



World Vegetable Center

Vegetables Go to School **INDONESIA**

School Vegetable Gardens: Linking Nutrition, Health and Communities

Project Documentation



Project Documentation

Vegetables Go to School
INDONESIA

*School Vegetable Gardens: Linking
Nutrition, Health and Communities*

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Abbreviations

CDDFS – Center for Dietary Diversification and Food Safety

FSA – Food Security Agency

VGtS – Vegetables Go to School

WASH – Water, Sanitation and Hygiene



EXECUTIVE SUMMARY

This report documents the preparation, implementation, findings, and recommendations of the Vegetables Go to School (VGtS) school garden program in Indonesia.

Vegetables Go to School is a new multidisciplinary, school-based project developed by a team from the Indonesian government and a team of international researchers from World Vegetable Center, Swiss Tropical and Public Health Institute and Freiburg University, and funded by Swiss Agency for Development and Cooperation. The project aims to address malnutrition among Indonesia children through a comprehensive school garden program.

Summary of School Garden Program

The VGtS school garden program in Indonesia is overseen by the County

Team under the supervision of the Center for Dietary Diversification and Food Safety (CDDFS), Food Security Agency (FSA) of the Ministry of Agriculture. The Country Team works with the International Research Team to design research protocols and curriculum for the pilot study. Furthermore, the Country Team trained school staff on the school garden program, research protocols and monitored their progress.

In the pilot phase, 30 schools participated in the project. VGtS Indonesia chose 30 schools and divided into 3 groups as treatments in the research model for baseline and endline data survey. The survey was aimed to see the impacts of the VGtS project implementation. Those 3 groups of schools, are:

1. Schools with school garden program initiated by Food Security Agency, Ministry of Agriculture, Republic of Indonesia plus VGtS Program (10 schools)
2. Schools with school garden program initiated by Food Security Agency, Ministry of Agriculture, Republic of Indonesia (10 schools)
3. Schools without any school garden program (10 schools as control)

The VGtS school garden program takes a two-pronged approach: classroom curriculum and school garden. The VGtS 32-week school curriculum teaches students: Good Gardening Practices; Nutrition Education; and Water, Sanitation and Hygiene (WASH). The school garden incorporates hands-on gardening activities and demonstrations to enhance the learning experience for students.

The program further impacts the lives of students' families and community through dissemination of agricultural information and technologies, and messages on nutrition and WASH. The program encourages families to start their own home gardens by modelling the school garden.

In Indonesia, the program links to FSA's Sustainable Homeyard Garden program that operates through local women's groups. Through this partnership, women's groups supply seeds and seedlings, technical advice and support to school garden activities. Agricultural extension workers also provide technical support to both school gardens and home gardens. Ultimately, the whole community is involved in growing nutritious and diverse vegetables for home consumption, leading to improved nutritional well-being and local agricultural and community development.

Research Findings

The Vegetables Go to School garden program significantly ($p < 0.01$) increased students' **knowledge about nutrition and preference for healthy snack choices**.

The improved program also **diversified older students' diets more than younger students' diets** ($p < 0.01$).

Due to the short one-year pre-post intervention assessment, the study did not find significant improvements in students' vegetable consumption or nutritional status. A longer term post intervention assessment may find stronger evidence.

Key Recommendations

- **The school garden program is an effective educational program** aimed at improving students' nutritional and health awareness and potential practice.
- **Collaboration between Ministry of Agriculture, Ministry of Education, Ministry of Health, and local governments to create**

an Integrated Healthy School National Program, in which the school garden program is mandatory for schools and adopted as a national program, is necessary to sustain the program and further its impact and benefits in the community.

- **The school garden program combined with a school lunch program is more effective for children to increase their consumption of balanced meals** including their own garden produce regularly.
- **The program should be integrated in the local curriculum** and taught as a regular school subject. This integration is necessary to sustain the program.
- **Financial and technical support for the program** is necessary for continual training of teachers and providing teaching materials.
- **School staff should be given incentives** to motivate their participation in the school garden program.
- **To sustain school gardens, the schools should be provided with seeds and stable water sources or water-saving technologies, and link with the community and parents.**
- If possible, the **Healthy Canteen Development project should be continued** to increase students' consumption of healthy snacks and the involvement of parents and women's groups in the school's activities.
- **Linkage with the national Sustainable Food Reserve Garden program** is recommended to improve local food production and security.

- **The school garden and home garden research data should be monitored and included in the National Food Diversification Programme** (led by Food Security Agency, Ministry of Agriculture) for continual monitoring and improvements on the programs.



INTRODUCTION

Indonesia is blessed with diverse terrain and vegetation as the largest island nation in the world. Due to its growing population and geographical challenges, feeding the nation and ensuring nutrition and food security is among the top priorities of the government.

Malnutrition in Indonesia continues to pose challenges for the well-being of Indonesians, especially women and children, and undermines mental and physical development of children into adulthood. About one out of five women (23%) of childbearing age suffer from anemia, which threatens the survival of both the mother and the child (Chaparro, Oot, & Sethuraman, 2014). Among the 24.5 million children under five years old, 20% are underweight, 36% are stunted, and 14% are wasted (Chaparro et al., 2014; IFPRI, 2016). The high prevalence of stunting is a major concern affecting children's cognitive development.

On the other spectrum, the nation faces the double burden dilemma, where both malnutrition from undernutrition and over-nutrition leading to child obesity co-exist. More than 11% of children under five are overweight (IFPRI, 2016). In light of the current nutritional challenges, government and non-government initiatives have turned to community-based agricultural strategies for improving household nutrition.

Indonesia's Food Security Agency (FSA) has developed the Sustainable Homeyard Garden program to train women's groups in home gardening with the aim of increasing local food production and consumption. One aspect of the program is to support schools with seeds and technical assistance to establish school gardens. With 99% of children from 6 to 12 years old enrolled in schools, the school system is an effective mechanism for community-based

nutrition interventions. However, in practice, establishing school gardens through the Sustainable Homeyard Garden program has not proven successful mainly due to the lack of structure, training and support for schools to sustain school gardens.

Vegetables Go to School (VGtS) is a new multidisciplinary, school-based project implemented in Bhutan, Burkina Faso, Indonesia and Nepal. In Indonesia, the project was developed by a team from the Indonesian government and a team of international researchers from World Vegetable Center, Swiss Tropical and Public Health Institute and Freiburg University, and funded by Swiss Agency for Development and Cooperation. The project aims to address malnutrition among Indonesian children through a comprehensive school garden program with emphasis on gardening, nutrition education and Water, Sanitation and Hygiene (WASH).

The first phase of the project began in 2013 with the main objectives to:

- Establish the school garden program in pilot schools (10 schools)
- Gather scientific evidence on the benefits and impact of the program in improving students' knowledge, attitude and behavior in healthy eating and lifestyle habits
- Understand the program's linkages with the local community
- Fine-tune the program for scaling up as a national school garden program

This report documents the preparation and implementation of the VGtS School Garden Program in Indonesia, empirical results from scientific research, and benefits and keys to success of the program. Finally, it outlines the challenges of the program and recommendations to move the school garden program forward nationally. The report is intended for government

and non-government organizations that would like to implement a school garden program in their community or country.



APPROACH

The school is a central part of the community as a place of learning. It also serves as a place of regular interactions between students, parents, teachers, community members and local businesses. These roles allow the school to motivate positive change in its community. Governments and non-profit organizations are leveraging on the existing school infrastructures and systems to introduce their agenda in community-based interventions. School-based health and nutrition programs are powerful strategies in improving local health situations and alleviating malnutrition.

Vegetables Go to School is an agricultural intervention aimed at promoting nutrition and health knowledge and practice in schools.

The project's school garden program could potentially increase students':

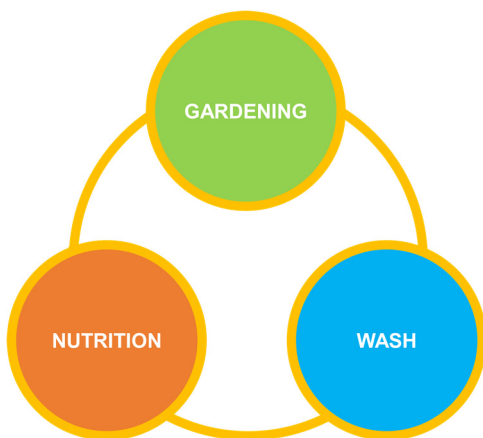
- Gardening, nutrition and WASH awareness and knowledge
- Environmental awareness
- Interaction with the community
- Practical learning and application
- Vegetable consumption

The program's two-fold approach: classroom curricula and school gardens.

Curriculum

The VGtS school curriculum teaches students:

- Good Gardening Practices
- Nutrition Education
- Water, Sanitation and Hygiene (WASH)



These three core components are incorporated to provide students with a solid foundation on the importance of choosing, growing and eating nutritious and clean foods to stay active and healthy. Gardening, nutrition and WASH go hand-in-hand in addressing malnutrition.

Good and safe **gardening** practices give students the knowledge and ability to grow their own foods. Students learn how to establish their gardens, make beds, install irrigation, sow and transplant seedlings, compost and nourish the vegetables, and how to protect their vegetables from insects and pests.

Nutrition principles teach students the basis of balanced diets and how to make healthy food choices including choosing nutritious and diverse vegetables to plant in their gardens, and how to properly harvest, store, cook, and eat vegetables. Students learn about the health benefits of vegetables and are encouraged to eat more vegetables daily.

Lessons on **WASH** teach students proper sanitation and hygiene practices. Poor WASH practices can lead to life-threatening illnesses caused by bacteria and pathogens. Ensuring a clean environment and washing hands after gardening activities and before handling food reduces the chances of infections. Diarrheal diseases and worms can further reduce nutrition absorption in the body and cause stunting and underweight.

School Garden

The VGtS school garden program incorporates hands-on gardening activities and demonstrations to enhance the learning experience for students. Each school establishes and maintains an on-site school garden growing diverse vegetables during the school year.

The garden is a live teaching tool for students to apply their classroom knowledge, gain experience in gardening, and eat the fruits of their labor. Apart from gardening activities, students also learn how to prepare nutritious foods and practice proper WASH techniques. In the process, students increase their vegetable consumption, learn gardening skills and are informed to make better nutrition and health choices in life. Students become

connected to the environment, appreciates nature, and are physically active. Moreover, through taking care of the garden, students gain a sense of responsibility and confidence in their achievements.

Beyond the School

The school garden program can impact the lives of students outside the school. The school is an avenue to disseminate agricultural information and technologies, and messages on nutrition and WASH with the community.

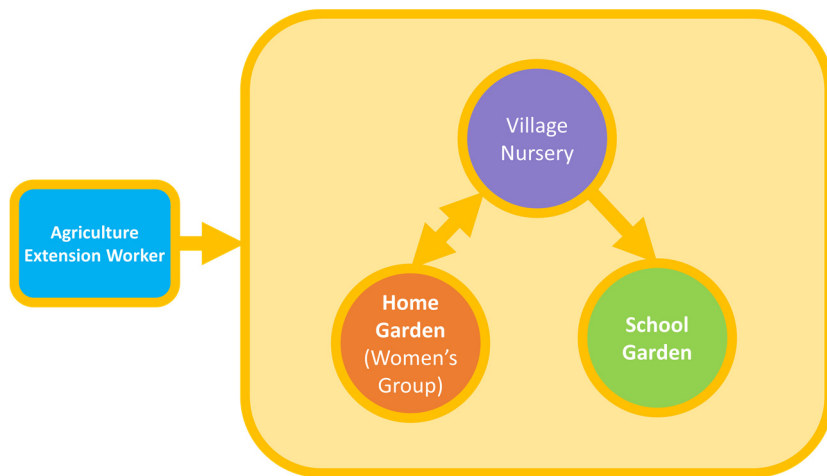
The lessons learned in school are easily brought home as the students share their knowledge and skills with the family. This exchange of know-how becomes a valued experience for the family. It motivates the family to start their own garden at home by modelling the school garden. Thus, as more students engage in the practice and take home their learning, more families in the community see the benefits and viability of gardening, leading to widespread home gardening.

Home food production allows families to produce and consume a variety of foods at affordable cost. Seeds and materials can usually be found or bought locally at low or no cost. Other non-monetary costs are manual labor for preparing the land and maintaining the garden. A home garden can feed a family without spending money on purchasing vegetables at the market. Surpluses from the garden can be sold to supplement household income.

Ultimately, the whole community is involved in growing nutritious and diverse vegetables for home consumption, leading to improved nutritional well-being and local agricultural and community development.

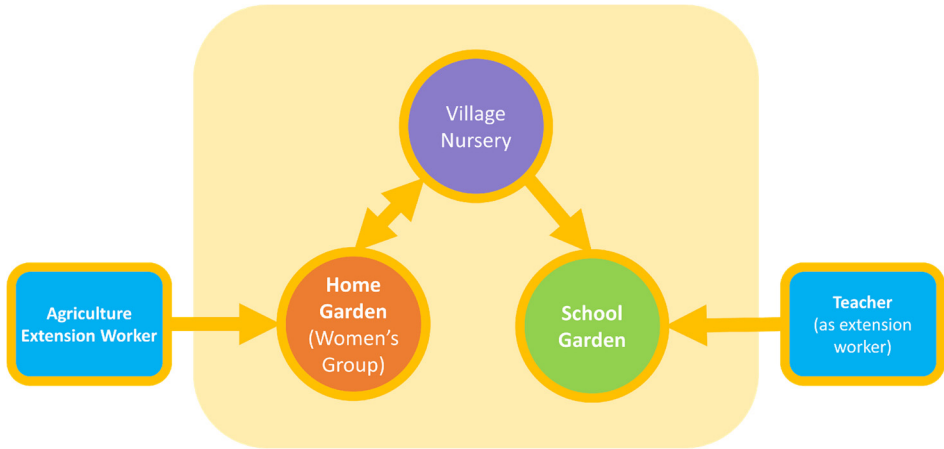
Existing Model in Indonesia

In the current model for school and home gardens overseen by Indonesia's Ministry of Agriculture's FSA, an agriculture extension worker technically assists the school to set up a garden. The village nursery provides seeds and seedlings to the school garden and the women's group that establishes home gardens in the community.



Vegetables Go to School Model in Indonesia

However, in the Vegetables Go to School model, teachers are trained as extension workers to supervise the establishment and maintenance of the school garden. Teachers also aid in the supervision and monitoring of home gardens set up by students' families. The agriculture extension worker aids the women's group to set up home gardens. The village nursery provides seeds and seedlings to both school and home gardens. With this new model, teachers and extension workers work together to solidify a strong technical network for both school and home gardens to flourish in the neighborhood.



WHO IS INVOLVED?

Who Is Involved?	Main Roles
Country Team	Oversee all aspects of the project in the country.
International Research Team	Provide technical assistance and works with Country Team on research protocols.
School Team	<ul style="list-style-type: none"> • The principal is the main authority for the school garden program. • Teachers oversee all aspects of the school garden program in the school. • The school gardener helps maintain the garden throughout the year. • The canteen staff promotes nutritious messages and snacks to students. • Students are the main and direct beneficiaries of the program.
Agriculture Extension Workers	Government agriculture extension workers provide technical assistance for the school garden.
Community	<ul style="list-style-type: none"> • Community leaders are the main authority of community initiatives. • Parents and community members interact with school garden program through students and teachers. They are the indirect beneficiaries of the program. • The local women’s group collaborates with the Country Team to support the school garden program.

Indonesia Country Team

The core group of the VGtS project and moving the school garden program forward in Indonesia is the Country Team. The team is overseen by the Center for Dietary Diversification and Food Safety (CDDFS) of the Food Security Agency, Ministry of Agriculture. At the district and provincial level, the following agencies are involved:

- Food Security Agency, Batang District
- Food Security Agency, Central Java Province

The team is involved project implementation and pulling together the country's resources and rallying government support for the school garden program. In addition to these key tasks, they are responsible over multi-sector activities including developing the country action plan, preparing school garden curriculum and teaching materials, implementing the project across the country, training teachers, overseeing field staff, monitoring the project's progress and holding regular meetings on project-related activities.

The team coordinates at a multi-sectoral level because school gardens and food security spans multiple ministries and disciplines. Delegates from the Ministry of Health and Ministry of Education have been invited to participate in the program by helping train canteen staff and teachers, and integrate nutrition and WASH activities in the program. The Country Team also collaborated with Assessment Institute for Agricultural Technology (BPTP) in training the school staff.

The Country Team works closely with teachers involved in the project who reported back on activities and progress. The Country Team reported their progress back to the Food Security Agency to discuss the project's goals and directions, and determine relevant training support and resources.

International Research Team

The function of the international research team is to work closely with the country team in research-related activities of the project. The research team trained the country team on developing the initial country action plan for the school garden program. The one-month training was organized prior to the start of the project in Indonesia and was led by the World Vegetable Center in Shanhua, Taiwan. The research team works with the country team to develop study protocols and analyze data for technical and scientific publishing. Furthermore, the team provided curriculum materials, nutrition and WASH teaching materials and community strategies for the promotion of school and home gardens.

The International Research Team consists of scientists from the following organizations:

- **Swiss Tropical and Public Health Institute**
- **University of Freiburg**
- **World Vegetable Center**

School Team

Principal

The principal is the school's authority and supporter for the school garden program. He or she decides on the school's land use, staffing, class scheduling and the school's activities. Activities relevant to the VGTs school garden program are approved by the principal, including nominating the focal teacher for teaching and maintaining school garden activities.

Teachers

Each school nominates and selects two teachers to oversee the school garden

program. The appointed teachers are usually the Sports Teacher, another teacher or the school guard.

The teachers are in charge of establishing the school garden, teaching the school garden curriculum, leading students in gardening activities, promoting health and nutrition messages and providing technical assistance to parents who decide to start their own home gardens. The teachers are trained by the Country Team through a series of trainings on the program's action plan and data collection. In order to teach the curriculum, the country team provided teachers with teaching aids and weekly curriculum. Teachers of the school garden program receive a monthly stipend in assistance from the project for their additional tasks in running the program. They are also tasked with maintaining the garden when students are not in the school during holidays and school vacations.

During the scaling up of the project, the program teachers from every school become resource persons to disseminate and train new schools in the school garden program.

Gardener

The school gardener is often another school staff trained to run and maintain the school garden throughout the school year.

Canteen Staff

Through the project, school canteen staff are trained in nutritious snack preparation and disseminating nutrition messages to students. The staff provide healthy snacks for the students to purchase in the canteen.



Students

Students from grades 4 and 5 were enrolled in the VGtS school garden program during the first phase of the project. The students took part in the program's lessons and actively participated in school garden activities. These activities included, but were not limited to, setting up the garden, making the garden beds, sowing the seeds, taking care of and watering the vegetables, and cooking sessions. Students are encouraged to promote vegetable gardening, nutrition principles and WASH techniques in their homes.



Agriculture Extension Workers

Local agricultural extension workers in Batang District of Central Java Province work with the country team to provide continual technical assistance in agriculture to set up and maintain the school garden.

Community

Community Leaders

Community leaders are the main authority for initiatives in the community. They are village headman, religion leaders (imam/priest/monk), the elders, school principals, etc. They provide decision-making, approval, support and resources for local activities.

Parents

Parents are invited to take an active part in school garden activities and promotional events with their children. Parents are encouraged to grow their

own gardens and increase their family's vegetable consumption. Newly set up home gardens are monitored and supervised by the designated school teachers and extension workers.

Women's Group

The local women's group works in collaboration with the Country Team to support the school garden through home gardening training, and providing seeds to the schools.

The women's groups are formed to implement The Food Reserve Garden for Sustainable Agriculture Programme (led by FSA, Ministry of Agriculture), which is focused on gardening for fruits and vegetables. This program could increase the nutrition level, income, and welfare of the Indonesian society and is applied in 33 provinces. In the VGtS project, the women's group supports the school garden in providing seeds to the schools and vegetables for daily family meals.

Other Community Members

Community members, including students' families, are invited to participate in school garden events and demonstrations. Community members also help care for and provide support for the school garden, and volunteer at the school canteen.

PROCESS



R Collection of research data in project schools



PREPARATIONS

Several important preparations were necessary prior to implementation of the school garden program in schools.

Plan Project

A project planning workshop was held with country representatives, the donor, and the International Research Team consisting of scientists from partner research institutes. During this workshop, the project's objectives and strategies were discussed and the initial plan of the project was set in place. The roles and responsibilities of the attending members were defined. This included assembling the project Country Team.

Assemble Country Team

The VGtS project was assigned to a specialized team within the Center for

Dietary Diversification and Food Safety (CDDFS) of the Food Security Agency, Ministry of Agriculture by the Indonesian government. The team was supervised by a Country Manager and overseen by the director of CDDFS.

Train Country Team

The Country Team was trained on the objectives and strategies of the project by the World Vegetable Center, Swiss Tropical and Public Health Institute and University of Freiburg. The 4-week training at World Vegetable Center headquarters in Shanhua, Taiwan, included current school garden approaches, hands-on garden management, nutrition education, WASH and health topics, and communication and promotion strategies. During this period, regular Country Team meetings were held to develop the Country Action Plan.

The training of trainers manual titled, “**Vegetables Go to School: Improving Nutrition by Agricultural Diversification**” was used as a guide throughout the training. Topics included:

- School Vegetable Garden Design and Realization
- Saving Your Own Vegetable Seeds
- School Gardens and Nutrition
- School Vegetable Garden and Synergies with Water, Sanitation, Hygiene and Health
- Communication Strategies for School Vegetable Gardens
- What Is the Impact of Our School Vegetable Garden?
- Collaborative Data Management and Data Sharing

Develop Country Action Plan

The Country Action Plan was developed by the Country Team with assistance from the International Research Team. The action plan is a blueprint for the implementation of the VGtS school garden program in the country. This included the project approach, timeline, activities and roles and responsibilities related to the project.

The project was initially planned for three phases, with the first phase being a pilot phase for implementing and fine-tuning the program in 30 schools for scaling up and collecting research data for scientific evidence.

Identify Stakeholders

Stakeholders are individuals or groups that are directly or indirectly affected by or those who can influence the project. Stakeholders identified by the project are:

- CDDDFS – Ministry of Agriculture as the country team
- Government (Central Java Province and Batang District) as the local team and the leader of the agriculture extension workers
- Ministry of Education as the leader of the schools
- Ministry of Health as the partner in Healthy School Program
- Schools and school staff
- Communities (children and parents) as the main recipients directly benefitting from the program
- Local NGOs
- Local community clubs and associations related to the project
- Local media

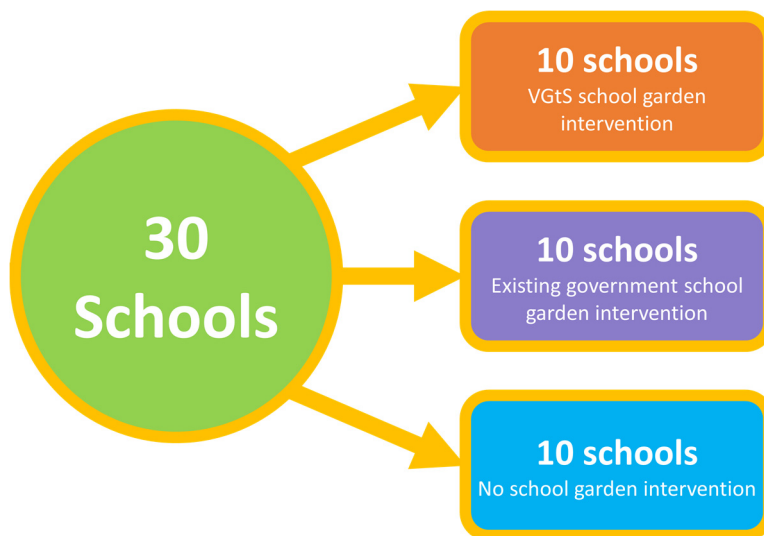
- Other community members
- National and international research organizations

The project organized an inception workshop and other workshops to engage the stakeholders and rally their support.

Identify Schools, Principal, and Teachers

In the pilot phase, 30 schools participated in the project. VGtS Indonesia chose 30 schools and divided into 3 groups as treatments in the research model for baseline and endline data survey. The survey was aimed to see the impacts of the VGtS project implementation. Those 3 groups of schools are:

1. Schools with school garden program initiated by Food Security Agency, Ministry of Agriculture, Republic of Indonesia plus VGtS Program (10 schools)
2. Schools with school garden program initiated by Food Security Agency, Ministry of Agriculture, Republic of Indonesia (10 schools)
3. Schools without any school garden program (10 schools as control)



The requirements for the 10 schools that received the intervention are:

- Primary school located in rural/urban area
- Minimum 50 m² land area available
- Potential teachers to assist the VGtS program

The requirements for the principals and teachers are as follows:

- Good ability in teaching activities
- Live near the school to monitor program effectively.

Pilot Schools in Year 1 of VGtS Project

No	School with VGtS Intervention	School with Government Intervention	School Without Intervention
1	SDN Sawangan 02	SDN Brokoh	SDN Proyonanggan 9
2	SDN Sembung 01	SDN Pandan Sari 01	SDN Toso
3	SDN Tembok 01	SDN Simbang Desa 01	SDN Sawangan 01
4	SDN Kepuh	SDN Gumawang 03	MI (Islamic School) Sembung
5	SDN Sojomerto 01	SDN Kutosari	SDN Kemiri 01
6	SDN Kauman 07	SDN Bawang 02	SDN Karang Tengah 01
7	SDN Sidayu	MI Selopajang 02	SDN Pesaren 02
8	SDN Sawah Joho 02	SDN Kebumen 02	MI Asriyah Plumbon
9	SDN Kemiri 03	SDN Kluwih 01	SDN Kumesu 01
10	SDN Menjangan 01	SDN Jlamprang	SDN Limpung 03

Inception Workshop

The inception workshop was organized to inform stakeholders on the project's goals and objectives and rally support from stakeholders in implementing the project. Participants of the workshop included:

- School principals from the participating schools
- Two teachers (or school staff) from each of the participating schools
- Agriculture extension workers
- Provincial and district teams related to the project

During the workshop, the Country Team also invited officers from Ministry of Health and Ministry of Education to discuss the synergic cooperation the three ministries to coordinate an integrated health program in the primary schools in Batang. The objectives were to:

- Gather support for the project from the three ministries
- Ask assistance from the ministries to train and support canteen staff
- Lobby for the inclusion of the school garden program and curriculum in the local curriculum

Develop VGtS Curriculum

The project created a curriculum for VGtS to guide schools in the implementation and maintenance of the school garden program. The curriculum consisted of 32 weeks of modules on gardening activities, nutrition and WASH. The curriculum was designed for 4th and 5th graders.

Develop Other Materials

Other materials developed by the project include:

Pre-intervention and Post-Intervention Surveys to assess students' knowledge, attitude and practice towards gardening, healthy eating and WASH practices and the impact of the school garden program.

Teacher Training Materials in the topics of gardening, nutrition and WASH.

Promotional materials for the VGtS school garden program include (details on the materials are found in the section – SCHOOL GARDEN PROGRAM):

- Educational flipchart on gardening, nutrition and WASH
- Comic and animation
- T-shirts, tumblers, pens, pencils, pencil cases, backpacks, lunchboxes, classroom clock with the VGtS logo and slogan of *Anak Pinat Suka Makan Sayur* – “Smart Children Like to Eat Vegetables”

Vegetables Go to School / Sayuran Masuk Sekolah Flipchart is a visual teaching aid for teachers of the VGtS program developed by VGtS Country Team at Center for Diversification and Food Safety. This colorful flipchart helps deliver the school garden curriculum with fun and easy-to-understand illustrations on gardening, nutrition and WASH concepts.

Vegetables and Nutrition for Schools in Indonesia was developed by the World Vegetable Center and Country Team members as a nutrition teaching material for schools. The material aids teachers in teaching students simple and useful nutrition concepts. The material is focused on helping students make healthy food choices by understanding the importance of nutrition, current nutritional problems in Indonesia, good nutrition and balanced diets, specific nutritional needs of different family members, and the health benefits of vegetables. In addition, the material provides photos, nutritional content and recipes for common vegetables to encourage planting and eating vegetables.

Topics include:

- Introduction to Good Nutrition (Nutrition in Indonesia)
- Healthy Diet for Indonesian People
- Good Nutrition for Indonesian People

- Nutrition Through Life
- Health Benefits of Vegetables
- Names and Photos of Common Vegetables
- Vegetable Planting Calendar
- Nutritional Information of Vegetables
- Vegetable Recipes
- Promotion

We Grow Vegetables, We Eat Vegetables! Communication Strategies for School Vegetable Gardens is a communications toolkit developed by World Vegetable Center for school garden implementers. The toolkit is a practical step-by-step guide to develop a communication strategy to effectively promote school gardens and engage the participation and interests of students.

Topics include:

- How is your school garden growing?
- To set a goal, begin at the end
- A-U-D-I-E-N-C-E
- Develop your message
- Awareness
- Incentives
- Share your experience!
- Plan a strategy
- Sample strategy

- Take the Healthy Pledge
- Classroom posters

Teacher Training and Workshops

A series of training workshops were organized by the project to fully equip teachers with knowledge and skills for implementing the school garden program in their schools. The training sessions included both lessons and practical hands-on demonstrations. The VGtS Country Team designed the trainings and partnered with institutes and staff from the Ministry of Agriculture, Ministry of Health, and Ministry of Education, and Assessment Institute of Agriculture Technology (BPTP) of Central Java in teaching the lessons.

Training for Teachers 1

The first training session was for teachers, including gardeners to be oriented in gardening and nutrition education. The two-days training also included field trips to a nearby school garden and a women's group. The topics of the training covered were:

- Cultural practices (nursery, pest and disease control, seed production)
- Nutrition
- WASH
- Presentation of World Vegetable Center's school garden project in Bali
- Training on administering assessment questionnaires and data collection

Training for Teachers 2

The second teachers' training covered the topics of:

- Improved food and nutrition science

- Making organic pesticides and organic fertilizers
- Cooking healthy and nutritious foods from school garden's harvests



The two-day interactive session included making nutritious foods such as: crispy spinach, crispy cassava leaves, vegetable noodle, and processing vegetable juices.

Training of “Healthy School Canteen”

The project held a “Healthy School Canteen Training: Vegetable-Cased Healthy and Nutritious Snacks for School Children” in Batang to train canteen staff. The school canteens are run by volunteer parents or teachers. The participants were very enthusiastic to practice making healthy and nutritious snacks from vegetables. Recipes included: juice, soft candy, jams, vegetable sticks, fruit popsicles, and an array of delicious and healthy foods.



Prepare for the School Garden

Prior to implementing the school garden program, the project aided schools in setting up the garden. This process took around two months to complete. The preparations included:

- Clearing school land
- Installing paved pathways for walking
- Installing the irrigation system
- Making garden structures, signs and racks for potted plants
- Building a nursery house
- Determining the garden layout and crop selections for year-round garden plan
- Distribution of seeds

Set Up WASH Facilities

WASH facilities were set up in the schools to aid in teaching and engaging students in WASH activities. The project provided schools with the following tools and facilities:

- Organic and inorganic trash cans
- Water tank
- Water pump
- Wash basins to wash hands after gardening or before eating
- Toilet maintenance



Develop Healthy School Canteens

The project gave the schools equipment for upgrading their school canteens. These included:

- Refrigerator

- Blender
- Gas stove
- Glass showcase

Some schools also renovated their canteen with paintings from the students to make a colorful and positive atmosphere for the students.



SCHOOL GARDEN PROGRAM

School Vegetable Garden

To enhance hands-on learning, the participating schools set up their own vegetable garden. The sizes of the school gardens depend on the available land space in the school. Schools with limited space planted vegetables in pots, containers and trellises. To achieve year-round vegetable production, access to a stable water source for irrigation is necessary. The school garden is maintained by the school guard during holidays.



Apart from the VGtS school garden lessons in the classroom, students participated in maintaining the garden during the Physical Education class or on Saturdays. Gardening activities included:

- Seedlings
- Plant media preparation

- Re-planting the seedlings
- Maintenance (watering, fertilizing, weeding, pest control)
- Harvesting
- Cooking class
- WASH activities related to gardening and cooking (such as handwashing, using latrines, and washing vegetables)

The school garden is an enjoyable project for the students and teachers. Through the hands-on activities, students learn the skills of vegetable production and cooking, enjoy being outdoors, reap the harvest from their labor, and interact with peers, teachers, parents and other community members.



List of vegetables and herbs planted in the school gardens

1	Amaranth	13	Ginger
2	Basil	14	Green onion
3	Betel	15	Kangkong
4	Bitter gourd	16	King's salad (Kenikir or <i>Cosmos caudatus</i>)
5	Cabbage	17	Lemongrass
6	Caisim (Choy Sum)	18	Lettuce
7	Cauliflower	19	Pak choi
8	Celery	20	Pumpkin
9	Chayote	21	Snake gourd
10	Chili pepper	22	Sweet corn
11	Cucumber	23	Sweet leaf (Katuk or <i>Sauropus androgynus</i>)
12	Eggplant	24	Tomato
		25	Yard-long bean

Apart from vegetables planted through the school garden programs, fruit trees were already planted in the schools. These fruits provide rich vitamins and minerals for the students. Fruit trees included:

- Passion fruit
- Banana
- Jackfruit
- Papaya

Three schools in the program have fish ponds and raised catfish, which provided protein in the students' diet through school feeding.

Curriculum – Gardening, Nutrition and Health and WASH

The teachers taught the students following the VGtS 32-week curriculum. Each week's lesson is 2 hours and is designed for grades 4 and 5 students. The lessons have interactive exercises and games, and correlates to the week's garden activities. Students recorded their learnings and planting progress for each week.



Topics include:

- Week 1: Plants and Plant Parts
- Week 2: Planning Your Garden
- Week 3: Starting your nursery
- Week 4: Site Selection and Soils
- Week 5: Soil constituents
- Week 6: Garden Size
- Week 7: Transplanting

Week 8: Composting
Week 9: Start a Compost Pit
Week 10: Introduction to Nutrition
Week 11: Food groups
Week 12: Importance of Nutrition in Health
Week 13: Irrigation, Drainage and Cultural Practices
Week 14: Integrated Pest Management
Week 15: Biological Control with Natural Enemies
Week 16: Sanitation and Hygiene Around the House and Kitchen
Week 17: Sanitation and Hygiene for Food Preparation and Storage
Week 18: Harvest and Postharvest Handling
Week 19: Food Preparation
Week 20-21: Prepare Food with Garden Harvest
Week 22: Maximizing Nutrients in Preparing Food
Week 23: Seed Saving
Week 24: Water Safety
Week 24: Safe Use of Latrines
Week 25: Handwashing
Week 26-27: Nutrition Workshops
Week 28-29: Sanitation and Hygiene Workshops
Week 30-31: Vegetable Production (Student Project)
Week 32: Final Test

Additional teaching materials include:

- **Vegetables Go to School / Sayuran Masuk Sekolah** flipchart as a visual teaching aid for teaching school garden curriculum developed by VGtS Country Team at Center for Diversification and Food Safety
- ***We Grow Vegetables, We Eat Vegetables! Communication Strategies for School Vegetable Gardens*** for VGtS school garden promotion activities developed by World Vegetable Center

- ***Vegetables and Nutrition for Schools in Indonesia*** developed by World Vegetable Center
- **WASH Manual** developed by Swiss Tropical and Public Health Institute

School Promotions

Each school promoted home gardening, eating vegetables and WASH to the students using different methods. School promotions included:

Healthy School Canteen Development

The project initiated the Healthy School Canteen in participating schools. The canteen staff are trained to prepare delicious and nutritious snacks, smoothies and drinks, noodles and other foods for the students. Fruit and vegetables from the school garden are often added to the recipes. The staff promote positive nutrition messages, including growing home gardens and help students choose healthy snacks. Students and school staff can purchase nutritious food at a subsidized price from the canteen.

To improve the canteen facilities, the project purchased a refrigerator, blender, gas stove and glass showcase for each school. The schools also received financial aid to renovate and paint the school canteen to create a colorful, friendly and clean atmosphere for the students. In some schools, the students participated in painting the canteen.



School Feeding

In Indonesia, school lunch programs are uncommon at primary schools. The schools operate on half-day schedules. Children leave school at lunchtime to eat at home. Many schools provide a mid-morning snack, but this is not always a healthy snack. In Batang, school feeding occurs 2 to 3 times a year. Through the VGtS program, school feeding was held once every month during the first year of the project, approximately 7-9 times in the year. The school and parents prepare a joint lunch for the students. The first to sixth class students ate lunch with a B2SA menu. B2SA, *Beragam, Bergizi, Seimbang dan Aman* means *Diverse, Balanced Nutrition and Safe*. This concept is promoted throughout the country's food and nutrition programs, including school gardens and women's groups. The meals include staple foods, meat, vegetables and fruits. A portion of the vegetables on the menu were harvested from the school garden. Students were happy to eat what they had grown.





Other Promotion Activities

- Posters, songs, information boards, nutrition charts, vegetable charts, comics, animation video, games, and school assemblies
- Communication between children and parents on project concepts, and garden demonstration to parents and visitors. Some parents provided advice, gardening facilities and materials to schools; schools consulted with parents about which varieties to grow and vice versa
- Invitation of a specialist from the local hospital to give a speech twice a year on the health benefits of eating and growing vegetables
- Demonstration on special garden produce, such as large and long gourds and radishes, to spark students' curiosity and interest in vegetables
- Promotional materials were given to teachers and students with the VGtS slogan *Anak pintar suka makan sayur* (Smart kids like to eat vegetables).

Promotional Materials

- Flipchart for teaching tool

- Promotion Kits and Souvenirs with the VGtS slogan *Anak pintar suka makan sayur* (Smart kids like to eat vegetables) for the students: Tumblers, lunch boxes, pen, pencil, pencil case, t-shirt, and backpack.

Public Promotion

Drawing and Colouring Competition

To promote the school garden activity in Batang Region, the country team proudly held a *Drawing and Colouring Competition* in SDN Kauman 07 on May 25, 2016. 120 primary school students from 30 schools in Batang participated in the competition. Students spent a half day drawing, painting and coloring about school gardens. The event was covered by the local media on the television news.



Healthy School Festival

As the peak public event, VGtS held the *Healthy School Festival* in SDN Tembok on May 26, 2016. The event was opened by Vice Mayor of Batang, Mr. Sutadi, who proudly showed his appreciation to VGtS achievements on the school garden program.

500 primary school students, teachers, principals, and chiefs from Batang Region and Central Java Province participated in the event, and it was covered by local television news media.

Festival highlights include:

- Visits of SDN Tembok's school garden
- Presentations on the VGtS school garden program
- Cooking Session on "Healthy Foods and Drinks from Vegetables" by Semarang State University. Participants in the festival can taste the foods and drinks such as vegetable schotel, fritter, fruit and vegetable juices and many more
- Healthy Vegetable Snacks stalls by local women's groups
- Award ceremony for the winners of the Drawing and Coloring Competition
- Singing show by students



Comic Book, Animation, and Games

The VGtS team designed a comic book and animation for children about the nutritious benefits of vegetables, how to plant a garden and principles of WASH. Children love to read comic books and resonate with the characters in the story. Both the comic book and animation are fun and creative ways to educate children.

The team also developed an interactive board game for children to play. The game is a “Snakes and Ladders”-type game. When players make poor eating choices, they slide backwards on the board, but when they make good choices, they spring forward.



Linking with Other School Nutrition and Health Initiatives

The school garden program strengthens the national school curriculum by contributing to topics taught in science and health. The program's focus on incorporating gardening, nutrition and WASH concepts made the topics in the curriculum more focused, effective and synthesized in its delivery and easier to understand for the students.

Local governments provide pilot health programs to selected schools based on distance. Some, but not all of VGtS project schools were selected. Those

with the health program benefit from the increased emphasis on health subjects, hygiene and sanitation. Health services include deworming, immunization, dental and eye checks, weight and height measurements and WASH class. The intensity and types of these services varies substantially among the schools.

Family and Community

Beyond the school walls, the project expands its influence by connecting to families and communities. Parents and community members are actively involved alongside the children, from establishing to helping maintain and support the school garden. This positive relationship with the community mutually benefits the school and the community, leading to potentially increasing:

- Awareness of the benefits of gardening, nutrition and WASH in the community
- School-community interaction
- Parents' role in students' health
- Vegetable production and consumption in the community

Students' families and the community are involved in the school garden in several ways:

Establishing the School Garden

Before establishing the garden, the School Team invited parents and communicated with them the importance of setting up a school garden. Through these meetings, parents understand the educational, health and nutritional benefits of the garden on their children. Continuous communication with parents gathered their full support for the school garden program. Parents are also invited to participate in school garden activities open to the community.

Families and other community members helped the students set up the school garden. As the majority of parents are farmers, building the school garden becomes an opportunity to exchange agricultural knowledge and techniques. New techniques, especially in vegetable gardening, were also communicated to the parents.

Homeyard Gardens

Prior to VGtS, the Food Security Agency implemented a school garden program in 2011, which linked with the Sustainable Homeyard Garden program in Indonesia. The model is for one women's group or women farmers' group to build one school garden in the village under the supervision of an agriculture extension worker. The women's group provides seed and technical support to the school.

With the VGtS project, the school encouraged families to start their own homeyard gardens. The Country Team would further link a school garden to 30 homeyard gardens from the Sustainable Homeyard Garden program. Seeds were distributed to students' families to help kickstart their gardens. Students played an active role in sharing what they have learned from the school garden program with their families. They helped the family establish and maintain the home garden. School teachers actively monitored and provided technical assistance to families who have started gardens.

School Canteen

School staff, parents and the local women's group worked together to run the school canteen. The canteen became a venue where parents, women's groups and the school interact on a daily basis for the welfare of the students. Students buy healthy food from the canteen and the money was used to keep the operation running. Community members often volunteered their time to prepare foods and juices for the canteen and as canteen vendors.



MONITORING AND EVALUATION

The VGtS team monitored the progress of the school garden program at three levels:

1. **School teachers** submitted reports on their progresses and achievements for:
 - a. Lessons taught from the curriculum
 - b. Garden activities including recording daily harvests and their purposes (vegetables were sold, given to the canteen, or for school feeding)
 - c. School feeding including dishes served and ingredients used

The teacher records were reviewed and signed by the principal and then collected by the country team.

2. **Facebook group** for teachers and country team to communicate on upcoming events, challenges and questions on gardening, sharing their progresses and successes, and upload photos.
3. **What's App** (mobile application) group for communication on gardening questions.

Internally, a **Rapid Assessment** was conducted by the World Vegetable Center on the project's implementation in Indonesia approximately midway through the project. The purpose of the assessment was to understand the situation of the project, issues and challenges, and areas of success and improvement for the project.

External Evaluation of the project was done by Mr. Douglas Pachico and Mr. John Mumba. Their activities included:

1. Dialogues with Indonesia country team in CDDDFS office, Jakarta.
2. Field trip to VGtS School Gardens in Batang & dialogues with principals, teachers, students and parents.

8 schools, 5 with intervention and 3 without intervention were evaluated by the external evaluation team.



RESEARCH

The research protocols and assessments were developed by the World Vegetable Center and the Indonesia country team. A baseline assessment was conducted prior to implementation of the school garden program and a post-implementation assessment was done to measure the impact of the program. A report detailing the VGtS research methods and results for school gardens in Indonesia was written by the World Vegetable Center. The following results are based on the report.

During the first year of the project, the study measured five main outcome indicators (Table 1) of students before and after participation in the Vegetables Go to School garden program.

Outcome Indicators

Table 1. Outcome indicators used in the study

Indicator level	Explanation	Testing method
A. Awareness	School girls and boys become aware of fruits and vegetables. They can recall different kinds and tell the names.	1. Ability to identify fruits and vegetables from a photo
B. Knowledge	School girls and boys know that different foods can help the body perform different functions. They also know some basics about sustainable agricultural production systems.	2. Food-nutrient association 3. Food-job association 4. Insect pests and natural enemies 5. Crop rotations
C. Preferences, attitudes	School girls and boys not only know about fruits and vegetables but also develop a desire to eat them.	6. Number of fruits and vegetable liked by the children 7. Preference for healthier snack choices
D. Dietary behavior	School girls and boys change their dietary and/or agricultural behavior.	8. Dietary diversity 9. Number of different vegetables consumed
E. Nutritional status	Long-term changes in dietary behavior could lead to improvements in nutritional status.	10. Anthropometrics (z-score)



Baseline Information

The students' characteristics of control and intervention schools (Table 2) shows some differences between groups due to the small sample size of the first year's study.

Table 2. Average characteristics of the sample of school children in Indonesia at baseline, 2014.

Characteristic	Control schools (n=792)	Intervention schools					
		Regular program (n=726)			Improved program (n=822)		
		Mean	Mean	p-value	Sign.	Mean	p-value
Age (years)	10.6 <i>0.1</i>	10.8 <i>0.1</i>	0.04	**	10.7 <i>0.1</i>	0.37	
Male (%)	50.0	49.3	0.86		53.3	0.37	
Female (%)	50.0	50.7	0.86		46.7	0.37	
Coming to school by foot (%)	62.6	65.7	0.79		60.1	0.84	
Walk to school for more than 30 min/day (%)	6.2	7.6	0.54		2.8	0.11	
Household size (persons)	2.5 <i>0.1</i>	2.5 <i>0.1</i>	0.85		2.4 <i>0.1</i>	0.67	
Vegetable garden at home? (%)	36.0	35.8	0.99		42.5	0.81	
<i>What meals do you regularly eat together with your parent(s)?</i>							
All meals (%)	55.8	59.0	0.66		53.8	0.83	
Only dinner (%)	13.4	14.6	0.72		16.5	0.40	
We never eat together (%)	18.4	16.3	0.66		22.6	0.54	
<i>Where do your parents work?</i>							
On a farm (%)	20.5	18.9	0.77		15.6	0.35	
In own shop or business (%)	7.2	11.6	0.12		10.3	0.19	
Work for a company (%)	11.7	10.5	0.68		11.3	0.91	
Work for government (%)	5.2	5.2	0.97		5.1	0.98	
<i>Which of the following items do you have at your home?</i>							
Tap water (%)	77.3	74.1	0.73		76.4	0.93	
Soap in the toilet (%)	94.4	94.8	0.94		97.6	0.32	
Water in the toilet (%)	91.2	88.4	0.63		94.9	0.37	

Refrigerator (%)	35.6	39.9	0.59	44.0	0.34
Toothpaste (%)	94.9	95.3	0.92	98.5	0.28

Notes: ***p<0.01, **p<0.05, * p<0.10.

Results

The research results (Table 3) show the following findings:

The Vegetables Go to School garden program significantly ($p<0.01$) increased students' **knowledge about nutrition and preference for healthy snack choices**.

The improved program also **diversified the older students' diet more than the youngers** ($p<0.01$).

Due to the short one-year pre-post intervention assessment, the study did not find significant improvements in students' vegetable consumption or nutritional status. Changes in consumption and nutritional status through a food-based approach requires time and would be more apparent in longer-term post-intervention assessments. Further analysis will be conducted to look at the effects of individual schools, as not all schools might have been equally supportive of the intervention.

Table 3. The impact of school gardens linked to complementary teaching and promotional activities about nutrition, water, sanitation and hygiene on the nutritional awareness, knowledge, preferences, eating behavior and nutritional status of 9- to 15-year-old schoolchildren in Indonesia, 2014-2015, standard deviations in italics

A. Baseline conditions

Outcome variable	Control (n=792)	Intervention			
		Regular program (n=726)		Improved program (n=822)	
		Mean	Mean	p-value	Mean
Awareness:					
1. Ability to identify fruit and vegetables	92.2 <i>1.2</i>	91.6 <i>1.3</i>	0.76	92.6 <i>1.9</i>	0.26
Knowledge about: ^a					
2. Food-nutrient association	68.6 <i>1.7</i>	69.4 <i>1.8</i>	0.74	72.5 <i>1.0</i>	0.73
3. Nutrition	70.6 <i>1.1</i>	70.1 <i>1.1</i>	0.74	68.8 <i>1.5</i>	0.43
4. Water, sanitation and hygiene	66.0 <i>1.6</i>	65.0 <i>1.6</i>	0.66	68.8 <i>3.3</i>	0.78
5. Sustainable agriculture	53.5 <i>0.9</i>	51.9 <i>0.9</i>	0.23	52.3 <i>3.4</i>	0.69
Preferences:					
6. % of fruit and vegetables liked	69.7 <i>1.9</i>	69.3 <i>1.9</i>	0.88	68.3 <i>2.7</i>	0.85
Behavior (24h recall):					
7. % of children who had eaten vegetables	77.0	75.8	0.83	80.0	0.39
8. Food categories consumed	3.8 <i>0.1</i>	4.0 <i>0.1</i>	0.31	3.8 <i>0.2</i>	0.11
Nutritional status:					
9. Height-for-age z-score	-1.2 <i>0.1</i>	-1.3 <i>0.1</i>	0.53	-1.2 <i>0.1</i>	0.60

Notes: ***p<0.01, **p<0.05, * p<0.10. a % of correct answers.

B. Endline conditions

Outcome variable	Control (n=792)	Intervention			
		Regular program (n=726)		Improved program (n=822)	
		Mean	Mean	p-value	Mean

Awareness:					
1. Ability to identify fruit and vegetables	88.6 1.2	91.6 1.2	0.81	92.7 2.6	0.28
Knowledge about: ^a					
2. Food-nutrient association	75.4 1.1	75.9 1.1	0.02 **	76.9 0.9	0.26
3. Nutrition	71.5 1.5	73.1 1.5	0.40	76.2 1.7	0.07 *
4. Water, sanitation and hygiene	74.6 1.6	73.3 1.6	0.23	78.5 2.9	0.36
5. Sustainable agriculture	59.4 1.1	57.5 1.1	0.45	64.4 3.7	0.35
Preferences:					
6. % of fruit and vegetables liked	80.2 1.7	80.9 1.7	0.58	88.1 2.7	0.05 *
Behavior (24h recall):					
7. % of children who had eaten vegetables	75.8	80.7	0.59	86.9	0.04 **
8. Food categories consumed	3.8 0.1	4.1 0.1	0.69	4.0 0.1	0.12
Nutritional status:					
9. Height-for-age z-score	-1.1 0.1	-1.2 0.1	0.88	-1.0 0.1	0.35

Notes: ***p<0.01, **p<0.05, * p<0.10. a % of correct answers.

C. Average treatment effect

	Regular program (n=726)		Improved program (n=822)		Difference	
	Mean	p-value	Mean	p-value	Mean	p-value
Awareness:						
1. Ability to identify fruit and vegetables	3.5 2.3	0.14	3.4 3.4	0.32	0.0 3.4	0.99
Knowledge about: ^a						
2. Food-nutrient association	-0.3 2.5	0.92	-2.5 1.9	0.2	-2.1 2.2	0.35
3. Nutrition	2.2 2.2	0.33	6.5 2.5	0.02 **	4.2 2.2	0.07 *
4. Water, sanitation and hygiene	-0.2 4.0	0.96	1.3 3.3	0.71	1.5 3.9	0.7
5. Sustainable agriculture	-0.3 4.4	0.95	5.8 4.9	0.25	6.4 4.0	0.13
Preferences:						
6. % of fruit and vegetables liked	1.0 3.6	0.78	8.7 4.0	0.04 **	7.8 3.0	0.02 **
Behavior (24h recall):						
	0.0	0.48	0.0	0.34	0.0	0.85

7. % of children who had eaten vegetables	<i>0.1</i>		<i>0.1</i>		<i>0.1</i>	
8. Food categories consumed	0.2 <i>0.2</i>	0.24	0.3 <i>0.3</i>	0.23	0.1 <i>0.2</i>	0.66
Nutritional status:						
9. Height-for-age z-score	0.0 <i>0.1</i>	0.85	0.2 <i>0.1</i>	0.15	0.1 <i>0.1</i>	0.28

Notes: ***p<0.01, **p<0.05, * p<0.10. ^a % of correct answers.



BENEFITS

Validated benefits of the VGtS school garden program were reported in the impact assessment. However, several benefits were observed and may not be measurable in the short-term period. These observed present and potential benefits of the school garden program were documented from face-to-face interviews with the Country Team, head teachers, focal teachers, students and their families, and through the World Vegetable Center rapid assessment, external evaluations of the project, and the impact assessment.

Beyond the school, the VGtS school garden program was seen to have **increased the number of home vegetable gardens** and **increased vegetable production and consumption** in the community.

The following are the detailed observed and potential benefits of the program on students, schools, families, community, and government.

Students

Observed Benefits

- Knowledge and skills in gardening, nutrition and WASH
- Awareness about fruits and vegetables
- Preferences for eating fruits and vegetables
- Students want to eat more vegetables
- Awareness and care for environment
- Awareness for hygienic and sanitation practice (wash hands, put trash in trash cans)
- Confidence and belief in their ability to contribute not only to their family's food security but to that of the country
- Enjoy participation in school gardening activities
- Sense of responsibility as models and teachers on gardening, nutrition and WASH at home and in the community
- School canteens used to sell unhealthy snacks containing MSG, artificial colour and sweeteners. Since the school canteen development program started, it has successfully changed the snacking habits of the children.

Long-Term and Potential Benefits

- Increased vegetable consumption
- Agricultural skills for future employment opportunities
- Ability to produce food and contribute to local and national food and nutrition security
- Ability to make healthy eating and lifestyle choices throughout adulthood
- Teach their children gardening, nutrition and WASH concepts

Schools

Observed Benefits

- Increased school capacity to implement school garden program:
 - Established garden facilities
 - Trained school staff
 - Productive use of school land
- Enhanced quality of education through hands-on learning program
- Increased competitiveness of the school in the district
- Increased interaction with families and the community (appreciation and support from parents and communities)
- Increased importance of school in the community as a resource center for sharing new agricultural technologies, and nutrition and health messages
- Greening of school environment
- The school canteen development provided healthy snacks to students during break time

Long-Term and Potential Benefits

- Recognition for higher quality of education by the school board. For example, in some schools, first year student enrolment has increased due to parents preferring to send their children to schools with the school garden program.
- Enhanced academic performance of students in the school

Families

Observed Benefits

- Students' families who already have home gardens are encouraged to continue

- Many students' families without home gardens have started their own home gardens
- More children-parent interaction and bonding due to engagement in school garden and home garden activities
- Increased home vegetable production and consumption (for families with home gardens)
- Reduced spending on vegetables (for families with home gardens) and increased opportunity to earn income from selling extra produce
- Children ask their mothers to cook and serve healthy meals daily
- Confidence in vegetable gardening gained from seeing the success of children's school garden
- Families who help make snacks for the school canteen are empowered and have an opportunity to improve their income

Long-Term and Potential Benefits

- Increased home vegetable production and consumption
- Income-generation from selling vegetables in local and distant markets
- Household food and nutrition security leading to improved nutritional status

Community

Observed Benefits

- Exchange of new farming technologies
- Neighboring community members are motivated to grow vegetables because of the school garden
- Increased home gardens and vegetable production near intervention schools

- Some farmers switched to vegetable farming from staple crop production
- Increased awareness, knowledge and preference for vegetables
- Empowered women's groups in technically aiding schools to set up their gardens
- Women's groups who help make snacks for the school canteen are empowered and have an opportunity to improve their income

Long-Term and Potential Benefits

- Diversification of agricultural production
- If all the households build their own home garden, it will create a "sustainable food garden community/area" and improve the vegetable production and consumption in the community
- New products and market opportunities
- Increased consumption of diversified food products
- Improved nutritional status
- Improved local food security

Government

Observed Benefits

- Coordination of multi-ministry school garden program

Long-Term and Potential Benefits

- The VGtS program is related to the national food security program of CDDFS, Ministry of Agriculture, and other programs of Ministry of Education and Ministry of Health. The successful implementation of VGtS can be spread everywhere in Indonesia to be a role model of school garden and community garden development in Indonesia

CHALLENGES & KEYS TO SUCCESS

Challenges

Several challenges were met by the school garden program. The following is a highlight of the main challenges:

1. **Self-motivation of the school team** in building, developing and maintaining the school garden is one of the major challenges. Initially, the project provided funds, resources and training for schools to establish the garden and teach the curriculum. However, after the first year of the project, the schools were no longer supplied with financial aid or other incentives in continuing the school garden. Moreover, joining the school garden program is additional work for the teachers. Motivating school staff is key to the success of the program and the quality of the students' learning experience. School competitions and awards are other ways the project motivated teachers.
2. Another challenge is the **motivation of agriculture extension workers** in supervising the school gardens. Without financial support, other incentives should be put in place to increase their engagement in the school garden program.
3. Constraints in growing a year-round school garden include the **lack of water** during drought season, and **seed availability**. A stable water source is necessary for the school garden to flourish. In drought-prone areas, water-saving technologies, such as pumps and drip irrigation were used. Continual provision of seeds and seed saving techniques are important for schools to continue growing vegetables.
4. **Sustainability of the school garden program** after the project finishes is an issue. The program needs to be adopted by the local

government, district and national curriculum to ensure the program continues in the schools and benefits the students. The budget to scale up the school garden program district- and nationwide needs to be assessed for the program to be cost-effective for the government.

Keys to Success

Several factors contributed to the success of the school garden program:

- The multi-ministry participation in the school garden program is vital in mobilizing resources and support for the program from the Education, Health and Agriculture ministries.
- Smooth coordination and cooperation of multi-ministry country team in organizing and overseeing the project.
- Good international partnership with research institutes to assess and generate valid data for the project.
- Intensive and hands-on teachers' trainings for the school garden program.
- Regular communication with school principals and teachers through meetings, on-site visits and mobile messaging platforms for monitoring program progress.
- Motivated school principal in supporting the school garden program.
- Motivated teachers in running, teaching, and promoting school gardening, healthy eating, and WASH to the students.
- Incentives such as school garden competitions to raise School Team's motivation, status, and accreditation of the teachers, schools, and agricultural extension workers.
- Students taking initiative to participate in the program and share what they have learned with the family.

- Supportive parents who participated in garden activities and demonstrations, running the canteen, and willing to initiate their home gardens.
- Supportive women's groups in technical assistance, seed distribution and participating in canteen activities.
- Supportive local government authorities by providing regular medical check-up for school children twice a year (dental check-up, eye examination, etc.).

Success Stories

SDN Sidayu School Canteen Success Story:

The teachers made vegetable juice for the students, and placed the juice pitcher on the canteen table. At break time, students would take the juice by themselves. They payed Rp 1000 per glass by putting the money in a can. Then, they washed the glasses and put the clean glasses on the table. This self-serving canteen model aims to teach the students to be independent and honest in their daily lives.

At SDN Sidayu, the students enjoy the school garden so much that after school, they often come back to take care of the garden and play there. The children are happy and proud of their garden.

SD Negeri Sojomerto 01

The students planted eggplant, tomato, spinach, red chili, mustard, squash, and many more vegetables in their garden. As they watched the seeds grow into plants and harvested them, they learned how food is produced and are happy with the result. Students also learn how to cook these vegetables into delicious snacks, juices and meals.

The vegetable garden has been approved as a local curriculum for grades 4 and 5 at the SD Negeri Sojomerto 01 school.

SD Sawahjoho 02

Students love gardening. They can play and learn in the garden. The students harvested vegetables together. They brought vegetables home and asked their parents to cook the vegetables. As a results, students started to love eating vegetables in their homes. They also educated their parents about the VGtS program in parent's gatherings and meetings.

SD Negeri Menjangan

At SD Negeri Menjangan, the teachers, students and their families enjoyed a Vegetable Potluck Party after an abundant harvest from the school garden. Everyone brings a different vegetable dish and shares a meal together.

SD Negeri Kauman 07

Following the weekly school garden curriculum, the students learned in both classes and in the garden. Vegetables are harvested each week from the school garden. In this school, the students have also learned to save seeds for the next season's planting. The school saved plenty of seeds and are ready to grow vegetables year after year.

RECOMMENDATIONS

Based on the quantitative and qualitative findings gathered from the Vegetables Go to School project, the researchers have the following recommendations:

- **The school garden program is an effective educational program** aimed at improving students' nutritional and health awareness and potential practice.
- **Collaboration between Ministry of Agriculture, Ministry of Education, Ministry of Health, and local governments to create an Integrated Healthy School National Program**, in which the school garden program is mandatory for schools and adopted as a national program, is necessary to sustain the program and further its impact and benefits in the community.
- **The school garden program combined with a school lunch program is more effective for children to increase their consumption of balanced meals** including their own garden produce regularly. Currently, the link between growing vegetables and eating them is not strong enough, which could weaken the impact of the project on dietary behaviour. Several schools expressed the need for a school feeding program.
- **The program should be integrated in the local curriculum** and taught as a regular school subject. This integration is necessary to sustain the program.
- **Financial and technical support for the program** is necessary for continual training of teachers and providing teaching materials.

- **School staff should be given incentives** to motivate their participation in the school garden program. VGtS trained teachers are important resource persons for training new teachers on the program during scaling up.
- **To sustain school gardens, the schools should be provided with seeds and stable water sources or water-saving technologies, and link with the community and parents.**
- If possible, the **Healthy Canteen Development project should be continued** to increase students' consumption of healthy snacks and the involvement of parents and women's groups in the school's activities and children's health.
- **Linkage with the national Sustainable Food Reserve Garden program** is recommended to improve local food production and security.
- **The school garden and home garden research data should be monitored and included in the National Food Diversification Programme** (led by Food Security Agency, Ministry of Agriculture) for continual monitoring and improvements on the programs.

SCALING STRATEGY & COSTS

Based on the experience and evidence for impact generated in phase I of the VGtS project, the Country Team has developed a plan for extending the school garden program to a larger number of schools. The plan includes a brief description of the scaling strategy and an estimation of the costs.

Scaling Strategy

Objectives

- To improve the children's knowledge about health, nutrition, and B2SA – *Beragam Bergizi Seimbang dan Aman* (various, balance nutrition, and safe) menu
- To improve the nutritional status of schoolchildren through lessons, promotions, and campaigns for children to eat more vegetables for healthy bodies and minds
- To educate schoolchildren to have an appreciation of nature and environment through school garden activities
- To educate schoolchildren in keeping their bodies and environment clean through WASH education

Targets

For 2017, the scaling strategy is to implement the school garden program in 34 provinces with 10 public elementary schools for each province. In total, the program will be implemented in 340 schools in 2017. For implementing scaling up, This targets integrated with ministry of education and ministry of health.

Primary school students, especially children aged 8-12 years old are the target population. Children in Indonesia usually don't like to eat vegetables, so they are not in balanced diet status, causing deficiency of vitamins and minerals. To change their mindsets and eating habits, children should be taught about

nutrition and healthy living. Furthermore, they can be entrusted with the responsibility of maintaining the school garden.

Theory of Change

Early-age education in primary school is expected to grow good habits in healthy eating (B2SA menu and eat more vegetables and fruits), clean and healthy living, and persists until adulthood. Children can share these good habits with their families and communities, so the nutritional status of the whole community will also improve. Children with good eating and living habits will become healthy grown-up people and expected to teach this good habits to their children.

With 340 schools implementing the school garden program, we expect at least 50 students from each school enrolled in the program. From these 50 students, at least 60% is estimated to establish home gardens with their families. Thus, the potential impacts in 2017 include:

Target Level	Target and Scaling Estimation	Estimated Final Beneficiaries
School	340 schools	340 school garden programs established and sustained
Students	50 students (enrolled in the program in each school per year) x 340 schools	17,000 students impacted by the school garden program
Household	50 students x 60% (who will establish home gardens) x 340 schools	10,200 home gardens established
Community	2-3 parents day and promotion events per school per year for each community x 50 community members x 340 schools	42,500 community members from 340 communities impacted by school gardens demonstration and nutritional promotion

Intervention Design

a) School garden setup may vary, depending on the condition of the school. Schools with limited space can build vertical gardens with pots, racks, polybags, etc. Schools with wide space can build a “conventional” garden with plant beds, pergola, etc. If the land is very wide, the school can add fish ponds, composting area, etc. The main aspect that is mandatory in every school garden is the mini-nursery to produce seeds and seedlings for the sustainability of the garden.

b) Curriculum is designed as “local curriculum” that integrates with the main curriculum as a subject. The school garden subject can be taught 2 hours each week (both in-class and practice in the school garden). The school garden curriculum contains the subject of vegetable cultivation, and is also enriched with basic knowledge about nutrition and healthy living.

c) Promotional activities are conducted in many ways. The simplest method is by displaying posters about nutrition and healthy living in every class. The media (newspaper, radio, television) can be invited to cover and spread the school garden activities to a wider range of communities.

d) The school can invite the parents and communities to contribute in this program. Parents can help the schools by providing manure, organic fertilizer or seeds for the school. School can provide seedlings to the students to grow in their own homeyard garden.

Sustainability

As described above, this program will be integrated as “local curriculum”, so this program will be sustained as a regular school subject. Support such as training for teacher and teaching materials will be provided regularly to aid teachers in implementing the program.

Scaling Approach

The program will integrate multiple ministries (Ministry of Agriculture, Ministry of Education, and Ministry of Health), supported by local and district government as the implementer, and in cooperation with local universities, research and development institutes, and communities. The Ministry of Education will take the lead in coordinating this multi-ministry team. The media will be involved in spreading information about VGtS to more communities and stakeholders regionally, provincially and nationally.

Monitoring and Evaluation

Monitoring and evaluation will be achieved by building an integrated team (cross sectoral) among ministries to oversee program activities. This team is supported by universities and research and development institutions.

Program Costs

For 2017, the cost of establishing the school garden program in 340 schools (10 schools/province in 34 provinces) is **USD 663,000**. The cost per school is **USD 1,950**.

This investment would establish 340 school garden programs, potentially impact 340 communities, benefit 17,000 students and 42,500 community members with gardening, nutrition and WASH education and practice, and establish 10,200 home gardens in Indonesia.

The purpose of the program is to improve students' nutrition and health through school gardening and home vegetable production and consumption. Costs of the program includes program administration, training of teachers, development of teaching and promotional materials and cost of setting up and maintaining the school garden.

Cost Estimation

The VGtS project estimated the costs of the implementing the school garden program in 340 schools in Indonesia (Table 4). Costs include both actual costs such as value of seed and garden tools, but also opportunity costs such as the value of land used for the garden, and the cost of time spent by teachers, children and parents.

Opportunity costs are defined as the loss of potential gain from other alternatives when one alternative is chosen. For instance, if children had not spent their time on gardening, they could have benefitted from learning other subjects. Valuing the opportunity costs is not always possible and assumptions must be made.

Table 4. The annual cost of scaling the school garden program per project activity

Activity (frequency)		Cost (USD)	Explanation
Activities conducted for the program cost per school per year:			
1.	Development of curriculum for training of school teachers (every year)	50	Expenditures on developing/improving the training course for school teachers. Exclude the actual training, which is listed under [5] below.
2.	Development of training and promotional materials for school children (every year)	50	Expenditures on developing/improving teaching materials and promotional activities for school children. Exclude the actual printing and dissemination, which is listed under [6] below.
3.	Project administration (annual)	1.000	Expenditures on regular project management including report preparation, communication with

	Activity (frequency)	Cost (USD)	Explanation
			stakeholders, project meetings, budget management, staff recruitment, monitoring and evaluation, etc.
Activities conducted per school in average cost per school per year:¹			
4.	School selection (once per school)	50	Expenditures on selecting schools to be included in the project, screening them for suitability, informing them about the project and getting approval of principal and other stakeholders.
5.	Training of school teachers and principals (every year)	100	Expenditures on conducting the training course, including the preparation of training materials, transport, food and lodging.
6.	Supply of garden inputs (every year)	50	Value of annual input expenses on seeds, water, electricity, and other inputs. Include land rental fees if paid. Also include the value of labor time spent on purchasing these inputs.
7.	Investments in school garden and related facilities (every year)	500	Expenditures on items used for more than one year, including hand hoes, watering buckets, fences, and other long-term improvements of the school garden or related facilities such as WASH infrastructure (washing basins, closed latrines, etc.).
8.	Dissemination of training and promotional materials (every year)	50	Expenditures on printing and disseminating of training and promotional materials to the schools.

Activity (frequency)		Cost (USD)	Explanation
9.	Project monitoring and evaluation (every year)	100	Expenditures on monitoring the progress by following up with teachers and principals by phone and through personal visits.
10.	Other activities		Any other expenses not included in the above.
11.	Total	1.950 per school 663,000 for 340 schools	The sum of [1] to [10].

Note: † Multiplying this by the number of schools reached would give the total budget per year.

The estimated opportunity costs of this program are:

- Additional 2 hours of time spent on the school garden program each week for the focal teachers. The program runs 32 weeks, in total; each teacher spends an additional 64 hours annually on program activities.
- Students spend 3 hours (2 hours of lessons and 1 hour in garden activities) extra each week in the school on program activities. In 32 weeks, each student spends an additional 96 hours annually on program activities.

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