# Assessment of School Vegetable Gardens in Selected Deped Schools in Ilocos Sur, Philippines: Building Food Literacy Through Gardening and Education

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**Abstract**

Background: The Department of Education (DepEd) in the Philippines has prioritized school food production programs through policies that encourage schools to establish vegetable gardens to supplement meals and teach agricultural skills. Ilocos Sur, a province in Northern Luzon, has a strong agricultural heritage and has adopted such initiatives, but limited data exist on their impact on food literacy among students.

Methods: This mixed-method study assessed school vegetable garden initiatives in 12 selected DepEd elementary and secondary schools in Ilocos Sur Philippines, to determine their role in building food literacy among Grade 4-10 students (n=360) during the 2023-2024 academic year. Food literacy was measured across three domains, which are nutritional knowledge, agricultural skills, and dietary behavior. Quantitative data were collected via pre- and post-tests, and qualitative data were gathered through focus group discussions with students, teachers, and parent stakeholders (n=48), field observation, and document reviews.

Results: Findings revealed significant improvements in all food literacy domains where nutritional knowledge had a pre-test mean of 12.1, post-test mean of 16.9, p-value is less than 0.001; agricultural skills had a pre-test mean of 8.5, post-test mean of 11.6, p-value is less than 0.001; and dietary behavior had a pre-test mean of 8.9, post-test mean of 11.6, p-value is less than 0.001. Rural students and secondary students showed higher gains than their urban and elementary counterparts. Qualitative findings highlighted successful strategies like stakeholder collaboration and teacher training, alongside challenges including resource constraints and sustainability gaps.

**Keywords:** agricultural skills; dietary behavior; food literacy; nutritional knowledge; school vegetable gardens

## Introduction

Food literacy is defined as the knowledge, skills, and behaviors needed to make healthy, sustainable food choices (Silva, P., 2023) is critical in addressing malnutrition and food insecurity in the Philippines, where 23.6% of children under 5 are stunted (FNRI, 2023). School-based initiatives like vegetable gardens have emerged as promising tools to integrate food education with hands-on learning, as they connect students to food production, nutrition, and environmental sustainability (SEARCA, 2017).

The Philippines faces dual nutrition challenges, with high undernutrition among young children and rising overweight and obesity among older youth. Expanded National Nutrition Survey (ENNS) data indicate that about 23.6% of children under five are stunted, while around 13% of adolescents aged 10–19 are overweight or obese, reflecting the coexistence of undernutrition and overnutrition (FNRI, 2023). These issues stem from limited food knowledge, reliance on processed and unhealthy foods in schools and communities, and gaps in integrating agricultural and nutrition education into school learning, as highlighted by national nutrition dialogues and school nutrition policy assessments (Golloso-Gubat, M. J., et al., 2025).

While school vegetable gardens are increasingly implemented nationwide, few studies have systematically assessed their effectiveness in building food literacy in the Ilocos Sur context. Previous research in the Philippines has focused primarily on nutritional outcomes, such as improvements in children's weight, vitamin A, and hemoglobin levels when school garden produce is used in supplementary feeding programs, and on enhancing dietary habits through school

and community garden initiatives. (Angeles-Agdeppa, I. et al., 2018) rather than the holistic development of food literacy, which includes practical skills and behavioral change. Additionally, implementation challenges specific to rural schools in Ilocos Sur such as climate variability, resource constraints, and stakeholder engagement gaps have not been fully documented.

Global evidence confirms that school gardens enhance children's nutritional knowledge through hands-on gardening and integrated nutrition education (Chan, C. L., et al., 2022) While school vegetable gardens are increasingly implemented nationwide, few studies have systematically assessed their effectiveness in building food literacy in the Ilocos Sur context. Research in the Philippines has tended to focus more on nutritional outcomes and gardening implementation than on how school gardens integrate with formal education to develop long- term food literacy skills (Ibañez, R. Y., et al., 2023) In Ilocos Sur specifically, no completed assessments have examined the link between garden operations, educational activities, and student food literacy outcomes, creating a gap in local policy and program planning.

This research fills this gap by evaluating existing school vegetable gardens in Ilocos Sur to identify strengths, challenges, and opportunities for improving food literacy. Findings aim to inform DepEd regional offices, school administrators, and policymakers on strategies to strengthen school-based food education initiatives.

The research objectives were to assess the implementation and impact of school vegetable gardens in selected DepEd schools in Ilocos Sur, Philippines, as platforms for building food literacy through gardening and education. Specifically, to describe the design, management, and educational integration of school vegetable gardens; to measure changes in students' nutritional knowledge, agricultural skills, and dietary behaviors associated with participation in garden activities; and to identify enablers and barriers to effective implementation of school vegetable garden initiatives from the perspective of students, teachers, and parents.

## Materials And Methods

### 2.1 Study Design

A sequential explanatory mixed-methods design was used, where quantitative data were collected first to measure outcomes, followed by qualitative data to explore and explain the quantitative results. This approach allowed for a comprehensive assessment of both the impact and implementation of school vegetable garden initiatives.

### 2.2 Study Setting

The study was conducted in 12 selected public elementary and secondary schools in Ilocos Sur, Philippines, 6 urban and 6 rural schools purposively chosen based on the presence of operational vegetable gardens for at least one academic year (2023–2024). Schools were selected to represent diverse geographic and socioeconomic contexts in the province of Ilocos Sur.

### 2.3 Sample Size

**Participants**

In quantitative sample, 360 students (180 elementary Grades 4–6; 180 secondary Grades 7–10), stratified by grade level and school type (urban/rural). All participants were actively involved in school garden activities like planting, harvesting, garden maintenance. While qualitative sample, 48 stakeholders, including 24 students (4 per school), 12 teachers (1 per school, responsible for garden programs), and 12 parents (1 per school, part of Parent- Teacher Association garden committees). Participants were recruited via purposive sampling to ensure representation of different perspectives.

### 2.4 Data Collection Tools

**Quantitative Data**

Pre-test and post-test questionnaires developed by the researchers to measure nutritional knowledge, agricultural skills, and dietary behaviors. Field observations using a structured checklist to document garden design, management practices, and integration with classroom instruction.

**Qualitative Data**

12 FGDs (4 with students, 4 with teachers, 4 with parents) lasting 20-30 minutes each, guided by semi-structured interview protocols. Document review of school garden plans, lesson plans integrating gardening, and attendance records for garden activities.

### 2.5 Data Analysis

Data were entered into STAR 2014 and analyzed using descriptive statistics (means, standard deviations, frequencies) and inferential statistics (paired samples t-tests, independent samples t-tests, chi-square tests). Significance was set at $p < 0.05$. Transcripts and field notes were coded using thematic analysis, with codes organized into themes related to implementation, outcomes, enablers, and barriers. Data were triangulated across stakeholder groups to ensure credibility.

### 2.6 Ethical Considerations

Ethical approval was obtained from the College Research Ethics Office. Informed consent was secured from parents/guardians (for minors) and informed assent from students. All data were anonymized, and confidentiality was maintained throughout the study.

### 2.7 Validation Reports and Pilot Testing of Survey Questionnaire and Interview Guide

**Validation by Expert Reviewers**

The purpose is to ensure the survey questionnaire and interview guide are valid, relevant, clear, and aligned with the study's objectives (assessing garden implementation, food literacy outcomes, and educational integration). A panel of 7 experts was convened, including 2 DepEd Principal, 2 agricultural extension specialists, 1 nutritionist-dietitian, 1 environmental education expert, and 1 qualitative research methodologist. The tool used a 5-pont Likert scale (1=Strongly Inadequate, 5=Strongly Adequate) with open-ended sections for comments. The key criteria were tailored to the study's focus: content validity, construct validity, clarity and comprehensibility, relevance to local context, usability and structure, ethical and cultural appropriateness Overall Mean Score 4.51 (±0.52), indicating Strongly Adequate validity across all criteria. Experts recommended adding items on water conservation practices (relevant to Ilocos Sur's dry climate) and integrating local crop varieties (e.g., kangkong, ampalaya) into response options in the vegetable garden management secton. Clarified terms like "food system" with simple examples ("how vegetables grow from farm to plate") and added a sub-item on traditional food preparation knowledge in food literacy section. Interview Guide where streamlined open-ended questions to reduce redundancy and included prompts tailored to different respondent groups (school heads, teachers, students, parent volunteers)

**Pilot Testing with Target Respondents**

The purpose is to evaluate the practicality, comprehensibility, and reliability of the revised tools when administered to the study's target groups. Pilot testing was conducted in 3 non-sample DepEd schools in Ilocos Sur, with 60 respondents total: 10 school heads, 20 teachers, 20 students (Grades 7, 8, 9 and 10), and 10 parent garden volunteers. Two tools were used: a respondent feedback checklist and a field administrator log to track implementation challenges.

**Respondent Feedback Checklist**

Respondent feedback on pilot test criteria, with high percentages rating "satisfactory" or higher across all aspects: Instructions are clear (92%), Questions are easy to understand (88%), Length is appropriate (85%), Response options are relevant (90%), Questions are respectful: 97% (the highest rating). Overall, respondents gave positive feedback on the pilot test instrument.

**Field Administrator Log**

Tracked issues like time to complete with an average 15 mins (questionnaire) and 30 mins (interview) within the planned timeframe. Technical challenges such as minor difficulties with paper-based questionnaire formatting for younger students; addressed by adding visual cues like icons for garden activities. In language preferences, 65% of respondents preferred Ilocano for interviews, confirming the need for bilingual administration.

**Pilot Testing Results and Revisions**

**Reliability Measures:** Cronbach's alpha for the survey questionnaire was 0.82, indicating good internal consistency.

**Key Adjustments:** For student questionnaire, simplified sentence structure, added visual aids (e.g., pictures of garden tools and crops), and reduced the number of Likert-scale items from 25 to 20 to lower response burden. In the interview guide, developed age- appropriate prompts for students (e.g., "What's your favorite vegetable to grow, and why?") and added a section on how students share garden produce with their families. Created a quick-reference guide for field staff on bilingual administration and provided training on how to clarify questions without influencing responses as administration protocol. Data collection tools were converted a portion of the questionnaire to digital format (via Google Forms) for schools with internet access, while retaining paper versions for low-connectivity areas.

**Final Validation and Pilot Test Summary**

The combined results confirm that the survey questionnaire and interview guide are valid, reliable, and contextually appropriate for the study. All revisions were integrated into the final tools, which now include Bilingual (Filipino/Ilocano) versions with visual support for students. Expanded sections on local agricultural practices and food literacy outcomes. Clear protocols for administration across different respondent groups. The tools are now ready for full-scale data collection in the selected DepEd schools in Ilocos Sur.

## Results And Discussions

### 3.1 Baseline Characteristics

All 12 schools had operational gardens ranging from 100 to 500 square meters in size. Key implementation features included garden design, educational integration, and management. 8 schools used raised beds, while 4 used traditional in-ground plots. Common crops grown included tomatoes, leafy greens (kangkong, mustard, petchay, kamote), eggplants, okra, squash, bitter gourd and string beans. 7 schools integrated garden activities with Science, Home Economics, and Values Education lessons; 5 schools conducted garden activities as extracurricular programs only. Most gardens (9 schools) were managed by student-led committees with teacher supervision; 3 schools relied primarily on teachers and PTAs.

### 3.2 Quantitative Outcomes on Food Literacy

Table 1 presents pre-test and post-test scores for food literacy domains among 360 participants, with all outcomes showing statistically significant improvements ($p < 0.001$).This is attributed to structured lessons and hands-on learning integrated into most schools' programs.Nutritional knowledge scores increased from a pre-test mean of 12.1 (SD = 2.9) to 16.9 (SD = 2.4), reflecting a mean difference of 4.8. This represents the largest gain among the measured domains. Agricultural skills mean scores rose from 8.5 (SD = 2.2) to 13.1 (SD = 1.8), with a mean difference of 4.6 nearly matching gains in nutritional knowledge. While dietary behaviors improvements were smaller (pre-test = 8.9, SD = 2.4; post-test = 11.6, SD = 2.1; mean difference = 2.7), results remained highly significant. Overall food literacy scores advanced from 29.5 (SD = 6.5) to 41.6 (SD = 5.5), with a mean difference of 12.1, indicating meaningful progress across all combined competencies.

The study's findings align with established literature on food literacy interventions. For instance, Contento's framework for nutrition education emphasizes that structured, theory- based education targeting nutritional knowledge consistently yields measurable gains, as programs systematically designed to link research, theory, and practice lead to more effective learning outcomes, and evidence from school- based nutrition interventions supports improvements in nutritional knowledge following education (Contento, I. R., 2008). The strong improvement in this domain may reflect the program's focus on evidence- based content, such as macronutrient functions and dietary guidelines, which are fundamental to understanding healthy diets and nutrition and are emphasized in validated food and nutrition education frameworks and WHO guidance on healthy eating and food systems (UNICEF, WFP, WHO, 2020).

Gains in agricultural skills and understanding of food systems are supported by research showing that experiential agricultural and garden education enhances students' practical abilities and knowledge about food production and origins. School- based farms and garden programs engage students in hands- on activities such as crop production and outdoor experiential learning, which improve agricultural literacy and provide knowledge of the food system beyond classroom concepts. These programs have been associated with increased agricultural knowledge, production skills, and deeper awareness of food systems among students. The study's interpretation links these gains to hands- on learning, a strategy supported by research showing that experiential activities like school gardens, cooking workshops, and other hands- on approaches improve retention and application of skills more effectively than classroom- only instruction, by engaging learners actively and linking concepts to real- world practice (Varman, S. D., et al., 2021).

Improvements in dietary behaviors, although often smaller than gains in knowledge and skills, typically lag behind because behavior change is influenced by contextual factors such as food access, cultural norms, and family habits. Research indicates that while nutrition education can successfully increase knowledge, translating this into sustained dietary behavior requires additional support from families, communities, and environmental interventions (Davidson, K. A., et al., 2025). This suggests that while the intervention successfully built competencies, sustained behavior change may require additional supports in partnerships with families or community food programs.

### 3.3 Food Literacy Scores by School Type (Urban vs. Rural)

Table 2 compares food literacy scores between urban and rural school students (n=180 per group) across three domains where are nutritional knowledge, agricultural skills, and dietary behaviors. Rural students performed significantly better post-intervention, likely due to stronger community ties to agriculture and higher participation rates in garden activities. In pre-intervention, no statistically significant differences were observed between urban and rural students in any domain (p-values = 0.23, 0.11, and 0.16, respectively).

The findings align with research showing that rural students often benefit more from food literacy interventions tied to agricultural practice. This may be attributed to stronger community connections to food production and higher participation in hands-on activities like school gardens (Holloway, T. P., et al., 2023). For example, Holloway, T. P., et al., 2023 found that school gardening programs in rural communities enhance not only agricultural skills but also nutritional knowledge and dietary behaviors by linking learning to local food systems. Consistent with these results, Gartaula, H., et al., (2020) emphasized that rural youth's food literacy is shaped by both formal education and informal community knowledge such as traditional farming practices which creates deeper engagement with food-related concepts. In contrast, studies on urban adolescents indicate that formal nutrition education programs can improve nutrition literacy and healthy eating behaviors, even though these students often lack direct food production experiences that build informal food system knowledge (nutrition education interventions among urban adolescents enhance healthy eating behaviors and food literacy) (Ashoori, M. et al., 2021).

The lack of pre-intervention differences (similar to Jeinie H. M. B. et al., 2021), who found no baseline gap in nutritional knowledge between urban and rural secondary school students) suggests the intervention was effective in driving disparities based on contextual factors. Programs like Garden to Table (2024) and Farm My School (2025) have also demonstrated that experiential learning such as growing and preparing food boosts food literacy outcomes, particularly when integrated with community practices.

### 3.4 Food Literacy Domain

Secondary students (Grade 7-10) showed significantly higher post-test scores across all domains in the Table 3. Field observations revealed they took on leadership roles in garden management (e.g., coordinating planting schedules),

which deepened their learning. The larger effect sizes in post-test scores align with developmental theories suggesting that older children have greater cognitive capacity to integrate new information, apply practical skills, and adapt behaviors (Piaget, J. 1952). Additionally, the observation of leadership roles among older students may reflect social-emotional maturity that enhances learning and engagement in group-based activities (Larson, R. W. & Rusk, N., 2019). These results highlight that age or grade level is a meaningful factor in food literacy outcomes. While baseline differences were minimal, older students demonstrated greater growth and performance post-intervention. This may be due to their advanced abstract thinking skills, which support understanding of nutritional concepts (Contento, I. R., 2008), as well as increased autonomy in food-related decisions that reinforces behavioral change (Ziegler, A. M., et al., 2021).

**3.5 Dietary Behaviors**

Table 4 presents pre- and post-intervention data on five vegetable-related dietary behaviors, with all measures showing statistically significant increases ($p \leq 0.001$, except for one behavior with $p = 0.001$). The significant improvements in all measured dietary behaviors align with evidence that experiential food education programs, especially those integrating hands on activities such as gardening, tasting, and cooking, enhance vegetable consumption and related behaviors among children (Poelman et al., 2020). For example, programs that involve growing food increase familiarity and willingness to try new produce, as seen in the large jump in "willing to try new vegetables" (from 27.5% to 65.0%). This reflects findings by Chan, C. L., et al., (2022), who found that school garden programs boost preference for and intake of fresh produce by fostering sensory and cognitive connections to food. Notably, even "choosing vegetables over processed snacks" showed meaningful improvement, which is critical given rising rates of childhood overweight and obesity globally (WHO, 2025). Interventions that target both individual behavior and environmental factors like school recess food options, family involvement, are most effective for long-term change (Silva de Medeiros, G. C. B., et al., 2022) trends rather than statistical differences.

**3.6 Implementation Factors and Program Effectiveness**

Table 5 examines how teacher training and school setting (urban/rural) relate to program implementation and food literacy gains.Schools with trained teachers had 38% higher food literacy gains. Rural schools achieved full student committee participation, as communities viewed gardens as a way to preserve agricultural traditions.

Schools with teacher training (7 schools): 100% curriculum integration, 86% with student committees, and a mean food literacy gain of 13.5. The strong association between teacher training and program effectiveness reflects evidence that educator capacity-building is critical for successful implementation of food and nutrition programs. Trained teachers are better equipped to integrate food literacy into existing curricula, design engaging activities, and foster student leadership, factors that drive meaningful learning outcomes **(Contento, I. R., 2008.)**. For example, **Chan, C. L., et al., 2022** found that teacher training in garden-based education increased program fidelity and student knowledge gains by up to 40% in Latin American and Southeast Asian contexts.Schools without teacher training (5 schools) shows only 20% curriculum integration, 40% with student committees, and a lower mean gain of 9.8. This aligns with the interpretation that trained teachers were linked to 38% higher gains.

Urban schools (6 schools): 83% curriculum integration, 67% with student committees, mean gain of 11.2. Rural schools (6 schools): 67% curriculum integration, 100% student committee participation, mean gain of 13. The interpretation notes rural communities view gardens as a way to preserve agricultural traditions. Rural schools' 100% student committee participation highlights the role of community cultural values in program adoption. When interventions align with local traditions such as preserving agricultural practices they gain stronger buy-in from families and students **(Kelemen, E., et al., 2021).** In the Philippines, rural communities often have deep ties to farming; framing school gardens as a way to honor these traditions can enhance engagement and sustainability, as national programs like Gulayan sa Paaralan integrate agriculture, nutrition, and environmental education into school life and encourage hands- on connection with local food systems **(DepEd, 2022) (GMA Integrated News, 2025)** While urban schools had higher curriculum integration rates, their lower student committee participation may reflect differences in community priorities or access to space and environmental constraints that challenge hands-on involvement in gardening activities **(Dimouli, I., et al., 2024).**

**3.7 Qualitative Outcomes**

Qualitative findings complement quantitative results by highlighting holistic benefits and actionable barriers that need targeted support.

**Positive Impacts**

Students developed hands-on skills like planting and caring for crops, illustrated by a Grade 7 student's comment about growing tomatoes. Collaborative garden work fostered teamwork, sharing, and mutual support, as reflected in a Grade 8 student's remark: "We work as a team to water the garden; we learn to share and help each other." These qualitative observations align with quantitative improvements in dietary behaviors. Experiential education in school gardens builds both competence and prosocial behaviors: meta-analytic research shows that experiential learning enhances prosocial behavior and empathy among youth (Chan, H. K. et al., 2021), while garden settings promote

social competence, communication, and cooperation (Pollin & Retzlaff-Fürst, 2021). Additionally, participation in school gardens increases collaboration, responsibility, and practical agricultural skills (Diaz, J. M., et al., 2018), and hands-on engagement with food production is linked to improved nutrition knowledge and greater willingness to try fresh produce (Davis, J. N., et al., 2015).

**Enablers of Success**

DepEd workshops equipped educators to link gardening to academic subjects (e.g., Science), reinforcing program integration into curricula. Student committees took ownership by planning activities (e.g., planting schedules), which aligns with rural schools' 100% committee participation in Table 3. While not expanded with a quote, this likely includes partnerships between schools, families, and communities. Teacher training (via DepEd workshops) is a well-documented driver of program fidelity trained educators are better able to align interventions with academic standards and deliver activities as intended (Dunn C. G., et al., 2019; Wang et al., 2023; Jumawan & Fabiania, 2025). Student leadership, meanwhile, empowers youth and builds ownership, a key factor in sustaining programs (IDRA, 2025).In the Philippine context, DepEd's role as a facilitator aligns with national efforts to integrate agriculture and nutrition into basic education, as seen in initiatives like the Gulayan sa Paaralan Program, which uses school gardens as outdoor learning laboratories for agriculture, nutrition, and sustainability, and partnerships to embed agriculture concepts into the K–12 curriculum (Hernando-Maliot, M., 2025).

## Conclusion

Secondary students (grades 7–10) had significantly higher post-test food literacy scores than elementary students (grades 4–6), though all groups showed growth with dramatic improvements in dietary behaviors like trying new vegetables. Schools with trained teachers saw much larger gains, with rural schools achieving full student engagement (tied to agricultural traditions) and urban schools focusing on curriculum integration. Beyond skills, the program fostered social learning and inter-generational connection. However, challenges like curriculum overload, staff/student turnover, and resource constraints highlight the need for targeted support to sustain success

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**Table 1.** Pre-Test and Post-Test Scores for Food Literacy Domains (Total Sample, n=360)

| Food Literacy Domain | Pre-Test Mean (SD) | Post-Test Mean (SD) | Mean Difference | t- Value | p-Value |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Nutritional Knowledge (20) | 12.1 (2.9) | 16.9 (2.4) | 4.8 | 19.5 | < 0.001* |
| Agricultural Skills (15) | 8.5 (2.2) | 13.1 (1.8) | 4.6 | 17.8 | < 0.001* |
| Dietary Behaviors (15) | 8.9 (2.4) | 11.6 (2.1) | 2.7 | 10.3 | < 0.001* |
| Overall Food Literacy (50) | 29.5 (6.5) | 41.6 (5.5) | 12.1 | 21.7 | < 0.001* |

**Table 2**. Food Literacy Scores by School Type (Urban vs. Rural)

| Food Literacy Domain | Urban Schools (n=180) Mean (SD) | Rural Schools (n=180) Mean (SD) | t-Value | p-Value |
|---|---|---|---|---|
| Nutritional Knowledge | 12.5 (2.7) | 12.1 (2.9) | 1.2 | 0.23 |
| | 16.3 (2.4) | 17.1 (2.6) | 2.8 | 0.006* |
| Agricultural Skills | 8.9 (2.0) | 8.5 (2.2) | 1.6 | 0.11 |
| | 12.4 (1.8) | 13.4 (1.9) | 4.2 | < 0.001* |
| Dietary Behaviors | 9.3 (2.2) | 8.9 (2.4) | 1.4 | 0.16 |
| | 11.0 (2.1) | 11.8 (2.3) | 3 | 0.003* |

**Table 3.** Food Literacy Domain

| Variable Group 1 | | Group 2 | t-value | p-value |
|---|---|---|---|---|
| (Grades 4-6) Mean ± SD | | (Grades 7-10) Mean ± SD | | |
| Knowledge Score | | | | |
| Pre-Test | 11.8 (2.8) | 12.4 (3.0) | 1.7 | 0.09 |
| Post-Test | 16.2 (2.3) | 17.6 (2.5) | 4.5 | < 0.001* |
| Agricultural Skills | | | | |
| Pre-Test | 8.2 (2.1) | 8.8 (2.3) | 2.0 | 0.04* |
| Post-Test | 12.5 (1.7) | 13.7 (1.9) | 5.1 | < 0.001* |
| Dietary Behaviors | | | | |
| Pre-Test | 8.7 (2.3) | 9.1 (2.5) | 1.3 | 0.19 |
| Post-Test | 11.2 (2.0) | 12.0 (2.2) | 3.2 | 0.001* |

**Table 4.** Frequency of Dietary Behaviors (Actual Study Data)

| Dietary Behavior | Pre-Test n (%) | Post-Test n (%) | Ï‡Â² Value | p-Value |
|---|---|---|---|---|
| Eats fresh vegetables daily | 61 (16.9) | 127 (35.3) | 22.4 | < 0.001 |
| Consumes homegrown vegetables at least 3x/week | 48 (13.3) | 109 (30.3) | 18.9 | < 0.001 |
| Willing to try new types of vegetables | 99 (27.5) | 234(65.0) | 56.7 | < 0.001 |
| Chooses vegetables over processed snacks at recess | 67 (18.6) | 118(32.8) | 12.1 | 0.001 |
| Helps prepare vegetables at home | 53 (14.7) | 102(28.3) | 16.3 | < 0.001 |

**Table 5**. Implementation Factors and Program Effectiveness (Actual Study Data)

| School Group | Number of Schools | % with Curriculum Integration | % with Student Committees | Mean Food Literacy Gain |
|---|---|---|---|---|
| With Teacher Training | 7 | 100% | 86% | 13.5 |
| Without Teacher Training | 5 | 20% | 40% | 9.8 |
| Urban Schools | 6 | 83% | 67% | 11.2 |
| Rural Schools | 6 | 67% | 100% | 13 |

**Table 6**. Qualitative Themes, Sub-Themes, and Representative Quotes

| **Theme** | **Sub-themes** |
|---|---|
| ***Positive Impacts*** | ***Nutritional Awareness*** |
| Practical Skill Development | I can now plant tomatoes in our backyard and take care of them (Grade 7 Student) |

| | |
|---|---|
| Social and Values Learning | We work as team to water the garden we learn to share and help each other (Grade 8 student) |
| ***Enablers of Success*** | ***Stakeholder Collaboration*** |
| Teacher Learning | The DepEd workshop taught us how to link gardening to Science lessons (Teacher) |
| Student Leadership | Student committees plan planting schedules they take ownership of the garden (DepEd Coordinator) |
| ***Implementation Barriers*** | ***Resource Constraints*** |
| Curriculum Integration Gaps | We have too many lessons to cover gardening often get pushed aside (Teacher) |
| Sustainability Challenges | When student graduate or teacher transfer |