Introduction

About 4 million children were undernourished (FNRI-DOST 2008). Anemia prevalence among schoolchildren 6–12 years old was at 20%. The 2013 national data on 5-10-year-old children are underweight 29%, stunting 29.9%, and wasting 8.6% (Figure 1). The 2015 updated data of DOST-FNRI revealed not much improvements with over-all stunting at 31.9%; wasting at 12.5% and overweight at 9.2%

As part of its hunger mitigation program and to have better attendance and retention among school children, the Department of Education instituted the school-based feeding program and the gardening program. Later the programs recognized the links of good nutrition and better educational outcomes. Unfortunately, implementation issues and weak link continue to affect the program. Thus, there a need to understand
issues and gaps and develop a model that would be more effective.

**Background**

Schools provide strategic, targeted pathways for delivering nutrition interventions among children and, indirectly, to their families and communities. A 3-year action research project (Phase 1) implemented by the International Institute of Rural Reconstruction (IIRR) and the Food and Nutrition Research Institute of the Department of Science and Technology (FNRI-DOST), in partnership with the Department of Education DepEd with support from IDRC from 2012 to 2015, developed and tested an integrated nutrition model of gardening, supplementary feeding and nutrition education among schoolchildren in Cavite province in the Philippines. Results showed that supplementary feeding of malnourished school children using iron-fortified rice and indigenous vegetables from school gardens significantly improved their nutritional status. Enhanced knowledge, attitude and practices on gardening and nutrition were observed among parents. The project tested and successfully sustained bio-intensive nutrition gardens and crop museums that aimed to retrieve and conserve crop cultivars while improving year-round availability of a diverse range of climate-resilient, locally adapted, and nutritionally important vegetables.

Phase 2 of this project focused on more in-depth understanding and operationalization of the integrated model by expanding the number of research schools. The potential of schools as platform for nutritional and environmental learning was investigated. Modalities by which local government and private sectors can support school nutrition were explored. A multi-scalar approach tested two pathways for scaling up. The first was directed towards public elementary schools at a sub-national level. The second was directed at national agencies, policymakers, planners and media. Phase 2 had influenced school health and nutrition programming, which currently had benefitted around 2 million malnourished schoolchildren (14% of total number of elementary students) based on DepEd’s data.

It’s envisioned that results of the research will be used by relevant government agencies such as DepEd, Department of Agriculture, Department of Social Welfare and Development and the National Nutrition Council (NNC) of the Department of Health. Research results are intended to be disseminated through publications, national and international fora, reports, policy briefs and other communication materials. This paper seeks to discuss pathways to scaling up an integrated school nutrition model.
Scaling up defined

Institutionalization and scaling up reflect wider adoption of a proven model, strategy, technology or an intervention. Clark makes a different distinction among three types of scaling up: project replication, building grassroots movements and influencing policy reform. The first two are linked to expansion…Fisher also defines scaling up as a process of influencing policy; she uses the term “scaling out” to describe expansion…

(As cited from Uvin, P. and D. Miller. 1999. Scaling Up: Thinking through the Issues. http://www.brown.edu/Departments/World_Hunger_Program/hungerweb/WHP/SCALING_U.html ) Scaling up is defined as: "more quality benefits to more people over a wider geographical area more quickly, more equitably and more lastingly" (IIRR, 2000). “Going to scale in general connotes vertical movement across institutional levels and/or horizontal spread as shown in figure 2.”

Figure 2. IIRR’s scaling up framework

1 IIRR. 2000. Going to Scale: Can we bring more benefits to more people more quickly? International Institute of Rural Reconstruction, Y.C. James Yen Center, Silang, Cavite, Philippines.
Horizontal scaling up, sometimes referred to as *scaling-out* means geographical expansion to include more communities, institutions and people. Vertical scaling up refers to higher level expansion and is rather institutional in nature. This reflects influence to policy makers, donors, development institutions and investors at national and international levels.

Sabine Gündel, et al in the paper: Scaling-up strategies for research in natural resources management. A comparative review, highlighted that the this definition reflects people centered vision. And that it introduces quality dimension, without neglecting quantitative dimension and stressed the value of time, quality, equity and sustainability dimensions.

The Innovation: GarNESupp – Gardening-Nutrition Education-Supplementary Feeding – the Integrated School Nutrition model

The innovation integrated three major components: (i) Bio-intensive school nutrition gardens were established using ecological gardening practices to improve productivity and sustainability of gardens. Deep-dug, raised plots followed by minimum tillage, use of green tree fertilizers like kakawate (*Gliricidia sepium*), and cover cropping using legumes during summer-season to protect soil health, were promoted. Decentralized crop museums helped conserve and propagate seeds of local vegetables to support needs of schools and household gardens. (ii) Supplementary feeding of underweight children used iron-fortified rice and indigenous vegetables from school gardens. Fifteen menus with indigenous vegetables were developed, lab-tested and implemented in schools, and are now made available for schools to use. (iii) Nutrition education was provided for students, parents / care providers / guardians and teachers to promote the importance of nutrient dense food and good eating habits. The integrated school nutrition model offers a way to achieve better nutritional outcomes which is linked to good educational outcomes. It also ensures sustainability of the gains in school nutrition program while optimizing benefits from limited resources. More information about the integrated school nutrition model during its pilot testing is provided at: https://schoolnutritionphils.wordpress.com.

Figure 3. Integrated School Nutrition Model
The research experience shows that there are various issues and dimensions that need to be considered to ensure effective implementation and later up-scaling of an integrated nutrition program in schools. A scalable, self-sustaining and effective program for integrated nutrition programming for Philippines schools must have the following attributes: (1) the program is supported by administrators, students and parents at all relevant levels. For this to happen, schools must be able to gain capacity to adapt the program based on their local context; (2) The program is consistent with governments’ education and nutrition objectives and policies; (3) It is supported by appropriate educational resources including garden space, learning resources, linkages to curricula for different subjects; (4) It is supported financially, including contributions from school budgets, NGOs, local governments, and the private sector; and (5) It generates strong synergies among the different elements, including nutrition, agricultural and environmental education.

The Multi-scalar Approach for Bringing the Integrated School Nutrition Model to Scale

The initial three year research 2012-2015 generated evidence on the effectiveness of the integrated school nutrition model –GarNESUpp – in addressing undernutrition among children. Based on lessons generated, the model was refined and implemented at a wider scale to achieve greater nutritional outcomes through institutionalization, wider adoption, better linkage, increased investments and enabling policies to support integrated school nutrition programming.

![Figure 4. Research conceptual and theoretical framework](image-url)
Utilizing a multi-scalar approach, the integrated school nutrition model was brought to scale through two pathways (Figure 5). The first pathway is via horizontal scaling where GarNEsupp was institutionalized in public elementary schools in one province (Cavite) and expanded at sub-national level – that is from Cavite province to Region 4A Calabarzon (additional 4 provinces – Laguna, Batangas, Rizal and Quezon). Schools were selected and designated as lighthouse school (LS) which are focal points for research, learning, sharing and dissemination hub of integrated school nutrition innovations. A critical mass of 58 lighthouse schools (40 in Cavite province and 18 in other provinces of Region 4A) were established from which other public elementary schools in Cavite and Region 4A learned from.

The lighthouse schools also served as crop museums, which was relevant in reintroducing agro biodiversity as nutritionally important to schools and surrounding communities. The second pathway is via vertical scaling aimed at the national level, influencing relevant national agencies, policymakers, and decision makers through theme presentations and related dialogue processes. Through partnership building, networking and linkaging, wider nutrition community which include NGOs, international donors, private (including corporate social responsibility pathways) and public sectors and the donor communities were engaged towards building a community of practice for nutrition. The platforms and associated knowledge products that came out of it, influenced the national government policy and planning processes to generate impact at the national level.

![Scaling up approach and target outcomes](image)

**Figure 5. Multi-scalar scaling up strategy**
Strategies, methods and lessons

It is the intent of the research project to establish a critical mass of schools implementing the model and to generate evidence based policy recommendations that would enhance existing school-based nutrition program to address school age malnutrition. Thus at the onset, strategies for out-scaling (to expand coverage of the adoption) as well as scaling up (influencing policies for national adoption) were developed and deployed.

Enabling environment at the national and sub-national level is necessary for scaling up

Enabling policy environment is key to sustain and implement the school nutrition program at a larger scale. These have to be backed up further by the commitment of school authorities headed by the DepEd Secretary, Directors, supervisors and principals, to ensure implementation. One of the important requirements for adoption and implementation of the model is the issuance of memorandum order since DepEd still follows a centralized set up. In 2016, memoranda were issued which included bio-intensive gardening approach in national guidelines of GPP (DepEd Memorandum No. 223, s. 2016); use of iron fortified rice and recipes with indigenous vegetables in feeding in the school-based feeding program national guidelines (DepEd Order No. 39, s. 2017); establishment of crop museums in every school division (DepEd Memorandum No. 223, s. 2016. At the regional level, 2 memoranda were sent to all the 19 divisions of Region 4A in support of the implementation of the nutrition model and establishment of additional crop museums (Regional Memorandum No. 226, s. 2016 and Regional Memorandum No. 446, s. 2017). This served as a legal document allowing school administrators to incorporate activities into their school improvement plan and in turn allow them to allocate resources to strengthen the program. Phase 1 study result as well as the developed information, education and communication materials were instrumental in setting a supportive environment.

Lighthouse schools: Focal point for horizontal scaling

A lighthouse school (LS) is a designated focal point for establishing evidence (decentralized and location-specific action research site of integrated school nutrition model) for supporting the advocacy and outscaling efforts of school nutrition by the Department of Education in the Philippines. Every LS is expected to demonstrate the integrated school nutrition model which features a regular feeding program, a well maintained / sustained bio intensive garden and related school-based nutrition education activities that are strongly linked with each other. For this to happen, a comprehensive capacity building package which include training of trainers and learning exchanges, implementation guidelines, starter diversity kit (seeds and planting materials)
and innovative IEC materials, was provided to the LS.

Fifty-eight (58) LS were established within Region 4A also known as CALABARZON. Learning and sharing events were conducted in LS. Trained teachers were given the responsibility to train other teachers within their respective school districts or school divisions. A total of 1,598 schools and 626 parents were reached. Inter division learning exchanges and benchmarking activities were conducted across the region. In addition, LS schools shared seeds to other schools within their own division.

The Role of Crop Museums

The 58 LS were also designated as crop museums (CM). Crop museums in schools serve as a focal point for collecting and saving crop varieties, especially those of nutritionally relevant. This is a garden where teachers, students, and community members can view a diverse range of nutritionally relevant and climate hardy vegetables. Crop museums also serve as nurseries (source of planting materials) for surrounding schools and communities.

School crop museum (CM) played a role in the dispersal of planting materials across the 19 school divisions in Region IVA. Crop Additional 237 school crop museum were designated in Region IVA. Support extended includes planting materials and information, education and communication materials. The goal is to have 1 crop museums per school district (cluster of 10 schools).
Seed exchange is another event that was successfully institutionalized within Region IVA to facilitate retrieval and popularization of indigenous/local vegetables and promotes self-reliance among school divisions. Eighteen (18) divisions were able to conduct seed exchange involving 1359 schools. Seed exchanges contributed to conservation of agro-biodiversity and promote garden diversification.

📚 Multi-level capacity building program for school program implementers

The capacity building program was designed not only for school level implementers but also school officials and program planners at various levels of DepEd. The program includes training of trainers; consultative workshop with school principals; orientation of division-level school officials; learning and sharing events; provision of IEC materials, basic garden tools, planting materials and on-site coaching and mentoring of local actors. Prior to the training, the team developed a training of trainers manual and was given to lighthouse schools. Series of orientation of school officials were held at the national level and in every province in Region IVA to generate interest and support. For technical assistance of local actors, it’s important to consider the staff movement within DepEd system in planning and programming to avoid unplanned visit for re-training/re-orientation.

📸 Generating evidence for influencing policies

Evidences on the effectiveness of the integrated nutrition approach have to be established as bases for adopting the approach on a wider scale. The project worked on the assumption that scaling up and institutionalization of innovations relies on evidence of its effectiveness and scalability. Evidence generated in phase 1 and 2 played a major role in influencing national-level program planners to adopt the model and allocate resources for nation-wide dissemination. The availability of a range of knowledge
products is an evidence of its readiness to be scaled up. The establishment of 58 LS led to wide-scale data collection. Baseline and endline data were collected and analyzed to serve as basis for recommendations and policy formulation. Teachers played a significant role in documenting activities and data within their respective schools. Results from the research were packaged into knowledge products that were shared with various stakeholders, sectors and national agencies. Advocacy activities through roundtable discussions, exposure visits, multi stakeholder dialogues, bilateral meetings, and active participation and sharing in national conferences have been effective platforms in raising interests and influencing other government agencies and program plans.

**Broad-based partnership for school nutrition**

Scaling up efforts also paved the way for partnerships with the different national agencies. The Department of Agriculture Bureau of Plant and Industry supported a national level training on integrated school nutrition model to regional representatives of the Department of Education and Department of Agriculture coming from the 17 regions of the Philippines. The Department of Social welfare and development saw the fit of the integrated nutrition model to day care centers (child development centers) which cater to younger children 3-5 years old. Finally, the National Nutrition Council of the Department of Health recognized its potential to contribute to efforts in scaling up nutrition interventions and help the country achieve its set Sustainable Development Goals (SDGs), thus included wider uptake of the integrated school nutrition within the Department of the Education, as part of the country’s PPAN – Philippine Plan of Action for Nutrition 2017-2022.

**Fostering better information and resource sharing through dialogue platforms**

Multi-stakeholder dialogue and advocacy events that increased awareness, improved coordination and enhanced convergence of the various stakeholders, targeting different segmented audiences are key elements of scaling up. Round table dialogue (RTD) and targeted discussion were organized with key decision makers and officials and it resulted to positive outputs. The project team met with different key officials of DepEd at the start of the project to secure needed support and to ensure adoption by schools. Study findings and recommendations were to different key officials at the national level.

Two key RTD with Department of Agriculture (DA) was done. The RTD allowed both parties to share initiatives and identify similar objective and ways to collaborate. Partnership was forged and a technical working group was established composed of representatives from DA-BPI, DepEd Bureau of Learner Support Services (BLSS) and IIRR
to strengthen the crop museums in Region 4A and to promote similar concept in another region as part of the scaling out. A round-table discussion was also organized with 6 private sector representatives. Information, education and communication materials were shared to encourage use of these outputs in their existing nutrition programs. Round table discussion is also seen as an effective means to engage and solicit support of local government units (LGU).

**Advocacy and dissemination via multiple platforms**

The research team shared the project in several events. The project was showcased during the Food Security Forum at the Asian Development Bank in June. Initial findings were also shared to the following events - Philippine Association of Nutrition (PAN) Convention in July 2017 with more than 1000 attendees; Philippine Society of Nutritionist-Dietitians, Inc. (PSND) Convention in October 2017 with 250 participants; DepEd Region 4A International Conference of Basic Education Researchers (ICBER) 2017 with 2287 participants; DSWD MIMAROPA Review and Planning Workshop for Supplementary Feeding in 2017 (activity reports will be shared upon request).

The research was also presented during DepEd national events such as DepEd Gulayn sa Paaralan Program National Workshop in 2017 and Consultative Workshop on Nutrition Services in January 2018 (activity reports will be shared upon request).

Events organized by non-government organizations such also served as point of dissemination. The model was shared to a multi-stakeholder event organized by Green Peace in observance of the World Food Day participated by 373 participants and Campaign on Healthy Diet with 150 participants. Another event involved sharing among non-government organizations via Philippine Coalition of Advocates for Nutrition Security (PhilCAN). The project was also shared in the Southeast Asian Ministers of Education Organization-Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEAMEO-SEARCA) international conference on multi-functionality of school gardens and training of trainers.

In South East Asia, learning exchanges were conducted between government offices and civil society organizations in Philippines and Myanmar. IIRR organized round table discussion on nutrition in Yangon, Myanmar attended by 50 participants from 46 agencies. This was followed by learning and sharing activity among officials from IIRR, DepEd, and FNRI-DOST and officials from Myanmar Ministry of Education and Health (activity reports will be shared upon request).
The complete package of information, education and communication (IEC) materials acted as catalyst in the diffusion of the model and guidelines. Different forms of IEC materials were developed as support to school implementers and as promotional materials to officials at various levels. The use of educational and communication strategies to expand nutrition oriented gardening programs are very useful. The posters, flyers, primers and modules used provided ready information to highlight the gardening and nutrition links, as well as the importance of good nutrition, especially to school age children. The nutrition campaigns, especially the nutrition month provides a venue for wider dissemination of nutrition messages.

IEC materials are accessible at https://schoolnutritionphils.wordpress.com/). The project implementation team formed per division was helpful to disseminate information faster to schools in the region.

A website https://schoolnutritionphils.wordpress.com/ was set up and maintained where outputs are shared to wider audience.

ุม The role of media

It is recognized that media have a major role in influencing the wider public. Reporters and writers were engaged in an attempt to draw media’s attention to important issues such as nutrition and food security, role of agro biodiversity, climate change, and food safety. A compilation of resource materials especially prepared for media personnel were distributed. Three media professionals were given additional and longer exposure visits and participated in events undertaken as part of this project. Nine articles were written about the project (links were provided above).

ุม Use of social media as platform for information sharing
Social media remains to be a significant and low cost platform to disseminate new knowledge, lessons learned, accomplishments, activities and innovations among community of practice to sustain a movement. The project team created a Facebook group (GarNeSupp) that has now 1047 members composed mostly of school teachers (https://web.facebook.com/groups/GarNESupp/). The site is being utilized by schools teachers to share activity photos, announcements and training opportunities.

Generating evidence-based for influencing policies and plans at the sub national and national level

The project worked on the assumption that scaling up and institutionalization of innovations relies on evidence of its effectiveness and scalability. Evidence generated in phase 1 and 2 played a major role in influencing national-level program planners to adopt the model and allocate resources for nation-wide dissemination. The availability of a range of knowledge products is an evidence of its readiness to be scaled up. The establishment of 58 LS led to wide-scale data collection. In order for the 58 LS to take on those roles, a capacity building program was implemented. Baseline and endline data were collected and analyzed to serve as basis for recommendations and policy formulation. Teachers played a significant role in documenting activities and data within their respective schools.

Data collected showed that all 58 lighthouse schools are practicing the bio-intensive gardening at different levels. Garden diversity has been achieved in most schools and the link between gardens to feeding and learning were evident. In the 3 sentinel research schools, the 120-day school feeding program of the Department of Education (DepEd) resulted to significant increase in the mean weight of students from baseline to endline. The extended feeding program or additional 80 days was implemented by the project in 3 sentinel research schools and was completed in July 2017. Nutrition education activities that were commonly used and sustained were documented. Data and results were presented to DepEd national-level program planners in 2017 and this led DepEd to allocate in their 2018 annual budget a certain amount for the national-level training for 220 LS, 1 in every school divisions in the country.
**Results Achieved at the Sub-national and National**

**Wide-scale adoption of innovations**

Continuous capacity building through experiential training; provision of information, education and communication material; and regular visit for technical input and monitoring led to adoption of various innovations introduced.

Data collected in 58 schools showed that there is significant increase in the adoption of 12 BIG practices. To link gardens and supplementary feeding, 15 recipes with indigenous vegetables were developed and introduced in Phase I in addition to the Moringa-based recipe recommended by DepEd. Schools were encouraged to adjust or explore other recipe combinations of recipes to enable them to utilize the garden produce and to meet the needs of beneficiaries. From 7.19 recipes, the number of recipes adopted from those introduced by the project had increased to 9.70. Aside from the support given to schools, the issuance of memorandum that includes the endorsement of the 15 recipes led to increase in adoption. Nutrition education (NE) strategies were divided into two main modalities – non formal and formal. Non-formal NE methods target parents, teachers and the general community whereas formal NE modes are directed towards students. Records from schools showed that schools were able to deliver nutrition education activities using varied strategies. The most widely used mode of NE is the participatory NE activities for community and parents (83.64%), followed by NE during feeding (74.55%), nutrition integration in lessons and NE during PTA/PTCs both at 67.27%, and garden-based nutrition-education (65.45%).

**Collaboration and resource-sharing**

Constructive dialogue with various government officials and non-government officials led to multiple training to disseminate the model. Two government agencies funded 2 training program - the Department of Agriculture- Bureau of Plant Industry (DA-BPI) funded the 3-day training for 37 participants composed of 23 DA regional level staff from the 17 regions of the Philippines and 14 DepEd regional level representatives and was followed by a training program funded by Department of Social Welfare and Development Region IVA (DSWD IVA) for 88 participants in 2017 and a planned training
for 177 child development workers of 4 provinces. Three other organizations engaged members of the project team to train schools and child development workers in other provinces in the Philippines - Fostering Education & Environment for Development or FEED, Inc., AngatBuhay Program of the Office of the Vice President, Adventist Development and Relief Agency.

**Increased investment on school nutrition**

At the sub-national level, the Education Support Services Division (ESSD) of DepEd Region 4A which oversees the school-based feeding program organized three-day training in November 2016 to capacitate school health personnel composed of medical doctors and nurses and allocated funds for 17 sets of weighing scale and height board for the schools and city divisions. This was in response to the findings presented to key personnel which revealed weak capacity of schools when it comes to nutrition assessment.

At the national level, the Department of Education made a commitment to promote the integrated school nutrition model to all schools in the Philippines, so in 2017 DepEd allocated resources for teachers’ training and reprinting of all IEC materials. A total of 220 schools, one from each school divisions across the Philippines are currently being designated and are being trained to be lighthouse schools.

**Institutionalization of the model**

Crafting of DepEd Memorandum Order for schools to adapt and implement the integrated school nutrition model is on-going and once signed by the secretary, all the 38, 600 public elementary schools in the Philippines will be required to adopt the integrated approach. This research project made the case for this to happen, and, will continue to provide the methodological and technical innovations to support the Dept of Education via the knowledge productions, working papers, primers and IEC materials featuring research derived recommendations.

**Conclusion**

Schools can serve as centers for learning and sharing about nutrition, food security, agro biodiversity conservation and climate change. The integrated school nutrition model that combines nutrition specific and nutrition sensitive interventions produced multiple nutrition outcomes. Effective scaling up requires demonstration of innovation’s effectiveness and scalability and a combination of advocacy and education, communication strategies directed at relevant agencies and sectors.