

Green Harmony: Granular Fertilizer and Liquid Soap from Eco Enzymes for The "Sustainable Elderly" Mission

HONORATA RATNAWATI DWI PUTRANTI^{1*)}, ENDANG SWASTUTI²,
ALBERTUS KRISTIYO WARSONO³

^{1,2} Universitas 17 Agustus 1945 Semarang

³ Universitas UNIMAR AMNI Semarang

Honorata-ratnawati@untagsmg.ac.id

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ABSTRACT

This community service focuses on the importance of integrating the elderly into productive activities that not only improve their health and psychological well-being but also reduce the social and economic burden on the younger generation. Through involvement in environmentally friendly product manufacturing projects such as granular fertilizer and liquid soap made from eco-enzymes, the elderly are given the opportunity to participate in meaningful efforts and become agents of change that support environmental sustainability. This service utilizes a participative approach, emphasizing the active involvement of the community at RW 7, Ngesrep Sub-district, Banyumanik District, Semarang, especially the elderly group (55-75 years), in all stages of activity, from planning to implementation and evaluation. It also involves students as a manifestation of the Institutional Key Performance Indicators (IKU) with indicators of student activities outside the campus. The conclusion of this service underscores the urgency to change policies and social practices to include the elderly more inclusively in all aspects of community life.

Keywords: *Elderly, Environmental Sustainability, Granular Fertilizer, Liquid Soap, Eco-Enzyme.*

1. INTRODUCTION

The active involvement of older people in productive activities is crucial not only for their health and happiness, but also for reducing the social and economic burden on younger generations. Active seniors tend to be physically and mentally healthier, highlighting the importance of providing them with opportunities to contribute meaningfully to society. Studies show that seniors in the community have a higher quality of life than those in nursing homes. All aspects of the quality are better. Community-based care and programs are recommended to improve the health, social and environmental conditions of elderly homes (Kiik & Nuwa, 2020) .

Worldwide, the aging population is increasing rapidly, affecting the job market and the well-being of seniors. The population composition changed from a pyramid to a rectangle (Cristea et al., 2022) . This is a priority to pay attention to because if the elderly are not healthy or

prosperous it can become a burden on the productive age (Behera, 2021) . Recent analysis reveals that increasing age is often associated with reduced health conditions, reduced ability to live independently, and a lack of activities that are healthy for oneself and society (Morrow-Howell et al., 2003) . However, by engaging older adults in stimulating and sustainable activities, we can help them maintain physical and mental health, as well as increase their sense of purpose in life and social integration. The involvement of the elderly as in the object of service, namely, in Kampung Gombel Permai RW 7, Ngesrep, Banyumanik District, Semarang, which was founded in 1984, most of the residents are retirees or elderly, with 70% of them aged over 55 years and already retired . This RW has also become a finalist in the 2023 Healthy Village competition. Supporting the welfare of the elderly, several programs have been held such as health exercises and monthly check-ups, but there needs to be improvement in these programs so that there are more choices of activities for the elderly. RW VII Kampung Gombel Permai, which is rich in plants, offers gardening activities as a way to pass the time. The activities carried out will contribute to the cleanliness of the environment and the comfort of daily life (Fitriani & Wijaya, 2023) . This is all directed at ensuring the welfare of the elderly in their old age, also in accordance with recent research findings (Lak et al., 2021; Xue, 2011) .

Introducing activities that unite wisdom and innovation, the elderly become bearers of change, enriching the community while protecting the environment which in this service is called (Sustainable Elderly) (Su & and Shiau Fang Chao, 2023). This situation requires immediate action. Society must urge and support the integration of older people in all aspects of social and environmental life to avoid greater harm in their mental and physical health, as well as ensure that they remain an important part of our social networks (Hampson, 2018) . Prosperous and happy seniors is also a PKK working group (POKJA) program, included in POKJA 1 and 4, which states that empowering seniors can maintain their physical, mental health, fitness and skills so they can carry out activities productively.

The aim and benefits of this community service activity are to improve the welfare of the elderly with practical eco-enzyme granule fertilizer and natural liquid soap, encouraging sustainable agriculture, empowering the elderly, education, waste reduction and environmental safety. This activity is also expected to improve the health and welfare of the elderly, make the environment healthier by reducing chemicals, and build ecological awareness in the community. It can create economic opportunities, facilitate intergenerational learning, serve as a model of social sustainability, and promote self-sustaining programs that are sustainable and adapt to changing needs and environments.



Figure 1. Activities in The process of making Eco Enzyme

The process towards retirement and the period after retirement and old age can be a challenging period but also open up opportunities for happiness and self-fulfillment. The transition to retirement and aging is often poorly prepared for by many individuals, which

can lead to difficulties in adjustment (**Wang & Wanberg, 2017**). They emphasized the importance of careful planning and preparation to face this big change, both from a financial, health and psychological perspective. Individuals who have positive perceptions of retirement, aging and remain engaged in meaningful activities tend to experience continuity in psychological well-being during the transition (**Henning et al., 2016**). This shows that attitude and active involvement are very important for happiness after retirement and the elderly. Facing retirement and old age holistically, by considering financial, health, social and psychological aspects as a whole, can facilitate better adjustment and opportunities for happiness after retirement and living in old age.

2. METHODS

Table 1 shows activity explanation of the community service.

Table 1. Problems with Activity Objectives

Priority Problems	Activity Objectives and Output Targets	Outcome Completion Targets
ACTIVITY I: Counseling on the benefits of a green environment and the benefits of outdoor activities, as well as physical activities for the elderly for physical and psychological health	Education about the benefits of green environments, outdoor activities and sports for the physical and psychological health of the elderly	Eco-friendly product adoption rate: Increase the number of seniors adopting eco enzyme and granule fertilizer as eco-friendly products within 3-6 months. This reflects the elderly's awareness and belief in the benefits of these products for the environment and their plants.
ACTIVITY II : Making granule fertilizer from eco enzyme dregs as organic fertilizer to empower the elderly	Added value from the activity of making eco enzymes, in the form of making granulated fertilizer so that it can be used more easily to be applied to ornamental plants and ornamental plants in the home yard	Elderly participation level: Within 3 -6 months, achieve the involvement of a minimum of 20 elderly people in the community service program, which includes training in making eco enzymes and granular fertilizer and their application in caring for plants in the home yard.
ACTIVITY III : Added value from ecoenzyme products, Making liquid soap from ecoenzyme with attractive packaging to empower the elderly	Eco enzyme liquid that has been fermented for 3 months can be used as a liquid soap ingredient which has various benefits	Number of participants applying knowledge: After attending training, achieve a level of knowledge application by participants of 60-70% within 6-8 months. This reflects how effective the training is in helping people make and use eco enzymes

Activity I, we will hold an outreach session that educates the elderly about the benefits of living in a green environment and doing outdoor activities. This session aims to instill an understanding of how interaction with nature can nourish the body and mind, as well as offering practical guidance on the types of physical activity that are appropriate and beneficial for the elderly. Activity II, we invite the elderly to be involved in making organic

granular fertilizer from eco enzyme dregs. This initiative aims not only to reuse waste creatively and sustainably but also to empower seniors with productive activities that increase their independence and self-confidence, while enriching their knowledge of sustainable agricultural practices. In Activity III, we developed the added value of eco enzymes by creating environmentally friendly liquid soap. The manufacturing process is designed to involve seniors, giving them an active role in product creation and packaging. The aim of this activity is to provide seniors with the opportunity to contribute economically through sustainable products and enrich their social involvement in the community. Overall, these three activities are expected to enrich the lives of elderly people both physically and psychologically, as well as provide them with opportunities to strengthen their social and economic involvement in the community.

The method for implementing the stages or steps in implementing the solutions offered to overcome partner problems is explained in table 2.

Table 2. Activity and Priority for Completion

Priority activities	Partner Participation	Implementation stages
ACTIVITY I: Counseling on the benefits of a green environment and the benefits of outdoor activities, as well as physical activities for the elderly for physical and psychological health	Be present at activities and actively participate in the implementation stages	Training and counseling
		Collection of raw materials
		Making organic fertilizer granules
		Storage
		Monitoring and evaluation
ACTIVITY II : Making granule fertilizer from eco enzyme dregs as organic fertilizer to empower the elderly	Be present at activities and actively participate in the implementation stages	Training and counseling
		Collection of raw materials
		Attractive packaging design
ACTIVITY III : Added value from ecoenzyme products, Making liquid soap from eco enzymes with attractive packaging to empower the elderly	Be present at activities and actively participate in the implementation stages	Training and counseling

Activity I is an outreach session aimed at the elderly, highlighting the importance of green environments and outdoor activities for physical and psychological health. Partners are expected to be present and actively participate throughout this outreach process. The stages include training and counseling, followed by monitoring and evaluation to assess the effectiveness of the program and its acceptability among the elderly. Activity II: This involves the process of making granule fertilizer from eco enzyme dregs as a form of empowering the elderly. Partners here are also expected to be actively involved in all stages, from training and counseling, collecting raw materials, to designing attractive product packaging. This step aims to equip the production process with the necessary education and skills. Activity III: This activity focuses on adding value to eco enzyme products by creating attractively packaged liquid soap as a way to empower the elderly. Partner participation includes direct involvement in every stage of activities from the beginning of training to counseling on how to make and market products.

Table 3. Research Object Data

Time and place of activity:	Implementation of activities in May 2023- November 2023
Objects/targets/partners:	Gombel Elok Housing Cluster RW 7, Ngesrep Village, Banyumanik District / Ibu RW 7 (Ibu Atik)
Number of family heads /partner members involved:	36 Heads of families (sampled from 10 RTs from RT 7 residents)
Method of implementing activities:	Socialization and direct practice



Figure 2. Making Granule Fertilizer with Eco Enzyme

Table 3 shows research object data and figure 2 shows process of making granule fertilizer with eco enzyme.

3. RESULTS AND DISCUSSION

Physical activity offers many benefits for older people, including improving motor skills, mental health, and reducing the risk of various health problems (**Danijel Božić, 2022**) . Engaging in regular physical activity can improve strength, coordination, balance, and agility, increasing mobility and functional independence in adults. Additionally, physical activity can help maintain heart health, prevent falls, and ensure optimal respiratory and bone health (**Dwojaczny & Bejtka, 2023**) . Research has shown that moderate-intensity exercise not only reduces major mobility disabilities but also slows the decline in kidney function in sedentary older adults. To maximize benefits, it is important to tailor physical activity programs to the specific needs of older adults, focusing on intensity, volume, frequency and progression. Overall, physical activity plays an important role in improving the quality of life and overall well-being of older individuals. Physical activity benefits seniors by improving cognitive function, delaying age-related decline, and improving physical and mental health, leading to a better quality of life. Physical activity in older adults improves motor skills, mental health, strength, and independence, improving overall quality of life.

Proper household waste management and the use of organic fertilizer have enormous benefits, both for the environment and for community welfare (**Susilawati, 2019**) . Good household waste management reduces waste, pollution and improves environmental quality, by converting waste into organic fertilizer, which supports soil fertility and sustainable agriculture. Apart from this, managing household waste also opens up economic opportunities (**Santosa & Sujito, 2021**) . For example, producing organic fertilizer from waste can be a source of additional income for households. In some communities, local groups have formed small businesses to collect organic waste from homes in their neighborhood and turn it into sellable fertilizer or compost. Apart from that, waste management and organic fertilizer production can also increase environmental awareness in

the community (**Sulistiyowati, 2021**) . By involving community members in waste management, we can help promote environmentally friendly behavior and increase understanding of the importance of conservation and sustainability.

Overall, the benefits of household waste management and organic fertilizer production are clear and significant. However, to fully exploit this potential, greater efforts are needed to promote these practices and to provide the education and support necessary for households to manage their waste in a more sustainable and productive way.

Granulated fertilizer made from eco enzymes gives Sustainable Elderly the opportunity to engage in gardening activities more easily and efficiently, giving them the means to contribute to the green environment significantly. The use of this fertilizer improves soil structure, increases fertility, and supports healthy plant growth without harming the ecosystem. The resulting liquid soap offers an environmentally friendly solution for daily hygiene, reducing dependence on synthetic chemicals that can damage the environment. For the Sustainable Elderly community, this means living a more sustainable and responsible lifestyle, fostering environmental awareness while looking after their own well-being. This initiative not only reduces waste and pollution, but also inspires the next generation to adopt similar practices, ensuring a greener and healthier future for all.

In each activity, there is a strong emphasis on the active involvement of partners involving older adults, giving them the opportunity to learn and directly apply new skills. This entire process is designed to hone their skills, increase their self-confidence, and educate them about the importance of a sustainable environment and activities that support physical and mental health.

Table 3. Output and Outcome of The Activity

Solutions Offered	Outer Target	Outcome Completion Targets
ACTIVITIES I		
Creating solutions for community service through making eco enzymes and granular fertilizer and liquid soap	<ol style="list-style-type: none"> 1. Partner knowledge increases 2. Knowledge skills increase 3. Partner's health improves 	Level of community participation: Within 3 -6 months, achieve the involvement of a minimum of 25 community members in the community service program, which includes training on granule fertilizer and its application in caring for plants in the home yard.
Community education (RW VII): Conduct outreach and training about environmentally friendly fertilizers	<ol style="list-style-type: none"> 1. Partner knowledge increases 2. Knowledge skills increase 3. Partner's health improves 	Adoption rate of environmentally friendly products: Increase the number of elderly people who adopt eco enzymes and granule fertilizers as environmentally friendly products by 40-50% within 3-6 months. This reflects the elderly's awareness and belief in the benefits of these products for the environment and their plants.

Solutions Offered	Outer Target	Outcome Completion Targets
Evaluation and monitoring: Conduct regular evaluation and monitoring to measure the success of community service programs through the manufacture of eco enzyme and granular fertilizer	<ol style="list-style-type: none"> 1. Partner knowledge increases 2. Knowledge skills increase 3. Partner's health improves 	Product dissemination: Increase the number of households or users adopting eco enzymes and granule fertilizers as environmentally friendly products by 50-60% within 1-2 years.
ACTIVITY 2		
Public education: convey information to the public about packaging changes and their benefits	Explains how to use the new packaging and how eco enzyme products can be used for various health purposes and environmental benefits	Educational outreach: achieve educational outreach to a minimum of 70-80% of the target population in 6-7 months
Evaluation and monitoring: regular evaluation and monitoring to measure the success of community service programs	This will help in identifying challenges and opportunities for improvement and further development	Frequency of evaluation and monitoring: Conduct evaluation and monitoring every 3-6 months to measure the success of the community service program in increasing awareness, knowledge and adoption of eco enzyme products in better packaging

The realization of Partner's collaboration and contribution is by providing a place for training in the form of a gazebo and being enthusiastic about attending every activity, providing a grinding tool to smooth the eco enzyme dregs and enthusiastic community presence. Overall, partners provide very meaningful facilities to support this activity (table 3).

In facing changing times that extend life expectancy, it is important for us to pay special attention to the elderly so that they always feel prosperous and happy. Feeling happy is the key for the elderly to maintain health and prevent it from becoming a burden on the productive generation. In an effort to achieve our service goals, we utilize the potential of waste to provide more benefits for the elderly. Through our innovation, the eco enzyme product is processed into granular fertilizer. Apart from providing environmental benefits by reducing waste, this product also acts as a useful fertilizer for improving the quality of soil and agricultural products. Almost all obstacles experienced can be overcome and worked on together. The difficulty that is really felt is the delay in funds from the Ministry of Research, Technology and Higher Education which are slow to be disbursed even though activities have begun to be implemented.

4. CONCLUSIONS

Effective waste management and use of organic fertilizers contribute to environmental sustainability and social well-being, empowering seniors with active involvement, improving health and creating economic opportunities. Widespread education is needed to support these sustainable practices. Additionally, these activities can strengthen their physical and mental health through outdoor work and community interaction. Embedding these principles in society requires greater educational efforts and support for more sustainable practices. This education and support can help develop environmental awareness and encourage a

sustainability approach that can be enjoyed by current and future generations. So, waste management and organic fertilizer production are important steps towards . Limitations in community service can include various aspects, such as limited resources, minimal community participation, cultural barriers, lack of skills or training, and logistical challenges. For example, in the context of waste management and organic fertilizer production, limitations could include limited access to effective composting technology, difficulties in distributing the fertilizer produced, or a lack of knowledge about sustainable agricultural techniques.

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