VIVEKANANDA GLOBAL UNIVERSITY, JAIPUR

DEPARTMENT OF AGRICULTURE

Experiment Learning Unit Report
Vermicompost
B.Sc. (Hons.) Agriculture 2024-25

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Introduction

Student's READY Programme & Experiential Learning in Agriculture

Student's READY (Rural Entrepreneurship Awareness Development Yojana) programme was launched by the Honourable Prime Minister on 25 July 2015. This programme consists of five major components designed to equip agriculture graduates with knowledge, skills, and experience:

1. Experiential Learning on Business Model / Hands-on Training
2. Experiential Learning on Skill Development
3. Rural Awareness Works Experience
4. Internship / In-Plant Training / Industrial Attachment
5. Student Projects

Experiential Learning Programme (ELP) Sanctioned by ICAR during the XII plan, ELP aims to develop competence, capacity building, skills, expertise, and confidence among agriculture graduates. Offered in the final year of the degree program, it follows the principles of "Learning by Doing" and "Seeing is Believing," fostering self-employment and entrepreneurship.

Objectives of ELP:

i. Provide practical exposure to real-life agricultural settings.
ii. Develop entrepreneurial skills in agriculture and allied sectors.
iii. Enhance decision-making abilities through hands-on experience.
iv. Promote self-employment and sustainable agricultural practices.

Experiential Learning with a business model helps students gain practical knowledge and understand business operations. After three years of theoretical and practical learning, students can apply their knowledge to business models and adopt the "Earn While You Learn" concept.

Vermicomposting: An Overview Vermicomposting is an eco-friendly method of transforming organic matter of plant and animal origin into nutrient-rich compost through earthworms. Earthworms consume biodegradable matter and excrete nutrient-dense vermi-castings. This organic manure improves soil structure, enhances soil fertility, and supports sustainable agriculture.

Products & Applications:

i. Provides essential nutrients and growth-enhancing hormones for plants.
ii. Improves soil structure, enhancing water and nutrient retention.
iii. Boosts plant productivity and crop quality.

Vermicompost contains significantly higher macro and micronutrient levels compared to conventional compost. It matures within 45-60 days, with 5-6 production cycles possible annually.

Planning & Implementation

1. **Guidance:** Lectures provided foundational knowledge and strategies for implementation. The marketing aspect was emphasized to anticipate challenges and solutions.
2. **Surveys & Understanding:**
   i. Assess awareness and knowledge of vermicomposting.
   ii. Identify implementation challenges.
   iii. Evaluate economic and environmental impact.
   iv. Gather feedback from farmers, gardeners, and households.

3. **Implementation Steps:**

Site Selection: Choose a shaded, ventilated area protected from direct sunlight and rain.

A. **Materials Required:**

i. Earthworms (Eisenia fetida or Lumbricus rubellus)
ii. Composting bins
iii. Bedding material (shredded newspaper, dry leaves, coconut husk)
iv. Organic waste (vegetable peels, fruit scraps, garden waste)
v. Water spray for moisture control

B. **Setup & Maintenance:**

i. Prepare bins with aeration holes.
ii. Add 3-4 inches of bedding material and dampen with water.
iii. Introduce earthworms (500 per square foot).
iv. Bury food waste under bedding to prevent odors.
v. Maintain moisture and aeration through regular monitoring.

C. **Harvesting:**

i. Compost matures in 2-3 months, appearing dark and granular.
ii. To separate worms, move compost to one side and introduce fresh bedding and food waste.
iii. After two days, sift and collect the finished vermicompost.

Nutrient Profile of Vermicompost:

Nutrient	Nutrient Content in Vermicompost (%)
Nitrogen (N)	1.6 %
Phosphorus (PO)	0.7 %
Potassium (KO)	0.8 %
Calcium (Ca)	0.5 %
Magnesium (Mg)	0.2 %
Manganese (Mn)	96.5 ppm
Iron (Fe)	175 ppm
Zinc (Zn)	24.5 ppm
Copper (Cu)	5.0 ppm
C: N Ratio	15.5

Required Materials:

i. Water, cow dung, thatch roof, soil or sand, gunny bags, earthworms
ii. Weed biomass, composting bins, biodegradable waste

Vermicomposting Process:

i. Choose bed or pit method (bed method is preferred for better aeration).
ii. Mix cow dung with dried leaves (3:1 ratio) and pre-decompose for 15-20 days.
iii. Prepare beds of 6x2x2 feet with a 15-20 cm bedding layer.
iv. Introduce 1500-2000 earthworms per bed.
v. Maintain moisture with daily water sprinkling and cover with gunny bags.
vi. Turn the compost after 30 days to enhance decomposition.
vii. Harvest mature compost after 45-50 days.

Market Potential Vermicompost is gaining popularity as a sustainable alternative to chemical fertilizers. It is widely used for crops, plantations, home gardens, and organic farming. Government agencies and NGOs promote its use through awareness campaigns. While demand has declined recently, its benefits continue to make it a valuable agricultural input.

Extension Activities & Awareness Programs

i. Increase farmer productivity by supplying high-quality inputs.
ii. Educate farmers on balanced and efficient fertilizer use.
iii. Offer free advisory services from sowing to harvesting.
iv. Utilize IT tools for real-time agricultural information.
v. Promote government agricultural networks like Kisan Call Centres.
vi. Facilitate collaboration between farmers, government agencies, and agribusiness companies.
vii. Conduct farmer training programs on agrochemical usage.
viii. Develop trained professionals to support the agricultural extension system.

Strengths, Weaknesses, Opportunities, & Threats (SWOT Analysis)

Strengths:

i. Improves soil fertility, structure, aeration, and water retention.
ii. Low-cost, easily adoptable technology.
iii. Enhances crop value and international market demand.
iv. Media campaigns raising awareness of organic farming.

Opportunities:

i. Growing consumer preference for organic food.
ii. Large quantities of biodegradable waste available for composting.
iii. Government support for organic farming initiatives.
iv. Low competition in vermicompost production.

Weaknesses:

i. Higher initial production costs.
ii. Limited awareness among farmers and consumers.
iii. Longer production cycles due to natural decomposition.

Threats:

i. Misinformation and negative perception due to low-quality producers.
ii. Widespread preference for chemical fertilizers.
iii. Dominance of large chemical fertilizer companies discouraging organic alternatives.

Multiplication of Worms in Large Scale

Prepare a mixture of cow dung and dried leaves in 1:1 proportion. Relase earthworm 50 numbers/10 kg. Of mixture and mix dried grass/leaves or husk and keep it in shade. Sprinkle water over it time to time to maintain moisture level. By this process, earthworms multiply 300 times within one to two months. These earthworms can be used to prepare Vermicompost.

Advantages of Vermicomposting

i. Vermicompost is an ecofriendly natural fertilizer prepared from biodegradable organic wastes and is free from chemical inputs.
ii. It does not have any adverse effect on soil, plant and environment. +
iii. It improves soil aeration, texture and tilth thereby reducing soil compaction.
iv. It improves water retention capacity of soil because of its high organic matter content.
v. It promotes better root growth and nutrient absorption.
vi. It improves nutrient status of soil-both macro-nutrients and micro-nutrients.

Precautions

i. Vermicompost pit should be protected from direct sun light.
ii. To maintain moisture level, spray water on the pit as an when required.
iii. Protect the worms from ant, rat and bird

Conclusion Vermicomposting is a sustainable and environmentally friendly solution to enhance soil fertility, reduce dependency on chemical fertilizers, and promote organic farming. With proper awareness, training, and government support, it can become a valuable tool for improving agricultural productivity and sustainability. The integration of vermicomposting into Experiential Learning Programs further equips students with practical skills, fostering entrepreneurship and self-employment in agriculture.

Vermicompost Unit

Fig. 1 Establishment of Vermicompost Beds

Fig. 2 Filling of Vermicompost Bed

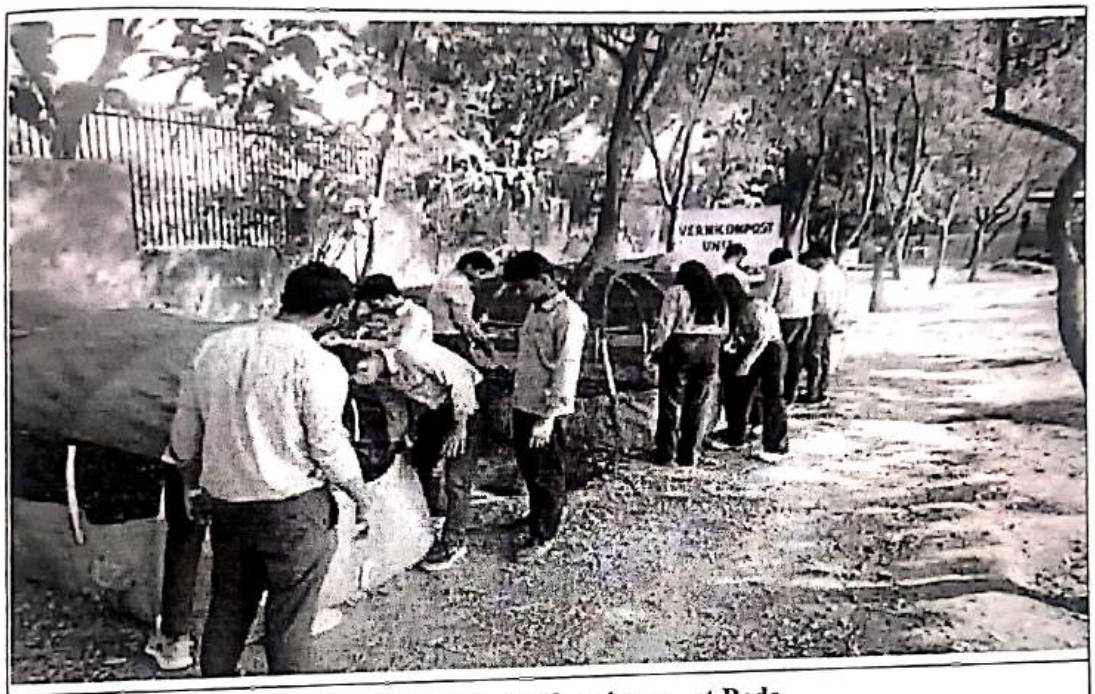

Fig. 3 Shading on Vermicompost Beds

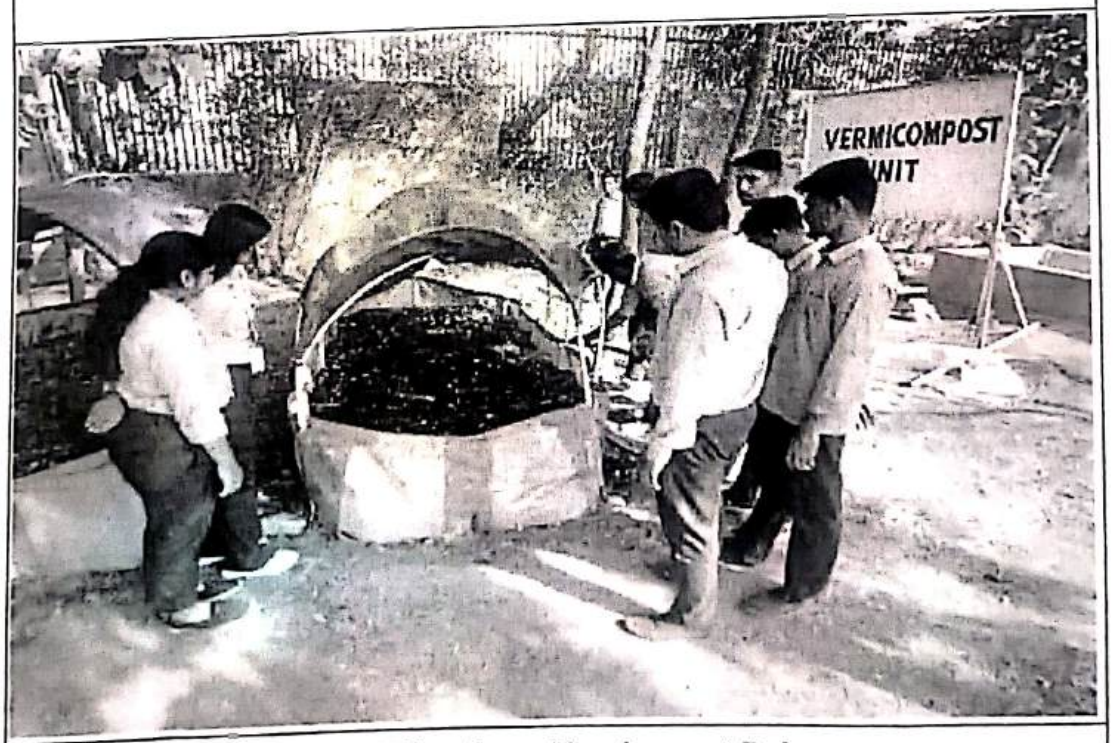

Fig. 3 Watering on Vermicompost Beds

Production Details

During the 2023–24 session, various crops and plants were cultivated in our vermicompost unit with the participation of our students. In this unit, students gained hands-on experience in vermicompost preparation. Through practical learning, they acquired knowledge about vermicompost production, sales, income generation, and cost-benefit analysis.

There are some enlisted details of components in table which are using prepration of vermicompost during this session:

S. No.	Components	Quantity	Rate (Rs.)	Cost (Rs.)
1.	Cow Dung	3.65 tonnes	3800	3800
2.	Earth Worms	22 kg.	6600	6600
3.	Plastic Bags	2 kg	400	400
4.	Labour	5 Peoples	1600	1600
5.	Grass, Plants leaves	200 kg	--	--
6.	Miscellaneous items (gunny bags, packing materials, etc.)			1100
7.	Others			900
	Total Cost			**14400/-**
	Gross Return			**36850/-**
	Net Return			**22450/-**

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Sellout of Vermicompost:

Total Vermicompost was prepared- 3685 kg.

Vermicompost Selling price was Rs. – 08 per kg.

Total Vermicompost sell price: Total production of vermicompost × Price rate per kg of vermicompost

= **3685** × 10 = 36850/-

Benefit Cost Ratio: $= \frac{\text{Net Return}}{\text{Total Cost}}$

$$\frac{22450}{14400} = \mathbf{1.5}$$

Amount of profit is equally distributed to the following students:

S. No.	Full Name	Registration Number
1.	AARTI KUMARI	21AGR2AG001
2.	ABHISHEK KHANNA	21AGR2AG003
3.	ABHISHEK MEENA	21AGR2AG004
4.	ABHISHEK PRAJAPAT	21AGR2AG005
5.	AKHLESH	21AGR2AG007
6.	AKSHAY KUMAR MEENA	21AGR2AG008
7.	DEVANSHU GUPTA	21AGR2AG020
8.	HAPPY DAGAR	21AGR2AG024
9.	HARISH MEGHWAL	21AGR2AG025
10.	JITENDRA MEHARA	21AGR2AG028
11.	KAPIL KUMAR JANGID	21AGR2AG030
12.	KARAN	21AGR2AG031
13.	KRISHNA KUMARI GURJAR	21AGR2AG033
14.	LAVANSHU	21AGR2AG036
15.	LOVEKESH	21AGR2AG037
16.	MAHAVEER RAR	21AGR2AG038
17.	MANVENDER SINGH RATHORE	21AGR2AG039
18.	Ms. ABHILASHA MEENA	21AGR2AG041
19.	Ms. ANUSHKA SHARMA	21AGR2AG042
20.	Ms. KUSHBOO YADAV	21AGR2AG043
21.	Ms. SHWETA TAMADIYA	21AGR2AG045
22.	Ms. SONAM DHAKED	21AGR2AG046
23.	Ms. UNNATI SONI	21AGR2AG047
24.	NARPAT RAM	21AGR2AG049
25.	NAVEEN YADAV	21AGR2AG050
26.	PRADEEP KUMAR	21AGR2AG052
27.	PREMRAJ SINGH SOLANKI	21AGR2AG054
28.	RAMESHWAR	21AGR2AG057
29.	RAVI CHOUDHARY	21AGR2AG059
30.	ROHIT TIWARI	21AGR2AG061
31.	SUNIL	21AGR2AG067
32.	DIGVIJAY SINGH	21AGR2AG069
33.	JATIN BAMNAWAT	21AGR2AG071
34.	Ms. RASHMI MEENA	21AGR2AG077
35.	PRIYANSHU PALSANIYA	21AGR2AG078
36.	RITESH CHANDA	21AGR2AG080
37.	RAKESH SUTHAR	21AGR2AG088
38.	ABHISHEK SAMOTA	21AGR2AG092

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