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Comparative analysis between the use of good agricultural practices and conventional farming in the production of mungbean

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Abstract

This study was conducted to compare the agronomic and yield response of mung bean as affected by the use of Good agricultural practices (GAP) and conventional farming. The study was conducted at Cagayan State University Piat campus from May to August 2024 and was terminated after eight primming's. The experiment utilized the Randomized Complete Block Design (RCBD) incorporating treatments for GAP and conventional farming. Key parameters measures included plant height, flowering time, pod formation, and herbage yield. Results indicated that mung beans grown under GAP exhibited earlier flowering time (42 days), greater plant height (47.95 cm) and heavier herbage yield (151.42 grams/plant) compared to conventional methods. The use of rhizobium inoculants, SpidTech, and mud press as a component of GAP not only boost productivity but also mitigates environmental concerns associated with conventional farming. In terms of net income, GAP cultivation resulted to have higher economic returns compared to conventional method of production. These findings suggest that GAP not only enhances agricultural productivity but also offers more suitable and economically viable alternative for mung bean growers.

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Introduction

With the increasing price of all agricultural inputs in the market, most farmers do not have the means to finance all their agricultural needs leading to lower production. The continued usage of synthetic fertilizers has also caused different negative effects including acidity due to the excessive application of ammonium fertilizers and even nutrient degradation due to ill practices applied along conventional farming systems (Gómez *et al.*, 2020; Tilman *et al.*, 2011). It should be mentioned that the majority of the farmers rely only on the use of synthetic fertilizers in production because of them have little knowledge of the different interventions such as the use of compost fungus activator in land preparation, use of rhizobium bacteria as inoculant for crops such as rice and legumes, and even the potential use of agricultural waste product available in the community like the sugarcane mud press, bagasse, and mud cake(Kumar *et al.*, 2019; Saha *et al.,* 2018).

In line with the implementation of the Organic Agriculture Act of 2010, the area for production must consider the transition period to prevent a sudden drop of yield. It should be further stressed that the effect of organic fertilizer can be realized only after how many years of application since it requires enough time to undergo the process of decomposition (Baker *et al.*, 2017; Reganold& Wachter, 2016). To suit with the pressing demand of time, the researcher was tasked to compare the effect of using good agricultural practices versus conventional farming in the production of mungbean.

Specifically, the study aimed to assess the growth, yield and the economics of using good agricultural practices versus conventional farming in the production of mungbean, hence this paper.

Materials and methods

Materials

The following materials used in the study were mungbean seeds, rhizobium inoculants, mudpress, inorganic fertilizers, rotavator, plow, placards, stick, sensitive weighing balance, record book and pen.

Land preparation

A total area of 240 square meters was used in the experiment including its alleyway of 1 meter in between treatment and replications.

The land was prepared thoroughly using a four-wheeled tractor twice while letting the soil rest for one (1) week in order to allow the weeds and other crops stubbles to decompose and allow weeds seeds to germinate.

Experimental design and treatment

The Randomized Complete Block Design (RCBD) was used in the experiment and was replicated four (4) times. The following treatments were as follows:
Treatment 1- Conventional farming
Treatment 2- Good agricultural practices

Seed inoculation

This process was applicable for plots observing Good agricultural practices (GAP). Seeds of mung bean were misted with water before incorporating the Rhizobium inoculum. One (1) pack of inocula is good to cover one (1) kilo of mungbean seeds and were mixed thoroughly until the seed materials were fully coated. Inoculated seeds were placed in a shaded area to avoid exposure to direct sunlight.

Furrowing

Furrows were prepared during planting following a space of 60 cm apart. Mudpress and other organic fertilizers was applied just after furrowing to ensure that adequate amount of nutrients were present when plants germinated.

Planting

Seeds were planted along furrows using the drill method. Seeds were covered with enough soil to help the seeds and to hasten the process of germination. Planting was done late in the afternoon to avoid exposure of seeds with direct sunlight.

Water management

Water was applied to the crop as the need arises. Watering was done through furrow irrigation.

Inorganic fertilizer application

The amount of inorganic fertilizer based on the result of the soil analysis were applied to crops following the amount and time. The inorganic materials were applied in split.

Pest and disease management

Pest and disease can be identified using the Spid Tech (an application introduced by DOST-PCCARD under the project SARAI). The Integrated Pest Management (IPM)such as the application of tricho-cards and hand-picking specifically for GAP treatments whileagro-chemicals following the manufacturers manual was used in the conventional farming approach.

Weed control

Weeds were controlled using the manual rotary weeder. Off-baring was also adopted 3 weeks after the crop establishment to ensure that there will be no weed competition between the main crop.

Harvesting and drying

Mature pods were harvested 60-70 days after seed sowing. Priming was done by twisting the mature black pods using the bare hands. Harvested pods were sundried for at least 12 hours to force the pods to split. Pods were covered with fine mesh nets during drying to avoid scattering of seeds.

Cleaning

The pods were placed inside a gunny sack and crushed using a bamboo pole. Cleaning also followed using a winnower to separate the grains from the chaffs.

Statistical analysis

All data was analyzed using the Statistical Tool for agricultural Research (STAR) using the analysis of variance. The t-test was also used to compare the treatments tested in this research study.

Result and discussion

Table 1 shows the different agronomic and yield characteristics of mungbean as when applied with different good agricultural practices and conventional farming. It was found out that mung bean applied with different good agricultural practices recorded the earliest to bear flower with a mean of 42 days compared to those plants under conventional farming system. The result could be attributed to the optimized conditions such as soil health, better nutrient management and enhanced pest control. In terms of plant height, the application of rhizobia as inoculum helps mungbean to grow taller and healthy with a mean of 47.95 cm.

The result of the study could be attributed to the fact that rhizobium bacteria help legumes to fix available nitrogen in the atmosphere thereby helping the plants to grow and thrive even without the application of synthetic fertilizers. Mali and Patil (2016) claimed that the application of rhizobium inoculant increases the plant biomass and height of mung bean plants.

Result also shows that those plants treated with different good agricultural practices recorded an herbage yield of 151.42 grams per plant compared to those plants exposed in conventional farming with 124.08 grams per plant.

It should be noted that the combined effect of the different good practices helps to produce bigger and healthier plants causing a heavier herbage yield.

The result of the study could be explained by Nandwani and Shukla (2015), who claimed that the symbiosis relationship of rhizobia and mungbean allows better uptake of essential nutrients which are vital for the overall plant health.

In terms of the number of pods per plant, the number of seeds per pod, and the yield in tons per hectare, mung bean applied with good agricultural practices recorded to perform better compared to crops exposed in conventional farming system. Good agricultural practices emphasize the use of organic and balance fertilizers which are crucial for promoting healthy plant. The result conforms with the study conducted by Kumar *et al.*, (2018) who claimed that the mung bean cultivated under GAP had significantly higher yield due to improved nutrient availability and uptake. He further stressed that proper nutrient management not only boosts vegetative growth but help in pod development which leads also to increased overall yield.

Table 1. Agronomic and yield response of mung bean grown under conventional farming system and good agricultural practices.

	Days to flower	Height at Maturity	Pod Number/ Plant	Seed Number/ Pod	Herbage Yield/ Plant	Yield in Tons/ha
Conventional farming	44.25	38.49	52	8.63	124.08	1.37
Good agricultural practices	42	47.95	65.25	11.44	151.42	1.64
Result	*	**	**	*	*	*
CV%	0.82	2.77	2.48	3.83	11.36	7.55

Table 2 also shows the economics of return of mung bean grown under conventional farming and Good agricultural practices (GAP). Based on the result, mung bean applied with different technologies under GAP recorded the highest net income of P84,600 and a return of investment of 74% while those grown under conventional farming recorded a net income of P46,582.00 with a return of investment of 74%. The high cost incurred in conventional farming is due to the heavy use of inorganic fertilizers, pesticides, and labor costs compared to the cheaper materials such as rhizobia and mud press in GAP farming.

Table 2. Cost and Return Analysis of mung bean grown under conventional farming system and good agricultural practices.

Variable	Conventional farming	Good agricultural practices
	Labor Cost	
Land preparation	4,200.00	4,200.00
Weeding and Cultivation	5,040.00	5,040.00
Fertilization	3,360.00	3,360.00
Pest control	1,680.00	-
Harvesting	16,800.00	16,800.00
Sun drying, shelling and packaging	6,300.00	7,350.00
Sub-total	37,380.00	36,750.00
	Materials/Inputs	
Seeds	3,750.00	3,750.00
Fertilizer	14,400.00	5,850.00
Insecticides/Pesticides	7,488.00	
Seed inoculants	-	500.00
Sub-total	25,638.00	9,850.00
Total	63,018.00	46,600.00
Yield (kgs)	1,370	1,640
P80.00/kg	109,600.00	131,200.00
Net Income	46,582.00	84,600.00
Return of Investment	74%	180%

In addition, tricho cards are also free materials given by the Department of Agriculture in the control of pest giving mung beans produced under GAP the edge over conventional farming.

Conclusions

The study clearly demonstrates the significant advantage of employing good agricultural practices (GAP) in the production of mung beans compared to conventional farming methods. The result indicated that mung bean cultivated using GAP not only help the plant to its floral formation but also improve the plant height, herbage yield, and pod formation. It should be further stressed that rhizobium inoculant is crucial specifically in nitrogen fixation which promotes healthier plants and increased plant yield. Economically, mung bean produced under GAP would also help farmers to increase their income since the majority of the inputs are cheaper and can be accessed within the locality as a free gift of nature. Overall, the findings of this research underscore the potential of GAP as a sustainable alternative to conventional farming, addressing productivity and environmental concerns in agriculture. Related studies must also be conducted during the dry season of planting to check its effect on the growth and yield of other crops.

References

Baker JM. 2017. "Soil health and organic farming." agricultural Systems **150,** 50-58.

Ghosh P, Ghosh S, Saha S. 2015. Effect of Rhizobium Inoculation on Growth and Yield of Mung Bean. International Journal of Current Microbiology and Applied Sciences **4(11),** 221-226. http://dx.doi.org/10.20546/ijcmas.2015.411.025

Gómez A. 2020. "Impact of synthetic fertilizers on soil health." Environmental Science and Policy **112,** 128-136.

Kumar A, Singh P, Mehta R. 2018. "Impact of Good agricultural practices on Mung Bean Yield." Journal of agricultural Science **10(4),** 45-53.

Kumar A. 2019. "Alternative nutrient sources for sustainable agriculture." Sustainable Agriculture Reviews **34,** 25-42.

Mali S, Patil R. 2016. Biological Nitrogen Fixation in Legumes. Current Science **110(5),** 871-879. http://dx.doi.org/10.18520/cs/v110/i5/871-879

Nandwani D, Shukla A. 2015. Role of Rhizobium in Enhancing Growth and Nutritional Quality of Mung Bean. agricultural Research Journal **52(3),** 255-259. http://dx.doi.org/10.5958/0976-0563.2015.00040.7

Reganold JP, Wachter JM. 2016. "Organic farming in the twenty-first century." Nature Plants **2,** 15221.