

Integrated Approach to Address Food and Nutrition Security in the Philippines



# Enhancing the Nutrition and Agro-biodiversity Outcomes of School Gardens





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## Introduction

In 2007, the Department of Education (DepEd) institutionalized the *Gulayan sa Paaralan* Program (GPP) as a response to the growing incidence of hunger and malnutrition in the country. The program also aims to increase awareness of the general public, especially students, parents, and teachers of the value of health and nutrition. Again, in 2010, as part of the National Greening Program, the DepEd revived the GPP (vegetable gardens in schools), along with waste management and climate change mitigation and adaptation components within schools. This is expected to be undertaken in the country's 42,000 public schools through 2016 (DepEd, 2010). The school-based gardens intend to ensure food security and meet the nutritional needs of schoolchildren; strengthen schoolchildren's appreciation and skills in agriculture and the environment; upgrade parents' knowledge in nutrition and agriculture; and improve family livelihood prospects through enhanced knowledge and skills in food production. The program provides garden tools, certified vegetable seeds, and training on food production.

In support of this program, Senator Edgardo Angara launched the nationwide *Oh My Gulay!* (Oh my vegetable!) campaign, with the private sector sponsoring school vegetable gardens in public elementary schools within the country. The campaign calls on parents to increase servings of vegetables such as *malunggay* (moringa), *kalabasa* (squash), *sitaw* (string beans), tomato, cassava, and corn to their children and encourages all Filipinos to eat vitamin- and mineral-rich crops as a more cost-effective solution to child malnutrition. The campaign involves print, music, outdoor, TV, DVD, and online media.

More recently, the Department of Agriculture's (DA) strategic framework *Agri-Pinoy* gave support to DepEd's GPP. In DepEd Cavite, through this program, schools were given a series of seminars on vegetable production through organic gardening technology, seeds, and sets of garden tools.

While advocacy for gardening interventions has increased, the methods generally remained unchanged, with heavy reliance on externally procured inputs and annual (mostly exotic) crops heavily depending on chemical inputs for optimum performance. Training tended to be single events with little or no follow-up. Relying primarily on the distribution of commercial seeds and tools, sustainability and continuity of garden activities remained poor. Gardens have also been neglected over the long summer vacation periods, resulting in the depletion of soil organic matter and loss of biological life. In Cavite, sustaining garden productivity and functionality is a

perennial challenge, which is worsened by intense or prolonged rainfall or drought (the classic manifestation of climate change). Climate change is expected to make gardening more challenging as temperatures rise and extreme rainfall events increase. Some of these problems can be addressed through the establishment of improved garden ecosystems, harnessing diverse agrobiodiversity, and use of agro ecological approaches. The Bio-intensive Gardening (BIG) approach features a few key principles and practices that promote garden health and resilience. BIG promotes a diverse range of nutritionally dense indigenous vegetables that can be grown with no chemical inputs in schools. A diverse garden guarantees good nutrition, providing vitamins A and C, iron, calcium, protein, and various other micronutrients. BIG advocates the use of hardy underutilized local (native) crops in schools as a way to conserve these vanishing genetic resources. However, the utilization of local vegetables by children or parents is often determined by the acceptability and palatability of recipes that feature these vegetables. Such school gardens are a valuable complement to school-based interventions.

## Methods

Twenty-seven schools, one from each district, were selected to be part of the research. Two schools were randomly selected to serve as research areas where the three-pronged approach would be tested. School 1 is Felipe Calderon Elementary School, district of Tanza and School 2 is General Aloña Elementary School, district of General Trias II.

### The BIG program comprises these various approaches:

- ◆ A bio-intensive gardening standard for schools was developed and tested in 27 public elementary schools in the province of Cavite. The BIG standard outlines both climate-smart gardening practices and principles to sustain gardens and strengthen their link with the school feeding program.
- ◆ Key administrators in agriculture and agriculture teachers were convened for a division-wide meeting in June 2012. The activity was part of the strategy to put the bio-intensive approach in the mainstream, as one of the ways to address sustainability issues of school gardens within DepEd Cavite. This event brought together agriculture teachers and evaluators to discuss the challenges faced by agriculture teachers with regard to evaluation. The BIG standard for schools that was developed in partnership with DepEd Cavite was presented and discussed.
- ◆ A range of activities was carried out to strengthen the knowledge and skills of agriculture teachers in the pilot schools—these included training on bio-intensive gardening technology, cross visits, study visits, and intensive mentoring and monitoring by IIRR staff and the DepEd division supervisor.
- ◆ Introduction and popularization of 17 types of vegetables in schools. Planting materials, especially indigenous root crops, legumes, leafy vegetables, and fruit-bearing vegetables, were sourced out from various areas within the country and distributed to schools. Special focus was given to diversifying root crops, including beta carotene-rich sweet potato and cassava. Vitamin A-rich green leafy vegetables were included. Attention was also given to leguminous cover crops to meet children’s protein needs while addressing soil and moisture and fertility conservation issues.

- ◆ A “mother crop museum” in support of five school-based “crop museums” was set up to serve as decentralized sources of planting materials. Crop museums serve as repositories for a diverse range of indigenous vegetables while also serving as a propagation area for the wider school community. The crop museums are strategically located near other elementary and secondary schools in the division of Cavite. The other schools have easy access for field study visits and seed distribution.
- ◆ Information, education, and communication materials were developed, distributed, and set up in the pilot schools to further promote and develop the gardens as center for learning and discovery for children and visitors.
- ◆ A range of learning approaches such as classroom and field-based training and workshops, field visits, and cross visits was carried out. Mentoring was undertaken to facilitate the adoption of the BIG standard.
- ◆ Minimal startup inputs such as seeds were provided.

Sets of monitoring forms were developed and used to gather information. In addition, a workshop was conducted during the last year of the research to gather additional information from agriculture teachers, home economics teachers, school principals, and district supervisors. The workshop aimed to understand both the hindering and facilitating factors in the adoption of BIG and the enhanced supplementary school feeding introduced during the intervention period. The enhanced gardening component was assessed for its effectiveness in addressing issues such as garden sustainability and weak links between gardens and school feeding. Different sets of questionnaires for each group were developed before the activity (see annex for questionnaires). These questionnaires were administered during the workshop. Assessment scores with respect to the adoption and application of certain practices were collected using a questionnaire and later on confirmed through school visits.

The t-test for dependent samples was used to determine significant differences in the following parameters: availability of vegetables in a 6-month period, diversity and type of vegetables in the school, and utilization of vegetables before and after the intervention. (The t-test statistics for dependent samples is a parametric statistical procedure used to compare two related samples, e.g., a ‘before and after’ situation when the variable/parameter being compared involves interval data.)

The McNemar change test was used to determine significant differences in the following: factors affecting school gardening and adoption of organic gardening practices before and after the intervention. (This test is a nonparametric statistical procedure applied in “before and after” designs in which each subject/participant is used as its own control and where measurements are made on nominal/categorical (particularly dichotomous [e.g., yes or no response] data.)

## Results

- ◆ The BIG standard for schools that was developed and tested is composed of 10 climate-smart gardening practices and 3 principles to sustain gardens and strengthen their link with school feeding programs. Of these gardening practices, eight were adopted and practiced by a majority of the schools. The adoption of the BIG standard by the schools contributed to the improvement

in year-round availability of diverse vegetables with lesser inputs, easier maintenance of gardens, and overall improvement in yield and crop performance as perceived and observed by the teachers.

- ◆ The introduction of diverse indigenous vegetables led to a significant increase in the types of vegetables grown in school gardens. A significant increase was recorded in leafy vegetables, root crops, and leguminous crops.
- ◆ The increase in diversity of vegetable types grown in schools led to an increase in number of vegetable types used for school feeding.
- ◆ Of the seven constraints identified by teachers that affect garden sustainability, three were addressed during the project period. The number of schools facing the following challenges—e.g., poor soil quality as indicated by difficulty in growing vegetables and stunting of certain vegetables, pilferage of garden produce, and weak support of school administrators—were significantly reduced. The improvement of soil quality can be attributed to various soil quality-enhancing practices that were introduced: e.g., use of deep-dug raised bed, cover cropping, mulching, and use of pure organic fertilizer. Pilferage of garden produce was also reduced significantly because of priority given to local vegetables (rather than exotics) and the emphasis on leafy greens and legume crops. The fences also prevented outsiders from entering the school premises.
- ◆ In the 25 schools, linking the school feeding program and the school garden was achieved to some extent, as indicated by the increase in vegetable types consumed in the feeding program as a result of the increase in vegetable types planted in the garden. However, only six of 10 vegetable types were identified by the home economics teachers as those harvested from the school garden. The weak implementation of the school feeding program as demonstrated by the absence of a regular feeding program at least once a week and the poor coordination between teachers is the crucial factor that affects the linkage between the two programs. The limited use of vegetables from the school gardens by the school canteen is attributed to the absence of a regular school-based feeding, the use of soup dishes that require few vegetables, the preference of children to soups with fewer vegetables, and the irregularity and insufficiency of vegetables supplied by the garden. The soup dishes being sold to the entire school population and the soup for supplementary feeding are not prepared separately. Because of this, vegetables from the garden become insufficient, and teachers resort to buying vegetables in the market.

## Conclusion

Agro ecological gardening approaches such as the BIG, combined with various capacity-building activities, advocacy, intensive mentoring and monitoring of key people, and distribution of information, education, and communication materials are seen as a viable way to revive, restore, and eventually sustain school gardens while also linking them with ongoing school-based supplementary feeding programs.

Bio-intensive raised beds and the use of local cultivars have helped strengthen resilience to extreme weather events that affect the province of Cavite during the 3-year research period.

Sustained bio-diverse gardens can contribute to dietary diversity, offering opportunities to

contribute to feeding program sustainability, provided that the feeding program relies on recipes featuring indigenous vegetables and is flexible enough to accommodate seasonal availability of garden produce.

Gardens can serve as repositories for the conservation and reintroduction of native/local varieties of legumes, green leafy vegetables, root and tuber crops, and others that are nutritionally rich for supplementary feeding and home use.

Garden programs can be introduced and promoted with effective results on scale, in a short time frame of 12-18 months, provided that multi-scalar approaches to capacity building and intensive mentoring are ensured. Successful garden interventions are knowledge-intensive and involve a series of action-reflection-action events that include training, mentoring, and monitoring.

Platforms are needed to foster teacher-to-teacher exchange of experiences and foster horizontal exchange of good practices.

The promotion of knowledge-intensive agro ecological gardening approaches such as BIG helps ensure broad-based adoption and subsequently assure the sustainability of garden interventions at the school level.

## Recommendations

Decentralized crop museums, at least one per school district, are fundamental in introducing BIG standards in schools as they serve as propagation area for a diverse range of indigenous vegetables that are selected on the basis of nutritional contribution, hardiness, tolerance for pest and diseases, and cultural acceptability.

A range of simple, culturally acceptable, gender-fair IEC materials are necessary in the promotion and popularization of less known indigenous vegetables among children, parents, and teachers.

Intensive mentoring and monitoring of gardens and school feeding programs by division education supervisors and key school administrators in agriculture and home economics are crucial for motivating and sustaining the interest of school teachers and school principals to effectively implement the two programs. School administrators at different levels should be oriented in a way that they can encourage and legitimize such initiatives.

Creative ways of maximizing gardens as a learning venue must be further explored, tested, and developed. The potential for expanding the use of gardens for learning beyond the nutrition objectives is enormous and could serve as a tool for basic environmental education, climate-smart agriculture practices, and waste management.

Diverse recipes that are culturally acceptable and are appetizing to schoolchildren must be developed through participatory recipe development to effectively build the capacities of school-feeding teachers in incorporating indigenous vegetables in the school feeding recipes.

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<sup>i</sup> *Vegetable gardens to help improve nutrition of public school children*, Tempo, July 20, 2011, downloaded from: <http://www.tempo.com.ph/2011/vegetable-gardens-to-help-improve-nutrition-of-public-school-children/#.TreTdPSN7v8>

