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REVITALIZING DEGRADED SOILS: UTILIZING SOIL CONDITIONER FOR SUSTAINABLE PECHAY PRODUCTION

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Review Paper

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ABSTRACT

To test the effect of soil conditioner on acidity and pechay (*Brassica pekinensis*) growth and yield performance, this study was conducted at Indangan, Davao City for four months duration. A Randomized Complete Block Design (RCBD) was used with seven treatments and three replications. The treatments were: T_1 = control; T_2 = RR NPK (140-60-30 kg/ha) based on soil analysis; T_3 = RR NPK + 0.5 rr soil conditioner; T_4= RR NPK + rr soil conditioner; T_5 = RR NPK + 1.5 rr soil conditioner; T_6 = rr soil conditioner; and T_7 = 0.5 RR NPK + rr soil conditioner. Growth and yield data were analyzed using ANOVA and HSD tests. Results showed that the highest root length was NPK + 1.5 rr soil conditioner followed by NPK + rr soil conditioner by 95% more than control. It increased leaves by 1.5 times more, enhanced fresh weight three times higher, and leaf length by 42% more than control. The yield of 0.5 RR NPK + rr soil conditioner was higher by 100% than control. NPK + rr soil conditioner and NPK + 1.5 rr soil conditioner got the widest leaves by 100% than control followed by NPK + rr soil conditioner and rr soil conditioner. Moreover, height was increased by 0.5 RR NPK + rr soil conditioner by 54% compared to control. Hence, the application of soil conditioner with half RR NPK increased root length, leaf width and length, leaves, plant height, fresh weight and yield of pechay. The control and NPK applied treatments had pH of 5.2 after four weeks from treatment applications, while treatments with soil conditioner had pH of 5.3-5.9. This implies the significant role of soil conditioner in reducing soil acidity and restoring the productivity of the land.

No. of Pages: 14 **References: 35**

Keywords: Soil Conditioner, Soil Neutralizer, Land Degradation, Pechay, *Brassica pekinensis*.

INTRODUCTION

According to Pascual et al. (2013), to produce high yield, most growers use synthetically-based products, thus, the possibility of pesticides and chemical residue accumulation is very serious that poses threat to human health. Synthetically-based fertilizers are the most common fertilizers used by the farmers. However, its use incurs a high cost and its supply is sometimes limited that many farmers now are still adapting the idea of using organic fertilizers no matter how long and laborious the preparation is.

Fertilizer application using either inorganic or organic fertilizer sources is one of the most common cultural management practices in vegetable production. According to Masarirambi et al. (2010), commercial

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and subsistence farming has been and is still relying on the use of inorganic fertilizers for growing crops. This is because they are easy to use, quickly absorbed and utilized by crops. However, these fertilizers are believed to contribute substantially to human, animal, food intoxication and environmental instability or degradation.

Earlier studies using various fertilizers and supplements have been tested to maximize the growth and yield of various crops (Magbalot-Fernandez et al. 2024, 2020; Pauya et al. 2024; Fernandez et al. 2023, 2015; Fernandez & De Guzman 2021; Magbalot-Fernandez & De Guzman 2022, 2019; Fernandez & Agan 2021; Magbalot-Fernandez & Montifalcon 2019; Eroy 2019; Montifalcon & Fernandez 2017; Fernandez & Andigan 2017; Fernandez & Sabay 2016; Fernandez and Caballes 2016; Fernandez & Quilab-Tud 2016; Fernandez & Miñoza 2015; Fernandez & Lumbo 2015; Lopez-Fabal et al. 2014; Lopez-Mosquera et al. 2014; Fernandez & Tipay 2013; Fernandez & De Guzman 2013).

Fulcrum+TM (Concentrate) is a natural, 100% biodegradable, active-colloid based formulation, consisting of natural surfactants, emulsifying agents derived from vegetable fatty-acids, other nutrients, and natural non-toxic proprietary formulas. It contains Palm Oil (20%), Corn Oil (20%), Soy Oil (15%), Sunflower Seed Oil (10%), Molasses (10%), SeaWeed (5%), Bacillus Bacteria (2.5), Polysorbate (7.5%), and Water (10%) which are natural ingredients.

Pechay (*Brassica napus* L.) belongs to the Brassiceae family and one of the most known vegetables in the Philippines. It is also known as one of the oldest green vegetables in Asia. It therefore plays an important role in the Philippines economy as well as in the nutrition of the filipino people. Pechay is used mainly for its immature, but fully expanded tender leaves (http://www.darfu4b.da.gov.ph/pechay.html).

According to Siemonsma & Piluek (1994) the crop is considered the most consumed leafy vegetable in the Philippines and contributes a very good income provider for farmers due to its short duration harvesting. This crop can be harvested 30-45 days from planting seedling foundation of this crop strongly affects performance as it contributes to almost half of the duration in cropping.

About 86.3 percent of the country's total Chinese pechay production came from the Cordillera Administrative Region. Central Visayas came next with 7.0 percent share. Northern Mindanao, Davao Region and the rest of the country had a combined share of 6.7 percent (PSA 2019). The crop is considered the most consumed leafy vegetable in the Philippines and contributes a very good income provider for farmers due to its short duration harvesting. This crop can be harvested 30-45 days after planting, the seedling foundation of this crop strongly affects performance as it contributes to almost half of the duration in cropping (Siemonsma & Piluek 1994). From 2019 to 2021, an average increase of 0.9 percent was noted in the production of pechay. From 47.30 thousand metric tons in 2019, it went up to 47.50 thousand metric tons in 2020 and increased further to 48.12 thousand metric tons in 2021. The average production of pechay was 47.64 thousand metric tons during the period (PSA 2022). Hence, a considerate effort to sustain the increase vegetable production through efficient fertilization techniques is a wise alternative.

This study is therefore conducted to verify the use of Soil Conditioner for vegetable crops such as pechay.

Objectives:

1. To test the efficacy of Soil Conditioner in increasing the yield of pechay; and
2. To determine the best treatment combination that will increase the yield of pechay.

METHODOLOGY

Site and Duration

To evaluate the efficacy of the Soil Conditioner application on the yield of pechay, field experiments were conducted at the experimental area at Indangan, Davao City for two months duration from February to March 2024. The area was in a flat topography with nutrient-deficient soil.

Climatic Condition

Meteorological data of the area were taken from the nearest Agromet station within the duration of the study.

Experimental Design and Layout

The experiment was carried out in Randomized Complete Block Design (RCBD). Field experiment was composed of seven treatments replicated three times (Figure 1). There were 128.4 pechay plants in a 12" x 12" planting distance with a plot size of $12m^2$ per replication for a total area of 228 m^2 with a total of 2,696 pechay plants. Each plot was provided with a 1m alleyway.

Soil Analysis

Soil analysis was done to determine the nutrient requirement of the area for pechay. Before the conduct

of the experiment, soil samples were collected at random in the area following the standard procedure of the DA Regional Soil Laboratory, Davao City and analyzed for nutrient requirements (Appendix A).

Treatments

The recommended rate of fertilizer was applied based on the recommendation of soil analysis. Inorganic fertilizers were purchased based on the recommendation in bags/ha and the FULCRUM was applied based on the following treatments: T_1 = control; T_2 = RR of inorganic NPK fertilizer based on soil analysis; T_3 = RR of inorganic NPK + 0.5 rr of FULCRUM+™; T_4 = RR of inorganic NPK + rr of FULCRUM+™; T_5 = RR of inorganic NPK + 1.5 rr of FULCRUM+™; T_6 = rr of FULCRUM+™; T_7 = 0.5 RR of inorganic NPK + rr of FULCRUM+™. The recommended rate of FULCRUM+™ was applied as: First application applied immediately during planting the seeds; Second application after transplanting the pechay; Foliar application only if needed for pests prior to maturity. (FULCRUM acts as an anti-fungal and insect repellant.)

Cultural Management

Sowing. Seeds were sown in a prepared seed box with ordinary garden soil. Land preparation. The field was plowed and harrowed once using animal-drawn implements. Transplanting and Thinning. Two to three seedlings were transplanted per hill, one-two weeks after planting from the seed box. One seedling per hill wad maintained one week after transplanting. Weeding. Manual weeding was done weekly whenever necessary. Watering. The plants were watered daily whenever necessary using a sprinkler. Pesticide application. Insecticide and fungicide were applied whenever necessary at recommended dosage and interval. Rotation use of pesticides was done to avoid the development of resistance to pests. Fertilizer Application. The different fertilizer treatments were applied based on soil analysis and manufacturer's recommendation. Basal application of inorganic fertilizers (140-60-30 kg/ha) was done one week before planting and side dress application was done two weeks after planting based on the soil analysis. The recommended rate of FULCRUM was applied once before transplanting pechay seedlings in the field. It was mixed thoroughly with the garden soil in 1kg/plot and allowed to rest for one week. Harvesting. Pechay (pak-choi cultivar) was harvested at maturity, 21 days from transplanting. The pechay is already matured at three weeks after transplanting the 1-2 weeks old seedlings from the seedbed. So it took 35-40 days for pechay from planting to harvesting. Land preparation took 2-3 weeks so it covered two months for pechay production from clearing, land preparation upto harvesting. This is based on Davao Area region climatic conditions and years of experience in pechay production and research. Pechay production guide publications may differ in conditions per region. Harvesting of pechay was done manually using cutting scissors. Dried leaves and damaged parts were trimmed off and washed in cleaning running water. Freshly harvested leaves were weighed and recorded.

DATA GATHERED

All marketable plant parts per plot was weighed and converted to tons/ha using the formula:

$$\text{Yield (tons/ha)} = \frac{\text{plot yield (kg)}}{\text{area (sq.m.)}} \times \frac{10{,}000}{1{,}000}$$

The following growth parameters were taken at harvest. Plant heights of ten pechay sample plants per replication was measured from the base up to the tip of the plants using a ruler. The number of leaves was counted each from the ten sample plants per replication. The longest leaf lengths and widest leaf widths of the ten sample plants per replication was measured using a ruler. The root length of the ten sample plants per replication was measured using a ruler. The average fresh weights of the ten sample plants per replication were measured using a digital weighing scale.

Data on pH and salinity of the soils were taken before and after FULCRUM applications to verify the effectiveness of FULCRUM as soil conditioner.

Data were analyzed using Analysis of Variance (ANOVA) and differences between treatments were compared using the Honest Significant Difference (HSD) Test.

RESULTS AND DISCUSSION

Root Length (cm)

There was a significant difference on the root length of pechay as shown in Table 1 and Figure 4, at 30 days after transplanting (DAT). Results showed that highest root length was obtained from T5 = RR of inorganic NPK + 1.5 rr FULCRUM followed by T4 = RR of inorganic NPK + rr FULCRUM. This implies that supplementation of FULCRUM enhances the root length of pechay by as much as 95% more than the control.

Table 1: Root length (cm) of pechay is influenced by FULCRUM at 30 days after transplanting (DAT).

TREATMENT	I	II	IIII	MEAN**
T1 = control	9	10	8	9.0 e
T2 = RR of inorganic NPK (140-60-30 kg/ha) based on soil analysis	13	14	12	13.0 cd
T3 = RR of inorganic NPK + 0.5 rr of FULCRUM	15	16	13	14.6 bc
T4 = RR of inorganic NPK + rr of FULCRUM	18	19	15	17.3 ab
T5 = RR of inorganic NPK + 1.5 rr of FULCRUM	18	19	16	17.6 a
T6 = rr of FULCRUM	11	16	13	13.3 cd
T7= 0.5 RR of NPK + rr of FULCRUM	12	13	10	11.6 de

C.V (%) = 6.83
**= highly significant at 1% level

Number of Leaves

The number of leaves of pechay was significantly affected by FULCRUM at 30 days after transplanting (DAT) as shown in Table 2. Results indicate that the most number of leaves of pechay was observed in T7 = 0.5 RR of inorganic NPK + rr FULCRUM followed by T5 = RR of inorganic NPK + 1.5 rr FULCRUM. This implies that FULCRUM increased the number of leaves of pechay by as much as 1.5 times than the control.

Table 2: Number of leaves of pechay as influenced by FULCRUM at 30 days after transplanting (DAT).

TREATMENT	I	II	IIII	MEAN **
T1 = control	10	8	9	9.0 d
T2 = RR of inorganic NPK (140-60-30 kg/ha) based on soil analysis	10	12	13	11.6 d
T3 = RR of inorganic NPK + 0.5 rr of FULCRUM	12	10	11	11.0 d
T4 = RR of inorganic NPK + rr of FULCRUM	16	16	17	16.3 c
T5 = RR of inorganic NPK + 1.5 rr of FULCRUM	19	20	22	20.3 ab
T6 = rr of FULCRUM	18	18	20	18.6 bc
T7= 0.5 RR of NPK + rr of FULCRUM	24	22	23	23.0 a

C.V. (%) = 6.54
**= highly significant at 1% level

Average Fresh Weight (g) of ten sample plants

The average fresh weight of ten sample plants significantly affected the fresh weight at 30 days after transplanting (DAT) as shown in Table 3. Treatments with T7 = 0.5 RR of inorganic NPK + rr FULCRUM followed by T5 = RR of inorganic NPK + 1.5 rr FULCRUM were significantly higher than without fertilizer applications. This shows that application of NPK with FULCRUM enhanced the fresh weight of pechay as much as three times higher than the control.

Table 3: Average Fresh weight (g) of pechay as influenced by FULCRUM at 30 days after transplanting (DAT).

TREATMENT	I	II	IIII	MEAN **
T1 = control	47	43	30	40.0 e
T2 = RR of inorganic NPK (140-60-30 kg/ha) based on soil analysis	62	67	80	69.6 d
T3 = RR of inorganic NPK + 0.5 rr of FULCRUM	70	76	83	76.3 cd
T4 = RR of inorganic NPK + rr of FULCRUM	75	80	78	77.6 cd
T5 = RR of inorganic NPK + 1.5 rr of FULCRUM	108	110	115	111.0 b

T6 = rr of FULCRUM	95	90	98	94.3 bc
T7= 0.5 RR of NPK + rr of FULCRUM	152	150	180	160.6 a

C.V. (%) = 9.04
**= highly significant at 1% level

Leaf Width

Table 4 shows that the leaf width of pechay was significantly affected by FULCRUM at 30 days after transplanting (DAT) using ANOVA. The T7 = 0.5 RR of inorganic NPK + rr FULCRUM and T5 = RR of inorganic NPK + 1.5 rr FULCRUM got the widest leaves followed by T4 = RR of inorganic NPK + rr FULCRUM and T6 = rr of FULCRUM. This suggests that fertilizer application supplemented with FULCRUM increased leaf width of pechay as much as 100% than the control.

Table 4: Leaf Width (cm) of pechay as influenced by FULCRUM at 30 days after transplanting (DAT).

TREATMENT	I	II	IIII	MEAN **
T1 = control	9	8	10	9.1 d
T2 = RR of inorganic NPK (140-60-30 kg/ha) based on soil analysis	10	11	12	11.0 cd
T3 = RR of inorganic NPK + 0.5 rr of FULCRUM	10	12	13	11.6 c
T4 = RR of inorganic NPK + rr of FULCRUM	15	15	17	15.6 b
T5 = RR of inorganic NPK + 1.5 rr of FULCRUM	18	17	19	18.0 a
T6 = rr of FULCRUM	15	14	16	15.0 b
T7= 0.5 RR of NPK + rr of FULCRUM	18	19	20	19.0 a

C.V. (%) = 4.73
**= significant at 1% level

Leaf Length

The leaf length of pechay also has significant differences at 30 days after transplanting (DAT) as indicated in Table 5 based on ANOVA. Still, T7 = 0.5 RR of inorganic NPK + rr FULCRUM followed by T5 = RR of inorganic NPK + 1.5 rr FULCRUM got the longest leaf length of pechay. Hence, this verifies that leaf length of pechay was enhanced using FULCRUM by as much as 42% than the control.

Table 5: Leaf Length (cm) of pechay as influenced by FULCRUM at 30 days after Transplanting (DAT).

TREATMENT	I	II	IIII	MEAN **
T1 = control	20	21	18	19.6 d
T2 = RR of inorganic NPK (140-60-30 kg/ha) based on soil analysis	25	23	20	22.6 bcd
T3 = RR of inorganic NPK + 0.5 rr of FULCRUM	21	20	23	21.3 cd
T4 = RR of inorganic NPK + rr of FULCRUM	24	25	23	24.0 bc
T5 = RR of inorganic NPK + 1.5 rr of FULCRUM	27	26	25	26.0 ab
T6 = rr of FULCRUM	26	24	22	24.0 bc
T7= 0.5 RR of NPK + rr of FULCRUM	28	29	27	28.0 a

C.V. (%) = 5.82
**= significant at 1% level

Plant Height

The pechay height was further significantly affected by various treatments at 30 days after transplanting (DAT) (Table 6). The highest height of pechay was observed in T7 = 0.5 RR of inorganic NPK + rr FULCRUM, T5 = RR of inorganic NPK + 1.5 rr FULCRUM and T4 = RR of inorganic NPK + rr FULCRUM which is comparable to the fertilizer treatments applied with inorganic NPK or FULCRUM except the control. Moreover, the height of pechay was increased by 0.5 RR NPK + rr FULCRUM by as much as 54% compared to the control.

Table 6: Plant Height (cm) of pechay as influenced by FULCRUM at 30 days after transplanting (DAT).

TREATMENT	I	II	IIII	MEAN **
T1 = control	19	15	12	15.5 b
T2 = RR of inorganic NPK (140-60-30 kg/ha) based on soil analysis	21	18	19	19.7 ab
T3 = RR of inorganic NPK + 0.5 rr of FULCRUM	20	22	19	20.3 ab
T4 = RR of inorganic NPK + rr of FULCRUM	21	22	24	22.3 a
T5 = RR of inorganic NPK + 1.5 rr of FULCRUM	22	23	24	23.0 a
T6 = rr of FULCRUM	21	20	19	20 ab
T7= 0.5 RR of NPK + rr of FULCRUM	24	23	25	24.0 a

C.V. (%) = 9.49
** = significant at 1% level

Yield (ton/ha)

The effect of FULCRUM on the yield of pechay per plot was highly significant (Table 7, Figures 2,3). The highest yield of pechay was obtained in T7 = 0.5 RR of inorganic NPK + rr FULCRUM and T5 = RR of inorganic NPK + 1.5 rr FULCRUM followed by T4 = RR of inorganic NPK + rr FULCRUM and T6 = rr of FULCRUM. The 0.5 RR of inorganic NPK + rr of FULCRUM was significantly higher by 100% than the control (T1). This indicates that the application of FULCRUM with RR inorganic fertilizer increased the yield of pechay.

This supports previous study where the recommended rate (rr) of NPK with and without 1.5 rr foliar fertilizer increased plant height and length of leaves as much as 45%, width of leaves by 40%, leaf number by 20%, fresh weight up to two times and yield by three times higher (Fernandez & Miñoza 2015). Stimulate hormones increased plant height of pechay by 37%, length of leaves by 44%, width of leaves by 39%, fresh weight by 2 times, yield by 3 times, and number of leaves (Andigan & Fernandez 2017). The application of RR of inorganic NPK + rr of DR. BO'S FARM ESSENTIALS got the heaviest weight as much as two times, the widest leaf by 100%, the highest height by 53%, and the highest yield of pechay up to three times than the control (Magbalot-Fernandez et al. 2024). Further studies verified that soil supplements with RR inorganic fertilizer increased the growth and yield of pechay (Magbalot-Fernandez et al. 2024; Fernandez et al. 2023; Fernandez & Agan 2021; Eroy 2019).

Table 7: Yield (ton/ha) of pechay as influenced by FULCRUM at 30 days after transplanting (DAT).

TREATMENT	I	II	IIII	MEAN **
T1 = control	0.922	0.845	0.706	0.824 b
T2 = RR of inorganic NPK (140-60-30 kg/ha) based on soil analysis	0.972	0.867	0.898	0.912 b
T3 = RR of inorganic NPK + 0.5 rr of FULCRUM	0.657	0.785	0.654	0.698 b
T4 = RR of inorganic NPK + rr of FULCRUM	1.059	1.346	1.564	1.323 ab
T5 = RR of inorganic NPK + 1.5 rr of FULCRUM	2.325	1.998	1.367	1.896 a
T6 = rr of FULCRUM	1.078	1.574	1.566	1.406 ab
T7= 0.5 RR of NPK + rr of FULCRUM	2.045	1.687	1.980	1.904 a

C.V. (%) = 20.98 **= highly significant at 1% level

Soil pH

Data on pH of the soils were taken before and after FULCRUM applications. There was an increase of pH after applications of FULCRUM treatments. The pH of the field before FULCRUM treatment applications were strongly acidic with a pH of 5.2. As indicated in Table 8, four weeks after the application of various levels of fertilizers with FULCRUM and lime pH increased which ranged from 5.3-5.9. While the control and inorganic fertilizer treatments maintained its pH to 5.2. This implies the significant role of FULCRUM as soil conditioner reducing acidity of the soil.

Table 8: Average Soil pH of the pechay field as influenced by FULCRUM applications.

TREATMENT	pH before FULCRUM Application	pH four weeks after FULCRUM application
T1 = control	5.2	5.2
T2 = RR of inorganic NPK (140-60-30 kg/ha) based on soil analysis	5.2	5.2
T3 = RR of inorganic NPK + 0.5 rr of FULCRUM	5.2	5.8
T4 = RR of inorganic NPK + rr of FULCRUM	5.2	5.4
T5 = RR of inorganic NPK + 1.5 rr of FULCRUM	5.2	5.3
T6 = rr of FULCRUM	5.2	5.9
T7= 0.5 RR of NPK + rr of FULCRUM	5.2	5.5

SUMMARY, CONCLUSION AND RECOMMENDATION

The study was conducted at Indangan, Davao City, with a duration of 2 months which started from February to March 2024. The objectives of the study were the following: To determine the efficiency of FULCRUM on pechay growth and yield performance; To verify the effects of FULCRUM application on the growth and yield parameters; fresh weight, plant height, leaf width and length, number of leaves and root length; and to determine the best treatment combination that will increase the growth and yield performance of pechay.

A Randomized Complete Block Design (RCBD) was used as the experimental design which was composed of six treatments, and replicated three times. The treatments were: T_1 = control; T_2 = RR of inorganic NPK fertilizer (140-60-30 kg/ha) based on soil analysis; T_3 = RR of inorganic NPK + 0.5 rr of FULCRUM+™; T_4 = RR of inorganic NPK + rr of FULCRUM+™; T_5 = RR of inorganic NPK + 1.5 rr of FULCRUM+™; T_6 = rr of FULCRUM+™; and T_7 = 0.5 RR of inorganic NPK + rr of FULCRUM+™.

Data on growth and yield components were gathered and analyzed using Analysis of Variance (ANOVA) and differences between treatments were compared using Honest Significant Difference (HSD) Test.

Based on the results of the study, the growth and yield performance of pechay were significantly affected by FULCRUM in terms of plant height, fresh weight, leaf width, leaf length, root length, number of leaves and pechay yield.

Results showed that highest root length was obtained from T5 = RR of inorganic NPK + 1.5 rr FULCRUM followed by T4 = RR of inorganic NPK + rr FULCRUM by as much as 95% more than the control. It also increased the number of leaves of pechay by as much as 1.5 times than the control, enhanced the fresh weight of pechay as much as three times higher than the control, and leaf length of pechay was enhanced using FULCRUM by as much as 42% than the control. The yield of 0.5 RR of inorganic NPK + rr of FULCRUM was significantly higher by 100% than the control (T1).

The T7 = 0.5 RR of inorganic NPK + rr FULCRUM and T5 = RR of inorganic NPK + 1.5 rr FULCRUM got the widest leaves by as much as 100% than the control followed by T4 = RR of inorganic NPK + rr FULCRUM and T6 = rr of FULCRUM. Moreover, the height of pechay was increased by 0.5 RR NPK + rr FULCRUM by as much as 54% compared to the control.

Hence, the application of rr FULCRUM with half RR inorganic fertilizer is recommended for increased growth and yield of pechay.

After four weeks from FULCRUM applications, the control and inorganic NPK applied treatments

maintained its pH to 5.2 while treatments with FULCRUM had increased pH which ranged from 5.3-5.9. This implies the significant role of FULCRUM as soil conditioner reducing acidity of the soil.

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SOIL TEST REPORT

Name :	**JHON PAUL AMBIT**	Submitted by: **J. P . AMBIT**	Ref. # : **23-07-0559**
Site of Farm *(Sitio/Brgy/Municipality/Province)* :	**CFFI, INDANGAN, DAVAO CITY**		
Area Represented *(has.)* :	**1 HECTARE**	Topography *(plain/sloping/hilly)*	**PLAIN**
Water Supply *(Irrigated/Rainfed)* :	**RAINFED**	Past Fertilizer Applied :	**COMPLETE**
Previous Crops :	**OKRA & PECHAY**	Date Collected:	**JULY 21,2023**
Previous Yield *(Cavans/ha.)* :		Date Submitted:	**JULY 24,2023**
Soil Type :	**CLAY LOAM**	Date Finished :	**OCT. 2, 2023**
Crops to be fertilized :	**CORN - HYV, PECHAY, TOMATO & PINEAPPLE**	Contact No./email	**0915 - 929 5246**

Lab. No./ Field Iden.	Soil Type/ Texture	RESULT OF ANALYSIS: Soil Reaction pH 1:1	Walkley-Black* OM %	Olsen P ppm	H2SO4 Ext's K ppm	MCF	CROP/ AGE	NUTRIENT REQUIREMENT (kgs/ha.) N	P_2O_5	K_2O	LIME REQ'T T/ha.	pH preference
23-1433	Clay Loam/	5.2	2.54	4.16	350.41	-	Corn - HYV	100	60	45	5	6.0 - 8.0
	Heavy	*Str. A.*	*M*	*VL*	*A*		Pechay	140	60	30	5	6.0 - 6.5
							Tomato	80	100	30	2	4.5 - 6.5
							Pineapple	200	80	60	2	5.0 - 6.5

Fertilizer Recommendation :

Options	1st application (Basal) Lime	Compost/ Organic Fert.	Complete (14-14-14)	Urea (46-0-0)	Ammophos (16-20-0)	Duofos (0-20-0)	Mu. Of Potash (0-0-60)	2nd application Urea (46-0-0)
	(tons/ha.)	(bags per hectare; kgs per hectare)						
Corn - hybrid (100-60-45) Wet Season								
Option 1	2 tons	20 bags	6.5 bags	0.25 bag	-	3.75 bags	-	2.25 bags
Option 2	2 tons	20 bags	-	0.25 bag	6 bags	-	1.50 bags	2.25 bags
Option 3	2 tons	20 bags	-	2.25 bags	-	15 bags	1.50 bags	2.25 bags

Crops	Lime	Compost/ Organic Fert.	Ammophos (16-20-0)	Duofos (0-20-0)	Urea (46-0-0)	Ammosul (21-0-0)	Mu. Of Potash (0-0-60)
	(tons/ha.)	(bags per hectare per season)					
Pechay							
1st application	2 tons	20 bags	-	8 - 15 bags	1 - 2 bags	3.75 bags	0.5 - 1 bag
2nd application	-	-	-	-	2 - 4 bags	-	-
Tomato							
1st application	1 ton	20 bags	2.5 - 5 bags	6.25 - 12.5 bags	-	-	0.5 - 1 bag
2nd application	-	-	-	-	-	2 - 3.75 bags	-
Pineapple							
1st application	1 ton	20 bags	-	10 - 20 bags	1.5 - 3 bags	-	1 - 2 bags
2nd application	-	-	-	-	-	3.25 - 6.25 bags	-
3rd application	-	-	-	-	-	3.25 - 6.25 bags	-

Legend:
* - interpretation applicable for Nitrogen fertilizer requirement
Str. A. - strongly acidic M - medium VL - very low A - adequate

Note:
Incorporate lime into the soil, 1/2 to 1 month before fertilization at the rate of 1 to 2 tons per hectare. Lime treatment must be done in staggered application until the desired pH is achieved.

Result of analysis as per sample submitted by the customer. Samples will be kept only for a month from the date received.

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Figure 1. Field Layout of the experiment in RCBD with 7 treatments and 3 replications at Indangan, Davao City. T_1 = control; T_2 = RR of inorganic NPK fertilizer (140-60-30 kg/ha) based on soil analysis; T_3 = RR of inorganic NPK + 0.5 rr of FULCRUM+™; T_4 = RR of inorganic NPK + rr of FULCRUM+™; T_5 = RR of inorganic NPK + 1.5 rr of FULCRUM+™; T_6 = rr of FULCRUM+™; and T_7 = 0.5 RR of inorganic NPK + rr of FULCRUM+™.

Figure 2: Effect of FULCRUM on pechay growth four weeks from planting at Indangan, Davao City. T1 = control; T2 = RR of inorganic NPK fertilizer (140-60-30 kg/ha) based on soil analysis; T3 = RR of inorganic NPK + 0.5 rr of FULCRUM+™; T4 = RR of inorganic NPK + rr of FULCRUM+™; T5 = RR of inorganic NPK + 1.5 rr of FULCRUM+™; T6 = rr of FULCRUM+™; and T7 = 0.5 RR of inorganic NPK + rr of FULCRUM+™.

Figure 3: Harvested pechay at 30 days after planting. T1 = control; T2 = RR of inorganic NPK fertilizer (140-60-30 kg/ha) based on soil analysis; T3 = RR of inorganic NPK + 0.5 rr of FULCRUM+™; T4 = RR of inorganic NPK + rr of FULCRUM+™; T5 = RR of inorganic NPK + 1.5 rr of FULCRUM+™; T6 = rr of FULCRUM+™; and T7 = 0.5 RR of inorganic NPK + rr of FULCRUM+™.

Figure 4: Roots of harvested pechay at 30 days after planting. T1 = control; T2 = RR of inorganic NPK fertilizer (140-60-30 kg/ha) based on soil analysis; T3 = RR of inorganic NPK + 0.5 rr of FULCRUM+™; T4 = RR of inorganic NPK + rr of FULCRUM+™; T5 = RR of inorganic NPK + 1.5 rr of FULCRUM+™; T6 = rr of FULCRUM+™; and T7 = 0.5 RR of inorganic NPK + rr of FULCRUM+™.

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