

WEED UTILIZATION FOR VERMICOMPOSTING - SUCCESS STORY



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**National Research Center for
Weed Science**

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WEED UTILIZATION FOR VERMICOMPOSTING

- SUCCESS STORY

Introduction

Of late, much emphasis has been paid globally on organic farming with large-scale use of organic manures and bio-fertilizers. Acute shortage of conventional organic manures like animal dung also necessitates the exploitation of other sources of organic manures.

Weed biomass is one of the easily available sources of organic matter and plant nutrients, which hitherto, have not received required attention. The favourable climatic condition of the North Eastern region in general and Assam in particular leads to the production of huge weed biomass of diverse species composition both in cropped and non-cropped areas. The biomass production in weeds roughly ranges from 5-20 t/ha depending upon the weed species, season and growing conditions.

The protocol for production of vermicompost from weed biomass has been developed at AICRP-WC Centre of AAU, Jorhat with generous funds given by the ICAR. Seven native earthworm species have been identified for efficient vermicomposting. The earthworms are multiplied and provided to farmers in the entire NE region for producing vermicompost. Until now 25,000 earthworms have been provided to the farmers and other clients.



Vermicomposting in process

Potential biomass as culture material production of some weeds

Name of Weeds	Biomass per year (t/ha)
<i>Ipomea carnea</i>	15-20
<i>Eichhornia crassipes</i>	6-8
<i>Mikania micrantha</i>	8-10
<i>Cassia occidentalis</i>	5-8
<i>Cassia tora</i>	6-8
<i>Mimosa invisa</i>	10-12
<i>Lantana camara</i>	10-12
<i>Chromolaena odorata</i>	10-12
<i>Ageraum conyzoides</i>	5-6
Mixed weed biomass	3-5



Ageraum conyzoides



Cassia tora



Lantana camara



Mikania micrantha

Production Technology

Raw materials required

Cowdung and any other biodegradable wastes such as crop residues, weed biomass, vegetable wastes, leaf litter, hotel refuse, wastes from the agro-industries, bio-degradable portion of urban and rural wastes etc. may be used for the preparation of vermicompost.

Earthworm species suitable for vermicompost production

Anyone of the following earthworm species may be used for preparation of vermicompost :

- *Eisenia foetida*
- *Amyntas diffringens*
- *Eudrilus eugeniae*
- *Perionyx excavatus*



Efficient earthworm species used for Vermicoposting

Methods of Preparation

- The compost can be prepared in concrete tank. Ideally a tank with breadth 3 ft. and height 1.5-2.0 ft. of appropriate length (depending upon the availability of raw materials). Could be used Suitable plastic tub/basin/structure may also be used.
- Collect and heap the weed biomass under sun for about 7-10 days. Chop the biomass required.
- Sprinkle cowdung slurry on the heap
- Place a thin layer of surface soil/sand (1-2 inch) at the bottom of the tank.
- Place fine bedding material such as partially decomposed cowdung/dried leaves etc. over the soil or sand layer
- Place the chopped bio-waste and partially decomposed cowdung layer-wise in the tank upto a depth of 1.5-2.0 ft. The bio waste : cowdung ratio should be 60:40 on dry weight basis.
- Release about 2-3 kg earthworms of any of the above earthworm species over the mixture.
- Cover the compost mixture with dry straw or thatch or hessian cloth.
- Sprinkle water as and when necessary to maintain 70-80% moisture content.
- Provide shade over the compost mixture to protect from rain water and direct sunshine.
- Stop sprinkling of water when 80-98% bio wastes is decomposed. Maturity could be judged visually by observing the formation of granular structure of the compost at the surface of the tank..
- Collect the vermicompost by scrapping layer-wise from the top of the tank and keep it under shade.



Screening of earthworm species

Separation of earthworm and cocoon :

- Heap the harvested vermicompost for 6-12 hrs under shade for separation of the earthworm.
- Seville vermicompost for separation of baby earthworm and cocoons.
- Dry vermicompost (if necessary) under shade to keep the moisture content below 20 per cent.
- Separate earthworms and cocoons for reuse.



Protection from enemies :

- Bio-wastes free from ants/termites, etc. are to be used for vermicompost preparation
- Liquid paraffin or burnt mobile could be used (if necessary) on the brim of the tank.

The vermicompost thus prepared would normally have the nutrients of following concentrations :

Nutrients		In Percent
Nitrogen	:	1.5 – 2.5
Phosphorus	:	1.2 – 1.8
Potash	:	1.5 – 2.4
Calcium	:	0.5 – 1.0
Magnesium	:	0.2 – 0.3
Sulphur	:	0.4 – 0.5
Iron	:	0.8 – 1.5
Copper (ppm)	:	22 - 36
Zinc	:	500-1000 ppm
Maganese	:	1000-2000 ppm

Comparative nutrient contents of different organic manures

Manure	Nutrient content (%)		
	N	P	K
Vermicompost	1.5 – 2.5	1.2 - 1.8	1.5 – 2.4
FYM	0.45 – 0.80	0.20 – 0.40	0.50 – 0.70
Rural compost	0.50	0.15	0.50
Urban compost	1.40	1.00	1.40
Pig dung	0.60	0.50	0.40
Bio-gas slurry	1.50 – 2.25	0.90 – 1.20	0.80 – 1.20
Cowdung	0.40	0.20	0.10
Mustard cake	5.2	1.80	1.20
Neem cake	5.2	1.00	1.40

Advantages of Vermicompost

1. Vermicompost is rich in plant nutrients, provides the entire essential nutrient element.
2. Provides excellent effect on overall plant growth, encourages new shoots/ leaves and improves the quality an self life of the produce.

3. Vermicompost is free flowing, easy to handle store and apply and does not have bad odour.
4. Improves soil structure, texture, aeration, water holding capacity and prevents soil erosion.
5. Vermicompost is rich in beneficial micro-flora such as N-fixers, P-solubilizers, cellulose decomposing micro-flora etc.
6. Vermicompost is rich in several enzymes and growth regulators such as auxins, gibberellins etc.
7. Vermicompost contains earthworm cocoons and increases the population and activity of earthworm in soil.
8. Soil pH is neutralized by the buffering action of vermicompost.
9. Prevents nutrient losses and increase the use efficiency of chemical fertilizers.
10. Vermicompost is free from pathogens, toxic elements, weed seeds etc.
11. Availability of nutrients from vermicompost is faster due to its narrow C:N ratio
12. Vermicompost minimizes the incidences of pests and diseases in crop.
13. Vermicompost enhances the decomposition of organic matter in soil.



25% N substitution through Vermicompost (*E. crassines*)



25% N substitution through Vermicompost (*L. camra*)

Technology transfer

The technology of production of vermicompost from weed biomass is being provided to the farmers/farm women/educated youth of the region in general and Assam in particular by providing on-station and on-farm training and demonstrations.



More than 2,500 farmers/farm women/educated youth have received training so far. The advisory service is also being provided to the tea growers of the state, scientists and officers from different Government and non-Government Organization like Rain Forest Research Institute, Central

Silk Board, Tea Experimental Station, Tocklai, ICAR Research Complex Nagaland, etc. Besides, a number of trainings are also being organized in collaboration with DRDA, District Administration and Deptt. of Agriculture, Govt. of Assam and other organizations for the benefit of rural educated youth.

Experiences for last few years showed that there is vast potentiality that there is vast potentiality of utilizing weed biomass for production of vermicompost in the region. The vermicompost produced from such biomass contains relatively higher amount of plant



nutrients compared to other conventional sources of organic manures. Further, the time taken for production of vermicompost is only 1.5-2 months compared to 8-12 months required with other methods of composting. Vermicompost is also odour less, friable and easy to apply. Due to narrow C:N ratio (9:1 to 12:1), the compost can also be applied to the standing crop.

Training imparted

	No. of beneficiaries	Target group
Training on vermicompost	2500	Farmers/Farm Women/ Educated youth/ Govt. & Non-Govt. Organization/Tea Estates
Demonstration	10	In different parts of the State
Advisory Service	95	Tea Estates/Officers from Deptt. of Agriculture / Sericulture / Central Govt. Organizations / Sr. Bank Officials/ Tea Garden, etc.

Technology adoption

The technology of vermicompost production from weed biomass has been well accepted by the farming community and already small units of vermicompost production have become popular in different parts of the State.

The commercial aspect of producing vermicompost from weed biomass shows greater promise. Already eleven educated youth of the State have started commercial production of vermicompost. Vermicompost thus produced has good demand particularly among tea planters, vegetable growers and city dwellers. Further a few tea estates have also started large scale production of vermicompost with the technology received from AICRP-WC AAU Jorhat Centre.

Commercial production of Vermicompost :

A number of educated youth of the State have started production of Vermicompost on commercial scale. The technical guidance as well as the earthworm culture was provided by the University. The names and addresses of



some of the youths who are involved in commercial production of vermicompost are given below:-

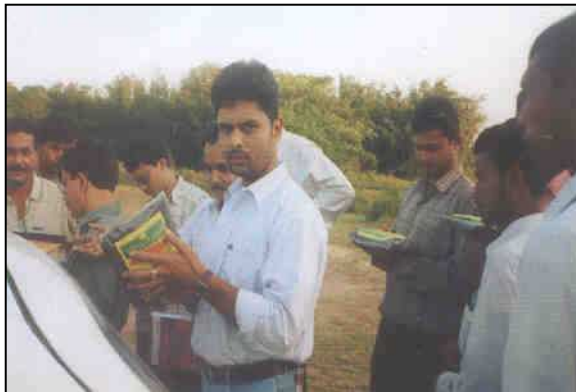
Name & Address	Educational Qualification	Production capacity (per year)
Sh. Narendra Kundalia Jorhat, Assam	B. Com.	200 t
Sh. Nabajuoti Rajkhowa Lokhowjan tini Ali, Bokakhat	B.Sc.	200 t
Sh. Ghanshyam Upadhyay Rowta, Mangaldai	B.A.	50 t
Sh. Hiren Sarma, Rowta Mangaldoi	B.A.	50 t
Sh. Dipak Modi Jorhat, Assam	B.B.A.	50 t
Sh,. Bubul Buragohain Golaghat, Assam	B.Sc.	200 t
Sh. Sanjib K. Gogoi Charing Baruwati Gaon Charing, Sivsagar	B.A.	50 t
Sh. Polash Bora Bor Samua Gaon, Pub Charigaon, Jorhat	B.A.	50 t
Sh. Deboraj Bordoloi, Duliajan	HSSLC	50 t
Sh. Subrata Bhowmic, Agartala, Tripura	B. Com.	200 t
Sh. Phanindra Pathak Nagaon	HSSLC	200 t

Besides a number of farmers have started producing vermicompost on small scale.

Future Needs :

The technology of utilizing weed biomass for production of Vermicompost needs to be popularized among the farming

community of the State. For this purpose, extensive training is required to be provided to the farming community of the entire State. Establishment of a demonstration unit in every district/ sub divisions of the State will definitely help in popularizing the technology among the farmers.



View of some of the commercial Vermicompost production units



View of some of the commercial Vermicompost production units