

Strengthening Local Food Security Through Yard-Integrated Farming System and Education for Housewives in Banjarrejo Village

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Abstract

The service program in Banjarrejo Village responds to the family capacity gap: agricultural potential has not yet resulted in economic resilience, while housewives depend on their husbands' income. The intervention utilizes the concept of integrated food and agriculture to strengthen the four pillars of food security. Participatory methods place housewives as the main managers: socialization, on-site training, application of household science and technology, as well as mentoring and replication. a total of 17 housewives accompanied by 17 students; each household received 10–15 polybags containing chili, eggplant, celery, and tomatoes. The success of growth reached 80–95% Appearance of shiny green paddy plants, supported by composting, and the utilization of pond water in a zero-waste scheme. Materials include plant cultivation, cultivation, maggots, and poultry; the presence of 85% and an understanding of $\pm 90\%$ indicate high acceptance. The initial impact can be seen in increasing the availability of fresh vegetables, the potential for a decrease in food spending, and strengthening the role of housewives in production decision-making. The program aligns with the SDGs (1, 2, 8, 12, 13) and prepares for the formation of farmer women groups for sustainability, standardization of daily work guidelines, and cross-hamlet replication. This approach is adaptive to the microclimate of the yard, water availability, and working hours of housewives. Simple, cost-effective.

Keywords:

1. local food security
2. Yards
3. integrated farming system
4. housewives

1. INTRODUCTION

Banjarrejo Village in Batanghari District, East Lampung Regency. Banjarrejo has agricultural potential with 3 km of irrigation canals and rice production of $\pm 1,200$ tons/year, which opens up opportunities to strengthen the agro value chain. In addition, the use of 8 ha of swamps for aquaculture is simple. In terms of human resources, this village has a population density of 8,557 people and a relatively complete education network (Riswanto et al., 2023), but agricultural potential has not been transformed into family economic resilience. This can be seen from the condition; the absence of village markets and shopping zones reinforces indications that the marketing of agricultural products depends on third parties so that the potential for added value at the family level is not optimal (Riswanto et al., 2023). Many parents have difficulty financing their children's higher education, and the majority of housewives are still dependent on their husbands' income and do not have productive economic skills. This condition shows a capability gap that requires family and community-based education and empowerment interventions. At the national level, the use of "family food gardens" has been

positioned to strengthen the four pillars of food security (availability, access, utilization, and stability), which demand a holistic approach to governance, nutrition education, inclusive policies, and community participation, especially in rural areas with limited incomes, education, health services, and exposure to climate change (Wahyudin, 2025). A cross-sectoral integrated approach that combines production, nutrition education, and access assurance is a prerequisite for sustainable food security (Wahyudin, 2025).

The "yard as a node for household food production" program has been shown to increase food availability, access, and utilization: the contribution of household consumption increased (e.g., the Pacitan study 53% vs 43% non-KRPL), food expenditure decreased, and the food diversity score of participants was higher than non-participants (≈ 80.5 vs 62.3, Pacitan increased from 65.6% to 77.5%)(Saediman et al., 2021). The use of yards as a node for household food production as well as a learning space for women's groups has been replicated nationally since 2011 to increase self-sufficiency, diversification based on local resources, plant conservation, welfare, village nurseries, and support for counseling to marketing (Saediman et al.,

2021). The proximity of the yard makes it easier for housewives to harvest the results of daily consumption and reduce food spending and increase income through vegetable commodities, fruits, medicinal plants, small livestock, and managed fish. The government also directs the use of yards to areas prone to stunting and food insecurity (Saediman et al., 2021).

Conceptually, yards are mini-agroecosystems of humans, plants, animals, soil, and water with low input needs and are easy to initiate by low-income households. Banjarrejo, which has 239 ha of unused yards, saves ecological and social capital to be activated through education and assistance for housewives (Saediman et al., 2021). The impact of yard utilization is stronger when integrated farming (plants with livestock and fish producing fertilizer) is done with the principle of zero waste. Integration improves soil quality, productivity, food diversification, and land efficiency; reduces pest attacks/pesticide needs; evens income distribution; opens up job opportunities; and suppresses urbanization (Utami & Rangkuti, 2021).

Community service in Banjarrejo combines knowledge transfer, practice-based training, and institutional

strengthening of housewives'/farmer women's groups, utilizing the existence of the Cepaka housewife group (as well as youth as a network) as an entry point for learning organizations; the group approach facilitates counseling, communication, and synergy with the government (Utami & Rangkuti, 2021). Home gardening practices increase women's control over daily food availability and small sales opportunities (Musembi, 2021; Saediman et al., 2021). When the integrated farming cycle runs by processing waste into fertilizer, the soil improves, and the harvest increases food variety and income, realizing the four pillars of strong family food security (Shabira et al., 2021; Wahyudin, 2025). Strengthening local institutions is also the key to the success of the yard/agroforestry-based system (Achmad et al., 2022). In some contexts, low-cost smart technology can improve efficiency and become a vehicle for literacy, but its application is adjusted to the readiness of citizens (Sulandjari et al., 2022).

In line with the SDGs, integrated farming: SDG 1 reduces input costs through recycling and diversifies local income and employment opportunities (Utami & Rangkuti, 2021), SDG 2 strengthens the availability/access to

fresh food; coal packs increase the diversity of consumption and reduce spending; rice mina adds protein (Saediman et al., 2021); SDG 8 encourages value-added clusters and citizen entrepreneurship (Mahaputra et al., 2022); SDG 12 advances sustainable production through zero waste and reduction of chemical fertilizers (Utami & Rangkuti, 2021); SDG 13 contributes to the reduction of methane emissions in rice fields and the resilience of the system (Ahmadian et al., 2021). With ecological (large yards) and social (housewife institutions) factors, Banjarrejo is worthy of adopting a step-by-step strategy of integrated garden-based farming that is relevant, measurable, and in line with the SDGs agenda (Anugrah & Alfarizi, 2021; Damayanti & Stiawati, 2025; Shantya Viratama et al., 2025).

2. METHOD

The program is carried out with a participatory and family-based approach: the implementation unit is the household, with 23 housewives as the main managers of the yard and daily decision-makers related to the production, consumption, and processing of produce. From the beginning, we have positioned the yard as a family living laboratory, integrating plants, house-scale fish, and organic

waste treatment to create a closed cycle that is cost-effective, low-waste, and easy to maintain.

The first stage is socialization and program debriefing. The activity began with a meeting of housewives from the hamlet to explain the goals, outputs, scope of work, and practical benefits for their families. At this stage, an initial mapping (baseline) of yard conditions is carried out, including area and layout, water availability, light shade, existing cultivation habits, commodity interests, and household food consumption habits.

The second stage includes training and capacity building, which is carried out in two complementary modes as shown in Figure 1. The first mode is workshops and demonstrations in the village communal space. The materials are designed to be simple and immediately practicable at home: installation of yard gardens with polybags, low beds, and mini hydroponics; the treatment of household waste into solid compost and vegetable pesticides, shown in figure 2; formulation of poultry alternative feed using local ingredients (e.g., fermented bran and oak) to reduce costs; as well as basic management of chicken coops and house-scale fish ponds (cleanliness, biosecurity, feed and water management). The second

mode is on-site training at members' homes.



Figure 1. Socialization of the integrated farming system program

The third stage is the application of appropriate science and technology in households. After the training, each housewife applies the agreed techniques according to the conditions of her yard. The plant component is focused on fast-harvesting vegetables, chili peppers, and tomatoes as valuable commodities, as well as toga for daily needs. The livestock and fish components are optional following interest and readiness; common choices are catfish pond tarpaulin and budidamber (Prafena et al., 2022). The activity mentors are a group of science lecturers and students. All practices are recorded in the mentoring logbook as shown in Figure 3 so that housewives can see progress, calculate costs and savings, and evaluate planting and harvesting patterns.



Figure 2. Polybag plant management training



Figure 3. Training on the use of compost fertilizer and rice husk media

The fourth stage focuses on intensive mentoring, organizing, and monitoring-evaluation. Companions make periodic visits to participants' homes to monitor the adoption of techniques, overcome technical obstacles, and refine overly complicated guides. Peer-to-peer forums between housewives are held regularly (for example, united with social gatherings) as a place to share experiences and solutions, test new seeds, and exchange seeds and materials. Monitoring-evaluation by the campus team as shown in Figure 4 was carried out with field observations, logbook reviews, and directed group discussions to assess how much technique was adopted, how

large the yard was that was active, changes in the frequency of family vegetable/protein consumption, and the emergence of small sales between neighbors.



Figure 4. monitoring the use of yard land

The fifth stage emphasizes sustainability and replication. Once the basic skills are established, simple tools and group guidance documents are used. Housewife cadres were designated as peer tutors for new members. Together with housewives, an annual planting calendar, a weekly vegetable package pre-order plan, and a monthly "yard market" agenda were prepared to strengthen local marketing without relying on digital channels. The service method places housewives at the core of design, implementation, and evaluation from production in the yard to processing to local marketing while ensuring that the process is easy to practice, time-efficient, cost-effective, and sustainable through strengthening farmer women's groups (Sulandjari et al., 2022). This approach

not only transfers techniques but also builds habits, supportive networks, and simple governance that allows family food security to grow and spread to other hamlets.

3. RESULTS AND DISCUSSION

Results

The local food security education program in Banjarrejo Village was attended by 17 housewives, each accompanied by 1 student (1:1 ratio) from a target of 20 houses. As seen in figure 5, attendance at core training reached 17/20 people ($\approx 85\%$). Each housewife receives 10–15 polybags containing chili, eggplant, celery, and tomatoes. In the initial phase of maintenance, the success of plant growth was recorded in the range of 80–95% in each house. Assuming one plant per polybag, the estimated total active polybag is around 170–255 units, and the plants that have successfully grown are in the range of ± 136 –242 units.

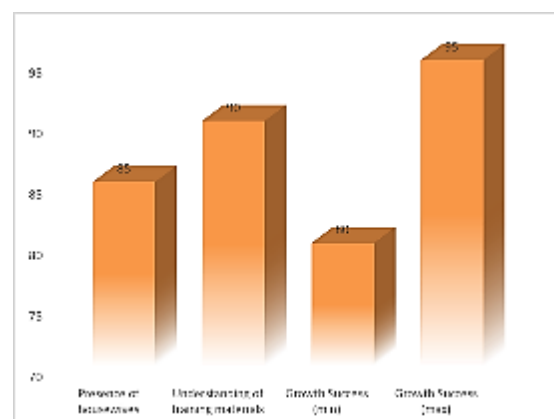


Figure 5. The results of training and education of housewives in the use of yard land

The materials provided include (1) socialization of local food security programs through house-scale integrated farming; (2) yard plant cultivation techniques; (3) budikdamber (fish in a bucket); (4) maintenance of maggots as an alternative feed; (5) poultry rearing of households; and (6) the plan to form a farmer women's group. At the end of the training, $\pm 90\%$ of participants stated that they understood the material, which is in absolute terms equivalent to $\pm 15\text{--}16$ housewives out of 17 active participants.

Assistance is carried out twice a week by students (recording plant harvest, water/fertilizer needs, mortality, and technical feedback). The activity was also attended by the Village Head, Pokdarwis, and three lecturers of the service team in collaboration with the University of Muhammadiyah Metro and Nahdlatul Ulama University of Lampung. To reduce input costs and build a closed cycle, the program utilizes compost and POC produced by PT Pumakkal UM Metro and compost as polybag media, POC as liquid fertilizer, and pond water waste that is reused for watering and fertilizing.

Discussion

The discussion on engagement and adoption in the group of housewives in Banjarrejo looked strong: attendance reached 85%, and around $\pm 90\%$ of participants stated that they understood the material. These figures show that the hands-on approach to hands-on practice in the family yard, where participants learn while applying, is well received. The findings are in line with the literature on the use of yard land in homes and home gardens that place the yard as a node of food production as well as a collective learning space for women; the proximity of the location to the home allows housewives to harvest for daily consumption or small sales, reduce food spending, and increase access to nutrition (AzZahrAzZahra, A. A., Samah, D. A., Mahardyka, G. C., Syahputra, M. I., Dewi, P. R. K., & Katmawanti, S. (2021).

In terms of local carrying capacity, Banjarrejo has significant "ecological capital" and "social capital." The availability of around 239 hectares of unused yards opens up opportunities to strengthen family food security through training and targeted assistance for housewives (Hendriadi & Ariani, 2024). The literature shows that systematically managed yards with simple rotations, appropriate commodity selection, and

ongoing mentoring can increase food availability, expand access, and at the same time create shared learning spaces that strengthen women's socioeconomic networks (Parsono et al., 2021).

The plant's initial performance also strengthens the program's sustainability optimism. The average range of growth success of 80–95% for chili, eggplant, celery, and tomatoes is consistent with the practice of low-input home gardens recommended in the home yard land utilization scheme. This data is measured from the growth conditions of healthy plants with shiny green leaf color indicators. This approach prioritizes fast-harvesting commodities and enhances family nutritional intake through simple management (Fitri & Usni, 2024). This practice produces results that are quickly visible at the household level, thus triggering the motivation of participants to maintain and expand cultivation.

Input management also follows the principle of zero waste. The use of compost as a planting medium and liquid organic fertilizer for fertilization, accompanied by the reuse of pond water as a liquid nutrient source, reduces costs while improving soil quality (Jum'ati et al., 2022). The integrated agriculture framework emphasizes that material flow engineering, where waste from one

component becomes input to another component, increases efficiency, reduces dependence on external inputs, and strengthens the durability of yard systems using IoT (Achmad Isya Alfassa et al., 2025).

The integration of fish components with poultry combined with plants expands the economic and ecological benefits. Fish farming in buckets (*budikdamber*) and poultry farming put households on the integrated farming path (Putri, 2024): organic waste can be processed into feed or fertilizer, production results are differentiated, and business risks are spread. Evidence from the rice mining literature suggests that the integration of plants with fish increases protein supply, helps control weeds and pests biologically, and in certain scenarios reduces fertilizer requirements and methane emissions (Cahya et al., 2021). In crop-livestock integration, various studies have also reported increased productivity, land use efficiency, reduced pesticide needs, and reduced costs through the recycling of hay and livestock manure.

The socio-economic implications of this initial achievement are quite clear. The combination of high attendance, adequate understanding, and cultivation success above 80% is a strong signal to

immediately form a Women Farmer Group and strengthen local marketing of yard products. Theoretically, the development of value-added clusters such as fertilizers/compost, processed products, and supporting services in village-level integrated agriculture programs has been proven to drive the local economy and increase the entrepreneurial capacity of residents (Jum'ati et al., 2022). From the perspective of the SDGs, this approach contributes to SDG 1 through reducing input costs and diversifying income, SDG 2 through increasing the availability and access to fresh food, and SDG 12 through zero-waste-based sustainable production (Minaka, 2025).

This program contributes directly to several measurable SDG indicators. In SDG 1 (No Poverty), it supports indicator 1.2.2 through increasing income and reducing household food expenditure by up to $\pm 20\%$ (Mulia et al., 2022). Indicator 2.1.2, which increases family access to nutritious food from yard products, reflects SDG 2 (No Hunger) (Sharma et al., 2022). SDG 8 (Decent Work and Economic Growth) supports indicator 8.3.1 through the creation of productive businesses and decent informal work for housewives (Mulia et al., 2022). SDG 12 (Responsible Consumption and

Production) is achieved in indicator 12.5.1 by reducing organic waste through the implementation of a *zero-waste system* based on compost and liquid fertilizers (Farooq, 2023). Meanwhile, SDG 13 (Handling Climate Change) is aligned with indicator 13.2.1 through the implementation of environmentally friendly agricultural practices that reduce emissions and strengthen the resilience of local agroecosystems (Farooq, 2023; Sharma et al., 2022).

Strengthening the program, there are still 15% of housewives who have not attended the core session. Follow-up recruitment and door-to-door visits will help close the participation gap. The variation in growth success (80–95%) is likely influenced by differences in yard microclimate, water availability, and fertilization discipline. The practical solution is to create a uniform flush-fertilizer calendar in the group, build a "compost bank" in the farmer women's group, and maintain mentoring twice a week to maintain consistency in practice. By standardizing short-duration daily guides (≤ 30 minutes) and tidying up the logbook (cost, yield, consumption, and small sales), the program has a high chance of moving from the adoption phase to sustainability and cross-hamlet replication. Manuscript.

4. CONCLUSION

The Local Food Security Education service program based on the Integrated Green Farming System (IGFS) in Banjarrejo Village showed high acceptance and participation from the target community. This program supports SDGs 1, 2, 8, 12, and 13 through increasing household income, access to nutritious food, economic empowerment of housewives, implementing *zero waste*, and environmentally friendly agricultural practices that maintain the resilience of local ecosystems. The program has produced a tangible impact: (1) increasing the literacy and skills of housewives in integrated yard cultivation; (2) an increase in the availability of family food and an early indication of reducing the cost of vegetable consumption; (3) efficiency and sustainability through zero-waste cycles; and (4) strengthening social capital for the institution of farmer women groups and village-campus networks. By maintaining a regular mentoring pattern, standardizing short daily guidance (≤ 30 minutes), and organizing logbooks (cost, output, consumption, small sales), the program is ready to move from the adoption phase to sustainability and replication in

encouraging inclusive, cost-effective, and sustainable local food security programs.

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