

EMPOWERMENT OF KARANG TARUNA IN GAMPINGROWO VILLAGE WITH HYDROPONIC TRAINING

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INTRODUCTION

Agriculture is a crucial sector for the people of Indonesia. This sector is a source of income, and most of the Indonesian Region is agricultural land. Along with the times in development, the farm sector experienced many obstacles (Waluyo et al., 2021; Wirawati & Arthawati, 2021). Constraints experienced include the availability of land converted into a residential function, agricultural products that are unsuitable due to pests and diseases, and the large number of migrants living in the village (Gayatri & Mahyuni, 2021; Warintan et al., 2020). Based on its geographical location, Gampingrowo Village is a lowland, so it is possible for agriculture, and most of the population earns a living as farmers (Central Bureau of Statistics for Sidoarjo Regency, 2018). Agricultural land is available as much as 2089.24 hectares and 1184.50 hectares as residential areas of 3605.97 hectares. The availability of agricultural land has decreased apart from the increase in population, and it is also because much agricultural land has been sold to be converted into housing by the property industry (Statistik, 2018).

One alternative to overcome the limitations of agricultural land is the hydroponic method, which is a way of farming using narrow land (Kurniaty et al., 2021; Linda et al., 2021). The nutrients provided are accessible and do not cause pollution to the environment (Halim & Yunita, 2019; Mulasari, 2019). Hydroponics was first introduced by William Frederick Gericke at Berkley, California, in 1930. Hydroponics is an agricultural activity in which soil media is replaced with water without requiring large land areas and can utilize yards to beautify homes, sustainable food sources, and green spaces (Warjoto et al., 2020). So that the hydroponic farming system can take advantage of narrow land, there are many benefits to be gained by implementing this hydroponic method, including straightforward maintenance, a faster harvest time, being the ability to utilize items that are no longer used, such as buckets, bottles, and basins (Susilawati, 2019). In addition, plants that can be grown using the hydroponic method are vegetables and herbs to improve the economy and public health (Purwasih et al., 2019). It is hoped that introducing the hydroponic way to the community will increase decent living standards, loves the environment, and develop the basis that growing plants is not complex and does not take long (Novianarenti & Ningsih, 2018; Nugraha, 2019).

The potential for developing agriculture at the household scale in Gampingrowo Village is quite immense because most of the residents' houses have good yards. Besides that, most of the population are farmers, but much land has begun to shift

by changing its function to housing. Karang Taruna is a social organization forum for developing youth potential with positive activities based on social awareness and responsibility (Handayani et al., 2018; Sarno, 2019). Exercises to improve organizational empowerment for youth are adapted to the crucial needs of the community. This activity also considers the community's unique characteristics, so developing organizational capacity leads to village independence. This hydroponic training for youth organizations in Gampingrowo Village is hoped to increase youth creativity towards economic independence in agriculture.

METHOD

In the success of this service activity, it is necessary to observe the location's situation and characteristics and coordinate with residents so that the programs offered to the people of Gampingrowo Village follow what is needed. For hydroponic training activities carried out at the Village Hall of Gampingrowo Village, there are two stages carried out, namely:

1. Lecture aims to provide general knowledge of hydroponics at this stage. In the process of delivering this lecture, it was assisted by an LCD device to make it more attractive to participants. The contents of the material presented include the meaning of hydroponics, types of media and hydroponic systems, maintenance, advantages and disadvantages of hydroponics, and things that need to be considered in selecting plant seeds.
2. Demo, participants practice assembling the starter kit provided. The materials used for this hydroponic training are starter kits, rock wool, net pots, pipes, hoses, rings, buckets, basins, flannel cloth, nutrient A, nutrient B, vegetable plant seeds, and water pumps.

DISCUSSION

The training activities ran smoothly and well. All participants showed enthusiasm, manifested in several questions, and assembled a starter kit to plant vegetable seeds. This training event was held at night because, on average, the youth organizations of Gampingrowo Village had busy lives, including work and study. The participants who came were representatives from Karang Taruna 10 RTs in Gampingrowo Village. The number of participants was 25 people. Training is designed to be simple and fast. The participants amounted to 25 people. Participants were divided into three groups, and each group prepared two starter kits and some complementary materials. Training activities are carried out using lecture and practice methods.

Lectures on hydroponics

Participants in this training registered and received photocopies of the material. The registration process is shown in Figure 1. A total of 25 participants were divided into three groups to optimize the process of delivering the material. Participants who attended did not match the expected target of 25 out of 50 participants. Even though the participants were outside the predictions, the implementation was more orderly and focused. After the participant data collection process was completed, a lecture on hydroponics was delivered. Delivery of courses within about 30 minutes took place interactively.

The material presented is about general knowledge about hydroponics, such as the meaning of hydroponics. Hydroponics comes from two Latin words, hydro meaning water and phonic meaning work, so the general understanding is an agricultural cultivation system that does not require land but uses water added

with nutrients (Bahri et al., 2022; Pambudi et al., 2022). In general, other things are conveyed, such as making hydroponic media, hydroponic planting procedures, and plants that can be planted, such as:

Flowers, flamingos, hibiscus, roses, and flat cacti.

Decorative bushes, Sri Fortune flowers, aloe vera, and red spinach,

Shrubs and Ornaments, cypresses, dwarf palms, herbs, and tree ferns.

Vegetables and Fruits, broccoli, green chili, cucumber, watermelon, spinach, and lettuce

Common hydroponic diseases and how to overcome them (Tunio et al., 2020).

Manganese (Mn) deficiency can be overcome by spraying $MnSO$ as much as 1 gram per 1 liter of water every week until the plants recover.

Lack of Magnesium (Mg), plants need to be given $MgSO$ as much as 1 gram per 1 liter of water every week until the plants recover.

How to overcome the deficiency of Calcium (Ca) by spraying $CaNO$ as much as 1 gram 1 liter of water every week until the plants are good again.

Deficiency of Iron (Fe), this disease can be recovered by spraying Fe-EDTA every week until the plants improve.

Information regarding these general matters can open insight and a brief understanding of the hydroponic system for trainees.

The benefits of applying the hydroponic method. This agricultural cultivation system has many benefits (Lakhiar et al., 2020; Schröter & Mergenthaler, 2019), including:

Assurance of the success of plants to grow and produce.

Efforts to control plant pests and experimental treatments for hydroponic plants.

Save using fertilizers and can be done in limited space or land.

If there are dead plants, it is easier to replace new plants and does not affect natural conditions.

Efficient in brute force and time.

Plant growth is faster under any circumstances, and production is more continuous and higher.

Plants grown do not depend on the season and have a high selling value.

Explaining these benefits can increase the motivation of youth participants to develop this hydroponic cultivation system.



Figure 1. Registration of Training Participants

Material about general matters in hydroponics, there is also knowledge about the six hydroponic systems(O'Brien et al., 2021), namely:

The wick system is a very effective hydroponic technique for the household scale. This technique is without a pump and timer.

In the NFT (Nutrient Film Technique) system, in this method, the plants grow in gutters/pipes, and water flows over the roots of the plants by being pumped.

Floating Raft System, this technique generally places plants on the styrofoam that floats on water that has been given nutrients directly.

Drip System, this method uses a pump and a timer. Water containing nutrients will be dripped at the base of the plant and absorbed by the roots.

The system Flow System (Flood and Drain) is one of the most widely used hydroponic techniques. This system utilizes the tidal principle in its irrigation technique.

The Aeroponic method is a method of growing plants in which plant roots hang in the air attached to a medium. Treatment process by spraying water every few periods.

Presentation of information on various variants of this planting technique so that participants can

choose the appropriate method. The choice is matched with the ability, environmental conditions, and spatial planning owned by the community. It is hoped that delivering material relevant to daily life can be applied directly and later improve the community's economy due to community involvement (Atmadja et al., 2022). In this training, participants will practice the NFT (Nutrient Film Technique) system. Available materials are well utilized. Before the lecture stage ended, participants were allowed to ask questions.

Demo of assembling the starter kit

The next stage is the demo stage, where all participants are allowed to assemble a starter kit, and all the materials needed have been provided. Participants prepared a basin to serve as a container for water as a medium, with a hole for water circulation, as shown in Figure 2. The water is distributed using a pump through a hose. In comparison, the other participants prepared rock wool and net pots.

The use of Rockwool as a planting medium because it has many advantages, including not containing pathogens that have the potential to cause disease in plants, can save on the use of disinfectants, playing an optimal role in replacing fertilizers, can be used many times and what is very important is that the use of Rockwool affects plant growth and yields (Degefa et al., 2021). Rockwool that has been cut is punched with a toothpick as a place for planting seeds. Available water adds plant nutrients. Plant vegetable seeds and water the nutritious water.



Figure 2. Participants Begin Assembling the Starter Kit

While assembling the place and planting media, the participants received an explanation from the committee. Discussions and questions went well, especially if there were difficulties in the assembly process. Questions about hydroponics also occurred a lot in this training. This training method is straightforward and practical. This training is perfect for today's young people, the instant and intelligent generation, because it can change their perception of a new way of farming that does not have to bother preparing large areas of land, but agricultural productivity continues. The results of the rafts ready to wait for the harvest are shown in Fig. 3 and can be taken home by participants. To be able to develop in their respective homes, participants are directed to use used materials that are no longer used, such as plastic bottles and buckets. This condition aims to reduce environmental pollution and can indirectly educate them to recycle plastic waste (Phibunwatthanawong & Riddech, 2019).



Figure 3. Results of Hydroponic Plants

CONCLUSION

Information related to cultivation with the hydroponic system is still very helpful and useful for developing agriculture in Gampingrowo Village. Counseling and hydroponic assembly practices for youth organizations in Gampingrowo Village can add insight and stimulate them to continue earning income without leaving the area. Cultivating plants with hydroponics is an alternative to overcome the limitations of agricultural land. The implementation of this dedication went smoothly and successfully. The training participants learn about the hydroponic method, hydroponic growing techniques, skills in assembling simple hydroponic methods, and the results of the assembly.

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