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EFFORTS TO INCREASE FOOD SECURITY THROUGH AQUAPONIC TRAINING PROGRAM ON LIMITED URBAN LANDS

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ABSTRACT

First of all, training programs must be designed to cover various levels of society. Through a development approach, all parties can be involved and contribute to developing the potential of aquaponics to increase food security and contribute to local economic growth. The training program aims to increase participants' knowledge and skills about aquaponics, from basic approaches to advanced techniques. In addition to technical training, the program should include social and environmental approaches. Participants should be made aware of the importance of sustainability, water management and the environmental impact of this farming method. By realizing their role in protecting natural resources, participants will be able to adopt responsible practices and contribute to environmental conservation. This includes understanding the water cycle, fish farming, plant selection and cultivation, and nutritional management. Participants should also be provided with knowledge about waste management and an understanding of the positive environmental impacts of the aquaponics method. Additionally, technology-based approaches should be integrated into training programs. By utilizing digital platforms and the latest software, participants can understand the concept of aquaponics more interactively and efficiently. This will also help them manage and monitor their aquaponics systems more accurately, optimize crop performance, and minimize risk and waste. In the long term, innovative training programs and improving human resources regarding the use of aquaponics on limited land will have a positive impact on society. Efficient and environmentally friendly land use will increase local food production, reduce dependence on imports, and provide new business opportunities and jobs in the field of sustainable agriculture. In training program innovation, collaboration between various parties is also very important. Governments, universities and the private sector must work together to share knowledge, resources and experience. This will create a sustainable ecosystem for the development of aquaponics, as well as facilitate the transfer of the latest technology and knowledge to the field.

Keyword: Aquaponics, Food security, Training

INTRODUCTION

Every year land is converted for other purposes, resulting in a reduction in land area. Most land conversion is for residential development as a result of high population growth and the conversion of villages into cities. The impacts include the number of food imports continuing to increase significantly, increasing poverty in villages, depletion of the ozone layer, changes in lifestyle and consumption patterns, and leading to threats to national food sovereignty. The Covid pandemic has made us aware of the importance of food availability, both consumption and medicine.

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Training programs should also encourage collaboration and knowledge exchange between participants. In this way, they can learn from each other from different experiences and challenges in implementing aquaponics on limited land. Discussions and question and answer sessions will open participants' insights, so that they are better prepared to face changes in the environment and problems that may arise. Developing mentoring and monitoring programs after training is also important. Mentors or facilitators should assist participants in overcoming practical obstacles and provide support in building and managing their aquaponics systems. Regular evaluation of the results and success of implementing aquaponics on limited land will also help identify areas for improvement and further development. Equally important is a continuous learning approach after training is completed. The mentoring and mentoring program will help participants face practical challenges that may arise when implementing aquaponics in the field. This support will give them confidence and increase their ability to face real situations.

Aquaponics is a sustainable agricultural method that combines aquaculture (cultivation of freshwater fish) with hydroponics (cultivation of plants without soil). The most important thing is that it does not require water pH measurements, whereas hydroponics requires fairly strict water pH measurements. Harvest two products, namely Freshwater Fish and vegetables/fruit, Master the Fish, Plants are the result, Processed naturally and Fish as a nutrient producer as well as a barometer of quality water for plants, Pond water is processed by circulating from the fish pond to the filter and then to the plants ends Return to the fish pond again. As for the types of freshwater fish, they include Tilapia, Gourami, Catfish, Patin, Mas, Tilapia and for more varied types of vegetables/fruit that can be planted, they include water spinach, spinach, Pokchoy, mustard greens, watercress, spring onions, ciplukan fruit, tomatoes. , Chili, Eggplant. This method has proven successful in maximizing limited land to produce food efficiently and environmentally friendly. To expand the use of aquaponics on limited land, innovative training programs and effective improvement of Human Resources (HR) are needed. In the long term, innovative training programs and improving human resources regarding the use of aquaponics on limited land will have a positive impact on society. Efficient and environmentally friendly land use will increase local food production, reduce dependence on imports, and provide new business opportunities and jobs in the field of sustainable agriculture. In the long term, innovative training programs and improving human resources regarding the use of aquaponics on limited land will have a positive impact on society. Efficient and environmentally friendly land use will increase local food production, reduce dependence on imports, and provide new business opportunities and jobs in the field of sustainable agriculture. In training program innovation, collaboration between various parties is also very important. Governments, universities and the private sector must work together to share knowledge, resources and experience. This will create a sustainable ecosystem for the development of aquaponics, as well as facilitate the transfer of the latest technology and knowledge to the field.

This Training Program is intended as a Collaborative Program Creating partnerships with local communities, universities and the private sector to hold collaborative training programs to develop participants' skills in managing aquaponics on limited land and Training for Schools and Students, Providing special aquaponic training programs for school and student students at various levels. Involving the younger generation in aquaponics will create awareness of the importance of sustainable agriculture and potentially create inspiration for the future of agriculture. By using aquaponics, people can meet their own food needs independently, increase family income, fill useful time at home, grow into a business, join the community of urban farmers.

RESEARCH METHODS

This research is a literature study with the method used, namely Systematic Review (SR) or generally called Systematic Literature Review (SLR) is a systematic technique for collecting, critically examining, ssintegrates and collects the results of various research studies on research question or topic you want to explore. Research begins with Find articles related to the research topic that will later be researched. A systematic review is a method of reviewing a particular problem in a certain way identify, evaluate, and select specific problems and propose questions that are resolved clearly based on predetermined criteria previously. This follows previous research which was of good quality and relevant with research questions. This research uses a Systematic Literature Review (SLR) method a systematic, explicit and reproducible method for identification and evaluation and synthesis of existing research works and thoughts carried out by researchers and practitioners with the aim of recognizing, reviewing, and evaluate all research

RESULTS AND DISCUSSION

Aquaponics is a sustainable agricultural method that combines aquaculture (cultivation of freshwater fish) with hydroponics (cultivation of plants without soil).

Aquaponics is a system of cultivating fish (aquaculture) and plants (hydroponics) together in a recirculating or mutually beneficial ecosystem that uses natural bacteria to convert fish waste & food waste into plant nutrients. In other words, aquaponics is a system where plants and fish grow together

The definition of food security is the condition of food fulfillment for households which is reflected in sufficient availability, both in quantity and quality, safe, equitable and affordable. defines food security as the ability to meet the food needs of household members in quantity, quality and variety according to local culture from time to time in order to maintain a healthy life. defines food security as the access of every household or individual to obtain food at any time for the needs of a healthy life.

No	Research Title	Research and Year	Research Result
1	Budikdamber Aquaponic System Development Training to Increase Community Food Security and Ecological Intelligence	Gilang Mas Ramadhan	The result of this service is increasing ecological intelligence which is implemented in the knowledge, attitudes and skills of local communities. After this service program was implemented, the community now has awareness of the importance of food security, skills in aquaponic planting systems and skills in making processed catfish food from budikdamber products which can then be marketed on the Kutamart application platform, so that the entrepreneurial and creative economy sectors can grow and develop in It is then hoped that Kutasirna

			Village can create synergy between the community and the government in an effort to create superior human resources capable of competing in the digital era through collaboration with stakeholders, local government and existing MSMEs.
2	Fish and Vegetable Cultivation Training simultaneously using the Aquaponics method.	Abdimas Galuh, et al	The results of hypothesis testing show that this training activity is able to increase students' knowledge in terms of aquaponics terms, benefits of aquaponics, and steps to make aquaponics. Therefore, this training is capable increase students' knowledge in cultivating fish and vegetables using the aquaponics method.
3	Empowering the Independence of the BKP Study Group with Aquaponics Training in the use of small land for food security	July Nursandi, et al	The result of how to improve knowledge and skills about aquaponics, which consists of activities for preparing infrastructure, providing theoretical counseling and technical guidance regarding aquaponic cultivation technology on limited land and marketing of the results online by optimizing the marketplace that is available on one of the social media. Technology guidance and monitoring is carried out every month to determine production developments

			and the application of technology carried out by partners, the outcomes obtained from this program there is increased empowerment of independence, knowledge and skills for partners' welfare through cultivating vegetables and fish with aquaponics

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CONCLUSIONS

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facilitators should assist participants in overcoming practical obstacles and provide support in building and managing their aquaponics systems. Regular evaluation of the results and success of implementing aquaponics on limited land will also help identify areas for improvement and further development. Equally important is a continuous learning approach after training is completed. The mentoring and mentoring program will help participants face practical challenges that may arise when implementing aquaponics in the field. This support will give them confidence and increase their ability to face real situations. In the long term, innovative training programs and improving human resources regarding the use of aquaponics on limited land will have a positive impact on society. Efficient and environmentally friendly land use will increase local food production, reduce dependence on imports, and provide new business opportunities and jobs in the field of sustainable agriculture. This Training Program is intended as a Collaborative Program Creating partnerships with local communities, universities and the private sector to hold collaborative training programs to develop participants' skills in managing aquaponics on limited land and Training for Schools and Students, Providing special aquaponic training programs for school and student students at various levels. Involving the younger generation in aquaponics will create awareness of the importance of sustainable agriculture and potentially create inspiration for the future of agriculture. By using aquaponics, people can meet their own food needs independently, increase family income, fill useful time at home, grow into a business, join the community of urban farmers.

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