A Grow Together Project: Performance Evaluation of Improvised Organic Fertilizers on the Yield of Cash Crops and its Economic Contribution to Agriculture Graduates in Tawi-Tawi Province, Philippines

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Abstracts: This study considers improvised organic fertilizers as one of the bioremediation therapies to restore soil fertility and the ecological stability of the farming environment. This used four homemade materials and leftovers to create improvised organic fertilizers. Banana peels, papaya peels, leaves, fish remains, and sea urchin pines are common food wastes that typically have no further use after the food has been devoured. Farmers could use these materials in a bioremediation process that supports the farming environment's ecological and economic stability. This study provides feedback on the significance of homemade organic fertilizer as it improves farmers' economic and environmental contributions. The parameters of this study were the yields of these four crops and the farmer's income. In this study, four different crops—peanut, bell pepper, string bean, and corn—were subjected to four different concentrations of improvised organic fertilizers, including: for the peanut, a concentrated mixture of ripe banana peels and papaya extract; for the bell pepper, a concentrated mixture of triturated sea urchin spines and basil extract; for the corn, a concentrated mixture of algae and wild basil extract; and for the string bean, a The data was analyzed using a Randomized Complete Block Design (RCBD), which produced highly good yield results for these crops and thus boosted the local farmers' income. The results were as follows: 1) Peanuts treated with 1500ml improvised organic fertilizers yielded 3.06 kilograms with a total mean score of 3.59abc; 2) Bell peppers treated with 1500ml improvised organic fertilizers yielded 15.9 kilograms with a total mean score of 5.30; and 3) corn treated with 1500ml improvised organic fertilizers yielded 5.30 kilograms with a total mean score of 5.30. The farmers' income was implied by the investment's return on these four crops. According to the study, income grows when yield rises, and selling volume is high.

Keywords: Performance, Improvised Organic fertilizers, Yield, Economic Contribution.

1. INTRODUCTION

This study introduces the recently invented organic fertilizers made from local farm waste materials and applied in Bongao Municipality, Tawi-Tawi Province, in southern Philippines.

Fertilizers are a major part of modern farming practices that help increase yield. As more farmers and individuals utilize fertilizers frequently in their farms, whether it be small-scale personal gardening or large-scale agricultural industries, they are becoming more important in demand and common resources in farming communities today. It is generally accepted that chemically enhanced fertilizers can harm the environment because of the contamination and toxic waste pollution they cause in soils. Soil contamination is one of the most harmful yet poorly controlled types of pollution brought on by inorganic fertilizers. It can be brought on by various circumstances, including inappropriate use and excessive use of chemical fertilizers over time in a specific location. Inorganic fertilizers should not be misused or in excess amounts as they can seriously injure plants, animals, and, eventually, people who consume farm goods that have been fertilized. Ecological diversity may be destroyed as a result of this.

An efficient, practical, and gaining in popularity technique for purging toxins from contaminated soil is organic fertilization. This is one of the strategies known to use naturally occurring organisms to break down contaminants. In contrast to commonly utilized approaches, this can permanently remove the pollution for the lowest possible cost. It contains naturally occurring organisms that can break down pollutants in soils. These organisms can be stimulated by a wide range of collected items that can add additional nutrients to the soils and encourage the growth of more creatures that can break down pollutants. This study expands the use of homemade organic fertilizers as a bioremediation technique for restoring soil fertility in agricultural areas. It highlights the value of homemade organic fertilizers, renowned for supplying the soil with vital nutrients. This experiment consists of applying four different kinds of improvised organic fertilizers in four other places as part of a grow-together project.

Common food wastes and leaf over include the spines of sea urchins, cooked seaweed remnants and algae, wild basil, banana peels, papaya peels and leaves, and fish remains. These wastes and leaves typically have no further use once the food has been eaten. This could be transformed into a bioremediation solution, contributing to the farming environment's ability to maintain its ecological and economic stability. In response to this difficulty, the researcher supported this research and developed and improvised organic fertilizers to solve the farming industry's current issues.

1.1. Objectives of the study

This was done with the following goals in mind: 1) Assess the efficacy of various improvised organic fertilizers manufactured in the province from waste materials such as banana peels, sea urchin spines, papaya peel, and leaf extract, seaweed residues, algae, wild basil, and fermented fish amino acid made from fish bones and garbage. 2) determine how these improvised organic fertilizers should be calculated in a grow-together farming system. 3) ascertain its economic applications, significance, and end-user approval. 4) ascertain its economic impact on Tawi-local Tawi's farmers and recent agricultural graduates. 5) based on the investigation findings, give a proposal regarding its contribution to the farmers' revenue. Pasiagan, Nalil, Tubig-basag, and Campu-sayul were the four localities in Bongao Municipality where this was undertaken.

1.2. Significant of the study

The author's persistence in carrying out this study was too great to offer end-users feedback, opinions, or valuable information about ways to raise the caliber of agricultural products at a low cost, particularly in developing cash crops. The province's local farmers and residents who make farming their profession would benefit significantly from this. Additionally, Tawi-Tawi Regional Agricultural College members who are vital contributors to the end-users in the larger community should be included in the research.

1.3. Expected beneficiaries

About 800 agriculture graduates were given among 11 towns in the province for the two academic years 2018–2019, in addition to the local farmers who are the study's target beneficiaries. The findings of this scientific investigation would be helpful to future agricultural curriculum applicants who seek to do similar research. The researcher advises the beneficiaries to apply these outputs. As a result, 85% utilize the advice given to increase their financial success when producing cash crops, including corn, bell pepper, peanuts, and string beans.

2. REVIEW OF RELATED LITERATURE

The literature, citations, readings, and material pertinent to this study are presented in this chapter. Manure and other organic fertilizers have been utilized in agriculture for thousands of years; while early farmers were unaware of the chemistry involved, they were aware of the advantages of feeding organic material to their crops. Singh [23]. Organic farming is becoming more popular worldwide as a sustainable agricultural method. Due to the delayed release of nutrients during decomposition, organic fertilizers are long-lasting suppliers of nutrients. Organic farming may restore the natural fertility of degraded soil and increase soil organic matter, which will increase crop output and help feed the world's expanding population. Esteban [9]. Organic fertilizers improve the natural soil processes, which have long-term consequences on soil fertility.

Sarfati [6], Seto [7], and other researchers have found that sea urchin spines include ever-smaller structures, down to length scales that are one billionth the size of a human hair. The strength, toughness, and forms of sea urchin spines are primarily a result of these ever-tinier structures. [6] [7]. According to recent research by scientists at the University of Konstanz, some of these proteins play a role in creating of the area where the nanocrystalline units and their close crystalline neighbors grow to create the spine. Mother Nature has discovered proteins that will orient crystals by having them grow into a position aligned and oriented instead of shifting millions of tiny nano-sized crystals around so that the units are aligned. [6] [7]. The spine has two roles in its structure and operation: (1) mechanically blunting the tip of cracks as they form and dispersing the energy of the fracture to prevent total

fracture (2) a stockpile of amorphous mineral phases that they can transfer to fracture areas to repair the mineral surface. The arrangement of all these parts enables the sea urchin spine to execute and function in the manner necessary to ward off predators and manage the regular demands of daily life [6] [7].

Each spine, according to Sarfati [6] and Seto [7], is a single calcite crystal (CaCO3). This mineral is typically fragile and delicate. However, it has been greatly strengthened in several ways. It is a hollow, tapered cylinder, so weight and materials are saved without much strength being lost. Some magnesium ions can substitute for calcium ions, creating an irregularity that prevents cracks from spreading (the same principle explains the greater strength of metal alloys). Therefore, any cracks resemble those in glass, a non-crystalline solid, rather than those in crystals. The animal's primary spherical shell, known as the test, is protected by this fracture, which also absorbs energy. Additionally, the mineral crystal contains a small amount of organic material (glycoprotein), significantly improving toughness, Sarfati and Seto (6).

Basil, a woody, branching plant, is a warm-weather annual that thrives in temperatures between 80 and 90 degrees. Unless you intend to create pesto, two or three basil plants will produce enough fresh leaves for a household of four. Encyclopedia [28]. Plant a dozen or more plants to grow and preserve enough pesto for winter. Numerous gardeners mix different varieties of basil in their flowerbeds, so it is always ready for a rapid harvest. It works well for containers as well. Encyclopedia [28]. Fresh basil should be added to meals for the most flavor in the last five to ten minutes of cooking. Use fresh basil in tomato-based meals, soups, salads, sauces, and pasta. Its flavor complements sage, parsley, rosemary, oregano, and thyme wonderfully. Encyclopedia [28].

The papaya plant is lactiferous because it has special cells called lactifers, which are present in nearly all tissues and secrete latex. Most plant tissues include lactifiers, which release latex, Encyclopedia [28]. The four cysteine endopeptidases papain, chymopapain, glycyl endopeptidase, and caricain are well known for being abundant in papaya-latex. Carpaine, a type of alkaloid, and carposide, a kind of glucoside, are both found in leaves. Alternative medicine has historically used various papaya plant components, including fruit, dried fruit, leaves, dried leaves, stems, seeds, and roots. For instance, according to Wikipedia [28], the seeds are employed as an abortifacient to drive out worms and roots. The leaves, especially the ones that have fallen, are used in various ways to cure inflammation, gonorrhea, syphilis, diabetes, fevers, and pyrexia. Encyclopedia [28].

Fish Amino Acid (FAA), sometimes known as FFAA, is a liquid manufactured from fish. Because it contains a wealth of minerals and different amino acids (which will serve as a source of nitrogen (N) for plants), FAA is very valuable to plants and microbes in their growth. Emaga, Happi [14]. The FAA will reward fish with a blue or white back. It directly penetrates the plants and also encourages the activity of microbes. [13] Hai-Yan et al. When combined with a small amount of urea, FAA's effects are easier to see. FAA contains a lot of nitrogen. It is a useful fertilizer for soil and foliage since it promotes crop growth throughout the vegetative phase when combined with other Natural Farming Materials. It is possible to apply FAA continually to boost yield and enhance flavor and smell in green vegetables. Apply the FAA after diluting IMO or mixed compost with water at 1:1000. The FAA will then assist in triggering the microorganisms. Mites and the greenhouse whitefly can be effectively eradicated by FAA (Trialeurodes vaporariorum). Spray FAA on the leaf's underside and over it after diluting it with water. The brown rice vinegar (BRV), which has a volume ten times more than the bones, should be added to the FAA-making leftover bones. The bones will break down and create high-quality calcium phosphate that is water soluble. Encyclopedia [28].

Contrary to other photosynthetic bacteria like purple and green sulfur bacteria, algae contain photosynthetic machinery that is ultimately descended from cyanobacteria that produce oxygen as a by-product of photosynthesis. Algae use various reproductive techniques, ranging from straightforward asexual cell division to detailed sexual reproduction. Hardy, et. al. [15], Brodie, et. al. [3]. Alliga, which means "binding and entwining," is a more plausible origin. Accordingly, depending on whether the Greek or Latin root is utilized. The study of marine and freshwater algae is either referred to as phycology or algology. Algae can be classified as aquatic, terrestrial, aerial (subaerial), lithophytic, halophytic (or euryhaline), psammon, thermophilic, cryophilic, epibiont (epiphytic, epizoic), endosymbiont (endophytic, endozoic), parasitic, calcifilic, or lichenic depending on their habitat (FAO [10], Hardy, et [3] Brodie, et al. The majority of algae have chloroplasts, which resemble cyanobacteria in structure. Chloroplasts are thought to

be reduced endosymbiotic cyanobacteria because they possess circular DNA similar to that seen in cyanobacteria. But different lineages of algae have distinct origins for their chloroplasts, indicating that they acquired them during various endosymbiotic processes. Hardy and others [15].

Nearly 500 million years ago, the earliest land plants most likely descended from shallow freshwater charophyte algae similar to Chara. Numerous algae, especially Characeae members, have been used as model experimental organisms to better understand the mechanisms underlying membrane permeability to water, osmoregulation, turgor regulation, salt tolerance, cytoplasmic streaming, and the production of action potentials. Algal cells, as well as higher plants, contain phytohormones. Some kinds of algae have symbiotic associations with other living things in; which the algae Henry et al. [16], Brook et al. [18], and Knight et al. [20] feed the host organism with photosynthesis (organic compounds), protecting the algal cells in the process. The algae provide the host organism with some or all of the energy it needs. In rare cases, geographic features like Antarctica, extensive ocean stretches, or large land masses can generate floristic discontinuities that affect the distribution of algae. FAO [10].

Uses - Agar, a gelatinous substance made from red algae, is used in various industrial processes. Since most microorganisms cannot digest agar, it is an excellent medium for growing bacteria and fungi. FAO [10], Hardy, et al. [15], and Brodie et al. [3], Biofuels must match or outperform the cost of fossil fuels to be competitive and free from varying assistance from a (local) policy in the long run.

Seaweed has been used as fertilizer for centuries. George Owen of Henllys wrote about drift weed in South Wales in the 16th century, describing how people frequently gather it and pile it high where it will rot and heat and have an offensive odor. Once it has reached this state, they cast it on the ground like their muck, and good corn, mainly barley, will grow there. FAO [11]. They bring it ashore in sacks on horseback after spring tides or large sea rigs, ride three, four, or five kilometers with it, and then cast it on the land, which improves the soil for maize and grass considerably. Today, humans employ algae in various ways, such as fertilizers, soil conditioners, and livestock feed Henry et al. [16], Brook et al. [18], and Knight et al. [20]. In transparent tanks or ponds, aquatic and microscopic species are cultivated, harvested, or utilized to clean effluents pumped through the ponds. Large-scale algae farming is an effective form of aquaculture in several regions. Mearl is frequently used to improve soil, according to Wikipedia [28].

Seaweeds that grow naturally are a significant food source, particularly in Asia. Brook et al. [18], Knight et al. [20], Henry et al. [16], etc. They are a good source of iodine, potassium, iron, magnesium, calcium, and several vitamins, including A, B1, B2, B6, niacin, and C. Additionally, professionally grown microalgae, including algae and cyanobacteria, are sold as dietary supplements. Examples include spirulina, chlorella, and the beta-carotene-rich vitamin C supplement made from Dunaliella. Many countries' traditional diets include algae:

- China consumes about 70 species, including the cyanobacterium fat choy, which is classified as a vegetable.
- Japan consumes over 20 species.
- Ireland consumes dulse.
- Chile consumes cochayuyo.

Welsh "laver bread" is made using laver, also called bara lawr in Korea, gim in Japan, and nori and aonori in Korea.

Additionally, it is used by the Mori of New Zealand, in Hawaii, and all the way up the west coast of North America from California to British Columbia. Henry and others [16]. Sea lettuce and badderlocks are used as salad ingredients in Scotland, Ireland, Greenland, and Iceland. Knight and others, [20]. High quantities of unsaturated fatty acids are found in oils from certain algae. For instance, the triglyceride pool of Parietochloris incisa has a very high amount of arachidonic acid, up to 47% of the total. Docosahexaenoic acid (DHA) and eicosatetraenoic acid are long-chain, necessary omega-3 fatty acids in some forms of algae that are popular among vegetarians and vegans

(EPA). Omega-3 fatty acids are found in fish oil, but their primary source is algae, specifically microalgae Brook et al., [18], consumed by copepods and then moved up the food chain. Algae can treat sewage, negating the need for significant quantities of hazardous chemicals. According to Knight et al. [20], algae can absorb nutrients in farm runoff. The enriched algae can be picked later and utilized as fertilizer. Algae, which absorb nutrients from the water in an algae scrubber, also known as an algae grass scrubber, can filter ponds and aquariums. Henry and others [16].

A horizontal algae scrubber, also known as an algal grass scrubber, was found to be effective at capturing 60–90% of nitrogen runoff and 70–100% of phosphorus runoff from manure effluents by Agricultural Research Service scientists, according to Wikipedia [28]. (ATS). The ATS was created by scientists Henry et al. [16], Brook et al. [18], and Knight et al. [20], who also conducted a three-year study on its effectiveness. The ATS consists of shallow, 100-foot raceways of nylon netting where algal colonies can grow. They discovered that algae might effortlessly be employed to improve the water quality flowing into rivers, streams, and oceans and lessen nutrient runoff from agricultural fields. Brook et al. [18], Knight et al. [20], Henry et al. [16], etc. The ATS's nutrient-rich algae were harvested, dried, and they investigated its potential as an organic fertilizer. They discovered that utilizing ATS organic fertilizer produced cucumber and corn seedlings that thrived just as well as those using commercial fertilizers. Aquaria and ponds are now filtered utilizing algae scrubbers Henry et al. [16], using bubbling upflowed or vertical waterfall variants. It can replace chemical dyes and coloring agents with natural pigments produced by algae (carotenoids and chlorophylls). [18] Brook et al.

In British English, "banana skin" is used for banana peels. The banana fruit's outer layer is the Hossenlopp [4]. With an annual production of over 145 million tons in 2011, bananas, whether eaten raw or cooked, are a common fruit consumed worldwide. As a result, a lot of banana peel trash is produced. Banana peels are employed as a feedstock because they have some nutritional value, according to Hai-Yan et al. [13] and Kalemelawa [19]. On small farms where bananas are grown, banana peels are frequently used. Concerns have been raised about how the peels' tannins affect animals that eat them. Banana peels are used as a feedstock for various animals, including fish, chickens, rabbits, cattle, goats, and pigs. Babatunde (12) and Emaga (14) On average, banana peels include 6-9% dry matter of protein and 20-30% fiber. The specific nutrition found in peel depends on the stage of ripeness and the cultivar; for instance, plantain peels contain less fiber than dessert banana peels, and lignin concentration increases with ripening. 40% of the starch in green plantain peels is converted into sugars during ripening. Ripe banana peels contain up to 30% free sugars, while green banana peels have significantly less starch. Encyclopedia [20].

Additionally, banana peels are used as compost, fertilizer, and for producing ethanol, cellulase, and laccase from water. The "slipping on a banana peel" physical comedy slapstick visual prank also includes banana peels. In 1920s America, people already regarded this joke as a classic. Banana peel trash was seen as a public health issue in several American communities, including Babatunde [12] and Emaga [14], in the late 19th century. Banana peel-slipping jokes have been around since at least 1854, but they took off in the late 1860s once bananas were imported in huge quantities. Orange peels, occasionally peach skins, fruit peels, peelings, or skins were humorous and potentially dangerous before banana peel jokes became popular, Kalemelawa (p. 19). According to Wikipedia [20], municipal rules regarding the disposal of the peel previously made slipping on a banana peel a serious issue.

3. METHODOLOGY

Experimental design: Four crops were produced simultaneously in four different areas using the Randomized Complete Block Design (RCBD) as a statistical technique. There were four treatments and three replications, and all data were examined at the 5% and 1% levels of significance for the following crops:

a) Peanut - Treatment-1, control without fertilizer; Treatment-2, treated with a concentration of 500ml improvised fertilizer; Treatment-3, treated with a concentration of 1000ml fertilizers; a mixture of pounded ripe banana peels and papaya extract per five gallons of water; and Treatment 4: a mixture of pounded ripe banana peels and papaya extract in five gallons of water, treated with a concentration of 1500ml fertilizers.

b) Bell pepper - Treatment-1, control without fertilizer; Treatment-2, treated with a concentration of 500ml improvised fertilizer; a mixture of pounded sea urchin spines [6] [7] and wild basil per five gallons of water; Treatment-3, treated with a concentration of 1000ml fertilizers; a mixture of pounded sea urchin spines [6] [7] and wild basil per five gallons of water; and Treatment-4

c) Corn: Treatment-1, a control with no fertilizer; Treatment-2, a treatment with a 500ml fertilizer concentration; and Treatment-3, a treatment with a blend of algae extract and wild basil juice extract in five liters of water; Treatments 3 and 4 each used a combination of algae extract and wild basil juice extract in a five-gallon batch of water. Treatment 3 used a concentration of 1000ml fertilizers, while Treatment 4 used a concentration of 1500ml fertilizers.

d) Stringbean: Treatment-1, control without fertilizer; Treatment-2, treated with a concentration of 500ml fertilizers; Treatment-3, treated with a concentration of 1000ml fertilizers; Treatment-4, treated with a concentration of 1500ml fertilizers; a mixture of concentrated fermented fish amino acid and seaweeds residues extract per five gallons of water;

Land preparation: A satisfactory soil tilt was achieved after thoroughly preparing the trial area using farm equipment. The garden plots were immediately seeded. Depending on the climate of the TRAC Research Area, a direct early, full sunrise with at least eight hours of sunlight each day was required.

Field layout: The field was divided into four halves, each measuring 444 square meters. There were three equal blocks in each section. Four identical plots were created for each block. The dimensions of each plot were 6x6 meters, with an alley between them of 1.5 meters.

Preparation of seeds: At 85% germination viability, seeds were obtained from reputable commercial seed dealers.

Planting and replanting: All seeds were sown directly in the plots, except for bell peppers, which needed a seedbed. It was seen that seeds were sown and then transplanted into a plot with well-drained soil. Only healthy plants were selected, and the barren hills were replanted to reach the necessary number of plants per hill.

Bell peppers were transplanted manually, while other plants needed three seeds per hill sown at precisely 60 centimeters apart and 30 centimeters between hills. This was a good benchmark distance for this experimental study in the region to prevent immature plants' leaves from competing with each other for sunlight.

Fertilizer Composition: Steps to Take and Actions to Take: Please be aware that these individual experiments have no intention of dispensing with any experimental advice from fertilizer professionals.

Peanut Procedure: Preparing peanuts requires a concentrated blend of ripe banana peels and papaya essence. 2 to 3 kilograms of ripe, dark green papaya plant leaves, a grinder or mortar, and pestle, containers for cleaning the leaves, a steamer or warmer (set to 60 degrees), a soft-cloth filter, and a graduated cylinder.

STEP 1

a) Wash and thoroughly dry two kilograms or more of mature papaya leaves. Pick the ones with dark green coloring.

b) Only slowly shred and tear the leaf's tender green portion. Avoid using the stem or stiffened veins to get rid of the papaya leaf's white resin (dagta). While it may take a few minutes, you can extract at least 500ml of the papaya leaf's liquid.

c) Using a mill and pestle, pulverize the torn leaf until it is finely ground and sufficiently pliable to allow you to squeeze out pure papaya leaf extract.

d) Squeeze the juice from the finely squeezed leaves into a clean cloth. Capture the chlorophyll-like green liquid in a different graduated cylinder. Repeat this procedure until the appropriate extract volume is produced.

STEP 2

a) Divide the 500ml concentrated papaya extract and 500ml concentrated banana peels into two graduated cylinders.

b) Calculate 500 ml of warm (60 °C) water.

c) Combine these three solvents well and mix for five minutes to achieve concentration.

d) Repeat this procedure until the appropriate mixture volume is reached. Now that you have your own specially designed fertilizers, they are prepared for usage.

Bell pepper Procedure: Preparing bell pepper requires a concentrated blend of crushed sea urchin spines [6] [7] and basil extract. 2-3 kilograms of young, green wild basil plant leaves, a grinder in place of the mortar and pestle, containers for washing papaya leaves, a steamer or heater (set to 50 degrees), a sieve (made of soft cloth), and a graduated cylinder.

STEP 1

a) Wash and thoroughly clean at least 2 kg of mature basil leaves. Pick the ones with dark green coloring.

b) To extract the wild basil's aromatic ingredient, slowly rip the leaves. While it may take a few minutes, you can extract at least 500ml of the basil leaf's liquid.

c) Using an electric blender or mortar and pestle, grind the gathered leaves into a fine powder that is soft enough to allow you to squeeze out pure extracts.

d) Squeeze the juice from the finely squeezed leaves into a clean cloth. Divide the chlorophyll-like green liquid into two graduated cylinders. Repeat this procedure until the appropriate extract volume is produced.

e) Collect spines from sea urchins that weigh at least 2 to 3 kg from vendors or the contaminated seabed.

f) Use a crusher and pestle to crush these spines thoroughly, then immerse them in a bucket for three days while leaving the lid open at night.

g) After three nights, strain the spines that have been soaked to get the needed liquid. This liquid has a slight natural odor, but it progressively goes away.

STEP 2

a) Pour 500 ml of concentrated basil juice and 500 ml of liquid from sea urchins into two distinct graduated cylinders.

b) Calculate 500 ml of warm (60 °C) water.

c) Combine these three solvents well and mix for five minutes to achieve concentration.

d) Repeat this procedure until the appropriate mixture volume is reached. Now that you have your own specially designed fertilizers, they are prepared for usage.

Corn Procedure: Prepare the following for maize (using a blend of algae and wild basil extract): 2 kilograms of wild basil can be found everywhere in the wild. In comparison, 2 kilograms of algae can be harvested from the seashores.

STEP 1

a) Gather 2 kilograms of greenish-brownish algae from the shorelines in step one. Dry the gathered green, brownish algae in the open air for half a day to allow the salt-containing particles to escape.

b) Wash them in clear water to remove any salt-containing particles, then squeeze the gathered green, brownish algae to squeeze out of the liquid until the appropriate amount is produced.

c) It has a faintly dark green appearance.

d) To obtain concentrated liquescent, place the squeezed liquid in a sealed container for 24 hours.

STEP 2

a) In two distinct graduated cylinders, place 500ml of concentrated algae liquescent and 500ml of liquid extract from wild basil.

b) Calculate 500 ml of warm (60 °C) water.

c) Combine these three solvents well and mix for five minutes to achieve concentration.

d) Repeat this procedure until the appropriate mixture volume is reached. Now that you have your own specially designed fertilizers, they are prepared for usage.

String bean Procedure: (Combination of seaweed remnants and fermented fish amino acids) [16] [18] [20] the following in advance: Gather 2 kilograms of seaweed from the shorelines and 2 kilograms of leftover fish, including bones, grills, scales, fins, and rubbish.

STEP 1

a) In the container, combine the small pieces of gathered fish pars with an equivalent amount of unrefined sugar.

b) For 45 days, place this mixture in a secluded area, leaving the container open at night to promote fermentation and lessen odor.

c) Strain the fermented fish amino acid to obtain 500 milliliters.

d) Collect seaweed from the shorelines that are dark green and brownish.

e) Using a mortar and pestle, pound the collected seaweeds to release at least 500 ml of liquid (grinder for alternative).

STEP 2

a) Measure 500 ml of concentrated fermented fish amino acid and 500 ml of liquid seaweed into two graduated cylinders, one for each.

b) Calculate 500 ml of warm (60 °C) water.

c) Combine these three solvents well and mix for five minutes to achieve concentration.

d) Repeat this procedure until the appropriate mixture volume is reached. Now that you have your own specially designed fertilizers, they are prepared for usage.

Application of fertilizers: During growth regulation, fertilizers were applied four times. Five days after planting, the first application was made using the recommended fertilizer. The second application was submitted a month or 30 days after the first application period. The third treatment was made 30 days after the second application or during the plant's flowering stage, and the fourth was completed ten (10) days later.

Control of insects: To be shipped or sold in far-off markets, these crops must be worm-free. Worms, ladybugs, and other insects that caused destructive growth were eliminated while the study was conducted. To prevent bug and pest attacks, repellents against insects were used. Throughout the growing period, the indicated insecticides (Malathion, etc.) were used in this investigation. Throughout vegetative development, there was regular observation and inspection.

Weeding and cultivation: Regularly cultivating the soil in the surrounding region to get rid of weeds and trash. Pests are attracted to waste and weeds. Thus, sanitation was preserved. Another method of removing weeds without using dangerous chemical herbicides was to burn the weeds along the garden's perimeter. Two weeks after germination, off-barring was carried out, and hilling-up a week afterward.

Care and Management: Throughout the growing season, these crops require warm soil and air temperatures with high levels of nitrogen, potassium, and phosphorus. Maintaining the mix warm during germination resulted in speedier germination and better plants. The mixture was kept moist (but not wet) and warm between 80F and 85F. It took one week for germination. The plants were thinned to three plants per hill after the appearance of the first genuine leaves. To prevent becoming soggy, the young plants were kept uniformly moist. It used black plastic mulch to help maintain the soil's moisture. Depending on the care and management needed for each crop, plants needed to be watered more frequently.

Data collected: For evaluation, analysis, and interpretation, the yields in kilograms of four different cash crops that were appropriately labeled in separate locations were collected. Information on the economic contribution was derived from the farmer's return on investment.

4. RESULTS AND DISCUSSION

“Potentials of a concentrated mixture of ripe banana peels and papaya extract: its effect on the yield of peanut.”

Table 1a. Yield of peanut in kilogram.

TREATMENT	**REPLICATION**			**TOTAL**	**MEAN/1**
	1	**2**	**3**		
T1	3.32	1.87	2.18	7.37	2.46a
T2	3.66	4.39	4.41	12.46	4.15bc
T3	4.86	4.81	3.86	13.53	4.51c
T4	4.20	3.52	3.06	10.78	3.59abc
TOTAL	16.04	14.59	13.51		
GRAND TOTAL AND MEAN				44.14	4.90

Note: 1/=means having the same letter subscript does not vary significantly from each other at a 5% level of significance, DMRT.

Treatment 1, control (without fertilizer), obtained the lowest score of 7.37 kilograms with a total mean score of 2.46a; Treatment 2, (treated with a concentration of 500ml fertilizers; application of improvise organic fertilizers (Concentrated Mixture of Ripe Banana Peels and Papaya Extract) per five (5) gallons of water) obtained 12.46 kilograms with its total mean score of 4.15bc; Treatment 3, (treated with a concentration of 1000ml fertilizers; of improvise organic fertilizers (Concentrated Mixture of Ripe Banana Peels and Papaya Extract) per five (5) gallons of water reached 13.53 kilograms of peanuts with its total mean score of 4.51c and; Treatment-4, (treated with a concentration of 1500ml fertilizers; application of concentrated of improvise organic fertilizers (Concentrated Mixture of Ripe Banana Peels and Papaya Extract) per five (5) gallons of water) obtained 3.06 kilograms of peanuts with its total mean score of 3.59abc.

Table 1b. Analysis of variance.

SOURCE OF VARIANCE	DF	SS	MS	FC	TABULAR F-VALUE	
					5%	1%
TREATMENT	3	7.25	2.42	7.12*	4.76	9.78
REPLICATION	2	0.81	0.41			
ERROR	6	2.02	0.34			
TOTAL	11	10.08				

Note: *= Significant at 5% level C.V. = 15.84%

The Analysis of Variance (ANOVA) conferred a significant result at a 5% level of confidence as supported by a Computed F-value of 7.12* and its C.V. of 15.84 %, which is higher than 5% and 1% levels, respectively. This means that peanut plants have responded to the different rates of concentrated improvised organic fertilizers (Concentrated Mixture of Ripe Banana Peels and Papaya Extract) per five (5) gallons of water in terms of yield in kilogram.

"Potentials of a concentrated mixture of sea urchins' spines and basil extract: its effect on the yield of bell peppers"

Table 2a. Yield of bell pepper in kilogram.

TREATMENT	**REPLICATION**			**TOTAL**	**MEAN1/**
	1	**2**	**3**		
T1	3.9	3.0	2.9	9.8	3.27a
T2	4.1	4.4	4.2	12.8	4.27c
T3	4.5	5.0	4.7	14.2	4.73bc
T4	4.9	5.1	5.9	15.9	5.30c
TOTAL	17.4	17.6	17.7		
GRAND TOTAL AND MEAN				52.7	4.39

Note: 1/=means having the same letter subscript does not vary significantly from each other at the 5% level, DMRT.

Treatment 1, control (without fertilizer) obtained the lowest score, 9.8 kilograms with a total mean score of 3.27a; Treatment 2, (treated with a concentration of 500ml fertilizers; application of improvised organic fertilizers (Concentrated Mixture of Ground Sea Urchins and Basil Extract) per five (5) gallons of water) obtained 12.8 kilograms with its total mean score of 4.27c; Treatment 3, (treated with a concentration of 1000ml fertilizers; of improvised organic fertilizers (Concentrated Mixture of Ground Sea Urchins and Basil Extract) per five (5) gallons of water reached 14.2 kilograms with its total mean score of 4.73bc and; Treatment-4, (treated with a concentration of 1500ml fertilizers; application of concentrated of improvised organic fertilizers (Concentrated Mixture of Ground Sea Urchins and Basil Extract) per five (5) gallons of water) obtained 15.9 kilograms of peanuts with its total mean score of 5.30c.

Table 2b. Analysis of Variance.

SOURCE OF VARIANCE	DF	SS	MS	FC	TABULAR F-VALUE	
					5%	1%
TREATMENT	3	6.67	2.223	9.79**	4.76	9.78
REPLICATION	2	0.01	0.005			
ERROR	6	1.37	0.228			
TOTAL	11	8.05				

Note: **= Significant at both 5% level and 1% level, C.V. = 10.76%

The Analysis of Variance (ANOVA) conferred a significant result at a 5% level of confidence as supported by a Computed F-value of 9.79* and its C.V. of 10.76 %, which is higher than 5% and 1% levels, respectively. This

means that bell pepper plants have responded to the different rates of concentrated improvised organic fertilizers (Concentrated Mixture of Ground Sea Urchins and Basil Extract) per five (5) gallons of water in terms of yield in kilogram.

"Potentials of Concentrated mixture of algae and wild basil extract and its effect on the yield of Corn"

Table 3a. Yield of corn in kilogram.

TREATMENT	**REPLICATION**			**TOTAL**	**MEAN1/**
	1	**2**	**3**		
T1	2.20	1.87	4.50	8.57	2.85a
T2	3.90	4.35	4.41	12.66	4.22bc
T3	4.50	4.05	6.87	15.42	5.14c
T4	6.50	7.80	7.95	22.25	7.41abc
TOTAL	17.10	18.07	18.73		
GRAND TOTAL AND MEAN				19.63	6.52

Note: 1/=means having the same letter subscript does not vary significantly from each other at the 5% level, DMRT.

Treatment 1, control (without fertilizer) obtained the lowest score, 8.57 kilograms with a total mean score of 2.85a; Treatment 2, (treated with a concentration of 500ml fertilizers; application of improvise organic fertilizers (Concentrated Mixture of algae and wild basil extract) per five (5) gallons of water) obtained 12.66 kilograms with its total mean score of 4.22bc; Treatment 3, (treated with a concentration of 1000ml fertilizers; of improvise organic fertilizers (Concentrated Mixture of algae and wild basil extract) per five (5) gallons of water reached 15.42 kilograms of peanuts with its total mean score of 5.14c and; Treatment-4, (treated with a concentration of 1500ml fertilizers; application of concentrated of improvise organic fertilizers (Concentrated Mixture of algae and wild basil extract) per five (5) gallons of water) obtained 22.25 kilograms of corn with its total mean score of 7.41abc.

Table 3b. Analysis of Variance.

SOURCE OF VARIANCE	DF	SS	MS	FC	TABULAR F-VALUE	
					5%	1%
TREATMENT	3	13.36	4.45	15.89**	4.76	9.78
REPLICATION	2	16.53	8.26			
ERROR	6	1.69	0.28			
TOTAL	11	31.58				

Note: **= Significant at both 5% level and 1% level C.V. = 16.48%

The Analysis of Variance (ANOVA) conferred a significant result at both confidence levels as supported by a Computed F-value of 15.89** and its C.V. of 16.48%, which is higher than 5% and 1% levels, respectively. This means that corn plants have responded to the different rates of concentrated improvised organic fertilizers (Concentrated Mixture of algae and wild basil extract) per five (5) gallons of water in terms of yield in kilogram.

"Potentials of Concentrated mixture of FFAA and SEAWEED Extract and its effect on the yield of String beans"

Table 4a. Yield of string bean in kilogram.

TREATMENT	**REPLICATION**			**TOTAL**	**MEAN1/**
	1	**2**	**3**		
T1	2.15	2.10	2.15	6.40	2.13^{a}
T2	2.30	2.40	2.35	7.05	2.35^{ab}
T3	2.65	2.50	2.70	7.85	2.62^{bc}
T4	3.15	2.65	2.55	8.35	2.78^{c}
TOTAL	10.25	9.65	9.75		
GRAND TOTAL AND MEAN				29.65	2.47

Note: 1/=means having the same letter subscript does not vary significantly from each other at 1% level, DMRT.

Treatment 1, control (without fertilizer) obtained the lowest score of 6.40 with its mean of 2.13a; Treatment 2, (treated with a concentration of 500ml fertilizers; a mixture of concentrated fermented fish amino acid and seaweeds residues extract per five (5) gallons of water) got a total score of 7.05 with 2.35ab mean score; Treatment 3, (treated with a concentration of 1000ml fertilizers; a mixture of concentrated fermented fish amino acid and seaweeds residues extract per five (5) gallons of water got 7.85 kilograms and its mean score of 2.62bc and; Treatment-4, (treated with a concentration of 1500ml fertilizers; a mixture of concentrated fermented fish amino acid and seaweeds residues extract per five (5) gallons and water) obtained 8.35 kilogram and the highest mean score of 2.78c.

Furthermore, the result of the study showed that all treatments revealed variations among each other. This implies that Stringbean responded and increased its yield in kilograms if treated with a concentration of 1500ml fertilizers; a mixture of concentrated fermented fish amino acid, and seaweed residues extracted per five (5) gallons and water.

Table 4b. Analysis of Variance.

SOURCE OF VARIANCE	DF	SS	MS	FC	TABULAR F-VALUE	
					5%	1%
TREATMENT	3	0.74	0.247	7.72*	4.76	9.78
REPLICATION	2	0.05	0.025			
ERROR	6	0.19	0.032			
TOTAL	11	0.98				

Note: **= Significant at both 5% level and 1% level. C.V. = 7.72%

The Analysis of Variance (ANOVA) conferred a significant effect at a 5% level of confidence as supported by a Computed F-value of 7.72*, which is higher than 5% levels. It implies that Stringbean has responded to the application of improvised fertilizers with a concentration of 1500ml fertilizers, a mixture of concentrated fermented fish amino acid, and seaweed residues extract per five (5) gallons and water.

Table 5. Comparison between the local commodity prices income of the farmers in four grown crops (2019).

CROPS	**Without Fertilizer**			**Applied with Organic Fertilizer**		
	Produce yield	Prices per kilogram in peso	INCOME	Produce yield	Prices per kilogram in peso	INCOME
Peanut	7.37	50.00	386.50	10.78	65.00	700.70
Bellpepper	9.8	175.00	1715.00	15.9	200.00	3180.00
Sweet Corn	8.57	34.00	291.38	22.25	45.00	1001.25
Stringbean	6.40	20.00	128.00	8.35	35.00	292.25
TOTAL			2521.88			5174.20

Table 5 above presents comparisons between the localized commodity prices surveyed and adapted from the pricelists of the Bongao public wet market in 2019 and the income gained by the farmers using the four grown crops from the experimental study where it fascinated crops with applied organic fertilizers yielded almost double the prices of the crop without the improvised organic fertilizers.

5. CONCLUSION

Based on the study's findings, the author concluded that four different homemade organic fertilizers produced highly excellent results for each crop they tested. As a result, the research produced the following results: 1) In terms of output in kilograms, peanut plants have responded very well to the various rates of concentrated homemade organic fertilizers: a concentrated mixture of ripe banana peels and papaya extract per five gallons of water. 2) In terms of output in kilograms, bell pepper plants have responded very favorably to the various rates of concentrated improvised organic fertilizers, including a Concentrated Mixture of Ground Sea Urchins and Basil

Extract per five gallons of water. In terms of yield in kilograms, maize plants have responded to various concentrations of improvised concentrated organic fertilizers: a concentrated mixture of algae and wild basil extract per five gallons of water. 4) In response to improvised fertilizers, string beans have responded with a concentration of 1500ml fertilizers, which include a blend of concentrated fermented fish amino acid and seaweed residue extract per five gallons of water. Additionally, the study's findings indicated that the farmers' revenue significantly increased economically. The income tends to rise as the yields of each crop rises.

6. RECOMMENDATION

Based on the study's findings, the author asserted that local farmers who want to cultivate these four crops and boost their output and income should utilize all four (4) treatments from each trial. The author also suggests this to incoming agriculture students who plan to do similar experimental investigations to increase their financial success in farming.

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