

## THE DEVELOPMENT OF FOOD SECURITY EDUCATION PROGRAMS IN ISLAMIC BOARDING SCHOOLS THROUGH CURRICULUM INTEGRATION AND EXPERIENTIAL PRACTICE

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### Abstract

Food security remains a critical challenge in Indonesia, where population growth, land conversion, and environmental degradation threaten sustainable food systems. Islamic boarding schools (pesantren), as influential educational and community-based institutions, hold significant potential to contribute to food security through integrated education and practice. By embedding food security concepts into curricula and daily routines, pesantren can cultivate a holistic model that unites faith, knowledge, and sustainability. This study emphasizes the role of santri in developing practical competencies through hydroponics, aquaponics, biopore infiltration systems, organic waste utilization, and sustainable cultivation. These practices not only ensure the availability of nutritious food for students but also foster ecological awareness, technical skills, and entrepreneurial capacity. The methodology includes the development of structured learning modules, hands-on training, teacher capacity building, and institutional integration, supported by monitoring and evaluation mechanisms to ensure sustainability. A notable example is Pesantren Tahfiz Al-Qur'an Ibnu Jauzi, Dramaga, Bogor, which demonstrates the potential to combine religious education with innovative food security initiatives. In the long term, pesantren-based programs strengthen institutional self-sufficiency, reduce dependency on external supplies, and empower surrounding communities, positioning pesantren as strategic actors in advancing national food sovereignty and sustainable development.

**Keyword:** Aquaponics, Biopore, Food Security, Hydroponics, Pesantren (Islamic Boarding School), Sustainable Agriculture

### INTRODUCTION

Food security is a multidimensional issue with profound implications for social stability, economic growth, and political resilience. In Indonesia, the world's fourth most populous nation, the demand for food continues to rise in line with population growth and shifting consumption patterns. While food is a basic human necessity, it also functions as a strategic instrument for enhancing human capital and strengthening national competitiveness in the

global arena. For this reason, food security has been positioned as a central pillar of Indonesia's national development agenda.

Previous studies on food security in Indonesia have largely focused on agricultural productivity and policy interventions. However, less attention has been given to the integration of food security education, community based initiatives, and curriculum development as long term strategies for resilience. Addressing this gap requires a holistic approach that not only emphasizes production and distribution but also strengthens knowledge systems, local empowerment and adaptive capacities.

Islamic boarding schools (*pesantren*) hold a unique position in Indonesia's educational and sociocultural landscape. With millions of students (*santri*) spread across thousands of institutions, *pesantren* are not only centers of religious learning but also community based institutions with significant economic and social influence. Their relatively autonomous governance and strong communal ethos provide fertile ground for the development of localized food security initiatives. By integrating agricultural practices, entrepreneurship, and sustainability values into their educational framework, *pesantren* can serve as role model for food security education.

Islamic boarding schools (*pesantren*) hold a strategic role in advancing food security education in Indonesia. Beyond their function as centers of religious and moral instruction, *pesantren* also serve as community based institutions with the capacity to model sustainable practices. Their communal structure, land resources, and culture of collective responsibility provide a strong foundation for developing localized food security systems that are both educational and practical.

Within this context, *santri* can actively contribute to food security by engaging in innovative and environmentally friendly agricultural practices. Through the adoption of hydroponics, aquaponics, biopore infiltration systems, and the utilization of organic waste, *pesantren* can establish integrated models of sustainable food production. These methods not only ensure a reliable supply of nutritious food for students but also cultivate technical skills and ecological awareness that are increasingly relevant in addressing contemporary challenges. Such initiatives also foster a culture of self reliance and sustainability, positioning *pesantren* as exemplary models of community based food security.

The application of hydroponics and aquaponics allows *pesantren* to maximize limited land resources while producing vegetables and fish in efficient, controlled environments. Meanwhile, the use of biopore technology enhances soil absorption capacity and supports waste decomposition, contributing to healthier ecosystems within *pesantren* compounds. Organic waste management, particularly composting, transforms daily food residues into valuable fertilizer, thereby closing the loop between consumption and production.

By embedding these practices into both the curriculum and daily routines, *pesantren* can create a holistic model of education that integrates faith, knowledge, and sustainability. *Santri* not only learn theoretical concepts of food security but also acquire hands on experience in managing resources responsibly. In the long term, such initiatives strengthen *pesantren's* self sufficiency, reduce dependency on external food supplies, and empower surrounding communities through knowledge transfer and collaborative projects. A concrete example can be seen in *Pesantren Tahfiz Al-Qur'an Ibnu Jauzi, Dramaga, Bogor*, which has the potential to implement such integrative programs, positioning itself as a model for combining religious

education with practical innovations in food security and environmental stewardship.

## METHOD

The first stage in developing food security within pesantren Ibnu Jauzi is the preparation of structured learning modules. These modules are designed to integrate theoretical knowledge with practical applications, covering topics such as sustainable agriculture, nutrition, waste management, and environmental stewardship. The curriculum is adapted to the pesantren context, ensuring that religious values and local wisdom are embedded alongside scientific knowledge. By providing clear guidelines, lesson plans, and competency based outcomes, the modules serve as a foundation for both teachers and santri to engage in systematic learning about food security.



Source: Private Documentation, 2025 [10]

**Figure 1. Socialization of the Food Security Module in Pesantren Ibnu Jauzi**

The second stage involves the implementation of aquaponics training. Aquaponics, which combines aquaculture and hydroponics, is introduced as an innovative method to maximize limited land resources while producing both fish and vegetables in a closed loop system. Training sessions are conducted through workshops and hands on demonstrations, enabling santri to acquire technical skills in system design, water quality management, and crop maintenance. This method not only enhances food production capacity within pesantren but also equips students with entrepreneurial skills that can be applied beyond the pesantren environment.



Source: Private Documentation, 2025 [10]

**Figure 2. Implementation of Aquaponics Training Program in Pesantren Ibnu Jauzi**

The third stage focuses on the creation of biopore infiltration holes and the management of organic waste. Santri are trained to construct biopores as a simple yet effective technology to improve soil absorption, reduce flooding, and accelerate the decomposition of organic matter. Simultaneously, organic waste generated from daily pesantren activities is processed into compost, which can be used as fertilizer for pesantren gardens. This dual approach addresses waste management challenges while contributing to soil fertility and sustainable agricultural practices.



Source: Private Documentation, 2025 [10]

**Figure 3. Implementation of Biopore Training Program in Pesantren Ibnu Jauzi**

The fourth stage emphasizes direct training in cultivation and planting techniques. Santri are guided in preparing planting media, selecting appropriate crops, and applying sustainable farming practices such as crop rotation and integrated pest management. Practical sessions are conducted in pesantren gardens or designated agricultural plots, allowing students to experience the full cycle of food production. This stage ensures that santri not only understand theoretical concepts but also develop the discipline, patience, and responsibility required in agricultural work.

In addition to student focused training, capacity building for teachers and caregivers (ustadz) is also essential. Educators are provided with workshops and reference materials to strengthen their pedagogical skills in integrating food security topics into religious and general education. This ensures that the knowledge and practices acquired by santri are reinforced consistently across subjects and daily routines, creating a supportive learning ecosystem within the pesantren.

The sixth stage involves integrating all activities into a cohesive program that is embedded within the pesantren's educational and daily routines. Food security practices are institutionalized through scheduled activities, extracurricular programs, and community service initiatives. Collaboration with local agricultural agencies, universities, and community organizations is encouraged to provide technical support and ensure sustainability. By embedding these practices into the pesantren system, food security becomes part of the institution's identity and long term vision.

The final stage is the establishment of monitoring and evaluation mechanisms to assess the effectiveness of the program. Regular assessments are conducted to measure student competencies, productivity levels, and the nutritional impact on santri. Feedback from teachers, students, and community partners is used to refine the program and address emerging challenges. Sustainability is ensured by developing a cycle of continuous improvement, where pesantren not only maintain but also expand their food security initiatives, positioning themselves as models of resilience and innovation for surrounding communities.

## **RESULTS AND DISCUSSION**

The implementation of food security training programs in pesantren Ibnu Jauzi has shown a significant positive impact on the awareness of santri. Prior to the intervention, many students had limited understanding of the concept of food security and its relevance to daily life. After participating in structured learning modules, their knowledge expanded to include not only the theoretical dimensions of food availability, access, and utilization but also the practical importance of sustainability and self-sufficiency. This shift in awareness indicates that pesantren-based education can effectively bridge the gap between abstract concepts and real-life applications.

The aquaponics training provided santri with hands-on experience in managing integrated systems of fish and vegetable cultivation. Students demonstrated increased confidence in operating aquaponics units, monitoring water quality, and maintaining plant growth. The training also fostered problem-solving skills, as santri learned to troubleshoot technical challenges and adapt to environmental conditions. These outcomes suggest that aquaponics not

only enhances food production capacity within pesantren but also equips students with transferable skills relevant to modern agricultural practices.

Similarly, the introduction of biopore technology and organic waste management practices contributed to both environmental and educational benefits. Santri became more conscious of the importance of waste reduction and resource recycling. They actively participated in converting organic waste into compost, which was then used to fertilize pesantren gardens. This activity not only reduced the volume of waste but also reinforced the principle of circular resource management. The positive behavioral changes observed among students highlight the potential of pesantren to cultivate environmentally responsible practices.

Training in cultivation and planting techniques further enhanced the practical competencies of santri. Students successfully applied sustainable farming methods, including soil preparation, crop rotation, and integrated pest management. The ability to grow vegetables and other crops within pesantren grounds provided tangible evidence of their learning outcomes. Moreover, the availability of fresh produce contributed directly to improving the nutritional quality of meals served to students, thereby linking food security education with health and well-being.

Overall, the training programs have strengthened the self-sufficiency of pesantren and reduced their dependency on external food supplies. More importantly, they have empowered santri to become active agents of change, capable of transferring knowledge and practices to their surrounding communities. The combination of increased awareness, technical skills, and ecological responsibility demonstrates that pesantren-based food security initiatives can serve as a replicable model for other educational institutions. These results affirm the strategic role of pesantren in advancing national food sovereignty and sustainable development.

## CONCLUSION

The integration of food security education and practice within pesantren demonstrates a promising model for sustainable development. By embedding hydroponics, aquaponics, biopore systems, organic waste management, and cultivation training into both the curriculum and daily routines, pesantren are able to strengthen their self-sufficiency while simultaneously enhancing the knowledge and skills of santri. These initiatives not only ensure the availability of nutritious food but also cultivate ecological awareness, technical competence, and entrepreneurial capacity among students.

In the long term, pesantren based food security programs contribute to reducing dependency on external food supplies and empower surrounding communities through knowledge transfer and collaborative engagement. Institutions such as Pesantren Tahfiz Al-Qur'an Ibnu Jauzi, Dramaga, Bogor exemplify the potential of pesantren to combine religious education with practical innovations in sustainability. Thus, pesantren can be positioned as strategic actors in advancing national food sovereignty, fostering resilience, and promoting holistic education that integrates faith, science, and community empowerment.

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