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Marketability and Acceptability of Home-Made Organic Fertilizer from Recycled Paper and Vegetable Waste

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ABSTRACT: This study aims to determine the level of acceptability and marketability of the home-made organic fertilizer using four Treatments. Treatment 1 composted waste paper and cartoon. Treatment 2 composted vegetable waste, Treatment 3 composted soil and Treatment foliar fertilizer. The research is experimental survey method. The facts gathered were information regarding making of home-made organic fertilizer. The research was completed by the use of evaluation instruments like questionnaire checklist. The respondents' ratings were collected, tallied, collated, statistically treated and interpreted. Furthermore, Tables were designed to facilitate the interpretation of data.There were thirty respondent-evaluators covered in this study compost of ten rice planter, ten corn planters and ten vegetable planters. Furthermore, the Mean (M) was utilized to gauge the level of acceptability and marketability of the waste paper, cartoon, vegetable waste and foliar organic fertilizer. While, the Analysis of Variance (ANOVA) One-way was employed to determine the significant differences on the evaluations of the three groups of respondents as to the level of acceptability and marketability of waste paper, cartoon, vegetable waste and foliar organic fertilizer. As to the significant findings, the home-made organic of fertilizer was developed from collecting, soaking, washing, boiling, extracting, mixing and evaluating the level acceptability, level of general acceptability and marketability. Furthermore, the level of acceptability of the home-made organic fertilizer along the four Treatments is suitable. Likewise, the level of general acceptability of the home-made organic fertilizer along the four treatments is likewise, appropriate. The evaluations of the three groups of respondents are significant along the four treatments. Meanwhile, the home-made organic fertilizer is saleable along consumer demand, availability of materials and production cost. Making home-made organic fertilizer should be introduced in the community as livelihood program.

KEYWORDS: Home-made organic fertilizer, Level of acceptability, Marketability, Wastepaper and vegetable.

I. INTRODUCTION

In the field of agriculture, maintaining healthy crop growth is vital to ensure productivity and sustainability. Farmers commonly use fertilizers to enrich the soil and enhance plant development. However, the excessive use of chemical fertilizers has led to adverse environmental and health effects, such as soil degradation, water contamination, and ecosystem imbalance [1]. Mismanagement of fertilizers in conventional farming results in inefficient nutrient utilization, economic loss, and energy waste [2]. Furthermore, synthetic fertilizers contribute to environmental pollution and global climate challenges [3].

Recent global initiatives, including the Global Sustainable Development Report (2019) and the European Green Deal, emphasize the need for sustainable agricultural practices that promote the reuse, reduction, and recycling of organic materials [4], [5]. One of the key strategies for achieving this goal is the use of organic fertilizers, which recycle biodegradable wastes to replenish soil nutrients and organic matter [6], [7]. The addition of organic materials to soil enhances its structure, microbial activity, and water retention capacity, leading to improved soil fertility and crop productivity [8]. Organic fertilizer technology has evolved rapidly, with innovations such as the Flippable Units Vermireactor Train System (FLUVTS) designed for efficient waste conversion and nutrient recovery [9]. The global overview on food waste recycling highlights the increasing shift toward composting and organic fertilizer production to minimize environmental impacts [10]. Converting food waste into fertilizer not only mitigates landfill problems but also supports circular bio-economy models that strengthen food system resilience [11], [12]. According to [13], nutrient recovery from food waste and wastewater is crucial for advancing global food security. Similarly, [14] emphasized that transforming bioresources into organic fertilizer supports both waste reduction and agricultural sustainability.

Food waste is composed of organic matter that can be composted into nutrient-rich fertilizer [15]. It contains essential nutrients such as nitrogen, phosphorus, and potassium, which are critical for plant growth. Vegetable waste, fruit peels, and other kitchen residues serve as excellent compost materials due to their high nutrient content [16]. Likewise, recycled paper—an often overlooked organic material—contains cellulose that can serve as a carbon source in compost mixtures [17]. When combined with vegetable waste, recycled paper contributes to soil moisture retention, weed suppression, and slow nutrient release, resulting in a sustainable and eco-

friendly fertilizer. Studies have shown that organic amendments from recycled materials enhance soil aggregation, nutrient stability, and crop performance [18]. The integration of recycled paper and vegetable waste into fertilizer production supports waste minimization and promotes circular economy principles [9], [14]. Furthermore, organic fertilizers have been found to improve soil enzyme activity and reduce the accumulation of heavy metals compared to chemical fertilizers [19].

Therefore, this research, "Marketability and Acceptability of Home-Made Organic Fertilizer from Recycled Paper and Vegetable Waste," seeks to explore the potential of utilizing common biodegradable wastes as a sustainable fertilizer source. The study also aims to determine the product's acceptability and potential marketability, contributing to environmental conservation, sustainable agriculture, and waste reduction. By adopting innovative waste-to-fertilizer approaches, the research aligns with global efforts to achieve sustainable food systems and ecological balance.

The research will address the following questions:

1. What is the level of acceptability of the recycled paper vegetable waste and foliar fertilizer in terms of:
   a. appearance;
   b. aroma;
   c. color; and
   d. texture?
2. Is there any significant difference in the evaluation of the respondents as to the level of acceptability of the three kinds of organic fertilizer along *appearance*, *aroma*, *color*, *texture*?
3. What is the level of marketability of the three kinds of organic fertilizer in terms of:
   a. consumer demand;
   b. production cost; and
   c. availability of materials?
4. Is there any significant difference in the evaluation of the respondents as to the level of marketability of the three kinds of organic fertilizer along consumer demand, production cost and availability of materials?

II. METHODOLOGY

Research Design

In this study the researchers used the experimental survey method. The facts gathered were information regarding preparation of waste paper, cartoon, waste vegetable and foliar fertilizer. The research was completed by the use of assessment instruments like questionnaire checklist The respondents' ratings were recorded, tallied, collated, analyzed and interpreted.

Data Gathering

The data gathering was conducted at **Barangay San Felipe, City of Ilagan, Isabela**. to determine the acceptability and marketability of the recycled organic fertilizer made from waste paper, cardboard, and vegetable waste**.** The instrument used in data gathering was a a **questionnaire–checklist** based on a **5-point Likert scale.**

The range of scale is interpreted as follows:

Scale	Mean	Descriptive Interpretation
5	4.50 - 5.00	Highly Acceptable
4	3.50 - 4.49	Acceptable
3	2.50 - 3.39	Moderately Acceptable
2	1.50 - 2.49	Slightly Acceptable
1	1.00 - 1.49	Not Acceptable

A respondents of this study was composed of **thirty (30) respondents** — composed of **ten (10) rice planters, ten (10) corn planters, and ten (10) vegetable planters.** Each respondent personally saw, touched, and smelled the fertilizers to assess their **appearance, aroma, color, and texture.**

Materials and equipment Needed in Making Organic Fertilizer.

These materials and equipment are essential for making organic fertilizer, ensuring a smooth preparation process and success final product.

Materials and Equipment Preparation

Category	
Materials	Soil Paper Vegetable waste Vegetables Sugar Wate

Equipment	**Plant bag** **Gardening gloves** **Tape measure** **Bolo**

Processes Applied in Making the Waste Paper, Cartoon, Waste Vegetable and Home-Made Foliar Organic Fertilizer Using the Four Treatments

The researcher executed the process of making organic fertilizer out of waste paper, and waste vegetable using the following steps:

Granular Fertilizer

1. Collect and Prepare all the materials
2. for the vegetables and paper merge in the soil
3. Cover the paper and vegetable waste until it rotten
4. Dig and take the soil that becomes fertilizer
5. Spread out and Chop the vegetables
6. Soak the paper
7. Dig up 12 inches deep, wide and length
8. Dry in the sun
9. Ready for packaging

Foliar Fertilizer

1. Collect and prepare all the materials needed
2. Blend the vegetable wastes
3. Mix all the ingredients
4. After blending add water and 1 kilo of brown sugar
5. Soak for up to three days
6. Squeeze the soaked vegetable wastes
7. Get the liquid and put in the packaging

III. RESULTS AND DISCUSSIONS

This chapter presents the results, discussions, and the interpretation of data gathered in the study.

A. Test of Difference in the Level of Acceptability of the Home-made Organic Fertilizer Using the Four Treatments as Evaluated by the Three Age Groups

Table 1. Level of Acceptability of Waste Paper and Cartoon, Granular Organic Fertilizer

Treatment 1	Sensorial Criteria	Mean	Qualitative Description
1-kilogram grounded waste paper and cartoon granular organic fertilizer	Appearance	4.51	Highly Acceptable
	Aroma	4.54	Highly Acceptable
	Color	4.41	Acceptable
	Texture	4.38	Acceptable
	Overall Mean	**4.48**	**Acceptable**

Table 1 presents the evaluation of the respondents in the level of acceptability of the 1-kilogram grounded waste paper and cartoon granular organic fertilizer as Treatment 1.

Specifically, the appearance and aroma of the of the organic fertilizer were described as "*highly acceptable*" (4.51), and (4.54) respectively. Meanwhile, the color and texture of the organic fertilizer were described as "*acceptable*" (4.41) and (4.38).

As a whole, the computed overall mean is 4.48 falls under the qualitative description of "*acceptable*". This shows that Treatment 1 which is domestic refuse food which represent the nitrogen source is good. This implies that 1-kilogram grounded waste paper and cartoon granular organic fertilizer is effective source of nitrogen.

Table 2. Level of Acceptability of Waste Vegetable Composted Granular Organic Fertilizer

Treatment 2	Sensorial Criteria	Mean	Qualitative Description
1-kilogram grounded waste vegetable composted granular organic fertilizer	Appearance	4.59	Highly Acceptable
	Aroma	4.35	Acceptable
	Color	4.43	Acceptable
	Texture	4.54	Highly Acceptable
	Overall Mean	**4.47**	**Acceptable**

Along treatment 2 which is1-kilogram grounded waste vegetable composted granular organic fertilizer, the appearance and texture of the home-made fertilizer were rated "*highly acceptable*" (4.59) and (4.54). On the other hand, the aroma and color were rated "*acceptable*" (4.35) and (4.43). The overall weighted mean is 4.47 was described as "*acceptable*". This goes to show that Treatment 2 which is 1-kilogram grounded waste vegetable composted granular organic fertilizer was preferred by the evaluators. As proven, decayed vegetable waste is outstanding in producing phosphorus and potassium.

Table 3. Level of Acceptability of Composted Granular Organic

Treatment 3	Sensorial Criteria	Mean	Qualitative Description
1-kilogram grounded composted granular organic fertilizer	Appearance/Color	4.38	Acceptable
	Aroma	4.32	Acceptable
	Taste	4.32	Acceptable
	Texture	4.38	Acceptable
	Overall Mean	**4.35**	**Acceptable**

For Treatment 3 which is 1-kilogram grounded composted granular organic fertilizer the appearance, aroma, color and texture were described as "*acceptable*" (4.38, 4.32, 4.32, and 4.38). Furthermore, the computed overall weighted mean is 4.35 and it was described as "*acceptable*". This goes to that Treatment 3 made of 1-kilogram grounded composted granular organic fertilizer is good and liked by the evaluators. This is possible, in the sense that compost enriches the soil. The principal reason to add compost to gardens is to treat nutrient-deficient soil. Compost introduces important nutrients to the soil. These nutrients break down in the soil and deliver food to the plants as nitrogen, phosphorus and potassium. Also, adding compost improves nutrient retention by increasing the soil cation-exchange capacity. Thus, allowing more nutrients to be transferred from the soil to the plant.

Table 4. Level of Acceptability of Foliar from Paper Waste, Vegetable Waste and Composted Granular Organic Fertilizer

Treatment 4	Sensorial Criteria	Mean	Qualitative Description
Foliar from paper waste, vegetable waste and composted granular organic fertilizer	Appearance	4.32	Acceptable
	Aroma	4.27	Acceptable
	Color	4.08	Acceptable
	Texture	4.22	Acceptable
	Overall Mean	**4.22**	**Acceptable**

Along Treatment 4 which is foliar from paper waste, vegetable waste and composted granular organic fertilizer, the appearance/, aroma, color and texture were rated "*acceptable*". Meanwhile, the computed overall weighted mean of 4.22 falls under the qualitative description of "*acceptable*".

This means that Treatment 4 composing of foliar from paper waste, vegetable waste and composted granular organic fertilizer was fairly preferred by the evaluators due to its texture and appearance.

B. Test of Difference in the Level of Acceptability of the Home-made Organic Fertilizer Using the Four Treatments as Evaluated by the Three Age Groups

Table 5. Significant Difference in the Level of Acceptability the Home-made Organic Fertilizer Using the Four Treatments as Evaluated by the Rice Planters

Farmer Category	Rice Planters					
Source of Variation	**Sum of Squares (SS)**	**Degree of Freedom (DF)**	**Mean Square (MS)**	**F-value**	**Table Value**	**Decision**
Between Groups	58.08	3	19.36	74.46	3.49	Significant
Within Groups	3.12	12	.26			
Total	**61.20**	**15**				

For the rice planters and above the computed F-value is 74.46, while the Table value is 3.49 lesser than F-value computed. At 15 degrees of freedom, the F-test exhibited a "*significant*" result. This goes to show that there is significant difference in the evaluation of the respondents under this category. Meaning, they have different perceptions as to the appearance, aroma, color and texture of the home-made organic fertilizer out of four Treatments. Hence, "*reject*" the null hypothesis.

Table 6. Significant Difference in the Level of Acceptability the Home-made Organic Fertilizer Using the Four Treatments as Evaluated by the Corn Planters

Farmer Category	**Corn Planters**					
Source of Variation	**Sum of Squares (SS)**	**Degree of Freedom (DF)**	**Mean Square (MS)**	**F value**	**Table Value**	**Decision**
Between Groups	228.5	3	76.17	6.074	3.49	Significant
Within Groups	150.5	12	12.54			
Total	**78**	**15**				

As to corn planters, the computed F-value is 6.074 and the Critical value is 3.49. At 15 degrees of freedom, the F-test exhibited a "*significant*" result. This goes to show the responses of the respondents as to the appearance, aroma, color and texture of the product are not the same. Hence, there is a significant difference in the evaluation of the respondents under the. So, the null hypothesis of the study is "*rejected*".

Table 7. Significant Difference in the Level of Acceptability the Home-made Organic Fertilizer Using the Four Treatments as Evaluated by the Vegetable Planters

Farmer Category	**Vegetable Planters**					
Source of Variation	**Sum of Squares (SS)**	**Degree of Freedom (DF)**	**Mean Square (MS)**	**F value**	**Table Value**	**Decision**
Between Groups	21.5	3	7.16	2.77	3.49	Significant
Within Groups	31	12	2.58			
Total	**52.5**	**15**				

Table 7 presents the significant difference in level of acceptability of home-made organic fertilizer using the four treatments as evaluated by the vegetable.

As seen in the Table, the computed F-value is 2.77 while the Table value is 3.49 lesser than F-value. At 15 degrees of freedom, the F-test exhibited a "*significant*" result. This goes to show that there is significant difference in the evaluation of the vegetable planter-evaluators as to the level of acceptability of the home-made organic fertilizer along the four treatments. This goes to show that the respondents' evaluation of the home-made organic fertilizer along the four treatments in terms of appearance, aroma, color and texture are not the same. In this case, "*reject*" the null hypothesis of the study.

C. General Marketability of Level of the Home-made Organic Fertilizer along the Four Treatments along Consumer Demand, Availability of Materials, Production Cost

Table 8. Level of Marketability of the Home-made Organic Fertilizer from the Four Treatments along Consumer Demand

Consumer Demand Indicators	**Weighted Mean**	**Qualitative Description**
1. The consumers liked to buy the home-made organic fertilizer due to its fertilizer value.	4.41	Marketable
2. The consumers are attracted to buy home-made organic fertilizer due to its aroma.	4.38	Marketable
3. The consumers are very much willing to buy due to its good color and appearance.	4.27	Marketable
4. The consumers are attracted to buy home-made organic fertilizer due to its quality.	4.19	Marketable
Total	**4.31**	**Marketable**

As to the level of marketability of home-made organic fertilizer using the four treatments along consumer demand, it has been found out that the home-made organic fertilizer from the four treatments is "*marketable*" (4.41) due to its fertilizer value. Furthermore, the home-made organic fertilizer is "*marketable*" (4.38) due to its aroma. On the other hand, the home-made organic fertilizer is "*marketable*" (4.27) due to its good color and appearance. Likewise, the home-made organic fertilizer is "*marketable*" (3.66) due to its quality.

As a whole, the computed overall mean is 4.31 falls under the qualitative description of "*marketable*". This shows that the home-made organic fertilizer is saleable anytime due to its fertilizer.

One important component of an organic farm is the use of Organic fertilizers and pesticides. The availability of these components supports the steady growth and development of our crops and even our live stocks. These could be achieved by preparing or producing the different organic concoctions and extracts

Table 9. Level of Marketability of the Home-made Organic Fertilizer from the Four Treatments along Availability of Materials

Availability of Materials Indicators	Weighted Mean	Qualitative Description
1. The materials of home-made organic fertilizer are always available anywhere.	4.51	Highly Marketable
2. The materials of home-made organic fertilizer can be found anywhere.	4.43	Marketable
3. The materials of home-made organic fertilizer are always manageable anytime.	4.49	Marketable
4. The materials of home-made organic fertilizer are always accessible anywhere.	4.41	Marketable
Total	**4.46**	**Marketable**

As to the level of marketability of home-made organic fertilizer using the four treatments along availability of materials Table 6 presents the data of interest. As seen in the Table, the home-made organic fertilizer is "*highly marketable*" (4.51) for always available anywhere. Likewise, the materials of home-made organic fertilizer are "*marketable*" (4.43) for the materials can be found anywhere.

Moreover, the home-made organic fertilizer is "*marketable*" (4.49) for the materials are always manageable anytime. Furthermore, the home-made organic fertilizer is "*marketable*" (4.41) for the materials are always nearby anytime. The computed overall weighted mean of 4.46 falls under the qualitative rating of "*marketable*". This shows that the materials in making home-made organic fertilizer using the four treatments are always obtainable anytime and anywhere. Aguto, Fatima, (2022) confirmed that organic products could be easily materialized if the materials are always available in the locality.

Organic fertilizer market is expected to experience significant growth over the forecast period due to factors including the growing need to boost agricultural production and increased awareness of the detrimental effects of chemical inputs and the positive effects of organic fertilizers.

Table 10. Level of Marketability of the Home-made Organic Fertilizer from the Four Treatments along Production Cost

Production Cost Indicators	Weighted Mean	Qualitative Description
1. The materials of the home-made organic fertilizer are cheap and available.	4.22	Marketable
2. The home-made organic fertilizer are easy to buy for it is affordable.	4.32	Marketable
3. The packaging of the home-made organic fertilizer is simple and cheap.	4.32	Marketable
4. The home-made organic fertilizer is a promising livelihood for a meager capital.	4.32	Marketable
Total	**4.29**	**Marketable**

As to the level of marketability of home-made organic fertilizer using the four treatments along production cost, it has been found out that the home-made organic fertilizer is "*marketable*" (4.22) for the materials are costless and available. Meanwhile, the home-made organic fertilizer is "*marketable*" (4.32) due to its easy to acquire for it is affordable.

On the other hand, the home-made organic fertilizer is "*marketable*" (4.32) due to the packaging is simple and cheap. Likewise, the home-made organic fertilizer is "*marketable*" (3.79) due to a promising livelihood for a meager capital.

As a whole, the computed overall mean is 4.16 which is equivalent to "*marketable*". This shows that the production cost of the home-made organic fertilizer is attractive due to its costless materials and ingredients.

D. Test of Difference in the Level of Marketability of the Home-made Organic Fertilizer in terms of Consumers Deman as Evaluated by the Three Groups of Farmers

Table 11. Significant Difference in the Level of Marketability of the Home-Made Organic Fertilizer in terms of Consumers Demand as Evaluated by the Famers

	Farmers					
Source of Variation	**Sum of Squares (SS)**	**Degree of Freedom (DF)**	**Mean Square (MS)**	**F-value**	**Table Value**	**Decision**
Between Groups	58.08	3	19.36			
Within Groups	3.12	12				
Total	**61.20**	**15**	.26	74.46	3.49	Significant

As reflected in Table 11, the computed F-value is 74.46, while the Table value is 3.49 lesser than F-value computed. At 15 degrees of freedom, the F-test exhibited a "*significant*" result. This goes to show that there is significant difference in the evaluation of the

respondents as to the marketability of the home-made fertilizer along consumer's demand. Meaning, they have different perceptions as to the appearance, aroma, color and texture of the organic fertilizer out of four Treatments. Hence, "*reject*" the null hypothesis.

Table 12. Significant Difference in the Level of Marketability of the Home-made Organic Fertilizer in terms of Availability of Materials as Evaluated by the Farmers

	Farmers					
Source of Variation	**Sum of Squares (SS)**	**Degree of Freedom (DF)**	**Mean Square (MS)**	**F value**	**Table Value**	**Decision**
Between Groups	228.5	3	76.17	.		
Within Groups	150.5	12	12.54			Significant
Total	**78**	**15**		6.074	3.49	

As to Table 12, the computed F-value is 6.074 and the Critical value is 3.49. At 15 degrees of freedom, the F-test exhibited a "*significant*" result. This goes to show the responses of the respondents as to the marketability of the home-made organic fertilizer availability of materials are not the same. Hence, there is a significant difference in the evaluation of the respondents. So, the null hypothesis of the study is "*rejected*".

Table 13. Significant Difference in the Level of Marketability of the Home-made Organic Fertilizer in terms of Production Cost as Evaluated by the Farmers

	Farmers					
Source of Variation	**Sum of Squares (SS)**	**Degree of Freedom (DF)**	**Mean Square (MS)**	**F value**	**Table Value**	**Decision**
Between Groups	21.5	3	7.16			
Within Groups	31	12	2.58			Significant
Total	**52.5**	**15**		2.77	3.49	

Table 13 presents the significant difference in level of marketability of the home-made organic fertilizer in terms of production cost as evaluated by the respondents.

It can be seen that the computed F-value is 2.77 while the Table value is 3.49 lesser than F-value. At 15 degrees of freedom, the F-test exhibited a "*significant*" result. This goes to show that there is significant difference in the evaluation of the of the farmer-evaluators as to the level of marketability of the home-made organic fertilizer. This means that the respondents' evaluation of the home-made organic fertilizer along consumers' demand, availability of materials and production demand are not the same.

In this case, "*reject*" the null hypothesis of the study.

CONCLUSION

Based on the given findings, the study concludes that the home-made organic of fertilizer was developed from collecting, soaking, washing, boiling, extracting, mixing and evaluating the level acceptability, level of general acceptability and marketability.

Furthermore, the level of acceptability of the home-made organic fertilizer along the four Treatments is suitable. Likewise, the level of general acceptability of the home-made organic fertilizer along the four treatments is likewise, appropriate. The evaluations of the three groups of respondents are significant along the four treatments. Meanwhile, the home-made organic fertilizer is saleable along consumer demand, availability of materials and production cost

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