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Empowerment of Coral Cadets In Cibiru Hilir Village In Building A Creative Economy Through Hydroponic And Aquaponic Training

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ABSTRACT

The Objective of the program of community service is To Empower Karang Taruna Cibiru Hilir Village In Building the Creative Economy Through Training on Hydroponics And Aquaponics. Weaknesses of teachers in making learning media makes the problem to be the solution sought. Hydroponics and aquaponics is one of the alternatives to build the creative economy of the community, so that it becomes the basis and the reason of rational team of researchers in taking steps to implement community service activities through training systems hydroponics and aquaponics. Community service is performed by the method of the development of action research. Community service activities in his youth in the Village Cibiru Hilir, Cileunyi District, Bandung Regency in accordance with the results of the response of the questionnaire the level of satisfaction of partners in the implementation of community service, which said that the partners responded to a positive response (90%) with the activity of this devotion.
Keywords: hydroponics, economics, aquaponics.

PRELIMINARY

The rapid development of development and economic growth in urban areas has caused an explosion in the need for massive land. This resulted in agricultural production lands managed by the community turned into commercial areas of various kinds of companies. In addition, the next problem from limited land is the swelling of land prices, so that land for agricultural production becomes increasingly limited. Furthermore, this also makes it difficult for houses in urban areas to have a yard or yard for farming (Goddek et al., 2019; Krismawati, 2012; Sudarmo, 2018).

In connection with the above, it is unfortunate that the potential of urban agriculture has become difficult to implement so that alternatives to fulfilling food for the community, reducing household expenditures, and increasing family income are also becoming increasingly difficult. Therefore, a new method of farming is needed that can be done in limited land, a new method of agriculture in the city that is currently being intensively carried out is the hydroponic method (Mardina, 2019; Resh, 2012; Roidah, 2015).

This hydroponic farming method is different from the greenhouse method, although a lot of hydroponic cultivation is carried out in a greenhouse. The use of greenhouses in hydroponic systems is mostly due to certain factors such as an ecosystem that is easier to control, limited land, variations in plant species in one land and others. At this time the use of the hydroponic method by the community is very less applied due to lack of knowledge from the community so that people often cultivate crops in large areas. The problem that often occurs when growing crops using the hydroponic method is that erratic watering causes the plant to be in poor condition from moisture and plant growth (Qurrohman, 2019; Sulistyawati et al., 2019; Susilawati, 2019).

Hydroponics literally means Hydro = water, and phonic = work. So in general it means an agricultural cultivation system without using soil but using water containing a nutrient solution. Hydroponic cultivation is usually carried out in a greenhouse to maintain optimal plant growth and is completely protected from the influence of outside elements such as rain, pests and diseases, climate and others. Hydroponics is an agricultural technique that can be applied to land and a limited time

can be applied to grow both vegetables and flowers. The advantages obtained by doing hydropinic farming include: it does not require large land or yards, the provision of nutrition is easier and more efficient, does not cause environmental pollution, is healthier and cleaner (Resh, 2013; Sulistyawati et al., 2019). The advantages of some cultivation using a hydroponic system include: Plant density per unit area can be doubled so as to save land use. Product quality such as shape, size, taste, color, cleanliness can be guaranteed because plant nutrient needs are supplied in a controlled manner in the greenhouse. It does not depend on the season/time of planting and harvesting, so it can be adjusted according to market needs.

Types of hydroponics can be distinguished from the media used to stand upright plants. The media is usually free of nutrients (sterile), while the supply of nutrients needed by plants is channeled into the media through pipes or manually watered. The planting media can be gravel, sand, cork, charcoal, zeolite or without aggregate media (only water). The most important thing in using the planting media is that it must be free from pests so that it does not grow fungi or other diseases (Tallei, Rumengan & Adam, 2017).

In connection with the above, there are several advantages of a hydroponic system, namely: (1) The success of plants to grow and produce is more secure. (2) Treatment is more practical and pest disturbance is more controlled. (3) The use of fertilizers is more efficient (efficient). (4) Plants that die are easier to replace with new plants. (5) It does not require a lot of manual labor because the work method is more efficient and has standardization. (6) Plants can grow more rapidly and in a condition that is not dirty and damaged. (7) Production yields are more continuous and higher than those on land. (8) The selling price of hydroponics is higher than non-hydroponic products. (9) Several types of plants can be cultivated out of season. (10) There is no risk of flooding, erosion, drought, or dependence on natural conditions. (11) Hydroponic plants can be done on limited land or space, for example on the roof, kitchen or garage (Swastika, Yulfida & Sumitro, 2017).

In line with this, the right method is needed so that plants with a hydroponic system can grow effectively. The basic principles of the hydroponic method are divided into two, namely substrate hydroponics and NFT (*Nutrient Film Technique*). Both forms of hydroponics can be made with new techniques that can be adapted to financial conditions and available space. (1) Substrate Hydroponics. Substrate hydroponics does not use water as a medium, but uses solid media (not soil) that can absorb or provide nutrients, water, and oxygen and support plant roots as well as soil functions.

Media that can be used such as pumice, sand, sawdust, or peat. The medium functions like soil. The ability to bind moisture to a medium depends on the particle size, the smaller the particle size, the larger the pore surface area, so the greater the ability to hold water. The irregular shape of the media particles absorbs more water than the flat spherical shape. Porous media also have a greater ability to hold water. The choice of media type depends on the availability of funds, quality, and the type of hydroponics to be carried out. Hydroponic substrate media must not contain poison (toxic).

Some examples of media that contain toxins are as follows: (1) Sawdust, sometimes contains high table salt (NaCl) due to wood that has been placed in the sea, so sawdust must be washed in fresh water before being used as a growing medium. (2) The media of pumice and sand originating from the sea, because they contain very high CaCO3. We recommend that if you want to use sand use volcanic sand. And the media used is not made of soft media, because it is easily damaged, the structure and particle size are small, so it is easy to solidify. This condition will make root aeration difficult.

Each time you replace the plant, the substrate to be sterilized should be sterilized by soaking it in chlorine water for approximately 1.5 hours. It is then washed with fresh water to remove chlorine before use. Irrigation Irrigation frequency depends on the substrate surface, plant growth stage, and climatic factors. Substrates with a rough surface and regular shape need to be watered more often than those with irregular, porous or small particles. Fine particles such as sand or sawdust need to

be watered 2-3 times a day, while for coarse particles such as pumice it is necessary to water once every hour throughout the day.

Plants that are placed outside the room are watered more often because the evaporation that occurs is greater. b. Hydroponics NFT (*Nutrient Film Technique*) NTF is a cultivation model by placing plant roots in a shallow layer of water. The water is circulated and contains nutrients according to plant needs. Roots can develop in a nutrient solution, because around the roots there is a layer of nutrient solution, the system is known as NFT. Excess water will reduce the amount of oxygen, therefore the nutrient layer in the NFT system is made a maximum solution height of 3 mm, so that the need for water (nutrients) and oxygen can be met.

In connection with the above, hydroponics and aquaponics are an alternative in building a community creative economy business, so that they become the rationale and rationale for the research team to take steps to carry out community service activities through hydroponic and aquaponic system training. In addition, this community service activity is a manifestation of the tri dharma of higher education and a form of the academic moral responsibility of the research team in contributing and participating in community change and progress. Based on the rational background above, the research team initiated community service activities, through an activity program with the theme "Empowerment of Youth Organizations in Lower Cibiru Village in Building Creative Economy Through Hydroponic and Aquaponic Training".

METHOD

The development of creative economy businesses for the residents of the downstream Cibiru Village, Cileunyi District, Bandung Regency will use the Action Study Development Method through Collaborative and Cooperative Programs with partner institutions for community service activities. The Action Study Development Method is an effort to develop a program of activities that is carried out systematically and comprehensively, starting with an in-depth study of the potential, supporting, and inhibiting factors of the program followed by concrete actions in implementing the program. The ultimate goal of this method is to implement the program effectively and efficiently. In an effort to realize community service activities through empowering youth groups in the downstream Cibiru village in building a creative economy through hydroponic and aquaponic training, it is carried out through several stages and systematic steps as follows. Preparation phase. In the preparatory stage, the abdimas team conducted a preliminary survey to analyze the location of partners, the training needs needed by partners, and drafted activities to be carried out, as well as developed instruments.

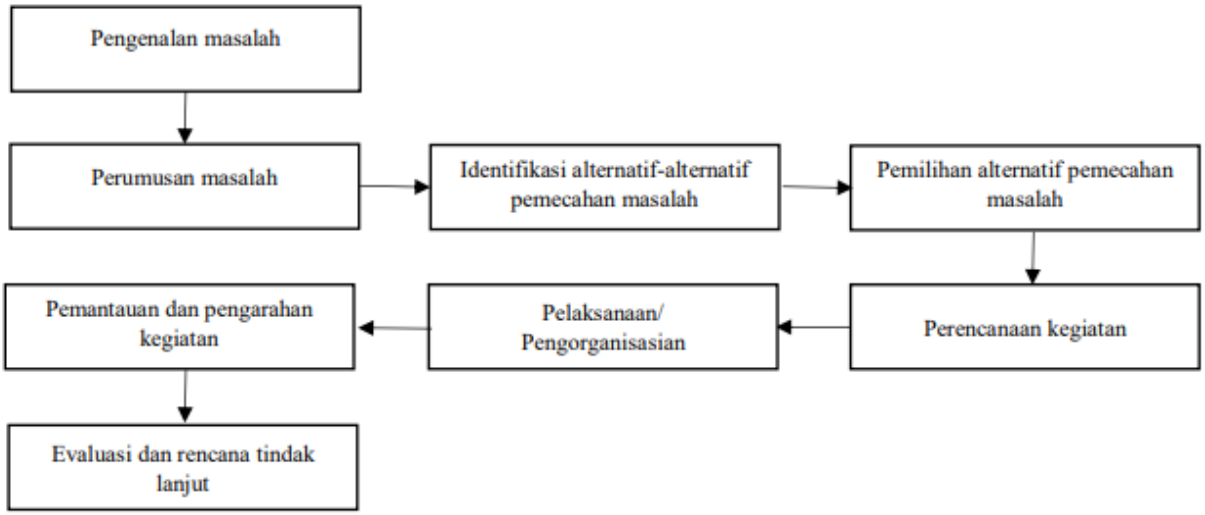

Figure 1. Flow of Community Service Activities

In connection with the activity flow scheme above, it can be explained as follows.

1. Identification of problems/needs and potentials as well as awareness.
   At this early stage, information was extracted through reflective analysis of the environment and the community of the downstream cibiru village. This is done as a basis for determining the orientation of the training activities to be carried out.
2. Formulation of problems and setting priorities.
   The problem formulation stage is the stage of determining the focus of the goal of community service training activities that will be carried out, especially on essential community problems related to efforts to increase creative economy efforts.
3. Identification of alternative problem solving / idea development.
   The identification stage of alternative problem solving is a stage of dialogue / deliberation with all elements of society, especially the government of the downstream cibiru village and the cadets of the downstream cibiru village related to the community's needs in building a creative economy.
4. Selection of the most appropriate alternative problem solving.
   At the stage of selecting alternative problem solving, determining community service activities that are in accordance with the needs of the downstream Cibiru village community, namely training for youth empowerment through hydroponic and aquaponic system training which is carried out programmatically and systematically.
5. Activity planning
   The activity planning stage, which is the consensus stage of the service team with the downstream cibiru village government and downstream cibiru village youth groups in determining the orientation of activities, includes: activity plans, implementation time, activity forms, to monitoring and evaluating activities to be carried out.
6. Implementation/Organization.
   No matter how sophisticated a plan is, it will only be meaningful if it is actually carried out. The organization can be concrete and simple or it can be sophisticated and basic to lead to institutional development. The implementation stage, is the implementation stage of hydroponic and aquaponic system training activities, which is carried out by starting the process of delivering theoretical/conceptual material which is then ended with practice by the youth of Karang Taruna in Cibiru downstream village as participants in training activities.
7. Monitoring and direction of activities.
   The monitoring and direction stage is the activity stage in controlling the process of implementing planting training activities with hydroponic and aquaponic systems that are carried out. This stage is carried out with the aim of ensuring that activities do not deviate from the goals that have been set.
8. Evaluation and follow-up plan.
   The evaluation and follow-up stages are the final stages carried out to determine and measure the success of the activities that have been carried out.

RESULTS AND DISCUSSION

This community service program has been implemented in Cibiru Hilir Village, Cileunyi District, Bandung Regency. The realization of this activity is carried out through schemes as, among others, (1) problem recognition; (2) problem formulation; (3) identification of problem solving alternatives; (4) alternative selection; (5) activity planning; (6) Implementation (7) monitoring, and; (8) Evaluation and follow-up plan. The first stage is the introduction of the problem, this is done by observing the location of the goal of community service. Then, the second stage is to formulate the problem, this is done by looking at the problems faced by the community service partners, namely youth organizations in Cibiru Hilir Village. The third stage, the team identified problem solving, this was done to find solutions

faced by community service partners. Then in the fourth stage, the selection of alternative solutions that will be used by the service team for partners is carried out.

Before starting the implementation, the fifth stage is carried out, namely activity planning. This is done to make schemes and techniques during the implementation of community service activities which include the selection of hydroponic materials and models to be used.

The next stage is the implementation stage, this includes making hydroponics, starting from purchasing goods, making hydroponic pipes, making support frames, and reaching the trial and *finishing stages.*

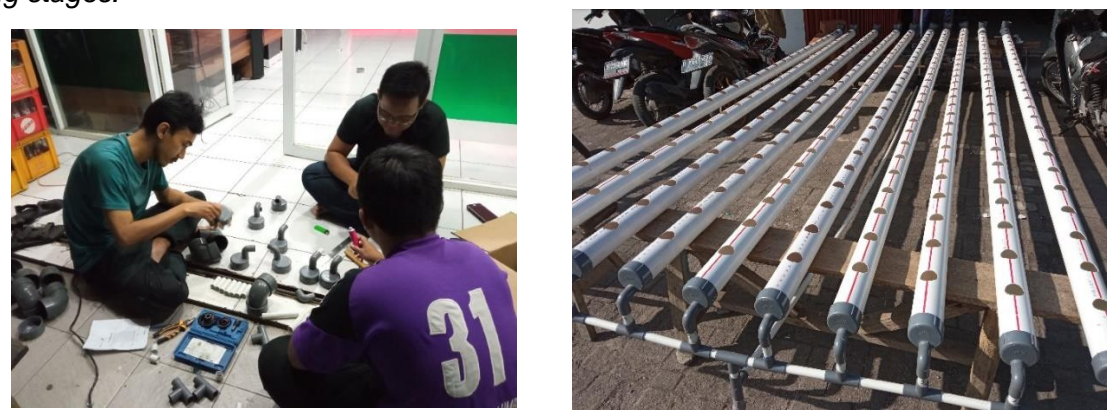

Figure 2. Activities for making hydropnic frame parts

The seventh stage is monitoring, this is done to see how the community can take advantage of the materials and practices that have been provided by the community service team. The last stage is evaluating, this is done in order to reflect on the implementation of community service programs that have been carried out. In addition, this is also intended as input for the community service team so that in the next program activities can be carried out even better.

Figure 3. Activities for presenting material about hydroponics

Figure 4. Monitoring activities for community service programs

Based on the description above, it can be seen that hydropoic and aquaponic training for youth groups can be an option for the development of the community's creative economy. This is in line with Mardina (2019) who said that the hydroponic method is a promising method of farming for now, given the increasingly limited condition of agricultural land and the high price of land. Therefore, the hydroponic method can be used by people who only have a limited land area, so they can still be productive (Resh, 2012; Roidah, 2015).

In addition, by using hydroponics, people can get many benefits, apart from being cheap, the method of farming using hydroponics can also increase production productivity. Therefore, this community service program received an enthusiastic response from youth organizations and the surrounding community. Furthermore, Swastka, Yufilda & Sumitro (2017) reveal eleven advantages of farming using the hydroponic method, namely as follows.

1. The success of plants to grow and produce is more guaranteed.
2. Treatment is more practical and pest disturbance is more controlled.
3. The use of fertilizers is more efficient (efficient).
4. Dead plants are easier to replace with new plants.
5. It does not require a lot of manual labor because the work method is more efficient and has standardization.
6. Plants can grow faster and in a state that is not dirty and damaged.
7. Production yields are more continuous and higher than those with land cultivation.
8. The selling price of hydroponics is higher than non-hydroponic products.
9. Some types of plants can be cultivated out of season.
10. There is no risk of flooding, erosion, drought, or dependence on natural conditions.
11. Hydroponic plants can be done on limited land or space, for example on the roof, kitchen or garage

Basically, the use of farming using hydroponic and aquaponic methods has great benefits for the development of the creative economy of the community, especially youth groups in Cibiru Hilir Village, Cileunyi District, Bandung Regency. In addition, the hydroponic and aquaponic training activities went well in accordance with the results of the feedback questionnaire on the level of partner satisfaction in the implementation of community service which said that partners responded positively (90%) with this service activity.

CONCLUSION

Community service activities with the theme " Empowering Youth Organizations in Cibiru Hilir Village in Building a Creative Economy Through Hydroponic and Aquaponic Training are going well according to the results of the feedback questionnaire on the satisfaction level of partners in

implementing community service which says that partners respond to positive responses (90%) with this service activity. This activity can add insight and skills for youth organizations and surrounding communities in building a creative economy by developing farming systems using hydroponic and aquaponic methods.

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