Success Story: Application of Waste Decomposer for Paddy Straw Management

J Vijay

Name: Rupireddy Laxmi w/o Thirupathi reddy
Age: 43
Education: 5th Class
Land holding: 14 acres
Address: Village - Kondapalkala
Taluk - Manukondur
District - Karimnagar
State - Telangana

India is an agriculturally based country. Farmers are the back bones of our nation. In early days farmers were using locally available natural materials like after harvest trashes, weeds, cow dung etc. as manure. Later on they started using chemical fertilizers in view of fast growth and good yield. Though they got good results in early days, after 10-15 years of continuous use agricultural land becomes barren, crops become less resistant to environmental conditions. To dispose the agriculture waste, they started burning it and digest anaerobically in the land itself, which leads to soil and environment pollution.

Problem identified

In Karimnagar district every year in late October and November, most of the farmers have been using burning method to dispose paddy straw after harvesting of paddy crop in their fields as a low-cost straw-disposal practice to reduce the turnaround time between harvesting and sowing for the second (winter) crop.

This situation leads to

- ✓ Release of soot particles and smoke causing human health problems such as asthma or other respiratory problems
- ✓ Emission of greenhouse gases such as carbon dioxide, methane, and nitrous oxide (N_2O) causing global warming
- ✓ Loss of plant nutrients such as N, P, K, and S
- ✓ When the straw is burned on the ground, the soil loses nutrients and becomes less fertile. It generates heat that penetrates the soil, increasing erosion and resulting in the loss of moisture and beneficial microbes.

Almost entire amounts of C and N, 25% of P, 50% of S, and 20% of K present in straw are lost due to burning. The gaseous emissions from the burning of rice straw were 70% CO2, 7% CO, 0.7% CH4,

and 2.1% N2O. Therefore, the burning of crop residues should be avoided, and alternate measures of disposal of residues should be found out.

ICAR –Krishi Vigyan Kendra, Jammikunta, Karimnagar, Telangana, India
vijayjakkula86@gmail.com

Farmer intervention

The waste decomposer developed by National Centre of Organic Farming (NCOF) helps in avoiding the burning of paddy straw, as it makes enzymes that break down paddy straw's cellulose, lignin and pectin. It is a low-cost and efficient method for managing crop residue and other agricultural waste as it can be decomposed in the process without causing any pollution. In general, normal composting takes about 60 days but decomposer converts the paddy straw into compost in just 15-25 days.

Key Features of the Technology (Process)

After harvesting the paddy crop, the left-over paddy straw will be collected and piled nearly maintaining thickness from 18-20 cm at the corner of the field. Then wet the straw with the solution of waste decomposer and again pile the paddy straw (by maintaining thickness 18-20 cm) on top of the already prepared bed. Again, wet the layer with the solution of waste decomposer. And on the same way, repeat the process till the piling goes up to 30-45 cm. While decomposing the straw, maintain adequate moisture levels during entire period for proper composting. The compost will be ready to use as manure after 30-40 days. The process is basically simple and reliable.

Outcome

Rice residue management through incorporation of rice straw is associated with certain problems such as immobilization of plant nutrients particularly Nitrogen, residues impede seed bed preparation and contribute to reduced germination of subsequent crops.

So, composting arises a safe opinion which results in reusability of the nutrients contained in the residue. Production of compost from straw is a alternative to burning and direct incorporation in soil. By composting paddy straw, can avoid air pollution, enhances soil organic matter content.

Economic benefits of the crop

Generally, most of the farmers follows conventional method paddy cultivation (raising nursery and transplantation). But here Smt. R. Lakshmi adopted & implemented broadcasting method in her field i.e., of paddy seed for 24 hrs in water & soaked paddy grains were broadcasted in her puddled field. Due to

Table 1: Soil organic carbon and other characteristics before and after treatments

Soil Health card no	pH	EC	Organic Carbon	Nitrogen (kg/ha)	Phosphorous (kg/ha)	Potassium (kg/ha)
Initial (05/05/2020) KVK/STL/21-48	**6.92**	0.67	**0.26**	189.12	30.74	298.82
Present (02/06/2023) KVK/STL/23-271	**7.31**	0.43	**0.39**	198.4	55.1	323.21

this she is able to save the time and labour when compared with conventional method.

With this practice, the total cost of cultivation is Rs 22,750/- per acre under normal method of rice transplantation against Rs 18,950/- per acre with the practice of Broadcasting method of rice cultivation. Even though the yields are less, an amount of 3800/- per acre was saved and in comparison, to the existing method, this technique saves labour and time to a great extent. She started this compost preparation technique from Kharif -2021, during these two seasons (kharif,2022 and kharif, 2023) the minor changes were observed in soil characteristics. The application of compost to soil caused a slight increase in soil pH, OC and decrease in EC which is ideal for crop growth.

Table 2: Economics of paddy cultivation

Sl. No.	Name of the parameter	Normal Rice Transplantation	Broadcasting method
1	Seed Rate (Kg/ac)	20-25 Kg/ac	10 Kg/ac
2	Seed Cost (Rs/Ac)	900/-	400/-
3	Land preparation cost (Rs/ac)	6000/-	6000/-
4	Transplanting cost (Rs/ac)	5500/-	1000/-
5	Herbicide cost (Rs/ac)	450/-	1650/-
6	Manual weeding (Rs/ac)	1800/-	1800/-
7	Fertilizer cost (Rs/ac)	2100/-	2100/-
8	Pesticide Cost (Rs/ac)	1800/-	1800/-
9	Labour cost for fertilizer & pesticide application (Rs/ac)	1000/-	1000/-
10	Cost of Harvesting (Rs/ac)	2200/-	2200/-
11	Cost of Transport & others	1000/-	1000/-
12	**Cost of Cultivation**	**22,750/-**	**18,950/-**
13	**Yield (Qt/ac)**	**26.40**	**24.65**
14	Market Rate (Rs/qt)	2040/-	2040/-
15	Gross Income (Rs)	53,856/-	50,286/-
16	**Net Income (Rs)**	31,106/-	31,336/-
17	**C:B Ratio**	**1:2.37**	**1:2.65**

* * * * * * * *