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Optimizing The Role of The Community in Ecosystem Resource Management to Reduce Stunting Rates in Baumata Timur Village

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ABSTRACT

Stunting is a chronic malnutrition problem caused by insufficient nutritional intake over a long period of time as a result of the provision of food that does not meet nutritional requirements and occurs from the fetus is still in the womb as well as newly appeared when the child is two years old. The purpose of the activities is to increase the participation of the community in the management of ecosystems in East Baumata Village, Kupang District, East Nusa Tenggara. The methods used are surveys and observations. The result of this activity is increased knowledge and understanding of the community of East Baumata Village about how to treat the ecosystem well and properly to deal with the problem of stunting, as well as increasing knowledge and skills for pregnant mothers or nursing babies about the importance of healthy foods and containing a lot of protein for the growth and development of children and breast-feeding accompanying food (MPASI).

INTRODUCTION

Baumata Timur Village is located in Taebenu Subdistrict, Kupang Regency, East Nusa Tenggara. The area of Baumata Timur Village is approximately 5,136.51 km² with a population of 6,000 (https://kupangkab.bps.go.id). The indigenous people of Baumata Timur are the Atoni. The people of Baumata Timur work as farmers in fields and rice paddies, as well as livestock breeders and employees. The local community's crops include rice, cassava, corn, bananas, coconuts, and vegetables. Additionally, they raise livestock such as buffalo, cattle, pigs, dogs, and chickens. The most common livestock owned by nearly every household are cows, pigs, and chickens. Stunting data for Taebenu Subdistrict in 2023 shows that 149 children fall into the stunting category out of a total of 1,317 children. The stunting target measured in Taebenu Subdistrict, specifically in Baumata Timur Village, was 212, and the total number of infants and toddlers measured was 212: 4 were very short, 14 were short, 188 were normal, and 6 were tall. The total number of stunted infants is 18, and the stunting rate among the measured infants is 8.5%. Based on these stunting data, this has become a focus of attention for the government in addressing the stunting issue in Baumata Timur Village (https://kupangkab.bps.go.id).

Based on interviews with the Village Head of Baumata Timur and direct field surveys, a fundamental issue was identified regarding the suboptimal utilization of the ecosystem as a renewable resource in the area. One of the identified problems is the traditional livestock management system, where livestock are allowed to roam freely without adequate housing. This situation directly impacts damage to residents' farmland and reflects the community's low awareness of the importance of a structured livestock system. Additionally, the community has not yet developed the habit of regularly consuming livestock products such as meat or eggs as part of their daily diet. Meanwhile, agricultural produce is still managed on a subsistence basis that is, it is produced solely for household consumption and sold in traditional markets without any focus on further development.

In terms of natural resource potential, Baumata Timur Village actually possesses significant capacity for development. The village's water supply is recorded at 18,144,565.0 liters per day, far exceeding the average water consumption of 80 liters per capita per day (Kuafeu et al., 2019). This potential should be maximally utilized to support the development of various sectors, including agriculture, livestock, and freshwater fisheries. The natural resource sectors that have not yet been optimally developed include food crops, plantation crops, horticultural crops, livestock, and freshwater fisheries (FAO, 2020). If this abundant natural resource potential is managed effectively and directed toward improving the quality of the population's food consumption particularly for children and adolescents it can make a tangible contribution to addressing stunting at the village level (Indonesian Ministry of Health, 2018; UNICEF, 2019). The most promising resources for development are plant-based and animal-based protein sources, particularly those derived from small livestock such as chickens and eggs, freshwater fish, and various types of legumes like soybeans, green beans, peas, and peanuts all of which are highly suitable for cultivation in the region.

One of the abundant natural resources is the spring water found in Baumata Village. Spring water is groundwater that emerges to the surface due to topographic intersections, contact between rocks, or fractures in the rock, and serves as one of the water sources utilized by the community to meet daily water needs, particularly for those living in rural areas (Santoso et al., 2020). This spring is frequently used by the community as a water source for rice crops and for daily living needs. In the agricultural sector, water is a critical element, and to ensure crops can thrive year-round, a reliable water supply must be guaranteed (Efrida et al., 2019).

In addition to the spring, there is an artificial pond used as a recreational area, along with a channel across from the pond that residents frequently use for washing clothes or bathing. This spring has also not been optimally developed for freshwater aquaculture, such as fish farming, which could serve as a nutritional source for the community and hold high economic value. Freshwater fish farming, such as catfish, tilapia, and gourami, has become a primary source of income for some communities, particularly in villages with access to irrigation and independent water sources (Defiana, 2016). Fish contain bioactive compounds that have economic value, are easily digestible, and provide better protein absorption; furthermore, fish consumption has been proven to offer significant health benefits due to its content of protein, omega-3 fatty acids, vitamins, and minerals (Nurapipah et al., 2023).

Based on the results of exploratory studies and surveys conducted in Baumata Timur Village, it was decided to carry out a community service activity in Baumata Timur Village, Taebenu Subdistrict, Kupang Regency. Consequently, a community service activity was developed in Baumata Timur Village with the aim of increasing community participation in the management of the Baumata Timur Village ecosystem to support efforts to address the issue of stunting. Compared to similar community service activities previously conducted regarding stunting which focused on partial medical and nutritional education approaches, such as nutrition counseling for pregnant women, provision of supplementary food, or anthropometric measurements of toddlers (Sonbay et al., 2023; Humaedi et al., 2023), this activity introduces a novel approach by integrating village ecosystem management as a holistic effort in stunting prevention in Baumata Timur Village, Kupang Regency.

IMPLEMENTATION METHOD

The Community Service Activity in Baumata Timur Village, Taebenu Subdistrict, Kupang Regency was held on Friday, November 24, 2023, starting at 10:00 a.m. WITA until completion. The event was attended by residents of Baumata Timur Village, two lecturers from the Biology Program at the Faculty of Science and Technology, Widya Mandira University (FST-Unwira), and twelve fifth-semester students from the Biology Program at FST-Unwira. Prior to the event, the organizing team carried out a series of structured preparations. These preparations included coordination with the Baumata Village Government and the Head of Baumata Timur Village, Taebenu Subdistrict, Kupang Regency. Subsequently, the event schedule was jointly determined by the entire organizing team. The team also prepared the materials to be disseminated and presented during the event, as well as the tools and supplies needed for the practical sessions or training in accordance with the established plan.

The initial phase of the activity involved problem-solving based on solutions designed to address the issues identified in Baumata Timur Village. Efforts to prevent stunting were carried out by involving students in the management of community service activities as a tangible contribution to the health and well-being of the village community. The form of intervention at this stage involved group discussions with community leaders, Posyandu cadres, and homemakers to map out nutritional issues and manage the ecosystem in a participatory manner. The second phase involves raising community awareness about the importance of equitable nutritional status across all family members. The goal is for every family member, particularly infants and toddlers, to receive nutritional intake in line with recommended needs. This is crucial because disparities in nutritional intake within extended families risk compromising the nutritional needs of infants and toddlers, who require optimal nutrition for their growth.

The third phase involves raising community awareness about ecosystem management and its optimal utilization in Baumata Timur Village. This outreach is designed to encourage active community participation in managing available natural resources as part of efforts to prevent stunting in the village. The final phase involves monitoring and evaluating the impact of community service activities on understanding nutrition and environmental health. This activity is expected to enhance the community's understanding of the importance of nutrition for families and the maintenance of green vegetation around their yards.

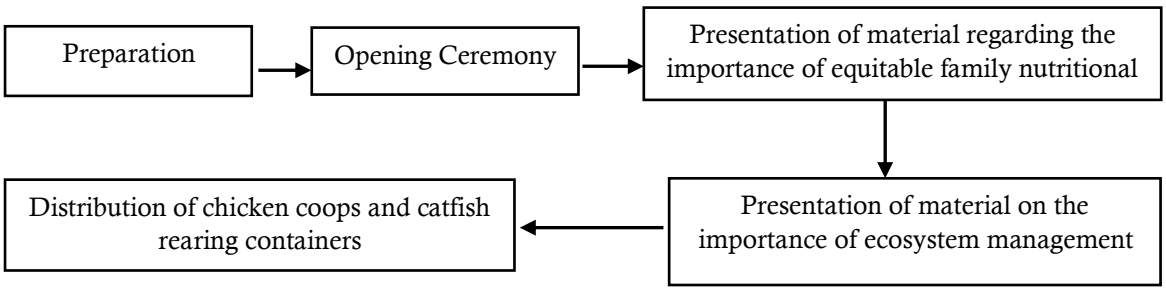

Figure 1. Stages of Activity Implementation.

RESULTS AND DISCUSSION

The community service activity was held on Friday, November 24, 2023, at the BKLDS Elderly School Hall, Baumata Timur Village, Taebenu Subdistrict, Kupang Regency. The event was attended by 52 participants, comprising 15 pregnant women, 10 breastfeeding mothers, 5 Posyandu cadres, and 10 community leaders from Baumata Timur Village, accompanied by 2 lecturers from the Biology Program, Faculty of Science and Technology, Widya Mandira University (FST-Unwira), and 12 fifth-semester Biology students from FST-Unwira as the implementing team. Most community service programs for stunting prevention reported in the literature generally focus on only one or two specific aspects, such as nutrition counseling for pregnant women and posyandu cadres, socialization and demonstrations of complementary feeding preparation, or nutrition education based on local foods (Mursali et al., 2023; Rohmawati,

2022; Sukmawati et al., 2021; Rantesigi et al., 2022). These activities generally involve participants limited to mothers of toddlers and posyandu cadres, using a one-way counseling approach that does not integrate environmental management dimensions. In contrast to these activities, the Community Service program in Baumata Timur Village features three key innovations: first, it integrates three topics into a single activity namely, nutrition status awareness, the preparation of complementary infant and toddler foods (MPASI), and ecosystem management as a natural resource a dimension not commonly combined in stunting-focused PkM; second, it engages a more diverse target group and a multi-stakeholder, encompassing pregnant women, breastfeeding mothers, Posyandu cadres, and community leaders simultaneously; third, the approach used is holistic, positioning village ecosystem management as the long-term foundation for food security and stunting prevention, in line with the sensitive intervention framework outlined in Presidential Regulation No. 72 of 2021 on Accelerating the Reduction of Stunting.

Figure 2. Outreach Activity on the Importance of Equitable Nutritional Status

The first activity focused on increasing community understanding of the importance of equitable nutritional status within every family. One of the factors contributing to stunting is parents' lack of understanding regarding balanced nutrition for children and how to prepare nutrient-rich foods, which can indirectly lead to children experiencing stunting. Based on the results of the UNWIRA team's community service activities, it was found that parents' level of understanding and knowledge significantly determines their ability to care for their children and the fetus in the womb. Pre- and post-program evaluation results showed that mothers' knowledge of how to prevent stunting through healthy food consumption and dietary patterns improved, and mothers who participated in the program better understood the importance of balanced nutrition and could identify foods essential for their children's growth and development. The better parents' knowledge, the more effectively they can provide care that supports their children's growth and development and vice versa. This aligns with the finding that a lack of knowledge among prospective parents regarding nutritional preparation during pregnancy and the first 1,000 days after a child's birth, as well as parents' lack of understanding in selecting appropriate parenting practices, are factors that can lead to stunting. Through this outreach, the community of Baumata Timur Village demonstrated improved understanding of cleanliving practices, dietary improvements, and the importance of balanced nutrition from pregnancy through the toddler years. The first 1,000 days of life (HPK) are a crucial period for stunting prevention, particularly through ensuring balanced nutrition for pregnant women (Victora et al., 2008; Indonesian Ministry of Health, 2018), making early educational interventions a highly strategic step in reducing stunting rates at the village level (Ruel & Alderman, 2013; UNICEF, 2019).

The second activity focused on educating the community about the empowerment and utilization of ecosystems as natural resources to support household food security (FAO, 2020). In this activity, the community service team demonstrated how to build simple chicken coops and catfish ponds using buckets and scrap wood from furniture. The use of these environmentally friendly and easily obtainable materials aims to demonstrate to the community that the utilization of natural resources can be carried out practically and affordably without requiring significant capital (Chambers & Conway, 1992). Catfish farming in buckets, known as "Budikdamber," is a method of raising catfish that uses 80-100-liter buckets as the cultivation medium (Sovianti et al., 2025). This method was chosen because it does not require a large area, is easy for households to

implement, and can be carried out at a very low cost. The catfish farming process in buckets begins with preparing the buckets, which are filled with clean water and left for several days to allow the chlorine content in the water to evaporate. Next, catfish fingerlings measuring 5–7 cm are stocked into the buckets at a density of approximately 60–100 fish per bucket. Feed is provided regularly two to three times a day using high-protein pellets to support optimal fish growth (SNI, 2014). Within 2–3 months, the catfish are ready for harvest and can be consumed by the family or sold to supplement income. In addition to their economic value, catfish are a high-quality source of animal protein that is easily digestible and excellent for supporting children's growth and preventing stunting. This initiative also serves as a concrete call to action for the community to utilize the potential of their surrounding environment more effectively, thereby increasing the availability of animal protein for families, which ultimately contributes to the prevention of stunting (FAO, 2020; UNICEF, 2019)

Figure 3. Outreach Activity on the Importance of Ecosystem Management

This community service activity received a very positive response from the residents of Baumata Timur Village, marked by high enthusiasm throughout the entire series of activities. The community's active participation in every awareness-raising session reflects a genuine need for information and practical skills in the fields of nutrition, maternal and child health, and environmental management. Therefore, similar activities need to be carried out continuously so that the resulting impact is broader and more significant in supporting efforts to prevent stunting and improve the welfare of the community in Baumata Timur Village. Stunting mitigation efforts include two main approaches, namely specific nutritional interventions directly related to health, such as meeting the nutritional intake of pregnant women, exclusive breastfeeding, and micronutrient supplementation; and nutrition-sensitive interventions, which include the provision of clean water and sanitation, health education, and the enhancement of household food security (Ministry of National Development Planning/Bappenas, 2018; Presidential Regulation No. 72 of 2021). Both of these interventions require sustained cross-sectoral collaboration between the government, health workers, and the community to produce significant impacts (Picauly, 2021). Therefore, similar activities need to be implemented continuously so that the resulting impacts are broader and more significant in supporting efforts to prevent stunting and improve the well-being of the community in Baumata Timur Village.

Figure 4. Symbolic handover of chicken coops and catfish rearing tanks

CONCLUSION

The Community Service activity conducted under the title "Enhancing Community Participation in Ecosystem Management to Support Stunting Prevention Efforts in Baumata Timur Village, Taebenu Subdistrict, Kupang Regency" can be summarized as follows: The knowledge and understanding of the community in Baumata Timur Village have improved through socialization activities, ecosystem management practices, and the provision of proper and appropriate supplementary food for pregnant women and infants (MPASI) by students guided by faculty members from the Biology Program at FST-Unwira. Given the significant benefits of this Community Service activity, the provision of complementary foods for pregnant women and infants in Baumata Timur Village should be demonstrated or practiced directly so that the pregnant women participating in this activity can learn firsthand the process of preparing MPASI.

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