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Comparative Analysis of Organic Waste Management in Rural Communities of Paratwada for Windrow and Sheet Composting Methods

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ABSTRACT: A Composting, the recycling of organic waste such as vegetation and food waste reduces the amount of waste going to landfill and is therefore a rapidly growing sector. The residual compost has been described as the stable, sanitized and humus-like material rich in organic matter and free from offensive Odour resulting from the composting process of separating collected bio-waste. Recycling is widely assumed to be environmentally beneficial, because allowing organic waste to decay in landfills has a negative impact both environmentally and economically. The elements of household waste most commonly collected for recycling are garden, food waste recycling those offers high energy and economic benefits. Land application of composted household waste can be one of the most economical and attractive methods to two problems: waste disposal and the necessity to increase the organic matter content of soil. Composting is a natural process which involves the aerobic biological decomposition of organic materials under controlled conditions. Composting is a nutrient rich soil-like material created by the biological decomposition of organic materials such as vegetative debris and livestock manures. Composting can improve soil fertility, extent fertilizers, save water, suppress plant diseases, and boost soil yield. In this Research Organic waste composting and sustainability studied in rural communities in Amravati District: Pilot project on Paratwada ,Amravati.

I. INTRODUCTION

Composting the organic portion of Organic wastes has multiple benefits, such as a reduction in the quantity of wastes to be disposed, a reduction in environmental impacts resulting from manure storage and production of a material safe to use in agriculture. Advantages of composting also include killing of pathogens, fly larvae and weed seeds and improving the handling of manure and other residues by reducing their volume and weight. The need to increase soil organic matter in certain countries, such as those in the African continent, is an important reason for recycling organic waste in view of returning the nutrients to the soil. Composting plays an important role in organic farming practices as well as in improving soil fertility. Among other benefits, the use of compost can improve access to food in rural communities with higher yields of vegetables and fruit obtained from a more fertile soil.

Farm households have many reasons for joining a composting programme, as they possess almost all the basic requirements for composting. Feedstocks, air, water, land and labour are present already on the farm although the scale of composting would be an important determinant of the resources available. The resulting composting product is a resource for the farmer and can be an additional source of revenue. The compost produced can be used on farm or sold to other farmers and community members. Like any product, compost must be marketed adequately and issues about producing a high quality material need to be addressed if the farmer expects to get revenue from the composting operation.

The installation and management of an organic system requires careful planning and technological considerations. When planning for a composting facility, technical, social and economic issues have to be considered. Proper siting of a facility can be done only after examining site factors and designing all components of the composting system, such as active composting technologies, curing processes and pre-processing and post processing equipment. Good process control and system management are needed to ensure that the composting facility continues to meet the objectives of the users. Proper project management involves monitoring compost parameters and maintenance to ensure that potential negative impacts associated with poor management in the form of leachate and odour or through the attraction of pests and vermin are minimized.

The benefits of using compost in farm applications and ways of producing compost are not always well known in farm households. Continuing efforts are needed to establish confidence in the quality of waste demanded for compost. There is an urgent need for more education and training aimed at various groups including composting facility operators,

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regulators, farmers and general public. Topics needing to be addressed are proper composting site management, the benefits of using compost in agriculture, and the public perception of the importance of composting in the context of a sustainable waste management strategy. Successful case studies and pilot projects conducted on composting in the African region are a valuable tool to demonstrate that composting has worked and can work successfully for farmers and rural communities

II. SCOPE

1) To secure healthy, clear, Environment to the public.
2) Develop recommendations for the pollution control board regarding option to protect ground water and surface water quality from pollution for the health, welfare, and safety of our residents and environment
3) To provide manure to farm very effectively.
4) To increase the rate of composting, so that problem of dumping the waste can be minimizing.

III. CASE STUDY

Paratwada, formerly known as Paltanwada and also known as "Achalpur Camp" is a city and a municipal council in Amravati District in the Indian state of Maharashtra. It is also the second most populous city in Amravati District after Amravati and seventh most populous city in Vidarbha. It has a twin city known as Achalpur. Paratwada is a gateway to the Melghat region which has one of the biggest Tiger conservation projects in India.

Fig 1 Study Area

IV. DATA COLLECTION

1. Organic waste Details

Type of organic waste producer	Separate collection	Home-community-composting	Composting at local facilities	Composting at centralized facilities
Households	√	√		√
Street markets	√		√	
Parks		√	√	
Schools	√	√		√
Commercial activities	√			√

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2. Organic waste

Bio waste diversion	t/day	t/year	g/inhab/day
Home, community composting	0.48	175.2	42.6
Small-scale composting plants	1.20	43.8	10.8
Large-scale plants	0.72	262.8	63.9
Total bio waste diverted	2.4	481.8	117.3

3. Existing Organic Waste Management Practice

Present scenario of Organic waste management practices in Paratwada:

1. Street Sweeping and Collection Points –The sanitary workers of GP collect waste during street sweeping and dump it to the nearest collection point. The household waste is also dumped in the nearby collection point. Approximately 10 collection points or temporary waste storage exist the village. Collections points are either open spaces or open containers or concrete bins. Containers are not placed on the paved surface which results in mixing of fine materials like soil. At number of places, these bins are found overflowing or underutilized. The location of these bins is not properly sited. At household level segregation of waste is nor done before disposing it collection point. Some of the household waste is thrown in gutters. Also no effort is taken from GP for segregation this waste.
2. Secondary Collection/Transportation – The tractor trolley system is used for collection of waste from community beans and transporting it to dumping site. This collection is done once in 2 months or after receiving complaints from public, whichever is earlier. The collection system is poorly planned. The Organic waste transportation is done by tractors or three wheelers. Most of the waste loading is done manually. The garbage is loaded transportation vehicle without any segregation. At some collection points, garbage is burned and its ash is disposed in gutters.
3. Final Disposal of SW – The collected waste is disposed off at dumping area. The total area of the site is approximately 2 acres. Mixed Organic waste is dumped in heaps without proper spreading and compaction, which causes unhygienic conditions. The waste is dumped without following by any segregation and applying soil covers. The garbage is dumped in heaps, without segregation. But nearby or local people collects reusable or recyclable products from dumped garbage.

4. Sample Collection and Waste Characterization

The Organic waste sample was taken from dumping site. The 20 kg of Organic sample was taken for waste characterization. The waste characterization is carried out to acquire information about composition of waste steam. It aids planner in decreasing landfill waste, to set up recycling programs and conserve money and resources. The average composition of waste by weight is estimated below.

Weight of Sample waste collected(kg)	Waste Characteristics		
	Garbage (kg)	Rubbish (kg)	Others (kg)
20 (100%)	8.5	5.9	5.6

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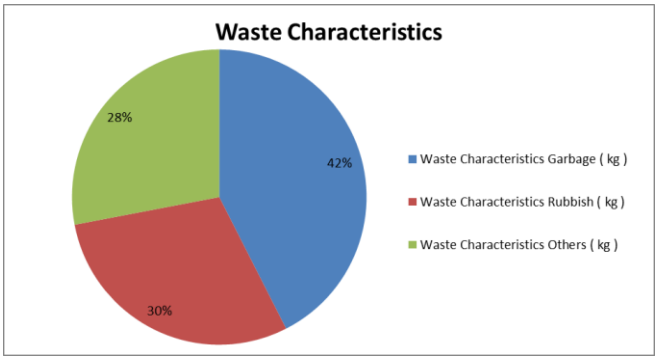

5. Carbon-To-Nitrogen Ratio

Carbon % for 20 kg Weight of Sample waste

Carbon % for 20 kg Weight of Sample waste			
	waste in Kg	Standard % Carbon Content	% Carbon
Garbage (kg)	8.5	15	1.275
Rubbish (kg)	5.9	40	2.36
Others (kg)	5.6	35	1.96
Total % Carbon			5.595

%Nitrogen for 20 kg Weight of Sample waste

%Nitrogen for 20 kg Weight of Sample waste			
	waste in Kg	Standard %Nitrogen Content	%Nitrogen
Garbage (kg)	8.5	2	0.17
Rubbish (kg)	5.9	0.1	0.0059
Others (kg)	5.6	0.1	0.0056
Total % Carbon			0.1815

Total Carbon-To-Nitrogen Ratio

5.595/0.1815= 30.82 parts carbon to 1 part nitrogen

V. RECOMMENDATION

5.1 Windrow Composting

Composting can take anywhere from several weeks to a year to complete depending on the method used. Here I would like to introduce WINDROW COMPOSTING–one of the most popular commercial composting technology worldwide. Windrow turning is important for speeding up the composting process because it breaks preferential air pathways, and brings the material from the outside to the center for pathogen kill

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As per collecting data from the Amravati, Paratwada we required compostable waste from that all wastage as per collection of data the wastage of Amravati, Paratwada for year as follow

Bio waste diversion	t/day	t/year
Home, community composting	0.48	175.2

From the site we collect 20kg of sample waste and analyze its Waste Characteristics such as garbage wastage, rubbish wastage, and other wastage for the WINDROW COMPOSTING we required garbage wastage, the total percentage (%) of the garbage wastage, rubbish wastage, and other wastage are as follow

Weight of Sample waste collected(kg)	Waste Characteristics		
	Garbage (kg)	Rubbish (kg)	Others (kg)
20	8.5	5.9	5.6
(100%)	42%	30%	28%

So as per the study we can decompose 42% of wastage by using WINDROW COMPOSTING, the total wastage are.

Total wastage	Decompose by Windrow Composting	Decompose fertilizer
175.2 **t/year**	42%	73.584 t/year

VI. CONCLUSION

- The Organic waste management appears to be inadequate and needs up gradation. The Organic waste has to be disposed of scientifically through sanitary landfill and recyclable portion of the waste should be salvaged.
- Segregation of recyclable material would also lead to reduction in quantity of Organic waste for final disposal.
- A system approach needs to be adopted for optimizing the entire operation of SWM encompassing segregation at source, timely and proper collection, transportation routes and types of vehicles and development and proper operation of sanitary landfill site.
- More emphasis needs to be laid on segregation and collection of waste at door step.
- Segregation of recyclable material from mixed waste not only is Tedious but also wasteful, therefore the residents should be sensitized towards the importance of segregation of wastes at source.

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