ASEAN Journal of Community Service and Education

AJCSE
ASEAN Journal of Community Service and Education

Journal homepage: https://ejournal.bumipublikasinusantara.id/index.php/ajcse

Food Security Strategy through Regenerative Agriculture for Capacity Building of Farmers with "Integrated Nutrient Management Training Program"

Dewi Febriani, Perbaja Tulus Pasaribu*

Agroteknologi, Institut Pertanian STIPER Yogyakarta, Yogyakarta, Indonesia
*Correspondence: E-mail: febrid074@gmail.com

ABSTRACT

Nowadays, farmers have several problems during the famine period that can reduce the income and productivity of the food crops they cultivate, this is due to the lack of knowledge of farmers regarding sustainable agricultural systems. This research aims to (1) Support the sustainability of food security for future generations. (2) Knowing the factors that cause the food security crisis. The method used in this research is a descriptive method with field study, using panel experimental design and secondary data accumulation. Then, for data collection technique is based on the results of research and experience that has been carried out. The result of this research is the implementation of the "Integrated Nutrient Management Training Program" for farmers by providing special training that focuses on the ideal fertilizer application system, resulting in high-quality food crops.

ARTICLE INFO

Article History:
Submitted/Received 09 Sep 2023
First Revised 24 Oct 2023
Accepted 17 Dec 2023
First Available online 18 Dec 2023
Publication Date 01 Mar 2024

Keyword:
Food security,
Future generations,
Integrated nutrient,
Management training program.

1. INTRODUCTION

Indonesia is an agricultural country with abundant natural resources found in various regions that must be preserved (Permatasari *et al*., 2016). One of them is the agricultural sector which must be maintained because the agricultural sector is one of the largest producers of foreign exchange earnings. This is a consideration for us, the younger generation, who must carry out sustainability in agriculture to be at the forefront as a provider of food security.

The world's current problem is that the demand for food is increasing following the increase in the world's population, but food security is currently decreasing due to the decreasing productive land. This event has become the center of attention for the entire community, especially those who are involved in agriculture (Kamilah & Nandiyanto, 2024; Rana *et al*., 2022).

From the reasons stated in this problem, farmers are the main issue due to the lack of knowledge and insight regarding the application of a sustainable agricultural system, which is a system of applying the ideal fertilizer for plants to maximize growth and increase high-quality food.

Sustainable agricultural development is highly dependent on the role of human resources. The existence of sustainable agricultural development through the management of all potential natural, human, institutional, and technological resources is expected to improve the welfare of society as a whole. Therefore, qualified human resources are needed and committed to developing the agricultural sector, which is one of the success factors of sustainable agricultural development (Susilowati, 2016).

The mindset of today's farmers needs to be changed with the knowledge that has been created by the younger generation with critical thinking. Many reports for farmers (Ibrahim & Nandiyanto, 2022; Effiong & Aya, 2022; Nueva *et al*., 2022; Nilong *et al*., 2022; Patil & Gaikwad, 2022). This mindset change is the main goal to increase the capacity of farmers in a good food crop management system. Indonesia, with its fertile land and ability to produce rice on a large scale, still receives rice imports from Thailand. The phenomenon that production is always greater than consumption but imports are still carried out by the government makes rice import-dependent in Indonesia. Rice production should be negatively related to rice imports because an increase in rice production will cause the amount of domestic rice to increase and if the government is still importing, there will be an increase in the supply of rice, which means that the price of rice can fall and harm farmers (Paipan, 2020). In terms of agriculture, this can happen because of the low quality of rice. Thus, it needs new handling in a good cultivation system by empowering and providing new knowledge to farmers today.

Food is very important for daily life. Thus, food technologists strive to create quality food products that are safe and nutritious. As students, we must be able to inspire other young people to participate in the goal to be achieved, namely increasing the capacity of farmers to deal with the low-quality food crisis in Indonesia. Critical thinking with new ideas will be able to change the misery of farmers' insights with the knowledge and empowerment we provide.

The food crisis caused by low quality can be overcome by providing new insights to farmers through a special training program with regular monitoring. This program is designed with materials from research experiments with valid results. Therefore, this kind of knowledge should be accepted by farmers and applied directly, intending to produce high-quality food products. This program can support current issues in food that reported in elsewhere (Effiong & Aya, 2022; Apriyanti, 2023; Ibrahim & Nandiyanto, 2022).

DOI:
p- ISSN 2828-3287 e- ISSN 2828-3295

2. METHODS

The method used in this research is descriptive method with the type of field study, using panel experimental design. Information from literature and secondary data was accumulated, analyzed, and explained. The data collection technique is based on the results of research and experience that has been carried out.

3. RESULTS AND DISCUSSION

3.1. Differences between organic and inorganic fertilizers for crop yields

Nutrients for plants play an important role in growing, developing, and reproducing. In food crops, for example, rice requires the right combination of various nutrients. Thus, when harvested, it produces a product that can be a source of energy and many benefits for humans. Rice can be obtained from the soil. Soil conditions greatly affect the development of agricultural plant roots. Fertile and loose soil is usually very good for plant scat development. Furthermore, plants growing in such soil will show optimal development for plants if accompanied by the availability of adequate nutrients. To maximize the nutritional needs of plants, farmers must provide special fertilizers for plants. Fertilizers can be either organic fertilizers or inorganic fertilizers, and each fertilizer has benefits for the plant itself according to those in **Table 1**.

Table 1. Differences between organic and inorganic fertilizers.

Organic Fertilizer	Inorganic Fertilizer (Chemical Fertilizer)
Made from natural ingredients	Made/mixed with chemicals
Has wide benefits	Limited to certain functions
Fertilizes the soil	Changing the properties of the soil
The soil will continually turn loose	Use for too long will make the soil barren
Absorbed into the soil gradually	Absorbed into the soil in a relatively short time
Provides long-term benefits for soil and plant health	Provides nutrition faster and more efficiently

As shown in **Table 1**, each fertilizer has advantages and certainly has disadvantages as well. Inorganic fertilizers can result in a long-term decline in soil fertility and organic fertilizers take a long time to be absorbed by plants.

3.2. Fertilizer incorporation with sufficient nutrients for high food quality

Another thing to consider is the nutrients contained in the fertilizer and the stage of nutrient release and absorption by plants. Inorganic fertilizers can release nutrients quickly at the beginning or young age of the plant. Thus, in the end, the nutrients are not available. While organic fertilizers can release nutrients for a long time. Thus, at a young age, there are not enough nutrients, but at the end of the harvest, the nutrients are abundant. From the advantages and disadvantages of these fertilizers, it can be a solution for farmers to use the ideal fertilizer. The two fertilizers can be combined. Thus, the nutrients needed are fulfilled from the beginning of planting to harvest. Of course, food crops with high quality and quality require adequate nutrition.

Figure 1 is an explanation of the combination of the two fertilizers (organic and inorganic). With Integrated Nutrient Management (INM), the final product can have good quality. The

DOI:
p- ISSN 2828-3287 e- ISSN 2828-3295

release of nutrients from the beginning of planting to the end and then the plant absorbs these nutrients throughout its growth.

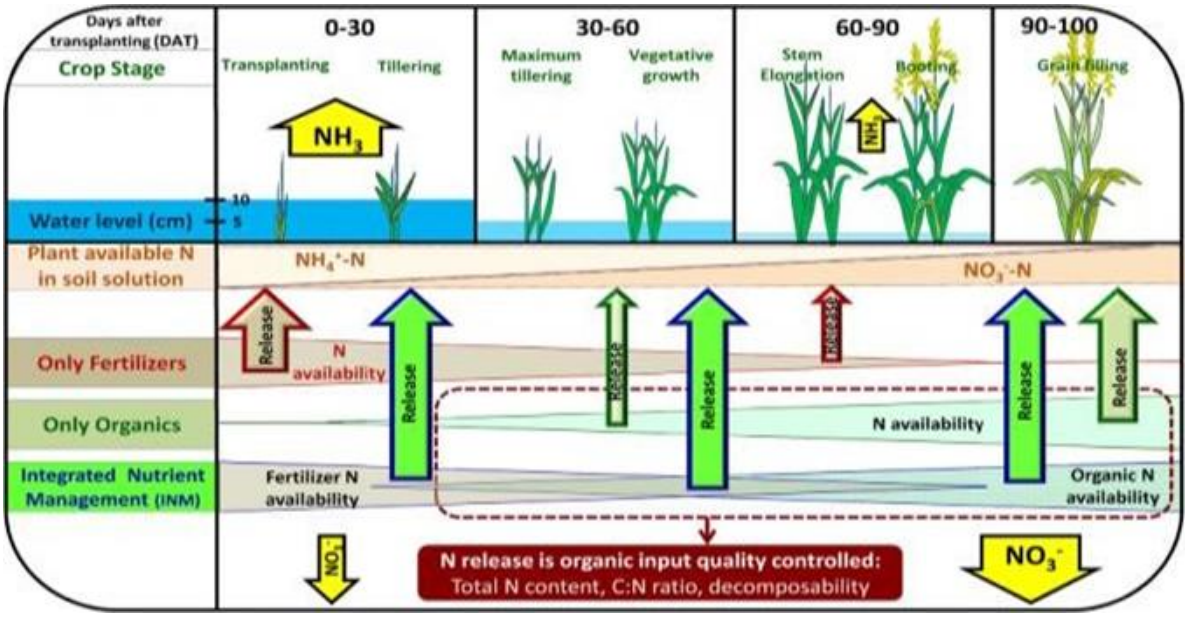

Figure 1. Integrated Nutrient Management (INM).

3.3. Specific training flow of integrated nutrient management training program for farmers

The training flow can be directly implemented because the material has been designed according to the research method and fertilizers can be easily obtained. Detailed training flow is explained in the following:

(i) Step 1: Preparation of Fertilizers. This step is to prepare materials that have been designed for farmers and fertilizers to be used (NPK fertilizer and manure).
(ii) Step 2: Search for Food Commodity Areas. This step is to find for place who cultivate food crop commodities with low quality results.
(iii) Step 3: Socialization regarding the Program. This step is to explain the program to farmers.
(iv) Step 4: Empowerment. This step is to participate in empowerment and program implementation.
(v) Step 5: Regular monitoring. This step is to monitor the development of plants and farmers periodically.

Not only NPK fertilizer but many other chemical fertilizers can be combined with organic fertilizers. Organic fertilizers are also not only manure but can be compost or liquid organic fertilizer. These materials can be adjusted according to your needs and budget. Next, find a suitable area, which is an area that cultivates food commodities but the area produces low-quality products. After finding a suitable area, socialize the program with farmers. Explain in detail about the program and the objectives to be achieved. Then participate in empowering the application of the program from upstream to downstream. And finally, monitor the development of plants and the performance of farmers to produce high-quality food products.

4. CONCLUSION

The current food crisis in Indonesia will impact future generations. It depends on the quality of food produced by farmers; low food quality can have a negative impact on the

DOI:
p- ISSN 2828-3287 e- ISSN 2828-3295

growth of the next generation. But it can be overcome by INTP training, the existence of this training can increase the insight of farmers who are lacking in sustainable agricultural systems. Ideal fertilizer application by combining organic and inorganic fertilizers. Thus, nutrients are fulfilled from planting to harvest. With high food quality, the world's current problems can be overcome easily.

5. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the paper was free of plagiarism.

6. REFERENCES

Apriyanti, V. P. (2023). Learning abilities of students with intellectual disabilities for cooking Indonesian traditional food "opak bakar": From step-by-step experiment to the analysis. *Indonesian Journal of Community and Special Needs Education, 3*(1), 43-54.

Effiong, J. B., and Aya, C. F. (2022). Rural-urban migration among women farmers: Science education, survey, and implication for food crop production in Cross River State, Nigeria. *Indonesian Journal of Teaching in Science, 2*(1), 75-80.

Ibrahim, M.M.M., and Nandiyanto, A.B.D. (2022). Education on the importance of food consumed by breastfeeding mothers and exclusive breastfeeding against stunting prevention through power point media. *ASEAN Journal for Science Education, 1*(2), 103-112.

Kamilah, N. N., and Nandiyanto, A. B. D. (2024). Balanced eating between food and healthy food for better nutritional needs. *Indonesian Journal of Educational Research and Technology, 4*(1), 1-8.

Nilong, B. X., Duldulao, S., Amazon, A. K., Moscoso, L. H., and Besa, A. S. (2022). Farmers' coping mechanism during the pandemic. *ASEAN Journal of Agricultural and Food Engineering, 1*(1), 1-4.

Nueva, J., Tanaleon, J.A., and Besa, A. (2022). Rice tariffication law: Education and views of farmers in the Southern Philippines. ASEAN Journal of Science and Engineering Education, 2(2), 143-146.

Paipan, S., and Abrar, M. (2020). Determinan ketergantungan impor beras di Indonesia [determinants of rice import dependency in Indonesia]. *Jurnal Ekonomi and Kebijakan Publik, 11*(1), 53-64.

Patil, U., and Gaikwad, H. (2022). Farmers buying behavior toward the fertilizers. ASEAN *Journal of Agricultural and Food Engineering, 1*(1), 29-36.

Permatasari, N., Sucahya, T.N., and Nandiyanto, A.B.D. (2016). Agricultural wastes as a source of silica material. *Indonesian Journal of Science and Technology, 1*(1), 82-106.

Rana, Z. A., Ahsan, M., Ali, M., Atif, A., and Uzair, M. (2022). Food preferences and nutritional status: Insights on nutrition transition in university community. *Indonesian Journal of Multidiciplinary Research, 2*(1), 169-178.

DOI:
p- ISSN 2828-3287 e- ISSN 2828-3295

Susilowati, S. H. (2016). Fenomena penuaan petani dan berkurangnya tenaga kerja muda serta implikasinya bagi kebijakan pembangunan pertanian. *Forum Penelitian Agro Ekonomi, 34*(1). 35-55.

DOI:
p- ISSN 2828-3287 e- ISSN 2828-3295