chemical inputs and the yields were not much. After the training, they started collecting all their cow dung and other kitchen waste in this vermi bed. The two feet deep vermi bed was initially filled up to one feet. It was covered and kept moist. The worms (1 Kilogram per bed) put in the vermi bed started multiplying and soon were on their job. One worm could produce four more. Soon the vermi bed was full of worms. After three to four months the vermi compost was ready and fit to use in their fields. The group produced about 40 quintals of vermi compost. Some of the members have sold vermi compost in the market at a rate of rupees 30 per kilogram. It thus means that group produced vermi compost worth rupees 1, 20, 000 with zero investment and by using farm and kitchen waste which otherwise had polluted the atmosphere.

Area under kitchen garden: This vermi compost has been used to grow vegetables on an area of 0.25 ha) by the group. The group members are now happy that they have not to spend on chemical fertilizers. Although there has been no marked increase in yield but they perceive that the soil health has also improved. All of them feel proud for they are contributing towards making Ladakh an organic region.

Area under Wheat: On an area of 0.5 hectare, wheat crop is raised by using this vermi compost. The group is now quiet relieved that they now do not have to spend money on costly chemical fertilizers. This has reduced their cost of cultivation by about 15 per cent.



Table 2: Vermi compost: production and area

Vermi compost(Qtls.)	Cost of Vermi compost (@ 3000/ Qtls.)	Area under vermi compost (in kanals)			
		Wheat	Veg.	Others	Total
40	1,20,000	10	05	-	15

Table 3: Equivalent of fertilizer saved and reduction in cost of cultivation in wheat crop

Total area under vermi composting (ha)	Fertilizer equivalent not used (kg)			Cost of fertilizer (Rs)				Reduction in cost of cultivation/ha (Rs)
	Urea@100kg/ha	DAP @90 kg/ha	MOP @33 kg/ha	Urea@ 5.90/kg	DAP@ 24/kg	MOP@ 18.90/kg	Total	
0.50	50	45	17	295	1080	289	1664	3,328

Rate of Urea @ Rs. 266.50 per 45 kilo gram, DAP @Rs. 1200 per 50 kilo gram and MOP @ Rs. 945 per 50 kilogram (as per govt. subsidized rates)

Table 4: Turnover rate of FYM into vermi compost

Kitchen, Farm and animal waste used (in qtls.)	Vermi compost produced	Turnover (rate %)
55	35	63.6

The data in the table 2 shows the amount of vermi compost produced and the money saved through the application of this vermi compost if synthetic fertilizers like Urea, DAP and MOP would have been used. The recommended rate of vermi compost to the field crops is 5 tons/ha i.e about 2.5 qtls/kanal. By using 25 qtls of vermi compost in a half hectare of wheat crop, the group saved rupees 1664 which otherwise would have been used for chemical fertilizers. This thus means the group reduced his cost of cultivation of wheat by about rupees 3,328 per hectare by simply recycling the kitchen farm and animal waste.



Overall impact of the technology:

The vermi beds (4*2*2 feet) provided to 135 No's of farmers in different villages of Leh district by KVK-Leh under its various schemes has brought a considerable area in this district under organic cultivation. Crops including vegetables and Cereals like wheat and Barley are grown on about 35 hectares of land by the farmers using the vermi compost. The household waste is now being properly recycled through vermi composting. The cost of cultivation has also been reduced by about 15-20 percent as the farmers do not have to spend on chemical fertilizers. An increase in the yield has also been reported. Many farmers are also selling the vermi compost at a price of rupees 25 to 30 per kilogram thereby augmenting. As a result of the initiative by KVK-Leh many hectares of land is under organic cultivation and the produce is also organic one. Vermicompost has also made farming more remunerative for them as it has considerably reduced their cost of cultivation and increased the yields. This is serving dual purpose. It helps realizing the government's ambitious goal of doubling farm income by 2022 and making Ladakh an organic region.

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