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Training on Microgreen Cultivation as a Strategy to Strengthen Food Security and Family Nutrition

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Abstract

The pandemic conditions since two years ago have left people vigilant about economic security, especially food security. Another problem is that the reduction of agricultural land and the density of residential housing has encouraged the emergence of a new concept of gardening on limited land. Agriculture in urban areas with minimal land is called Urban Farming by the agricultural community. This service aims to provide knowledge to partners about alternative strategies to strengthen family food security through microgreen cultivation. The method used in this service is the Community Based Research (CBR) approach, which prioritizes the utilization of assets and potentials that are around and owned by the community or society. This activity was carried out in 3 stages; training, cultivation preparation and implementation of microgreen cultivation. Many people got the benefits and virtues of microgreen cultivation. The partners of this service are community groups who are members of the WES (Women and Environmental Studies) Payungi community which focuses on women and environmental issues and actively participates in spreading knowledge about the environment to the surrounding community. By conducting this training to the partner group, the partners can practice growing microgreens for themselves and participate in introducing it to a wider community environment.

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INTRODUCTION

The Covid-19 pandemic has had a major impact on the health sector, but it has also affected various aspects of social and economic life, including the food sector (Wardah & Niswah, 2021). So far, food security has focused on the ability of farmers to plant and harvest crops. When you have to study and work from home, every family must have a strategy to live frugally and empower themselves to meet food availability personally. For example, by growing food around the house such as chilies, vegetables, and fruits that are sufficient for family consumption and can reduce spending on daily basic needs (Aidha, 2021).

The pandemic conditions that have been going on since the beginning of 2020 and it is not yet known when it will end, people need to pay attention to food security readiness

in dealing with this pandemic (Aisyah, 2020). Another problem is that the reduction of agricultural land and the density of population housing have encouraged the emergence of new concepts of gardening on limited land. Farming in urban areas with minimal land by the agricultural community is called Urban Farming (Ahmad & Setyowati, 2021). Urban farming activities are increasingly in demand as a hobby, but also as a solution to family food security to improve the body's immune system.

The immune system can be maintained through adequate nutrition, especially vitamins and minerals and bioactive compounds that can be found in vegetables (Susilawati et al., 2021). Vegetables contain various kinds of vitamins needed by the body, especially green vegetables. Currently, one of the trending vegetable cultivation techniques is microgreens.

Microgreen is a young vegetable produced from vegetable seeds that already have two fully developed cotyledon leaves and have emerged young true leaves (Treadwell et al., 2020). Microgreens are vegetables that can be harvested at week 1 to week 3 after germination (Turner et al., 2020). In addition, microgreen is a type of vegetable that has a higher nutritional and vitamin content than commonly grown vegetables (Riggio et al., 2019).

Microgreens are known as vegetables that are rich in nutrients. Some studies show that microgreen food security is better when compared to sprouts and mature vegetables (Ikrarwati et al., 2020). Microgreens are rich in nutrients and contain many phytonutrients such as vitamins B1, K1 and C, carotenoids, minerals and antioxidants that are known to boost immunity and have protective benefits against cancer (Sharma et al., 2021).

Based on the situation analysis of this study program-based service research, so far many people have not understood the benefits and virtues of microgreen cultivation. The partners of this service are community groups who are members of the WES (Women and Environmental Studies) Payungi community which focuses on women and environmental issues and actively participates in spreading knowledge about the environment to the surrounding community. By conducting this training to the partner group, it is hoped that partners can practice growing microgreens for themselves and participate in introducing it to a wider community environment. Furthermore, it is hoped that this service will be able to open partners' knowledge about alternative microgreens businesses.

Microgreen planting which is easy, cheap, and rich in benefits is not fully known by many people. Microgreen, which is popular in developed countries and in big cities, has not yet become a trend among the community, especially in Lampung province. This encourages researchers to introduce microgreen as an alternative to urban farming to improve family food security.

METHOD

The method used in this study program-based service research is the Community Based Research (CBR) approach, which prioritizes the use of assets and potentials that are around and owned by the community or society (Page-Reeves, 2019). This activity will be held at the Yosomulyo Pelangi Market Library Room (PAYUNGI) on Saturday-Sunday, October 30-31, 2021 The target of this service activity is women in the Women

and Environment Studies (WES) community. The number of participants in this training activity is 20 people.

RESULT AND DISUCSSION

The results of community service activities on microgreen cultivation training as an alternative to food security and nutrition in the Women and Environment Studies (WES) Payungi community. Study program-based community service research activities include the introduction of urban farming methods, exposure to microgreen cultivation and the benefits of microgreen cultivation as an alternative to food security and nutrition during a pandemic. The detailed explanation of the stages of microgreen cultivation training conducted by Yosomulyo Pelangi Market residents is broadly divided into three stages as follows:

1. Training Phase

   This activity is in the form of pretest implementation, material explanation, discussion and questions and answers about what microgreen is and its benefits. The pretest questions were given through the quiziss application, so each participant could access the pretest questions through their respective devices. This activity aims to determine the initial knowledge of training participants related to urban farming and microgreen cultivation.

Picture 1: The Pretest Session

Picture 2. The Training about Microgreen

After working on the pretest questions, participants then received material explanations from resource persons related to urban farming and microgreen cultivation.

Microgreen plants can be harvested by cutting the stems using sharp scissors just above the surface of the growth medium. So that what is consumed from microgreens is part of the stem, cotyledons and first leaves that have opened completely except for the roots. Microgreens contain bioactive compounds such as pigments, enzymes, vitamins 4-40 times more than the adult plant and other phytochemical compounds.

2. Preparation Stage of Microgreen Cultivation

Several vegetable species can be grown in the form of microgreens such as the Brassicaceae family (eg: cauliflower, broccoli, cabbage, kale, watercress, radish, arugula, mustard and tatsoi), Asteraceae (eg: lettuce, endive, escarole, chicory, radicchio), Apiaceae (eg: carrots, fennel. Celery), Amarillydaceae (eg: garlic, onion, leek), Amaranthaceae (eg spinach, beetroot, red orach, swiss chard) and Cucurbitaceae (eg melon, cucumber, pumpkin) (Khairad, 2020).

Materials and equipment used in microgreen cultivation include: vegetable seeds, growing media, and containers. The most effective planting medium is a mixture of soil, husk charcoal, and organic fertilizer in a ratio of 1:1:1. But don't forget to perforate the bottom so that water does not stagnate.

The seeds that can be used are those that are free from pathogens such as bacteria. Any leaf vegetable seed can be used as microgreens material. Seed density is low when planting, because young vegetables need enough space and light to grow (Mir et al. 2016). Microgreens can be harvested and consumed at a very young age, which is between 10 to 20 days after seed breakage (Pramaningtyas et al. 2019). Most are harvested at the appearance of the first true leaf, by manually or mechanically cutting the seedlings a few millimeters above the surface of the growing medium (Kyriacou et al. 2016).

Picture 3. The Microgreen Materials

Microgreens can be grown conventionally or hydroponically. Growers should note that fertilizer is not necessary for fast-growing microgreens such as brassicas. However, fertilizer can help the growth of slow-growing microgreens such as carrots, lemongrass, and onions. Microgreen production generally uses flat plastic with drainage holes at the bottom. The trays are lined with sterile fibers. Microgreens with a hydroponic system can use aggregates with rockwool as a growing medium.

Some food nutritionists and microgreens farmers are eager to research the nutrition of microgreens. Microgreens only have very small leaves and stems and are very new in their diet and they really don't know the nutritional value of them. Until further research is done to find out the amount of Phytonutrients and chlorophyll in them.

The results of a study of 25 types of microgreens and looked at the amount

of phytochemicals, the name of substances in vegetables, including some herbs such as coriander, celery and chia. The results showed that all types of microgreens were found to have more vitamins and carotenoids than vegetables harvested as adults. Almost all types of microgreens contain four to six times more beneficial nutrients, such as vitamin C, vitamin E and beta-carotene. Each type of microgreens has different nutrient advantages. For example, red cabbage microgreens contain the most vitamin C.

3. Microgreen Cultivation Stage

This activity is in the form of practicing microgreen cultivation with materials that have been available. The stage of the process (Figure 5), while the training participants practiced how to cultivate microgreen directly. First, vegetable seeds are sown first. For example, using cotton to sow. Place the cotton in a small container, moisten the cotton until it is moist, and sprinkle seeds on it.

Picutre 3. Microgreen Seeding and Planting

Next, store the microgreen in a shady place, so that germination occurs. After that, make sure the plants get enough sunlight and spray using water every day, making sure the soil or planting media is not waterlogged.

After 10 days, the height of the microgreen plant has reached 5 to 10 centimeters and the leaves have started to grow, microgreens can be harvested. The way to harvest is to cut the stem at the base closest to the growing media. Wash the microgreens thoroughly, then the microgreens are ready for consumption.

Microgreens can be grown conventionally or hydroponically. Growers should note that fertilizer is not required for fast-growing microgreens such as brassicas. However, fertilizer can help the growth of slow-growing microgreens such as carrots, lemongrass, and onions. Microgreen production generally uses flat plastic with drainage holes at the bottom. The trays are lined with sterile fibers. Microgreen with a hydroponic system can use aggregates with rockwool as a growing medium. The optimal seed density is one that maximizes production space while avoiding very thick stands that cause stems to elongate or disease

problems to develop(Rusu et al., 2021).

Many people still have difficulty distinguishing microgreen from sprouts, even though the two phases of plant growth are actually quite easy to distinguish. In fact, in appearance, microgreen is more like young vegetables or commonly called baby greens than sprouts. In the sprout phase, plants have just developed from the seed stage. With adequate sunlight intake, the first two leaves called cotyledon leaves are formed. After this, the true leaves grow. Microgreens are harvested when the true leaves grow. That is the difference. Sprouts do not yet have true leaves, while microgreens already have true leaves like vegetables, only younger(Riggio et al., 2019).

With that, it is certainly understandable that actually every vegetable plant can be grouped with the microgreen plant group as long as it is harvested at the right time. Even herbs can be grown and harvested as microgreens.

Microgreens are immature young vegetables, produced from vegetable or herb seeds, having two fully developed cotyledonary leaves with or without the appearance of the first pair of true leaves (Xiao, et al., 2014). Microgreens are plants from the group of vegetables or herbs that are harvested at the age of 7-21 days (Delian, Chira, Badulescu, & Chira, 2015).

These plants can be harvested by cutting the stems using sharp scissors just above the surface of the growth medium. So that what is consumed from microgreens is part of the stem, cotyledons and first leaves that have opened completely except for the roots. Microgreens contain bioactive compounds such as pigments, enzymes, vitamins 4-40 times more than adult plants and other phytochemical compounds. This happens because the existing compounds have not been used for differentiation of organs (Samuolien, et al., 2016).

Microgreens originated in San Francisco, California where they began appearing on chefs' menus in the 1980s. In Southern California, microgreens have been popular since around the mid-1990s. Initially microgreens came from the few varieties available such as arugula, basil, beets, kale, cilantro and a mixture called Rainbow Mix. After spreading east from California, they are now grown in most areas of the United States with more and more varieties being produced.

There are certainly many types of vegetables and herbs in Indonesia but they have not been cultivated in the form of microgreens. So the development of microgreens is still wide open considering the increasing awareness of healthy food. Typical Indonesian plants such as basil (Ocimum canum), red spinach (Alternanthera amoena), red celadah (Lactuca sativa var encephala), cauliflower (Brassica oleraceae var botrytis), green beans (Vigna radiata), sunflower (Helianthus annuus), sweet sorghum (Sorghum bicolor) and purple cabbage (Brassica oleraceae) can be cultivated into microgreens that have high nutritional value compared to microgreens from abroad.

Microgreens that are currently widely developed are mini plants derived from leaf vegetables. Kyriacou et al. (2016) stated that microgreens have great potential to adapt leafy vegetable production to a micro scale and to increase

nutritional value in the human diet.

Talking about microgreen cultivation in relation to family food security efforts during a pandemic can certainly be an alternative. According to USAID (1992), food security is a condition when all people at all times have physical and economic access to obtain their consumption needs for a healthy and productive life. Food security according to FAO (1997) is a situation in which all households have both physical and economic access to food for all family members, where households are not at risk of losing both access.

Food security is one of the important aspects to achieve Susteinable Development Goals (SDGs). The second goal of the SDGs is to end hunger, achieve food security and improve nutrition and promote sustainable agriculture. From the second goal of the SDGs, food security is said to be achieved when people are free from hunger, access to safe and nutritious food is sufficient for everyone. An area is said to be in a food-secure condition, one of which can be described by the availability of food in the area.

So, to achieve family food security during the current pandemic, each family member can make efforts by implementing several gardening alternatives from home, one of which is microgreen cultivation. Community service on microgreen cultivation training as an alternative to food security and nutrition in the Payungi Women and Environment Studies (WES) community has been carried out according to schedule. The training went smoothly, there was a positive response from the participants, seen from the enthusiasm of the training participants.

CONCLUSSION

Many people got the benefits and virtues of microgreen cultivation. The partners of this service are community groups who are members of the WES (Women and Environmental Studies) Payungi community which focuses on women and environmental issues and actively participates in spreading knowledge about the environment to the surrounding community. By conducting this training to the partner group, the partners can practice growing microgreens for themselves and participate in introducing it to a wider community environment. Furthermore, it can open partners' knowledge about alternative microgreens businesses. This encourages researchers to introduce microgreen as an alternative to urban farming to improve family food security.

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