Food Security Education Through The "Love to Plant From an Early Age" Program : Implementing A Vegetable Garden in Schools

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ABSTRACT

The partners in this Community Partnership Program are elementary schools consisting of students, teachers, staff, and parents at GMIM 30 Elementary School in Sario Tumpaan Subdistrict, Sario District. The partner, GMIM 30 Sario Tumpaan Elementary School, as the target audience of the PKM program, represents a group of young community members who are the intended beneficiaries. Understanding the concepts and implementation of food security and food availability requires educational efforts from an early age, including through the application of the "love to plant" concept for elementary school students — the next generation who will face various challenges related to environmental sustainability and food security. By introducing them to planting activities early on, they will better understand how food is produced, the importance of protecting the environment, and develop an awareness to live healthily and independently. The problem is that implementing education to raise early awareness of planting among school children and practicing vegetable gardening at school faces several challenges, namely the absence of human resources at the school who can serve as educational facilitators and provide technical assistance in creating the garden. Additionally, students and teachers need to be motivated to participate in these activities so that the program can be carried out in accordance with its goals of promoting food security starting from elementary school. The solution to be implemented at the elementary school is collaboration with lecturers from the Faculty of Agriculture at Sam Ratulangi University to provide education to the students so that from an early age they can be taught about food security and the love of planting. In addition, there will be hands-on practice in planting vegetables and creating a vegetable garden at the school to encourage students to engage and develop an interest in agriculture as a food provider in support of the Food Security program.

Keywords: *food security, early education, vegetable planting*

1. INTRODUCTION

Situation Analysis

Food security has become an increasingly critical global issue in line with rapid population growth and climate change. Ensuring future food availability requires early educational efforts, including the introduction of planting awareness and environmental stewardship among elementary school children.

Children represent the next generation who will face complex challenges related to environmental sustainability and food system resilience. Introducing planting activities at an early age enables them to understand how food is produced, recognize the importance of environmental conservation, and develop healthy and independent living habits.

School-based planting activities are not merely complementary academic practices but serve as experiential learning platforms with substantial educational value. Through gardening, students can learn about plant life cycles, ecological interactions, and the significance of soil and water resources. Furthermore, gardening supports the development of motor skills, patience, responsibility, and collaborative learning.

This program also provides an alternative to excessive screen time, a growing concern as many children spend a significant amount of time on mobile devices rather than engaging in outdoor physical activity. Reduced exposure to natural environments may hinder environmental awareness and emotional connection to nature. Hence, the “planting awareness” program is envisioned as an effective intervention to enhance children's interaction with their surroundings and instill environmental values from an early age.

Through structured planting education for elementary school students, the initiative aims to cultivate a generation that is environmentally conscious, adopts healthy lifestyles, and understands the importance of food security. This effort also represents a modest yet meaningful step toward developing communities that are more self-reliant in food production and committed to sustaining natural resources in the long term.

Partner Problems

Observations and direct discussions with partner institutions indicate several constraints in implementing early planting awareness and establishing school vegetable gardens. Key challenges include:

1. Limited Physical Space – Insufficient land available for gardening or establishing a vegetable plot.
2. Inadequate Resources – Limited availability of tools, seeds, fertilizers, and personnel with agricultural expertise.
3. Low Student Awareness and Motivation – Students’ interest in planting activities remains low, particularly when activities are not facilitated through engaging pedagogical approaches.
4. Inconsistent Maintenance – Many school gardens become neglected due to poor continuity in routine maintenance.
5. Environmental and Biological Constraints – Extreme weather events and pest infestations frequently hinder plant growth and result in crop failure.
6. Limited Institutional and Parental Support – Planting programs have not been fully integrated into school curricula, and parental involvement in supporting gardening activities remains minimal.

Objectives and Expected Benefits

In response to the issues identified, the Community Partnership Program proposes the following interventions:

1. Alternative Land Utilization – Implementing the use of polybags as planting media to address land limitations.
2. Strengthening Resource Capacity – Establishing collaboration between lecturers and students from the Faculty of Agriculture, Sam Ratulangi University, and GMIM 30 Elementary School in Sario Tumpaan, Manado, through the provision of resources, training, and technical assistance.
3. Engaging Educational Strategies – Applying project-based learning, scientific experimentation, and gamified activities to enhance student motivation in planting activities.
4. Structured Garden Management – Developing a scheduled maintenance plan and forming a school garden team consisting of students, teachers, and staff to ensure continuity, including during school holidays.
5. Integrated Pest and Climate Management – Promoting organic agricultural practices such as the use of natural pesticides and selecting plant varieties resilient to extreme weather.
6. Community and Parental Engagement – Encouraging active participation of parents in school gardening activities and organizing communal harvest events to strengthen community support.

The expected outcome of this Community Partnership Program is the establishment of a structured planting education model for elementary school students, fostering a generation that is environmentally responsible, health-conscious, and aware of the importance of food security. This initiative also contributes to the development of communities capable of producing their own food and safeguarding natural resource sustainability. From an academic perspective, this program serves as a mechanism for applying university-generated innovations for the benefit of society, thus strengthening the relevance and impact of higher education research.

2. METHOD

The implementation methods applied in this program aim to provide solutions to the challenges faced by the partner, GMIM 30 Elementary School in Sario Tumpaan, Manado. The program is conducted through structured educational activities and continuous mentoring. The stages are designed to support the school-based vegetable gardening education program, which plays an important role in introducing elementary school students to agricultural concepts, sustainability, and the importance of healthy eating from an early age.

Program Implementation Stages

1. Program Planning

The planning stage involves defining the core objectives of the program, namely educating elementary school students about the concept of food security and engaging them directly in vegetable cultivation in the school garden. This aims to familiarize children with agricultural processes and develop healthy eating habits.

Land identification and gardening design are conducted by selecting appropriate spaces within the school, and when land is limited, alternative planting methods such as polybags or vertical gardening will be utilized.

Selection of Vegetable Types: The program emphasizes planting vegetables that are easy to grow in school environments, such as lettuce, tomatoes, chili peppers, and water spinach.

2. Preparation of Educational Materials

Educational materials will be delivered to students under the guidance of teachers and school staff. Teachers and staff will also receive basic training on vegetable cultivation techniques, including planting methods and plant maintenance. This ensures that the school community has the necessary knowledge to support the program sustainably.

3. Program Implementation

Educational activities and hands-on practice will be organized by assigning students to groups responsible for different garden maintenance tasks. Responsibilities may be divided by class or group, covering activities such as planting, watering, and caring for crops.

Practical Activities: Students, supervised by teachers and supported by staff, will engage in direct planting activities. Basic steps such as preparing planting holes, transplanting seedlings, and watering will be presented through interactive and enjoyable methods, including games and experiential activities.

Monitoring and Maintenance: Students will be taught to regularly monitor plant growth, apply fertilizers, and manage pests using environmentally friendly approaches.

4. Evaluation and Recognition

The program will undergo periodic evaluation to assess plant growth, students' comprehension, and their level of enthusiasm. Recognition and awards will be given to students who demonstrate strong performance in plant care or to the most active class. This strategy is intended to enhance motivation and sustained participation.

Partner Participation

As the implementing partner, the school is expected to support the program, particularly during educational sessions and practical gardening activities. The school's primary role is to allocate time for students to participate in food security learning activities. Practical sessions, including vegetable planting and school garden development, require the school to provide appropriate space and ensure that the garden area is well-maintained to achieve the program's objectives.

A collective harvesting event will be organized to increase students' interest in agriculture while demonstrating the outcomes of independent food production. Students serve as the main beneficiaries, receiving education, training, and mentoring. They will prepare and carry out planting, maintenance, and harvesting activities in accordance with the program schedule. The partner institution will also prepare the necessary time allocation and space for both educational and practical sessions.

Program evaluation is carried out to assess early student interest in vegetable planting, the effectiveness of the "love for planting" approach, and the establishment of a vegetable garden to support food security education and improve school aesthetics. The program is expected to strengthen students' understanding of food security concepts through early planting engagement and hands-on gardening practices.

Target Participants

The target participants of this program are students of GMIM 30 Elementary School in Sario Tumpaan, Manado, from Grade 1 to Grade 6.

Location and Implementation Schedule

The program will be implemented at GMIM 30 Elementary School, Sario Subdistrict, Manado City, from September to October 2025.

Methods Used

The program employs several methods, including:

a) Socialization of Food Security Programs
b) Socialization of Early Planting Awareness
c) Application of Hydroponic Vegetable Cultivation and Vegetable Planting Using Polybags
d) Harvesting of Hydroponically Grown Vegetables

3. RESEACRH FINDINGS AND DISCUSSION

Food Security Program Socialization

The socialization of the Food Security Program was conducted for students and teachers at GMIM 30 Elementary School in Manado. The materials delivered covered the definition of food security and the rationale for its importance. Food security was explained as a condition in which every individual, at all times, has physical, social, and economic access to sufficient, safe, nutritious, and sustainable food to meet dietary needs for an active and healthy life. In general, food security is built upon four key pillars:

1. Food Availability
   Food must be available in adequate quantities through domestic production, food reserves, imports, or effective distribution systems.
2. Food Access
   Individuals must have adequate economic capacity (purchasing power) and physical/logistical access to obtain food.
3. Food Utilization
   Food must be consumed in a nutritious and safe manner, supported by adequate sanitation, nutritional knowledge, and healthy dietary patterns.

4. Food Stability
   Availability and access to food must remain stable over time and not be disrupted by price fluctuations, natural disasters, conflicts, seasonal variations, or other shocks.

Early Introduction to Planting ("*Cinta Menanam Sejak Dini*")

The early planting education was delivered directly to students at GMIM 30 Elementary School. After discussing the benefits of planting, the students were guided through hands-on planting activities. The initial phase involved introducing seedlings of various vegetable crops and explaining different types of vegetables, their seed forms, and the process through which seeds grow into harvestable plants that can eventually be consumed by families.

Hydroponic Cultivation Methods and Vegetable Planting Using Polybags

The hydroponic vegetable cultivation process was implemented through the following stages:

1. System and Media Preparation
   Installation of systems such as NFT (Nutrient Film Technique), floating raft systems, or wick systems.
   Preparation of growing media such as rockwool, cocopeat, perlite, or hydroton.
2. Germination
   Seeds are germinated in moist rockwool, stored in a dark and humid environment until sprouting, then moved to a well-lit area.
3. Nursery Stage
   Seedlings with 2–3 true leaves are maintained for 7–10 days with adequate light and controlled humidity.
4. Transplanting
   Seedlings are transferred into the hydroponic system, ensuring their roots have direct contact with nutrient flow.
5. Maintenance
   Nutrient solutions (AB Mix) are prepared according to dosage recommendations. pH (5.5–6.5) and EC levels are monitored regularly. Water circulation and light exposure must be maintained consistently.
6. Pest and Disease Control
   System cleanliness is ensured at all times, and biological or organic pest control methods are applied when needed.
7. Harvesting
   Vegetables are harvested according to their growing period (e.g., lettuce 25–35 days; water spinach 21–25 days). Harvesting involves cutting the plant base and cleaning the roots from the planting media.

Hydroponic Vegetable Harvesting

The hydroponic vegetable harvesting activity is conducted directly by the students who participated in the planting process. This approach increases their engagement and interest in understanding the full cycle of cultivation—from planting to harvest. Harvesting follows plant maturity, with lettuce harvested at 25–35 days and water spinach at 21–25 days. Students are permitted to take their harvested produce home to share with their families, thereby strengthening the educational impact beyond the school environment.

4. CONCLUTION

The socialization of food security for elementary school students significantly enhances their knowledge regarding nutrition, food availability, access, and safety. Students gain understanding of healthy food sources and how to choose nutritious foods. Hands-on planting and harvesting activities cultivate students' interest in growing and consuming vegetables as part of a healthy, local food system. Students also develop an appreciation for food self-

sufficiency through school gardening and hydroponic activities, while gaining awareness of sustainable agriculture practices and social responsibility toward food availability and access. The next phase of the initiative includes distributing seedlings and polybags to students and teachers at GMIM 30 Elementary School, ensuring continued engagement and sustainability of early planting practices in support of food security education.

5. SUGGESTION

a. The school garden should continue to be actively utilized, and students should receive ongoing encouragement and training to cultivate their interest in growing vegetables. Vegetable planting and harvesting activities should be maintained as part of the school's routine program to support independent food availability both at school and at home.
b. Hydroponic systems should continue to be used optimally to produce consumable vegetables within the school environment.

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