

# Upland Rice Production As Influenced by the Organic and Inorganic Application of Fertilizers: Technology Demonstration Model

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**Abstract**— A Technology demonstration on upland rice production was conducted to determine which among the three treatments would provide better yield of upland rainfed rice and serves as a technological show-case to Agrarian Reform Beneficiaries (ARBs) and Non- Agrarian Reform Beneficiaries (ARBs) in the community. This study consists of three (3) treatments. Treatment 1 – Regional Soils Laboratory In-organic fertilizer recommended rates alone. Treatment 2 – ½ Regional Soils Laboratory In-organic fertilizer recommended rates plus 12.5 bags Vermicast per hectare. Treatment 3 – Organic fertilizer alone at 25 bags vermi cast per hectare.

Result shows that the best practices of fertilizer application is Treatment 3 the application of organic fertilizer which produces heaviest weight of fresh palay (31 grams/hill) and dried weight of palay (4.3 grams/hill) and obtained the highest yield of upland rice (6.20 tons/ha) than variable 1 and 2. Based on the cost analysis the application of organic fertilizer (Treatment 3) produced high profit due to low price of organic fertilizer.

**Keywords**—Agrarian beneficiaries, Tehnology, upland rice, Vermicast, Panicle.

## I. INTRODUCTION

Fertilizer is one of the most important management practices used to determine the quality and quantity of crop production. It will affect the general health of the plant. The healthier the plant is, the better the plant stand can compete and tolerate competing pests, like weeds, disease and insects. However, plant needs right kind and amount of fertilizer to produce optimum yield. This study evaluates the

performance of inorganic and organic fertilizers on the growth and yield of lowland rice.

Inorganic and organic fertilizers are nutrients required for the growth stage of plant for the optimum production of rice. The application of organic fertilizer improves crop yield because it increases the fertility of the soil (Hayne & Naidu, 1998). It also conforms to the report of Rodriquez (2015) that the application of organic fertilizer improves the quality of tomato fruit. Similarly, Alam & Khan (1999) reported that optimum quantity of inorganic fertilizer through correct method and time of application in right proportion increases plant production. Zhang (2001) revealed that balanced fertilization sustained the continuous healthy plant growth and high yield because of correct method and time of application in right proportion.

The application of fertilizers (inorganic and organic) was not applied religiously by the farmers due to insufficient observations/facts that can justify their farming practices. The farmer has no awareness on the importance of fertilization for the sustainable crop production.

The performance on the growth and yield of lowland rice production as affected by the application of inorganic and organic fertilizers can be determined using the analysis of variace experimental design will provide additional information and facts that can awaken/provoke their interest in practicing organic farming.

## Theoretical Framework

The theory of the study stated Organic Farming sustained crop production. The variables involved are the growth and yield of upland rice production as influenced by the application of organic and inorganic fertilizers.

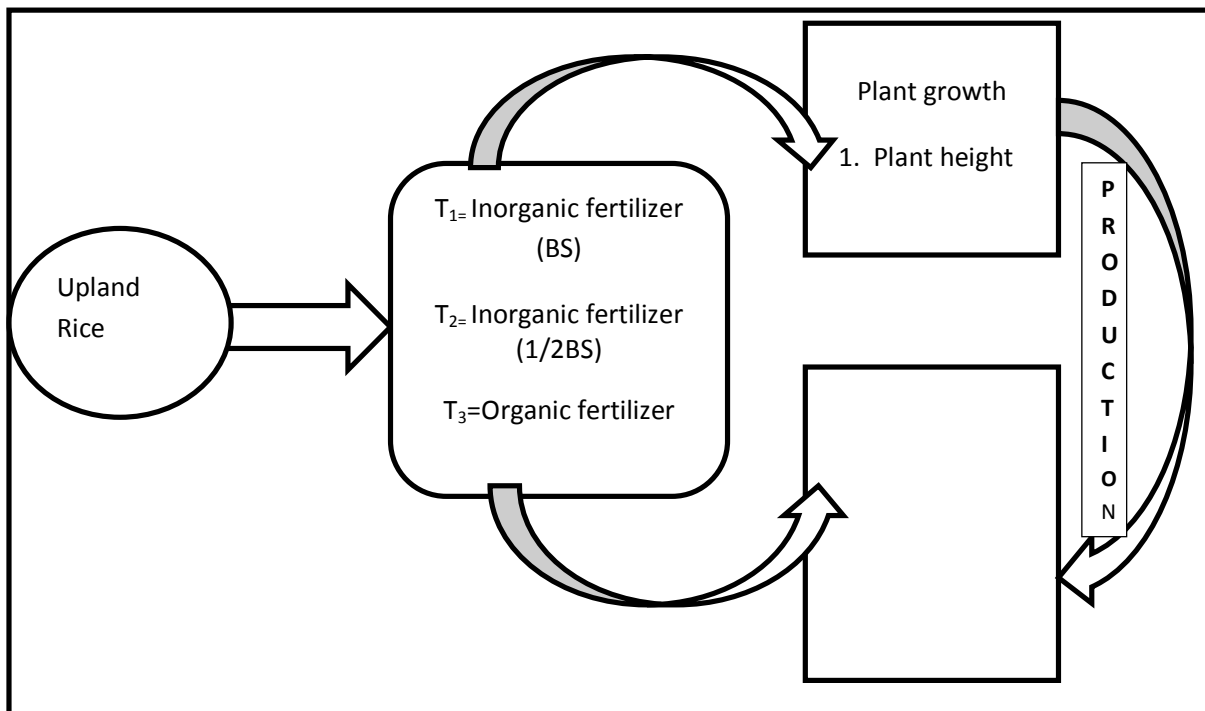


Fig.1: Schematic Diagram of the study

## II. OBJECTIVES

### General:

To demonstrate the performance of the three (3) treatments of fertilizer applied to upland rice.

### Specific:

1. To show case the visual growth and development of upland rice under three (3) treatments of fertilizer application.
2. To determine which among the three (3) treatments would provide better yield of upland rainfed rice.
3. To serve as a Technological show-case to Agrarian Reform Beneficiaries (ARBs) and Non- ARBs in the community.
4. To make the demo-farm as a learning venue for Coaching and Mentoring Exercises.

### Methodology

A 1,500 square meters area owned by one of the members of the Bayan Free Farmers-Multi-Purpose Cooperative (BAFF-MPC) at Bayan, Marihatag, Surigao del Sur was used through a MOA. The BAFF-MPC is one of the Agrarian Reform Beneficiaries under the Department of Agrarian Reform (DAR). Soil samples from the identified 1,500 square meters Technology Demonstration Farm (TDF) area were collected and processed for analysis. A 1 kilo soil sample was submitted to DA-Regional Soils

Laboratory at Butuan City. The NSIC RC 111 variety of upland rice was used.

An area of 1,500 sq.m was prepared thoroughly before planting. It was plowed, harrowed two times at weekly intervals to allow the seed to germinate and stubbles to decompose. After the last harrowing, three (3) blocks with an area of 500 sq. m. (50m x 10m) were prepared/laid out. The treatments were designated as follows:

## III. FERTILIZERS APPLICATION

Treatment 1 – Regional Soils Laboratory In-organic fertilizer recommended rates alone.

Treatment 2 – ½ Regional Soils Laboratory In-organic fertilizer recommended rates plus 12.5 bags vermicast per hectare.

Treatment 3 – Organic fertilizer alone at 25 bags vermicast per hectare

### A. Data gathered

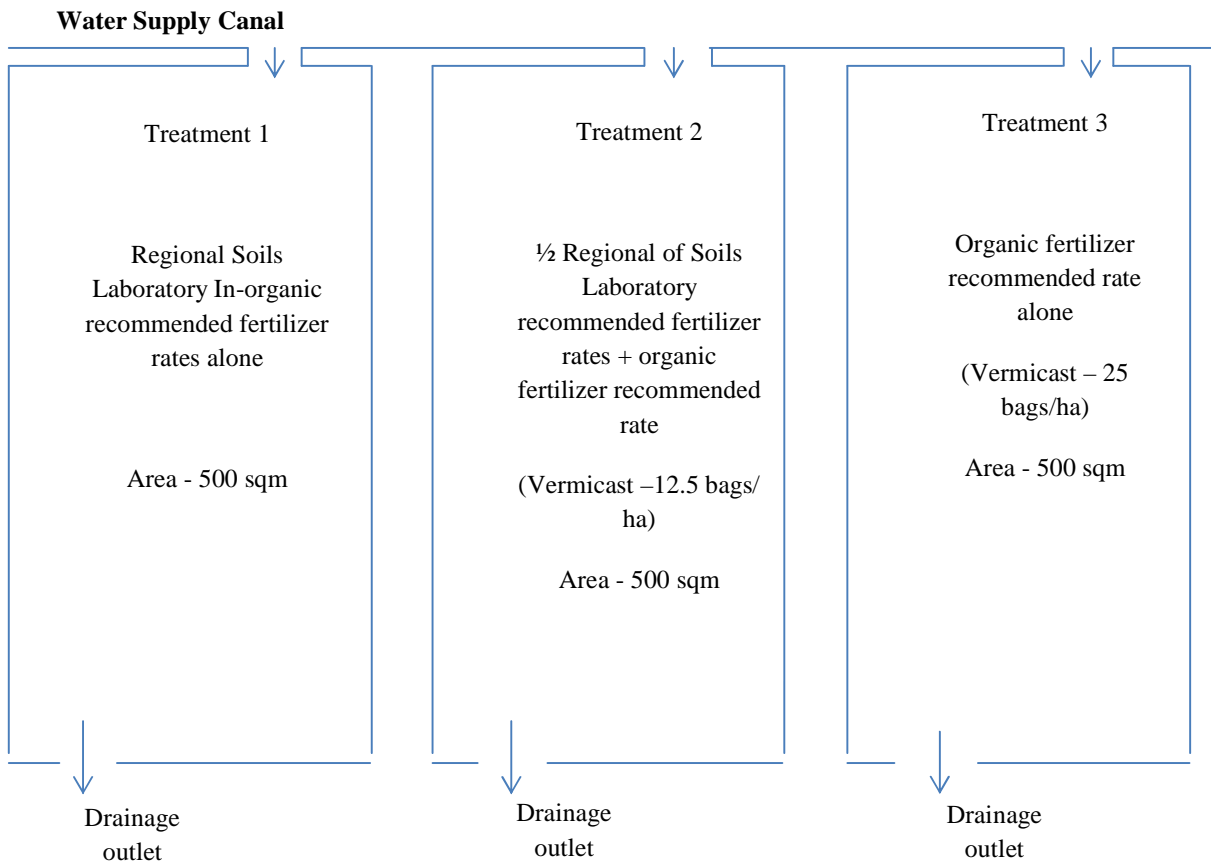
1. Average height of rice (cm) per hill– this was taken 45 days after planting (DAP) from 20 randomly harvested rice hills per variable.
2. Average weight of fresh palay (gram) – this was taken from 20 plants randomly harvested per variable.

3. Average weight of dried palay (gram) - this was taken from 20 plants randomly harvested, shelled and dried palay per variable.
4. Computed yield of rice per hectare (ton) – this was obtained by multiplying the average yield of rice per hill to 200,000 hills population of rice per hectare.

Frequency and means were used in this study to determine the performance of inorganic and organic fertilizer on the growth and yield of lowland rice.

### Technology Demonstration Farm Lay-Out for Upland Rice

#### Research Design and Field Layout



#### IV. RESULTS AND DISCUSSION

Table 1.0 presented the average height of rice as affected with the different kind and amount of fertilizers. Results showed slightly differences per treatment of about 59.65 cm, 53.90 cm and 55.25 cm for treatment 1, 2 and 3, respectively.

Plants applied with organic fertilizer (T<sub>3</sub>) produced the heaviest fresh weight and dried weight of palay of about 31.0 grams and 4.3 grams respectively while the application of inorganic fertilizer (T<sub>1</sub>) got the lightest weight of fresh palay(16.50 gms) and dried weight(2.3 gms) of palay.

On the yield of upland rice, Table 1.0 indicated that treatment 3, the application of organic fertilizer obtained the

highest yield (6.20 tons/ha) followed by Treatment 2, the application of ½ recommended rate of inorganic and organic fertilizer of about 4.60 tons/ha and lowest yield of 3.30 tons/ha was attained by treatment 1, the application of inorganic fertilizer.

*Table 1.0 Summary data on the plant height, fresh weight of palay, and dried weight of palay and yield of upland rice of 20 hills per treatment planted last September 12, 2015 to January 20, 2015 at Bayan, Marihatag, Surigao del Sur.*

<b>Variab les</b>	<b>Ave. plant height (cm) at 45 DAP</b>	<b>Average fresh weight of palay per hill (gram)</b>	<b>Average weight of dried palay per hill (gram)</b>	<b>Compute d rice yield/ ha(tons)</b>
Treatme nt 1	59.65	16.50	2.3	3.30
Treatme nt 2	53.90	23.14	3.2	4.60
Treatme nt 3	55.25	31.00	4.3	6.20

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*Table 2.0 Cost Analysis of Inorganic and Organic Fertilizers*

<b>Particular</b>	<b>Quantity</b>	<b>Unit Cost</b>	<b>Total</b>
Fertilizer			
<b>A. Inorganic Fertilizer</b>			
1. 16-20-0	4 bags	P 1,300/bag	P 5,200.00
2. 46-0-0	4 bags	1,200/bag	4,800.00
3. 14-14-14	2 bags	1,200/bag	2,400.00
			<b>12,400.00</b>
<b>B. Organic Fertilizer</b>			
1. Vermicast	25 bags	P 350/bag	<b>8,750.00</b>

## V. SUMMARY AND CONCLUSION

Result shows that the best practices of fertilizer application is treatment 3 the application of organic fertilizer which produces heaviest fresh weight of palay, dried weight of palay and obtained the highest yield of upland rice than treatment 1 and 2. Based on the cost analysis the application of organic fertilizer (Treatment 3) attained high profit due to the low price of organic fertilizer.

## REFERENCES

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