



Empowering Women Farmers: Training in Organic Fertilizer Production for Sustainable Horticulture and Economic Growth

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Abstract: Women in Indonesia often bear the primary responsibility for household and childcare, a role inconsistent with global gender equality principles. This study focuses on a women's farming group in the Griya Wana Karya Permai housing complex, Bubulak Village, Bogor City, who transformed public facility land into productive horticultural areas. To support their efforts, training was provided on producing liquid organic fertilizer to enhance crop productivity. The initiative also introduced hydroponic systems for cultivating vegetables like pak choy. Results showed that the women farmers successfully utilized organic waste to create both liquid and solid fertilizers, improving horticultural yields and contributing to family income. This activity not only promoted sustainable agriculture but also empowered women by providing them with new skills and economic opportunities, aligning with SDGs on gender equality, food security, and climate action..



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Introduction

Food security is one of the crucial issues faced by the global community recently. In the midst of the challenges of climate change, population growth, and economic insecurity, sustainability and access to sufficient, safe, and nutritious food are important for human welfare¹. Therefore, innovative steps and strong policies are needed to build sustainable and inclusive food security. Problems arising from climate change, pandemics, imbalance in food distribution, and dependence on food

¹ R. Tranggono Akbar et al., "Krisis Ketahanan Pangan Penyebab Ketergantungan Impor Tanaman Pangan Di Indonesia," *AZZAHRA: Scientific Journal of Social Humanities* 1, no. 2 (2023): 73–81.

imports result in crop prices harming agriculture, because the prices are low², and it is recorded that 6 out of 9 food ingredients needed in Indonesia come from imports³.

Food security is the provision of food for households that is good enough in terms of quantity, quality, food safety, distribution, and affordability⁴. One way to achieve food security is by utilizing the potential of diverse local resources to increase food availability⁵. Most people from the lower middle class are experiencing an economic crisis, such as a decrease in salaries and even loss of work after the COVID-19 pandemic.

To address these challenges, this study introduces a community-based intervention focused on empowering women farmers through training in organic fertilizer production and the use of hydroponic systems. By shifting from inorganic to organic fertilizers, the project aims to improve soil health, increase crop yields, and reduce environmental harm. The initiative also emphasizes the importance of community involvement, as the women farmers actively participate in the training and implementation of these sustainable practices. This participatory approach ensures that the solutions are tailored to the specific needs of the community, fostering a sense of ownership and long-term commitment.⁶

Women's empowerment in improving family welfare is very necessary both in the domestic and in the public area⁷. Problems that frequently arise in rural areas are also related to the difficulty of women's access to education, both formal and informal. For rural communities, women only have a role in the domestic sector, not in the public area. This is a gender gap between men and women in the public area. Apart from that, there is a problem that is no less important, namely the sustainability of food security both in terms of land, growing media, and business.

To address these issues, this study focuses on empowering women farmers through community-based training and support. Specifically, the research collaborates with a women's farming group in the Griya Wana Karya Permai housing complex, Bubulak Village, Bogor City. These women have transformed idle public

² Dedi Hidayat, "Ketergantungan Impor Ancaman Masa Depan Petani Indonesia," *Rri.Co.Id*, last modified 2023, <https://www.rri.co.id/nasional/450106/ketergantungan-impor-ancaman-masa-depan-petani-indonesia>.

³ Muhammad Maruf, "Indonesia Negara Darurat Impor Pangan!," *CNBC Indonesia*, last modified 2023, <https://www.cnbcindonesia.com/research/20230704185303-128-451320/indonesia-negara-darurat-impor-pangan>.

⁴ Badan Ketahanan Pangan, *Laporan Tahunan Badan Ketahanan Pangan Tahun 2013, 2014*, https://drive.google.com/file/d/1sntZ8Y5a7jv5TkWf75KnW_QSHiwcYzOT/view?usp=drive_link.

⁵ Kementerian Pertanian, *Laporan Tahunan Badan Ketahanan Pangan Tahun 2019* (Jakarta: BKP Kementan RI, 2019).

⁶ Rudy Catur Rohman Kusmayadi, "Proses Pengambilan Keputusan Dalam Keluarga," *Gender Equality: International Journal of Child and Gender Studies* 3, no. 1 (2017): 1–10.

⁷ Narilah A. Tuara, "Peran Perempuan Dalam Meningkatkan Ekonomi Keluarga (Studi Kasus Ibu-Ibu Kelurahan Sulamadaha Kecamatan Ternate Barat Kota Ternate)," *Jurnal Ilmiah Wahana Pendidikan* 8, no. 20 (2022): 506–514.

land into productive horticultural areas, cultivating vegetables such as pak choy, kale, and chilies. However, their efforts are hindered by the use of inorganic fertilizers, which degrade soil quality and attract pests, as well as a lack of organized record-keeping for sales.

This community service initiative aims to address these challenges by providing training in the production and use of organic fertilizers, introducing hydroponic systems, and promoting sustainable agricultural practices. By involving the community in these activities, the project seeks to enhance women's roles in agriculture, improve crop yields, and contribute to household income¹¹. The initiative aligns with the Sustainable Development Goals (SDGs) on gender equality, food security, and climate action, demonstrating how community involvement can drive sustainable development and economic resilience.

l function from public housing land has changed to idle land. If this land is left untreated, it will be very detrimental to local residents because it will become dirty and full of untreated weeds. Several women who care about the environment in these housing complexes use idle land to become productive land⁸, which is used to cultivate vegetables⁹.

The problems faced by this group are related to the use of inorganic fertilizer which causes the land to become saturated, apart from that there is the problem of rot/minor pests found in the vegetables produced as well as recording the results of vegetable sales which is still not organized. Therefore, in this service activity, we want to increase the role of women farmer groups who can realize food security and environmental management as climate change mitigation¹⁰. This relates to the SDGs of gender equality, food security, and climate change mitigation. The objectives of community service activities for women farming groups in the Griya Wana Karya Permai housing complex, Bubulak Village, West Bogor District, Bogor City include the following: firstly, empowering women in these housing complexes by educating them on the manufacture and use of organic fertilizer for horticultural cultivation needs on their public facility land. secondly, improving the quality and quantity of horticultural cultivation results on their idle land so that product marketing increases. third, provide an explanation of the importance of sustainability, accessibility, and quality of nutritious food in the context of food security using organic fertilizer.

⁸ Riyanto Adji and Tjong Wan Sen, "Peningkatan Produktivitas Jambu Kristal Melalui Pemanfaatan Teknologi Yang Ramah Lingkungan," *Remik: Riset dan E-Jurnal Manajemen Informatika Komputer* 7, no. 1 (2023): 109–122.

⁹ Riyanto Adji and Tjong Wan Sen, "Pendampingan Masyarakat Kota Dalam Memanfaatkan Lahan Tidur Di Kawasan Industri Jababeka Ditinjau Dari Aspek Teknologi Dan Agrobisnis," *Academics in Action: Journal of Community Empowerment* 5, no. 1 (2023): 29–40.

¹⁰ Yudhy Harini Bertham, Dwi Wahyuni Ganefianti, and Apri Andani, "Peranan Perempuan Dalam Perekonomian Keluarga Dengan Memanfaatkan Sumberdaya Pertanian (Women Role In Family Economy With Agricultural Resources Utilizing)," *AGRISEP* 10, no. 1 (2011): 138–153.

Method

Theoretical Framework

Community empowerment aims to increase the abilities, independence and overall welfare of society. The role of empowerment in increasing independence is to encourage people to have the ability to identify and solve problems that occur in the community so that they are not dependent on help from outside parties. Things identified include developing skills, increasing access to resources, and strengthening community capacity in managing local resources around them.

In community empowerment, an interaction occurs that has an impact on increasing active participation by the community in the decision-making process that can affect their lives. The involvement of community participation is very important for the planning, implementation and evaluation of development programs that are relevant to the needs and aspirations of their environment. With the involvement of all levels of society, social, economic and political inequality that occurs in society will begin to decrease because all levels of society will improve their access to resources, opportunities and basic rights, as well as reduce disparities in the distribution of wealth and power.

And of course this will benefit the community itself because indirectly they try to improve the welfare of society as a whole, both in terms of the economy, health, education, and other aspects of life through development of social infrastructure, job creation, access to health and education services. As well as improving the general standard of living. This increase in prosperity will encourage sustainable development while still paying attention to the needs of the present generation without compromising the ability of future generations to meet their own needs, so that in managing natural resources and the environment they will use them wisely, and develop sustainable and inclusive economic practices.

Therefore, the concept of empowerment that will be used in this research takes the theme of training and assistance in making liquid organic fertilizer for groups of women farmers in the Griya Wana Karya Permai housing complex, Bubulak Village, West Bogor District, Bogor City. This theoretical framework in community service regarding the manufacture of organic fertilizer includes various concepts and theories that are relevant to the manufacture of organic fertilizer. The components that the public must know include the good micro nutrients present in the plants to be cultivated and the macro nutrients present in the planting media to be used. These nutrient elements are very important because they are directly related to the nutritional content of plants and plant nutritional needs which can influence plant growth and productivity, so that plants with optimal growth are obtained. The next component that must be known is the composition of organic materials which can be used as raw materials for fertilizer, such as compost, manure, organic waste. In this section there is also a need to understand the nutritional

content of organic material composition, so that it can be processed to produce quality organic fertilizer.

The next step used in the theoretical framework for making organic fertilizer is the composting process which is an important part of making organic fertilizer. In this section you need to know how the composting process works, including the role of microorganisms in the decomposition of organic material, factors that influence the speed and efficiency of composting, and techniques that can improve the composting process. The theoretical framework that is then explained further concerns ecological principles because organic fertilizer is considered as part of a broader organic farming approach. Therefore, this section will discuss the ecological principles that underlie organic agriculture, such as ecosystem balance, sustainable management of natural resources, and efforts to reduce negative impacts on the environment.

The final part which is used as a theoretical framework for making organic fertilizer is regarding the benefits and sustainability of organic fertilizer on plants, soil and the environment as a whole. This section also explains an understanding of how organic fertilizer can increase soil fertility, reduce soil erosion, and reduce environmental pollution.

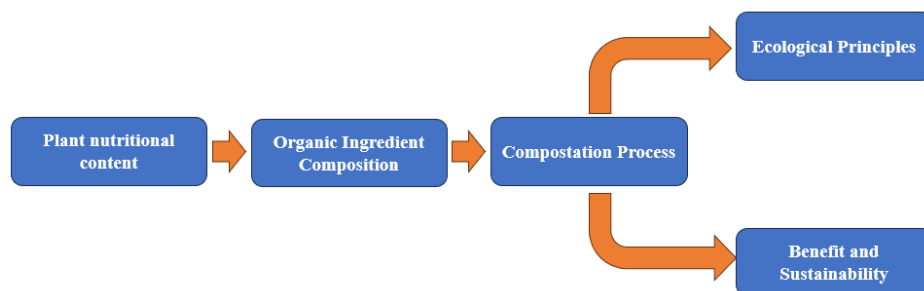


Figure 1. Concept Theoretical Framework Making Organic Fertilizer

Activity Plans and Stages

The form of activity that will be carried out is increasing the role of women farmer groups. The design of the activities used in community service is: firstly, carry out surveys and observations regarding the location of horticultural cultivation being developed by the Bubulak sub-district women's farmer group to see what potential can be developed and what problems are being faced, secondly, record what is obtained from the service location so that there is data about the needs that must be met at the location to support the community service process, third, prepare all the equipment needed when implementing community service, fourth, prepare a suitable method to carry out this community service activity complete with stages, fifth, carry out the process of making organic fertilizer and use organic fertilizer for horticultural plants, sixth, create an evaluation plan for the results of community service implementation in Bubulak Village, West Bogor, Bogor

City.

Location surveys

The survey was carried out in two stages, the first was using Google Maps, and the results of Google Maps monitoring were as follows

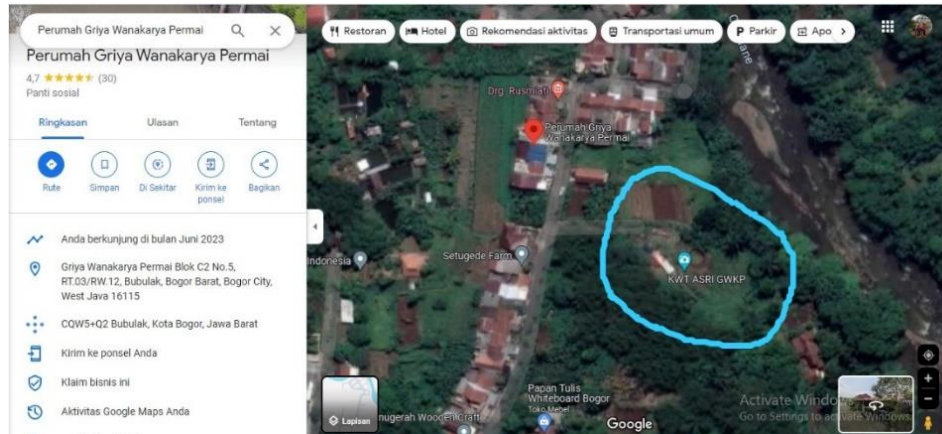


Figure 2. Location Survey Using Google Maps

The second survey is to carry out a direct visit to the location to see directly the location and its potential.



Figure 3. Direct Survey of Public Facilities for Horticulture Cultivation in Bubulak Village, West Bogor, Bogor City

Based on the results of the Google Maps survey and direct survey, data was obtained that the point in question was suitable and appropriate, so it could be concluded that it was suitable to continue community service activities.

Data collection

After coming in person and finding out the location of the service activities, records are made regarding the potential of the area, the area of unused land (public facilities) used for cultivating horticulture, and the types of horticulture being cultivated, as well as the type of fertilizer used in cultivating said horticulture. As a result of the recording, the following data was obtained:

Table 1. Survey Result Data

No	Survey Notes	Description
1	Land area	1000 m ²
2	Land Plan	Trapezium
3	Types of Horticultural Plants that are Cultivated	Green onions, chilies, pak choy, caisim, kale, honje, tomatoes, galangal
4	Type of Fertilizer to Use	Organic fertilizer

Source: Processed Data, 2025

Results

At these results stage the implementation of community service and the final results are explained. This section also explains the stages of the training process starting from material preparation, preparation of tools and materials, implementation of training, monitoring, and utilization of liquid organic fertilizer waste.

Preparation Step

After the data is collected, the next activity is the preparation stage which includes planning the time for implementing community service. The activity planning includes the duration of implementation, type of activity, beneficiary, and activities.

Table 2. Data for Planning Training Activities

No	Activity plan	Description
1	Duration of Activity Implementation	Two months
2	Type of Activity	Mentoring, training and meetings with related parties
3	Benefit recipients	Griya Wana Karya Permai Housing Women's Farming Group, Bubulak Village,

West Bogor District, Bogor City	
4	Activity Training, and practice of making organic fertilizer

Source: Processed Data, 2025

After the activity planning data has been compiled, the next step is to create an activity time schedule containing what activities will be carried out over the next three months, complete with the objectives of the activities we are carrying out. The following is a table of time planning schedule for training activities

Training Activity Time Planning Schedule

Several activities must be carried out in this research, including First, coordinating with the women's farmer group at the research location regarding the research plan and community service. Second, providing training in making liquid organic fertilizer to women's farmer groups at the research location. Third, practice making liquid organic fertilizer for hydroponic plants. Fourth, monitor the age of the organic liquid fertilizer. Fifth, utilizing liquid fertilizer waste for plants in horticultural cultivation land. In detail the activities carried out are as follows:

The first activity is an introduction to the administrators of the women's farmer group at the Griya Wana Karya Permai housing complex, Bubulak Village, West Bogor District, Bogor City, and then continued with discussion activities about the problems currently being faced by women farmer groups and inventory their potential, then proceed with conducting a direct survey to the location of horticultural cultivation on idle land (residential public facilities). The goal of these activities is to obtain initial data so that it can be mapped out what type of service will be carried out and which is suitable for the group of women farmers in the Griya Wana Karya Permai housing complex, Bubulak Village, West Bogor District, Bogor City.

After the researcher knows closely the conditions of the research location, the next activity is carrying out internal discussions and coordination with the community service team regarding the results of the field survey, and then the community service team makes plans for the types of activities that are suitable for the women's farming group housing Griya Wana Karya Permai, Bubulak Village, West Bogor District, Bogor City. The planned activities that can accommodate the needs of the housing farming group of women at Griya Wana Karya Permai, Bubulak Village, West Bogor District, Bogor City, including first carrying out training in making liquid organic fertilizer. Secondly Assisting in the form of hydroponic equipment as a practical tool for cultivating vegetables to utilize the organic fertilizer that has been made. Thirdly monitoring during the planting process, so that the use of organic fertilizer and its results will be well recorded so that it can be

proven that the training is beneficial for the group of women farmers in the Griya Wana Karya Permai housing complex, Bubulak Village, West Bogor District, Bogor City.

The goal of these activities is to make a work plan for what types of activities will be carried out and when they will be carried out so that the activities remain targeted according to what is needed by the women's housing farming group at Griya Wana Karya Permai, Bubulak Village, West Bogor District, Bogor City. After planning work for types of activities that are appropriate to the research location, the next steps taken by the community service team are:

First, coordinating with the administrators of the Griya Wana Karya Permai residential farmer group, Bubulak Village, West Bogor District, Bogor City. Second, create a schedule of training activities which includes: implementation time, implementation location, number of training participants, coordination with sub-district authorities, and Third, coordination with the Bubulak district government regarding community service activities. The goal of these activities is to obtain an appropriate training activity schedule, so that everyone can participate well without being disturbed by other activities or disrupting other activities, and the second goal is open access to cooperation with the local sub-district government regarding the importance of synergy between education, society, and sub-district government.

After a schedule of activity planning has been prepared, the next step that needs to be taken is: holding a meeting with the management of the women's farmer group to discuss planning for training in making organic fertilizer and horticultural cultivation using hydroponics. then proceed with an inventory of equipment and supplies needed for making organic fertilizer. After inventory is made, then the equipment and supplies are purchased. The next step is to plan preparations for procuring equipment for making hydroponic media. The goal for these activities is so the training process for making liquid organic fertilizer can run smoothly.

The second activity is providing training in making liquid organic fertilizer. The community service team carried out this activity in the form of implementation of training in making liquid organic fertilizer, and the goal of this activity is to organic fertilizer is obtained from organic waste from the surrounding environment.

Tool and Equipment Preparation Step

The equipment and supplies needed for this community service activity are divided into two, namely the first is preparing equipment and supplies for making liquid organic fertilizer, and the second is preparing hydroponic equipment and equipment for cultivating pakchoy plants.

Training and Manufacturing Steps of Liquid Organic Fertilizer

Before making, training is first carried out on how to make liquid organic fertilizer, and what materials are needed. The training was carried out on vacant land which is horticultural cultivation land. It was attended by the Head of Bubulak

Village, Mr Arief Rusdiman, SE., and women and administrators of the women's farmer group housing Griya Wana Karya Permai, Bubulak Village, West Bogor District, Bogor City. The training explained how to make liquid organic fertilizer, and the materials used to make liquid fertilizer, and explained that after the liquid fertilizer is used, the dregs/waste of the fertilizer can be used as solid fertilizer.



Figure 4. Forum with women farmers in Bubulak discussing land use, organic fertilizer production, and food security to increase family income

Equipment and supplies that must be prepared for making liquid organic fertilizer include a 120-liter blue plastic waste bin, complete with a lid, EM 4 (bioactivator/fermentation bacteria and soil organic matter), organic waste taken from around the vacant land in the form of some leaf waste. and other organic waste, salt, sugar, livestock manure, and MSG. After all the materials have been collected, all materials such as organic waste, EM 4, sugar, salt, MSG (in certain quantities), and livestock manure are put into plastic barrels. After all the ingredients are added, add enough water then cover tightly.



Figure 5. Organic Fertilizer Making Process; (A). Addition of Probiotics; (B). The Process of Mixing Organic Waste, Water and Probiotics; (C). Organic Fertilizer Tube Closing Process. Implementation of Making Liquid Organic Fertilizer

After closing tightly, secure the plastic trash can from sunlight, and then leave it for two weeks or around 14 days.

After the training on making organic liquid fertilizer is complete and the organic fertilizer is nearly 14 days old, the next step is to coordinate with the management of the women's farmer group to prepare for providing horticultural planting media using hydroponics. The goal for these activities is the utilization of liquid organic fertilizer for horticultural cultivation using hydroponics, and the utilization of coarse waste in the form of dregs/residues from liquid fertilizer for plants on idle land. Providing hydroponic planting media is done by installing hydroponic planting media and planting horticultural seeds, with the type of plant chosen to be pak choy. Once the hydroponic planting medium is installed and the pak choy plants are 3-4 weeks old, liquid organic fertilizer can be used. Apart from applying liquid organic fertilizer, other treatments need to be carried out according to the instructions for cultivating pak choy vegetable plants.

Two weeks after the liquid organic fertilizer has been made, the next step is to use the liquid fertilizer for horticultural cultivation such as vegetables, chilies, and other plants. One of the uses of liquid organic fertilizer is on hydroponic plants such as pak choy, kale, and caisim (green mustard greens). During this community service activity, training was also provided on how to use liquid organic fertilizer for hydroponic plants which had been prepared by researchers.



Figure 6. Hydroponic Installation; (A, B, C). Hydroponic Materials and Installation Testing; (D). Installation of A Hydroponic Frame at The Research Location; (D). Hydroponic Installed and Ready to Use.

Monitoring Steps of Planting Period and Waste Utilization

After the organic fertilizer is 2 weeks old, and the pak choy plants being cultivated have started to grow, the planting period is monitored by fertilizing using organic fertilizer that is ready to use. Providing liquid organic fertilizer and monitoring pak choy plants is carried out starting from the plant's growth period or when the pak choy is 3-4 weeks old until harvest time.



Figure 7. The Results Of Vegetable Cultivation; (A). Monitoring Results of the Planting Period; (B). Harvest Results of Horticultural Cultivation

After harvest, plants cultivated in hydroponic media leave behind waste from liquid organic fertilizer, namely in the form of coarse material from rotting

organic fertilizer materials. This decomposed coarse material can be used as fertilizer in sleeping areas for other horticultural cultivation areas, the method is by burying the rotted coarse material in the soil on horticultural cultivation land. so that the land will become fertile, and of course this will benefit the plants cultivated on that land.



Figure 8. Utilization of Liquid Organic Waste for Idle Land

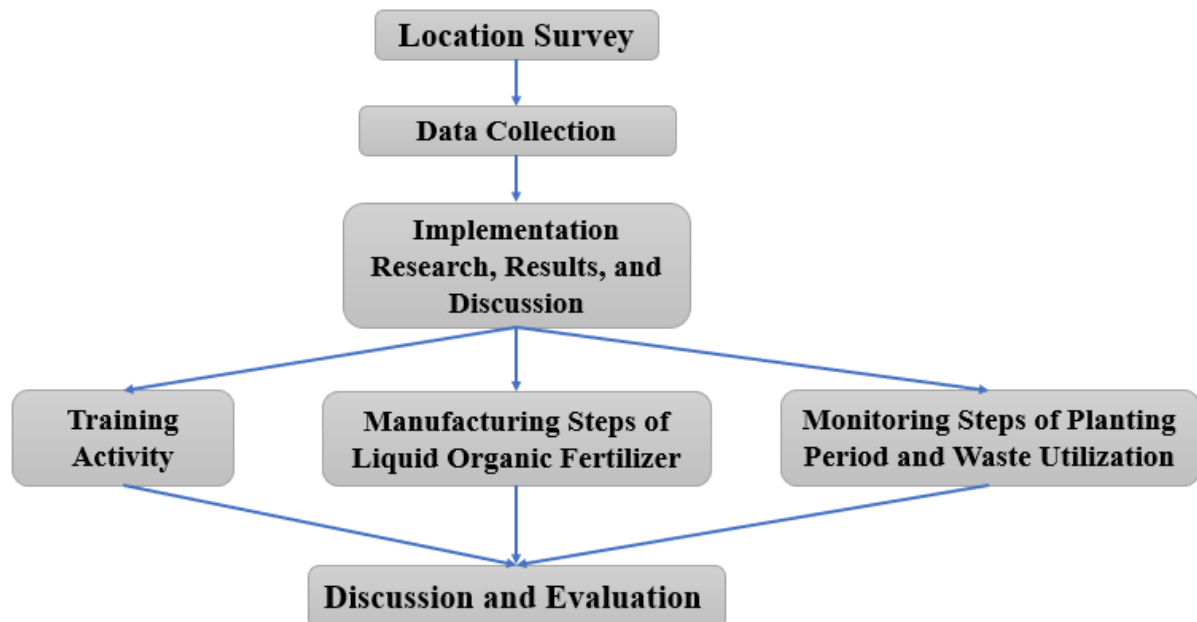


Figure 9. Activity Plans and Stages

Discussion

The implementation of community service in the group of women farmers at Griya Wana Karya Permai Housing, Bubulak Village, West Bogor District, Bogor City, received a fairly good response. In this service process, researchers invite residents of the Griya Wana Karya Permai housing complex to always pay attention to environmental conditions for sustainability in the future. A concrete manifestation of caring for environmental sustainability is by using organic waste as organic fertilizer so that when using unused land for horticultural cultivation you do not rely on fertilizers containing chemicals.

Ease of Making Liquid Organic Fertilizer

Liquid organic fertilizer is very easy to make because the ingredients that make it up are widely available around us, such as organic waste. The use of organic fertilizer is very beneficial for humans because the results of the plants obtained, apart from cultivated vegetables, taste better and more natural, so they are healthier to consume. It cannot be denied that when plant cultivation is carried out, to accelerate plant growth, humans mostly use chemical fertilizers because they fertilize the soil more quickly, speed up the growth of the cultivated plants and are more efficient because they are less complicated. However, the impact resulting from the use of chemical fertilizers can damage the soil because the soil loses its porosity so that the soil hardens, with damage to the soil the microorganisms in the soil are also destroyed. Apart from that, it turns out that chemical fertilizers can pollute groundwater because when using chemical fertilizers you must always use water, so after the fertilization is finished the water is polluted and this results in aquatic animals and microorganisms in the water dying. Another loss caused by the use of chemical fertilizers is the contamination of groundwater because when fertilizing there is part of the water that is absorbed by the soil which carries very high nitrogen concentrations, so it can pollute the groundwater that humans consume for daily life¹¹.

When using liquid fertilizer, you must use the specified dosage, because if it is given in excess dosage, it will result in the plants dying or being damaged. The main characteristic of liquid fertilizer is additional nutrition because it contains micronutrients which help plants grow. The nutrient elements contained include:

The first micronutrient is Iron (Fe) which is an important element in the formation of chlorophyll and the process of plant photosynthesis, so that it always keeps plant leaves green, and if the iron in plants is low or even reduced, the plant leaves will turn yellow (chlorosis). The second micronutrient, namely Manganese (Mn), is a nutrient needed for metabolic processes and the formation of enzymes in plants so that their growth is very good and of course will facilitate the photosynthesis process. The third micronutrient is Copper (Cu) which plays a role in metabolic processes, such as chlorophyll formation, and cell division in plants. The fourth micronutrient is zinc (Zn) which has an important role in protein synthesis and enzyme formation in plants. Plants that are deficient in copper and zinc will experience chlorosis and their growth will be stunted.

The fifth micronutrient is Molybdenum (Mo) which is needed for the formation of the nitrogenase enzyme, which functions to fix nitrogen in plants so that plants do not experience problems in absorbing nitrogen. The sixth

¹¹ Silmi Nurul Utami and Serafica Gischa, "Dampak Positif Dan Negatif Penggunaan Pupuk Kimia," *Kompas.Com*, last modified 2021, <https://www.kompas.com/skola/read/2021/06/16/090000269/dampak-positif-dan-negatif-penggunaan-pupuk-kimia?page=all>.

micronutrient is Boron (B), which is a nutrient that plays a role in the formation of cell walls and carbohydrate metabolism in plants so that plants do not experience problems with growth and development.

The role of organic liquid fertilizer as additional fertilizer to increase plant micronutrients must be supported by the adequacy and availability of macronutrients such as Nitrogen (N) because it is the main element in the formation of protein, chlorophyll, and plant DNA for strong vegetative growth, such as leaves and stems. The next macro element is Phosphorus (P) for the development of a healthy root system, the formation of flowers, and the formation of fruit and seeds in plants so that energy metabolism in plants will run optimally. The next macro nutrient is potassium (K), which plays a role in regulating osmotic pressure in plant cells, enzyme activity, and protein synthesis so that plants can easily adapt to the environment so that plants do not get stressed easily when there are seasonal changes and pest and disease attacks.

The next macronutrient that is important for plants is Calcium (Ca) because it is needed for the formation of strong cell walls in plants so that nutrient transport in plants will run well. The next macro nutrient is Magnesium (Mg) because it is an important component of chlorophyll, which plays a role in the process of photosynthesis and activation of enzymes in plants. The next nutrient element that is quite important for plants is Sulfur (S) because it is an important component of amino acids and proteins in plants. Apart from that, the element sulfur plays a role in the formation of chlorophyll and carbohydrate metabolism. The macronutrient elements mentioned above can be obtained by applying organic fertilizer directly into the soil so that the soil will break down and form the elements needed by plants.

Women's Empowerment and Enterprise Opportunities

Based on the explanation regarding the advantages and disadvantages of using chemical fertilizers, the administrators and members of the Griya Wana Karya Permai housing women's farmer group, Bubulak Village, West Bogor District, Bogor City, are increasingly enthusiastic about learning how to make organic fertilizer around where they live. This women's group is interested in taking advantage of training and mentoring opportunities in making liquid organic fertilizer as a step in empowering women and business opportunities. The activeness of the women's farmer group at Griya Wana Karya Permai Housing, Bubulak Village, West Bogor District, Bogor City in utilizing and managing unused land so that it can be of economic value is very helpful in improving the household economy¹² as one of the women's empowerment activities. The business opportunity obtained by the women farmer group is that the selling price of organic vegetables is quite high so this group of women farmers will learn how to distribute the results of their

¹² Naili Rahmawati, "Aktivasi Kelompok Wanita Tani (Kwt) Dusun Murpeji Lingsar Melalui Optimalisasi Kegiatan Budidaya Ayam Kampung Sebagai Upaya Peningkatan Ekonomi Rumah Tangga," *Jurnal Transformasi* 14, no. 1 (2018): 43–54.

horticultural cultivation harvest, so that they will have new positive activities, namely opening networking in marketing gardening products using organic fertilizer, and of course this will increase their activities in optimizing the use of public facilities on vacant land to become more productive¹³.

The independence of this group of women farmers cannot be separated from understanding their role in the family and community, so that communication is built to advance the region and improve the economic level of the family runs well baik¹⁴. The positive activities carried out by the women's group in managing and optimizing sleeping land were inspired by the desire of housing residents to be independent, environmentally friendly, and maintain environmental sustainability¹⁵. The use of public facilities into productive land for horticultural cultivation by women administrators and members of this group shows that there is an effort to optimize the area based on local culture to make a real contribution to the Bubulak sub-district. Sensitivity and concern for preserving nature cannot be separated from the role of all levels who want to involve all citizens to become actors in regional change so that their participation will benefit them. The involvement of women administrators and members of the women's farmer group cannot be separated from their participatory role in realizing regional independence and progress, so that they make themselves not research objects but research subjects. The role of the research subjects makes them the perpetrators of changes in their environment¹⁶.

Horticulture and Business Opportunities

The creativity and all the activities carried out by the group of women farmers at Griya Wana Karya Permai Housing, Bubulak Village, West Bogor District, Bogor City need to be properly appreciated because this group uses idle land for horticultural cultivation. Horticultural crops such as vegetables provide many economic benefits, such as having a fairly high selling value, having a wide market and having flexibility in developing their business. As time goes by, horticultural cultivation such as vegetables has experienced quite rapid technological and creative developments, for example, vegetable cultivation has now developed into

¹³ Maghfira Anggita Budiati and Ananto Aji, "Hubungan Pengetahuan, Sikap Dan Perilaku Perempuan Dalam Optimalisasi Lahan Pekarangan Di Kecamatan Margorejo Kabupaten Pati," *Edu Geography* 8, no. 3 (2020): 189–201, <http://journal.unnes.ac.id/sju/index.php/edugeo>.

¹⁴ Anna Puji Lestari and Yuliyanto Budi Setiawan, "Komunikasi Dan Strukturasi Gender Petani Di Era Revolusi Industri 4.0," *Jurnal Kajian Komunikasi* 8, no. 2 (2020): 141–151, <http://jurnal.unpad.ac.id/jkk>.

¹⁵ Ida Widiyawati et al., "Optimalisasi Pengelolaan Pertanian Terpadu Guna Mendukung Terwujudnya Desa Mandiri Energi Di Desa Sokawera, Kabupaten Banyumas," *Agrokreatif (Jurnal Ilmiah Pengabdian kepada Masyarakat)* 6, no. 2 (2020): 112–120.

¹⁶ Riyanto Adji, "Manfaat Metode Participatory Action Research (PAR) Dalam Pembangunan Wilayah RT Di Masa Pandemi," in *Monograp* (Bekasi: President University, 2021).

hydroponic media so that it does not have to rely on agricultural land or gardens.

After the COVID-19 pandemic, horticultural food sources such as fruit and vegetables are widely consumed by the public because they contain quite high vitamins and minerals, so they are needed by the body, especially to increase the body's immunity.

Business opportunities for horticultural crops such as vegetables and several types of kitchen spices are opportunities for millennial farmers in Indonesia. Millennial farmers are known to be hungry for knowledge, technology, and new ideas, so with limited land for horticultural cultivation, it can be used as the main source in applying technology to increase the entrepreneurial spirit so that they will try to find solutions to limited land but still be able to produce various types of farming vegetables (Adji, 2023). Even though most of the horticultural cultivation activities of vegetables in the Griya Wana Karya Permai Housing Complex, Bubulak Village, West Bogor District, Bogor City are carried out by housewives, there is no harm in getting the millennial generation in the area involved.

The involvement of the millennial generation in the Griya Wana Karya Permai Housing Complex, Bubulak Village, West Bogor District, Bogor City has the potential to become an agent of change in facing challenges in the horticultural cultivation process up to the post-harvest period. The millennial generation can adapt quickly to change, adopt the latest technology, and bring fresh ideas in handling problems, especially post-harvest problems. A strong understanding of biological, and physiological factors, the production environment, and post-harvest science and technology places millennials as central players in solving what happens in horticultural cultivation. By taking advantage of technological advances and easy access to information, the millennial generation can optimize the supply chain for horticultural commodities, thereby reducing losses that often occur in the horticultural crop business, especially at post-harvest time. Ease of access to information and optimal supply chains will certainly have an impact on increasing the income of the women farming group at Griya Wana Karya Permai Housing, Bubulak Village, West Bogor District, Bogor City and will certainly have a positive impact on the horticulture industry as a whole.

Conclusion

The community service initiative in the Griya Wana Karya Permai housing complex successfully demonstrated the potential of empowering women farmers through training in organic fertilizer production and sustainable agricultural practices. The project not only improved horticultural productivity and household income but also promoted gender equality and environmental sustainability. The active involvement of the community in all stages of the intervention was key to its success, ensuring that the solutions were practical, relevant, and sustainable. These

findings highlight the importance of community-based approaches in addressing global challenges such as food security, gender inequality, and environmental degradation.

Recommendations

For this activity to continue, there needs to be regular coaching in the group of women farmers at Griya Wana Karya Permai Housing, Bubulak Village, West Bogor District, Bogor City, so that their consistency in maintaining the sustainability of the surrounding environment will continue to be maintained and increasingly improved. Strong support from the Bubulak Village government also really needs to be continuously improved because this will help improve the welfare of the community.

Utilizing unused land and cultivating horticultural crops should involve the millennial generation, because the millennial generation is quite open to technology, so they are able to create new breakthroughs and innovations in developing existing businesses.

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