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EMPOWERMENT OF PKK CADRES THROUGH TRAINING ON PROCESSING COCOMIXS WASTE INTO PCO-YOCOCO TO SUPPORT THE ECONOMIC SUSTAINABILITY

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ABSTRACT

This community service program aimed to empower PKK (Family Welfare and Empowerment) women cadres in Teguhan Village through the utilization of organic waste to support sustainable agriculture and local economic resilience. Specifically, the program focused on training cadres to process coconut husk waste from Cocomixs beverage production and leftover household rice into an organic liquid fertilizer named PCO-Yococo. The program employed a Participatory Action Research (PAR) approach, emphasizing active community involvement throughout the process. Activities were implemented in five stages: planning, socialization, training, technical guidance, and mentoring. The methods included environmental observation, participatory formulation of PCO-Yococo production procedures, hands-on production practice, dissemination of a digital pocket book, and periodic monitoring of the fermentation process and plant growth in Kebun Rahayu. The results showed significant improvements in participants' technical skills related to organic fertilizer production, increased production capacity, and enhanced social and economic empowerment among PKK cadres. Overall, this program indicates that a participatory, community-based waste management initiative can effectively transform local waste into value-added agricultural inputs while strengthening environmental awareness, social capacity, and economic resilience in Teguhan Village.

Keywords : Community Empowerment, Coconut Husk Waste, Organic Liquid Fertilizer, PCO-Yococo
JEL Classification: G18, G21, G28

1. INTRODUCTION

Environmental management has been identified as a key development priority in Ngawi Regency, as outlined in the 2021–2026 Regional Medium-Term Development Plan (RPJMD). One of the pressing environmental challenges in the area is the accumulation of young coconut husk waste generated by the Cocomixs beverage business, which has been operating since 2016. Most of this waste is disposed of in temporary disposal sites (TPS) or surrounding areas without adequate treatment, resulting in environmental pollution and unpleasant odors.

Previous studies and community service programs have demonstrated that coconut husk waste can be processed into organic fertilizers or growing media due to its high nutrient content, particularly potassium, phosphorus, calcium, and magnesium (Faizi et al., 2021; Ilalfiah & Agustina, 2024). However, many of these initiatives focus primarily on technical processing aspects or are conducted in controlled research settings, with limited emphasis on community empowerment, participatory approaches, and integration with local household waste management. In addition, few programs involve women's community groups as key agents in waste utilization and sustainable agriculture. In contrast, this program integrates the processing of young coconut husk waste from a local micro-enterprise with leftover household rice to produce liquid organic fertilizer (PCO-Yococo) through a participatory, community-based approach. The program actively involves PKK (Family Welfare and Empowerment) women cadres as the main actors, thereby strengthening their technical skills, environmental awareness, and social capacity.

Therefore, the objective of this community service program is to empower PKK women cadres in Teguhan Village to utilize locally available organic

waste for the production of liquid organic fertilizer, reduce environmental pollution, and support sustainable agricultural practices in line with Sustainable Development Goal (SDG) 12 on responsible consumption and production.In addition to coconut husk waste, the community in Teguhan Village also faces the issue of leftover spoiled rice, which is frequently discarded. However, spoiled rice can be fermented into molasses and utilized as an additional input in the production of liquid organic fertilizer. The innovative combination of young coconut husk waste and spoiled rice results in PCO-Yococo, a fertilizer rich in potassium and nitrogen. This product contributes to improved soil structure, promotes plant growth, and offers an environmentally friendly alternative to chemical fertilizers (Praputri, 2022). This community empowerment program trained PKK cadres in Teguhan Village to process waste into PCO-Yococo. The product supports the sustainability of Kebun Rahayu, a garden dedicated to vegetables and family medicinal plants (TOGA) managed by the cadres. This article outlines the program's implementation, examines its empowerment outcomes, and discusses its environmental, social, and economic impacts.

2. LITERATURE RIVIEW

Organic waste management is not only an environmental issue but also a strategic entry point for community empowerment and sustainable agriculture. Improper disposal of biodegradable waste such as coconut husks and leftover cooked rice can lead to methane emissions, unpleasant odors, and groundwater contamination (Setiyani, 2023). Conversely, when managed through participatory and community-based approaches, organic waste can be transformed into value-added agricultural inputs that simultaneously address environmental and socio-economic challenges.

Several studies highlight the potential of coconut husks as a raw material for organic fertilizers due to their fibrous structure and high macro-nutrient content, particularly potassium (K), phosphorus (P), calcium (Ca), and magnesium (Mg) (Faizi et al., 2021). The processing of coconut husks into liquid organic fertilizer has been shown to improve soil structure, enhance aeration, and stimulate vegetable crop growth (Himawan et al., 2018). However, most existing studies focus on agronomic outcomes and laboratory-scale processing, with limited attention to community involvement and capacity building in waste utilization.

Leftover cooked rice has also been identified as a valuable fermentation substrate. Its high carbohydrate content enables the production of simple sugars and active microorganisms through fermentation, which function as bioactivators in liquid organic fertilizer production (Suriana, 2024). Molasses derived from fermented rice plays a critical role in supporting microbial activity, enhancing nutrient binding, and increasing nitrogen (N) availability in liquid fertilizers (Johnposon, 2023). These findings indicate that household food waste can complement agricultural residues in integrated organic fertilizer systems.

Liquid organic fertilizer (LOF) itself is widely recognized as a fast-releasing organic input due to its water-soluble macro- and micro-nutrients, plant hormones, and bioactive compounds (Ginting & Sipayung, 2020; Dewi et al., 2021). Despite its technical advantages, the successful adoption of LOF at the community level depends largely on participatory learning, local resource utilization, and continuous mentoring.

Therefore, this program builds upon previous findings by integrating coconut husk waste and leftover rice into LOF production through a participatory empowerment approach involving PKK women cadres. By

linking organic waste utilization with hands-on training and community mentoring, the program operationalizes existing theories and empirical findings into a practical, community-driven model for sustainable waste management and agricultural support

3. METHODOLOGY

The activities were conducted in Teguhan Village, Paron District, Ngawi Regency, with PKK women cadres as the primary target group. This community service program employed a Participatory Action Research (PAR) approach, which emphasizes active community involvement through iterative cycles of participatory planning, collective action, reflection, and evaluation. A participatory approach was adopted to ensure that the cadres were actively engaged at every stage of the program.

a. Planning

The planning stage began with a series of meetings and coordination activities among the proposing team to formulate observation strategies for the partner location, namely the PKK cadres in Teguhan Village. These initial observations were intended to identify environmental parameters affected by the disposal of Cocomixs waste, while interviews with the cadres revealed that the waste had contributed to environmental pollution in the surrounding area. Following the completion of the observation phase, the team sought formal permits from relevant stakeholders, including the Head of Teguhan Village and the Chairperson of the PKK Mobilization Team, to obtain institutional support and legal approval for the implementation of the activities. Subsequently, a literature review was carried out to examine the benefits and nutrient composition of coconut husk waste generated by Cocomixs (SK Mitra Desa Teguhan, 2025). The literature review was led by

the principal investigator, who has expertise in biotechnology, while team members with backgrounds in environmental chemistry were responsible for analyzing the essential elements required to enhance the growth and quality of vegetable and TOGA (family medicinal plant) crops in Kebun Rahayu. The planning stage concluded with the initial processing of young coconut husk waste into PCO-Yococo, an organic fertilizer formulated to improve crop quality in Kebun Rahayu.

b. Socialization

Following the completion of the planning stage and the development of an appropriate formulation for processing Cocomixs waste, the program proceeded with a socialization session for the PKK cadres in Teguhan Village. This activity aimed to enhance the cadres' understanding of (1) the benefits of organic fertilizers, (2) the advantages of utilizing young coconut husk waste, and (3) the procedures for producing liquid organic fertilizer from coconut husk waste. The socialization session was designed to involve practitioners from the Ngawi Regency Environmental Agency in order to provide more comprehensive insights into the potential benefits of processed waste products. This activity was scheduled to be conducted in June 2025.

c. Training

The training stage, scheduled for June 2025, focused on hands-on practice in producing PCO-Yococo from Cocomixs waste. During this activity, one of the lecturers from the proposing team directly demonstrated the step-by-step process of converting young coconut husk waste into liquid organic fertilizer. Throughout the training session, student team members documented each stage of the fertilizer production process. The

documentation was later edited into a training video on PCO-Yococo production. In addition, participants were provided with a digital pocket book entitled PCO-Yococo Digital Pocket Book to support their understanding and serve as an easily accessible reference. This digital resource was expected to facilitate long-term, independent learning among the PKK cadres.

d. Technical Guidance

After the PKK cadres had acquired the necessary knowledge and skills to process Cocomixs waste into PCO-Yococo and had received the PCO-Yococo Digital Pocket Book as supporting material, the program proceeded to the independent implementation stage in July 2025. During this phase, the cadres were divided into five groups, each tasked with independently producing PCO-Yococo. The production process was carried out under the direct supervision of the community service team to ensure that all groups applied the techniques correctly and adhered to the established standards.

e. Mentoring and Evaluation

Following the technical guidance phase, the PKK cadres, assisted by student team members, conducted four evaluations of the fermentation process throughout August 2025. In September 2025, the cadres, accompanied by student team members, applied PCO-Yococo to the plants in Kebun Rahayu on two occasions during the first two weeks. Subsequently, student team members carried out two observation sessions during the final two weeks of the month to assess plant growth quality. In addition, the student researchers distributed checklist questionnaires to assess the cadres' understanding and practical skills in producing PCO-Yococo. Program evaluation was carried

out at each stage of implementation from June to September 2025. In addition, monitoring and evaluation were conducted by the internal unit of STKIP Modern Ngawi (LPPM) in August 2025 and by the external DRTPM team in October 2025. Progress reports were prepared in August and September 2025, followed by the completion of the final report, journal publication, and intellectual property registration for PCO-Yococo in October 2025. A dissemination seminar was held in November 2025, and a follow-up proposal was submitted in December 2025.

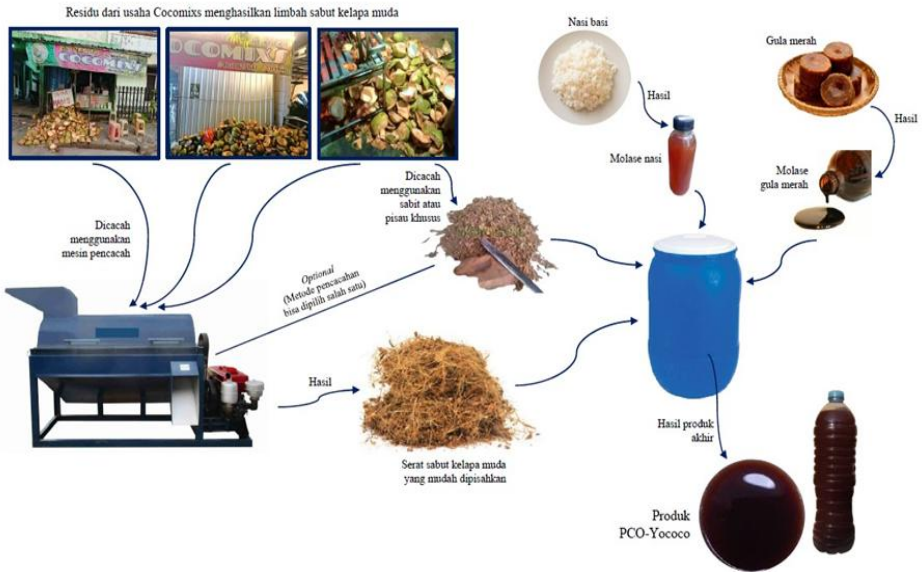


Figure 1. Schematic Illustration of the Technology and Innovation Applied in the Empowerment of PKK Cadres Through Training on Processing Cocomixs Waste Into PCO-Yococo for the Sustainability of Kebun Rahayu in Teguhan Village

4. RESULTS AND ANALYSIS

1) Result

a. Planning

The planning stage, conducted on 6 April and 12 May 2025, began with a series of meetings and coordination activities among the proposing team to formulate observation strategies for the partner location, namely the PKK cadres of Teguhan Village. During this phase, the service lecturers, assisted by students, examined the actual conditions of the PKK cadres as well as the environmental parameters affected by the disposal of Cocomixs waste. The data obtained during this stage are presented as follows:

a) Cocomixs vendors disposed of coconut husk waste at the temporary disposal site (TPS) and in surrounding areas of Teguhan Village, resulting in the accumulation of unmanaged coconut husk waste.
b) The environment in and around Teguhan Village had begun to experience pollution as a result of the accumulation of young coconut husk waste, which generated unpleasant odors.
c) Most PKK cadres in Teguhan Village are housewives who are not yet economically productive, making them highly potential participants for socialization, training, technical guidance, and mentoring activities related to the production of PCO-Yococo liquid fertilizer.
d) The side yard of the Teguhan Village Office had been cultivated with vegetables and family medicinal plants (TOGA), collectively known as Kebun Rahayu, which has strong potential for further development through the application of PCO-Yococo liquid fertilizer.
e) None of the PKK cadres had previously utilized leftover cooked rice as a source of molasses in the production of liquid organic fertilizer.

During the planning phase, the service team also held coordination meetings to determine the appropriate formulation for processing Cocomixs waste into PCO-Yococo. In addition, young coconut husks and fermented rice molasses

were prepared to facilitate hands-on practice by the PKK cadres in producing PCO-Yococo.

The materials required for one batch of production were as follows:

a) Young coconut husks: 10 kg
b) Water: 120 L
c) Mixture of water and rice (fermented rice molasses): 7.2 L
d) Palm sugar: 2.8 kg

b. Socialization

The subsequent stage, namely the socialization session for the PKK cadres of Teguhan Village, was conducted on 20 July 2025. This activity aimed to enhance participants' understanding of (1) the benefits of organic fertilizers, (2) the advantages of utilizing young coconut husk waste, and (3) the procedures for producing liquid organic fertilizer from young coconut husk waste.

The socialization session featured an environmental practitioner from the Indonesian Green Youth Coalition (Koalisi Pemuda Hijau Indonesia/KOPHI DIY), Nindita Sabila Ningtyas, M.Sc., who provided comprehensive insights into the benefits of processed waste products. In addition, the service team—Qurrotul Anfa, M.Pd.; Ratna Tri Widyawati, S.Pd., M.Si.; and Lina Rumiati, M.Pd.—also served as facilitators during the session.

c. Training

The training stage was conducted on 20 July 2025 and focused on hands-on practice in producing PCO-Yococo from Cocomixs waste. During this activity, one of the lecturers from the proposing team directly demonstrated the process of converting young coconut husk waste into liquid organic

fertilizer, explaining each step in a systematic manner.

During the training session, student team members documented the entire fertilizer production process, which was later edited into a PCO-Yococo training video. In addition, a digital pocket book entitled PCO-Yococo Digital Pocket Book was provided to facilitate understanding and serve as a sustainable and easily accessible reference for the cadres. This resource is expected to support the cadres' long-term, independent mastery of PCO-Yococo production procedures.

d. Technical Guidance

Having acquired the necessary knowledge and practical skills through the socialization and training stages, and equipped with the PCO-Yococo Digital Pocket Book, the PKK cadres proceeded to the independent implementation stage on 20 July 2025.

During this phase, the cadres were organized into five working groups (Pokja), each tasked with independently processing Cocomixs waste into PCO-Yococo under student supervision. The production process was also supported by direct mentoring from the service team to ensure that each group applied the techniques accurately and adhered to the established standards.

e. Mentoring and Evaluation

Following the completion of technical guidance on PCO-Yococo production, the PKK cadres, accompanied by student members of the proposing team, conducted four evaluations of the fermentation mixture on 23 and 30 July 2025, as well as on 3 and 7 August 2025. The PCO-Yococo liquid fertilizer was subsequently harvested on 20 August 2025.

Subsequently, over four consecutive days in late August (21, 22, 23, and 24 August 2025), the cadres, accompanied by students, applied PCO-Yococo to the plants at Kebun Rahayu by spraying the fertilizer onto the vegetable crops.

In the final stage, conducted in September 2025, student team members carried out plant growth quality observations at Kebun Rahayu on four occasions, namely on 1, 5, 8, and 11 September 2025. In addition, the students distributed checklist questionnaires to assess the cadres' understanding and practical skills in producing PCO-Yococo.

Evaluation of the community service program was conducted at each stage from June to September 2025. In addition, internal monitoring and evaluation were carried out by the LPPM team of STKIP Modern Ngawi at Universitas Muhammadiyah Ponorogo in September 2025, followed by external monitoring and evaluation by the DPPM team. A progress report was subsequently prepared in September 2025.

Furthermore, the final report, journal publication process, and the registration of intellectual property rights for PCO-Yococo were completed in October 2025. A dissemination seminar was subsequently conducted in November 2025.

The service team also carried out routine monitoring to ensure the sustainability of the program. With the support of the PCO-Yococo Digital Pocket Book provided to the PKK cadres, it is expected that they will be able to independently recycle Cocomixs waste into PCO-Yococo. The availability of PCO-Yococo stock is anticipated to support long-term fertilizer use and ensure the continuous maintenance of plants at Kebun Rahayu.

Figure 2. Delivery of socialization material


Figure 3. Training on PCO-Yococo production conducted by the service team


Figure 4. PKK cadres of Teguhan Village accessing the PCO-Yococo Digital Pocket Book accompanied by students


Figure 5. Technical guidance for the groups


Figure 6. Students checking the fermentation results of the PCO-Yococo mixture


Figure 7. Students assisting the PKK cadres of Teguhan Village in spraying PCO-Yococo onto the plants in Kebun Rahayu

2) Analysis

a. Level of initial economic empowerment (pilot commercialization stage)

In addition to improvements in production capacity and social empowerment, the program also initiated early-stage economic empowerment, although commercialization remains at a pilot level. The increase in PCO-Yococo production volume enabled PKK cadres to explore its economic potential through limited trial sales within the local community.

During the final phase of the program, a portion of the PCO-Yococo produced was packaged in small bottles and introduced to residents around Kebun Rahayu as a trial product. This initial marketing effort focused on informal distribution channels, such as neighborhood networks and PKK activities, to assess community acceptance and perceived value. While the sales volume and revenue generated were still limited, this activity marked an important transition from purely environmental and educational outcomes toward income-generating potential.

From an economic empowerment perspective, this stage reflects the emerging level of productive economic activity, where participants begin to recognize waste-derived products as commodities with market value. The PKK cadres demonstrated increased confidence in product handling, simple packaging, and basic pricing discussions, even though formal cost–benefit analysis and profit optimization have not yet been fully implemented. These findings align with community empowerment theory, which emphasizes that economic independence typically develops gradually, beginning with experimentation and learning-by-doing rather than immediate financial gains.

Moreover, the pilot commercialization stage strengthened participants' motivation to sustain production continuity, as the prospect of additional household income—however modest—reinforced their commitment to

maintaining product quality and consistency. With continued mentoring, improved packaging, and market linkage support, PCO-Yococo has the potential to evolve into a village-level economic product that complements the social and environmental benefits already achieved.

Overall, although economic outcomes remain preliminary, the trial sales of PCO-Yococo indicate the initial formation of economic empowerment, positioning the PKK cadres not only as environmental actors but also as prospective micro-entrepreneurs in sustainable agriculture-based products.

b. Level of increased production aspects.

The training results demonstrate a substantial increase in PCO-Yococo production levels, as reflected in the growing production volume. Initially, no PCO-Yococo was produced; however, after one month of soaking, each group was able to produce an average of 1,000 mL, which was harvested on 20 August 2025. After two months of soaking, with harvesting conducted on 20 September 2025, each group produced up to 5,000 mL. Consequently, the total volume of PCO-Yococo liquid produced during the program reached 30,000 mL across the five groups.

Table 1. Data on the Level of Increase in PCO-Yococo Fluid Production

Team Work	The Volume of PCO-Yococo produced		
	Before	After a month	After 2 months
Core	0	1000	5000
1	0	1000	5000
2	0	1000	5000
3	0	1000	5000

Team Work	The Volume of PCO-Yococo produced		
	Before	After a month	After 2 months
4	0	1000	5000

This increase in production levels has generated positive environmental impacts. The conversion of Cocomixs waste into a beneficial product has helped reduce the volume of waste being discarded (Sinar Ngawi, 2025). Moreover, the continuity of PCO-Yococo production at Kebun Rahayu in Teguhan Village has strengthened the community's collective awareness of the importance of environmentally friendly waste management practices.

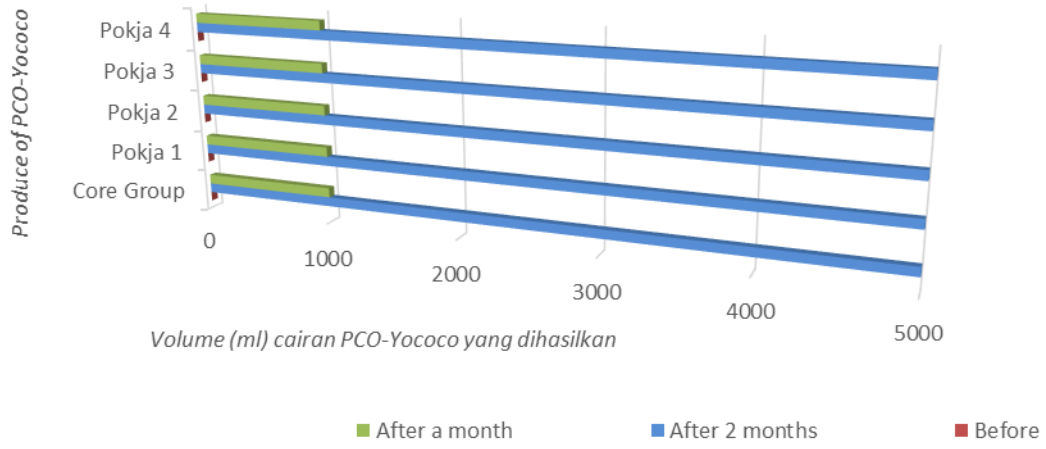


Figure 8. Percentage increase in production level

Through consistent mentoring, PCO-Yococo has the potential to become one of Teguhan Village's flagship products, with competitiveness at both regional and national levels. The following figure illustrates the increase in PCO-Yococo production levels in Teguhan Village (Department of Economic and Social

Affairs, 2023).

c. Level of improvement in social and community aspects.

The implementation of the Community Partnership Program (PKM) aimed at empowering PKK cadres through training on processing Cocomixs waste into PCO-Yococo in Teguhan Village has had a significant positive impact on enhancing community social empowerment. This impact is particularly evident among PKK cadres in the Kebun Rahayu neighborhood, as reflected in improvements across the following eight aspects of social empowerment.

Table 2. Data on the Level of Improvement in Social Aspects

Aspek	Before	After	Improvement Level	Percentage Increase (%)
A. Understanding of PCO-Yococo production materials	1,50	4,23	2,73	54,60
B. Understanding of PCO-Yococo production measurement ratio	1,57	4,73	3,16	63,20
C. Understanding of PCO-Yococo benefits	1,47	4,27	2,8	56,00
D. Skills in recycling young coconut husks	1,57	4,6	3,03	60,60
E. Understanding the benefits of young coconut husks and stale rice	1,33	4,47	3,14	62,80
F. Skills in making PCO-Yococo	1,57	4,6	3,03	60,60
G. Skills in applying PCO-Yococo	1,33	4,37	3,04	60,80
H. Skills in using tools in the production of PCO-Yococo	1,57	4,43	2,86	57,20
Average	1,49	4,46	2,97	59,40

Based on Table 2 above, the data indicate a substantial increase in participants' understanding of the materials used in PCO-Yococo production following the training. The average score increased from 1.50 before the program to 4.23 afterward, representing an improvement of 2.73 points or a 54.60% increase. These findings suggest that participants developed a clearer understanding of the required raw materials and their respective functions in the production process, reflecting the effectiveness of the instructional methods employed during the activity.

Participants also demonstrated a considerable improvement in their understanding of the appropriate measurement ratios required for PCO-Yococo production. Their average scores increased from 1.57 to 4.73, representing an improvement of 3.16 points or a 63.20% increase, which is the highest percentage gain among all indicators. This finding highlights that the training effectively addressed knowledge gaps related to accurate formulation and proportionality in the production process.

Participants' understanding of the benefits of PCO-Yococo improved markedly after the program. The average score increased from 1.47 to 4.27, reflecting an improvement of 2.80 points or a 56.00% increase. This progress indicates that participants developed a deeper appreciation of the functional advantages of PCO-Yococo, particularly its role in supporting sustainable agricultural practices.

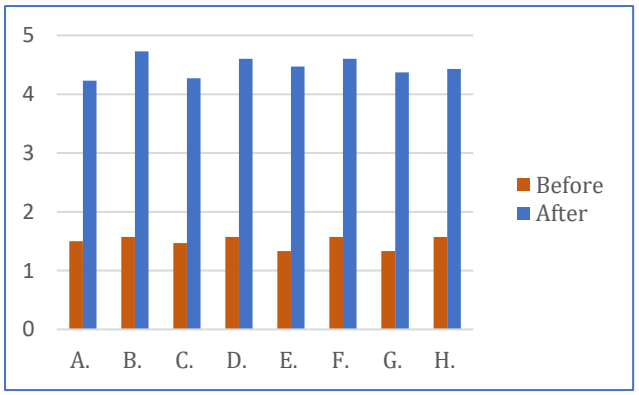
The training also strengthened participants' practical skills in recycling young coconut husks as a core component of PCO-Yococo production. Their average score increased from 1.57 to 4.60, indicating an improvement of 3.03 points or a 60.60% increase. This improvement suggests a growing level of competence in transforming agricultural waste into valuable inputs for organic fertilizer production.

The data reveal a marked improvement in participants' understanding of the benefits of young coconut husks and stale rice as supporting materials in the formulation process. Average scores increased from 1.33 prior to the training to 4.47 afterward, reflecting an improvement of 3.14 points or a 62.80% increase. This finding demonstrates that the training effectively clarified the synergistic roles of both materials in producing high-quality liquid fertilizer.

Participants' skills in the actual production of PCO-Yococo improved significantly. The average score increased from 1.57 to 4.60, representing an improvement of 3.03 points or a 60.60% increase. These results indicate that the hands-on approach effectively equipped participants with the procedural skills required to produce the fertilizer independently.

Participants' ability to apply PCO-Yococo correctly also improved following the training. Average scores increased from 1.33 to 4.37, indicating an improvement of 3.04 points or a 60.80% increase. This result demonstrates that participants not only learned how to produce PCO-Yococo but also developed competence in its practical application for agricultural purposes.

Finally, participants demonstrated improved mastery of the tools required for PCO-Yococo production. The average score increased from 1.57 to 4.43, reflecting an improvement of 2.86 points or a 57.20% increase. This improvement indicates that participants became more confident and proficient in handling the equipment, which is essential for ensuring safe and efficient production processes.



Description:

A. Understanding of PCO-Yococo production materials
B. Understanding of PCO-Yococo production measurement ratio
C. Understanding of PCO-Yococo benefits
D. Skills in recycling young coconut husks
E. Understanding the benefits of young coconut husks and stale rice
F. Skills in making PCO-Yococo
G. Skills in applying PCO-Yococo
H. Skills in using tools in the production of PCO-Yococo

Figure 9. Percentage of Improvement in Social Community Level

Based on the results of the questionnaire distributed to PKK cadres in Teguhan Village, overall community social empowerment was found to have improved considerably. One of the most critical success factors in the training of Family Welfare and Empowerment (PKK) cadres for converting Cocomixs waste into PCO-Yococo was the strong teamwork demonstrated among the participants. Through collaborative efforts, the cadres shared practical tasks—such as measuring and mixing materials, operating equipment, and applying the fertilizer—thereby leveraging one another's strengths and enhancing overall efficiency. This teamwork likely contributed to the high levels of post-training competence observed, particularly in indicators such as "skills in producing PCO-Yococo" and "skills in using tools." From a theoretical perspective, effective teamwork enhances performance by fostering coordination, trust, and mutual support, which are core elements of team dynamics, including open communication and interdependence.

In addition, studies on community-based training programs indicate that collaborative work within local groups fosters shared responsibility and

collective learning, which enhance not only individual capacity but also collective ownership of project outcomes, particularly in participatory agricultural waste management initiatives (Azami, 2025).

In the context of cadre training, such teamwork not only accelerates skill acquisition during workshops but also strengthens social cohesion, which is essential for sustaining long-term, community-based initiatives. In light of these insights, future training programs should continue to emphasize structured group work and may integrate team-building activities to further enhance collaboration and clarify roles among cadres, as supported by research in organizational development.

PCO-Yococo is packaged in 250 ml bottles, making it highly practical for distribution due to its compact size, while also helping to keep the selling price affordable. Each 250 ml bottle can be sold at a price ranging from IDR 30,000 to IDR 40,000, generating a profit of approximately IDR 10,000 to IDR 20,000 per bottle. This product therefore has strong potential to serve as an alternative source of income for the residents of Teguhan Village. The marketing strategy can be implemented through a Unique Selling Proposition (USP) approach, highlighting the product's distinctiveness derived from its raw materials, namely young coconut husk waste and leftover rice. In addition, marketing can be conducted both online through social media and e-commerce platforms, and offline through agricultural supply stores in the Ngawi Regency area.

5. CONCLUSION, LIMITATION AND RECOMMENDATION

Conclusion

The empowerment program for PKK cadres through training on processing young coconut husk (Cocomixs) waste and leftover cooked rice into PCO-

Yococo has proven effective in enhancing the cadres' technical skills in producing liquid organic fertilizer. From a production perspective, the program resulted in significant improvements in the volume, quality, diversification, and efficiency of the PCO-Yococo manufacturing process. From a social perspective, the program successfully strengthened participation, solidarity, collaboration, and independence among the PKK cadres in environmental management initiatives.

The application of PCO-Yococo generated positive impacts across environmental (waste pollution reduction), social (enhanced collective awareness), economic (the creation of new business opportunities), and agricultural dimensions (supporting the sustainability of Kebun Rahayu). This program facilitated the following achievements:

1. Reducing environmental pollution caused by the accumulation of coconut husk waste and leftover cooked rice.
2. Equipping PKK cadres with new skills in producing a functional liquid organic fertilizer.
3. Supporting the sustainability of Kebun Rahayu as a vegetable and family medicinal plant (TOGA) garden through the application of PCO-Yococo.
4. Increasing the added value of organic waste while reducing community dependence on chemical fertilizers.
5. Generating positive social, economic, and environmental impacts while enhancing the active participation of PKK cadres in community empowerment initiatives.

Overall, the program confirms that integrating organic waste utilization with a participatory empowerment framework not only reduces environmental pollution but also enhances social capacity and opens opportunities for local

economic development. Future programs are recommended to focus on product standardization, expanded marketing networks, and financial feasibility analysis to strengthen the economic sustainability of PCO-Yococo at the village level.

Limitation

This community service program has several limitations that should be acknowledged to inform future program development. First, the fermentation process of PCO-Yococo remains dependent on weather conditions and open storage spaces, which resulted in variations in product quality across fermentation drums. Second, the mentoring activities were conducted within a limited timeframe, from June to September 2025, which was insufficient to assess long-term sustainability in production or consistent implementation among all PKK cadres. Third, the effectiveness evaluation of PCO-Yococo in Kebun Rahayu did not employ a controlled experimental design, making it difficult to quantitatively compare plant growth outcomes with those achieved using other types of fertilizers. In addition, the economic analysis of the product remains preliminary, as it does not yet include detailed calculations of production costs or assessments of long-term business sustainability. Finally, production capacity still relies on simple equipment, which limits output volume and prevents the product from meeting potential demand in a broader market. These limitations provide an important foundation for refining and strengthening the program in future stages.

Recomendation

The production of PCO-Yococo should be expanded through the Village-Owned Enterprise (BUMDes) to ensure sustainability and enhance market competitiveness. Future follow-up initiatives should include training in large-

scale production management, accompanied by sound financial management practices. In addition, digital marketing strategies utilizing social media, e-commerce platforms, and community networks need to be strengthened to increase product visibility and market reach. This empowerment model has the potential to serve as a best-practice reference for other villages seeking to implement community-based organic waste management programs.

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