



Development Model of School Gardens Through Vegetables Go to School (VGtS) Activities for Improving Nutrition of Elementary Age Children in Batang Regency, Central Java Province

Mochamad Zakky¹(✉), Heri Suliyanto², Temy Indrayanti², and Rinna Syawal³

¹ Bogor Agricultural University, Bogor, Indonesia
zakky141198@gmail.com

² Agricultural Mechanization Technology, Indonesian Agricultural Engineering Polytechnic,
Tangerang District, Indonesia

³ Food Security Agency, Jakarta, Indonesia

Abstract. Indonesia was currently facing multiple nutritional problems. One of the nutritional problems was caused by a lack of consumption of vegetables. The Vegetables Go to School (VGtS) activity was a solution to promote a balanced nutrition menu, nutrition education and family nutrition development. The purpose of this study was to determine the modeling of healthy schools through vegetables go to school activities. The method used descriptive by interpreting the results of the VGtS activity. Data were collected from 10 Elementary Schools (SD) in Batang Regency, Central Java Province that received the VGtS activity, where 15 respondents were taken from each school to see changes before and after the intervention activities for 6 months. The results of this study showed a change in the participation rate for growing vegetables from 43.2% an increase to 91.3%. In addition, households (RT) in the intervention of this activity decreased their dislike of eating vegetables from 17.3% in the early stages to 10.0% after the intervention, while sick family members also decreased from 25.3% to 12%. Changes in the condition of the beneficiaries after the intervention showed an increase in health by consuming vegetables.

Keywords: Development · Health improvement · Vegetables Go to School (VGtS)

1 Introduction

Quality nutrition is a determinant of children's survival, health and growth. Well-nourished children can grow and learn, participate and benefit society, and are able to survive the challenges of disease, natural disasters, and other forms of global crisis. Child nutrition is also a key priority in Indonesia and part of the government's SDGs commitment to tackle nutritional problems such as low birth weight and stunting. Malnutrition in children is a significant problem in Indonesia; stunting conditions, low body

weight, and wasting continue to affect children aged under five. Stunting reflects chronic malnutrition and can have long-term impacts, including stunted growth, decreased cognitive and mental abilities, susceptibility to disease, low economic productivity, and low quality of reproductive output. Wasting is the result of acute malnutrition and high frequency of illness in children; This condition increases the risk of child mortality significantly. Stunting and wasting occurs because children do not get proper or appropriate nutrition at all stages of their lives. This condition can have significant implications for the health and survival of children in the long term as well as Indonesia's economic productivity and the nation's ability to achieve its national and international development targets [1].

The role of nutrition for health and intelligence has been scientifically proven. Balanced nutrition, namely a diet that is sufficient in number and diversity accompanied by a healthy lifestyle such as washing hands with soap and physical activity is one of the keys. It is a shame that the food consumption patterns of Indonesians, including children, have not been balanced, including very minimal vegetables and fruit. Efforts to increase consumption of vegetables and fruit must be started early. School as a vehicle for learning is the right place to teach children to love vegetables and fruit. With school gardens, children will feel the benefits of their work, be physically active and learn to love the environment. The integration of school gardens with the implementation of the school sanitation program, namely the provision of clean water facilities, separate toilets that meet the requirements to support efforts so that Indonesian children grow up healthy, smart, active and productive [2].

Utilization of the yards a source of nutrients, especially those from vegetables and fruit is a nutritional coral. In Indonesia, most schools still have yards, and many school yards are not used or are not well maintained. Utilization of the school yard into a school garden has great potential, both as a source of nutrition (vegetables and fruit), as well as a medium for learning the use of the yard that can be applied to students' homes. The use of school gardens for nutrition improvement was first introduced by FAO and UNICEF through the Applied Nutrition Program which was started in 1957. Recently, school gardens have received more and more attention and are being applied in various parts of the world as a means to promote balanced nutrition, nutrition education, and environment and improvement of life skills [3].

Vegetables Go to School (VGtS) is an activity that aims to overcome nutritional deficiencies (malnutrition), especially in children, by building school gardens in several countries in Asia and Africa. This activity is an initiative of the Asian Vegetables Research and Development Center (AVRDC) based in Taiwan and is supported by the Swiss Agency for Development and Cooperation (SDC) [2].

The World Vegetable Center experience shows that by introducing the concept of gardening as part of the public-school curriculum in the Philippines, it is possible to change diets and educate parents. The program under the name "Gulayan sa Paaralan", running until 2016 under the Philippine Department of Agriculture, supports the establishment of vegetable gardens in 42,076 public primary and secondary schools in his country [4].

The vegetable garden, which is held in schools, aims to broaden the introduction of the family vegetable garden model to students. In addition, the school's vegetable garden is also intended to increase knowledge about vegetables, so that students will get used to consuming various types of vegetables. Vegetable cultivation in schools is very useful for introducing new types of vegetables, increasing students' interest in consuming vegetables, and reducing spending on buying nutritious food. This vegetable garden is designed in a narrow area, because in Indonesia most families do not have a large yard area. Approaches to overcoming the problem of malnutrition require adequate amounts of protein, carbohydrates and micronutrients in foodstuffs [5]. As happened in Africa, the pressure of population growth and poverty can lead to malnutrition and is projected to continue until 2020 [6].

Therefore Stephenson et al., [7] stated that school vegetable gardens can overcome nutritional deficiencies that are often experienced by school students. The results of a study by the Asean Vegetable Research Development Center between 1990 and 2000 showed that the implementation of the vegetable garden program with as many as 30,000 households in Bangladesh, Cambodia, Nepal and the Philippines could significantly increase vegetable consumption. The application of this vegetable garden can also increase household income in these countries. However, the increase varies between countries. Cambodia is the country with the largest increase in income. In addition, vegetable gardens in Bangladesh significantly reduce the prevalence of anemia [8].

In Indonesia, the school garden program is also implemented under the name Vegetables Go to School (VGtS) program. Since 2010–2017. This activity is carried out by the Food Security Agency, Ministry of Agriculture with the location of the activity in Batang Regency, Central Java Province (1). VGtS activities take a two-way approach: classroom curriculum and school gardens. The VGtS school curriculum lasts 32 weeks and teaches students: Good Gardening Practices; Nutrition Education; and Water, Sanitation and Hygiene (WASH). The school garden combines practical gardening activities and demonstrations to enhance the student learning experience. Vegetables Go to School activities are not only held in Indonesia but also in several other African and Asian countries. In addition to the purpose of improving nutrition, this program is also intended to have a multiplier effect, for example school children become agents of change by bringing the concept of school gardens into house yards [9].

School gardens are an important requirement with regard to the promotion of a balanced diet, nutrition education and development of life skills [3]. School gardens must be conceptualized and implemented together with the local community and must be related to the local environmental and socio-cultural context, especially in the choice of plant species and garden maintenance techniques. Successful school gardens target not only school students, but also principals, teachers, school staff and parents.

School garden activities can have a multiplier effect by encouraging the growth of private vegetable gardens in students' homes. The most important thing to do to build a school garden is to create a relationship between aspects of nutrition, health, agriculture, and education to build a strong synergy [10].

According to the World Vegetable Center [11], a successful school garden can be seen in the following indicators:

1. improve students' understanding of biological processes, sustainable agricultural practices, and increase environmental awareness;
2. provide better information on healthy food choices, encourage intake of diverse diets and ensure availability of water, sanitation and hygiene;
3. lower food prices and provide a safety net for the poor by giving them the ability to grow their own food.

The purpose of this study was to determine the modeling of healthy schools through vegetables go to school activities.

2 Methodology

The method used is descriptive qualitative. By collecting data from respondents who are beneficiaries of the Vegetables Go to School (VGtS) activity to see changes before and after the activity intervention. Sources of data from this research are the beneficiary schools of the Vegetables Go to School (VGtS) activity, where 15 respondents were taken from each school, so the total number of respondents was 150 people. The beneficiary schools of VGtS activities are shown in Table 1.

Table 1. Beneficiary schools of VGtS activities

No	School Name	Village	(Sub District)
1.	SDN Sawangan 02	Sawangan	Gringsing
2.	SDN Sembung 01	Sembung	Banyu Putih
3.	SDN Tembok 01	Tembok	Limpung
4.	SDN Kepuh	Kepuh	Limpung
5.	SDN Sojomerto 01	Sojomerto	Reban
6.	SDN Kauman 07	Kauman	Batang
7.	SDN Sidayu	Sidayu	Bandar
8.	SDN Sawahjoho 02	Sawahjoho	Warung Asem
9.	SDN Kemiri 03	Kemiri Barat	Subah
10.	SDN Menjangan 01	Menjangan	Subah

Source: primary data

Table 2. Average number of household members and elementary school children

No.	School Name	JART (person)	Number of elementary school children (person)
1	Sembung	5,2	1,0
2	Sojomerto	3,7	0,4
3	Kepuh	4,5	0,8
4	Sawahjoho	5,2	0,4
5	Kemiri	3,4	0,3
6	Menjangan	3,8	1,0
7	Sidayu	4,7	1,4
8	Sawangan	3,5	0,4
9	Tembok	4,7	0,6
10	Kauman	4,8	1,3
Average		4,4	0,8

Source: primary data

3 Results

The family is the first educational environment for their children. So how to educate children and the type of food given to them will become a pattern for them. Many research results show that the level of education and knowledge of parents will affect the habits and mindset of their children. Therefore, seeing that this family is still a young family, there will be many opportunities and time to take part not only for members of the family but also for the environment. In Table 2 it can be seen the average number of household members (JART) and the average number of children who are still in school at the elementary school level.

3.1 Participation in Planting Vegetables

From Fig. 1, all families were observed about growing vegetables, the level of participation in planting was different between schools. At the beginning of the activity, the participation rate in growing vegetables in the Sembung Elementary and Kepuh Elementary School areas reached more than 80%, meaning that 80% of the families at that time were growing vegetables. On the other hand, less than 5% of families in the Kauman Elementary School.

Table 3 shows an increase in household members in each elementary school (SD) who grow vegetables. At the beginning of the activity an average of 43.2% grew vegetables and after 6 months of intervention (endline) an average of 91.3% grew vegetables. This is due to the ease of access to get vegetable seeds/seeds.

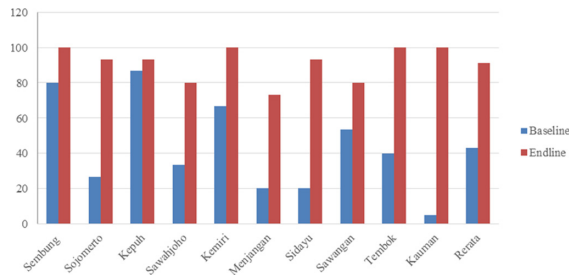


Fig. 1. Participation in planting vegetables.

Table 3. Number of JART planting vegetables

No	School Name	Number of JART Planting Vegetables (%)	
		Baseline	Endline
1	Sembung	80	100,0
2	Sojomerto	26,7	93,3
3	Kepuh	86,7	93,3
4	Sawahjoho	33,3	80,0
5	Kemiri	66,7	100,0
6	Menjangan	20	73,3
7	Sidayu	20	93,3
8	Sawangan	53,3	80,0
9	Tembok	40	100,0
10	Kauman	4,9	100,0
Average		43,2	91,3

Source: processed data

3.2 Proportion of Dislike Eating Vegetables

In Fig. 2 and Table 4, in general, those who dislike eating vegetables decreased from the baseline 17.3% to the endline 10%. From Fig. 2 and Table 4, it can be seen that SD Sidayu experienced an increase in dislike of vegetables. The results of interviews with respondents that there are still family members who do not like vegetables for certain types so that they do not consume vegetables that they do not like. There are various reasons why you don't like certain vegetables, but the reason "from a young age is not introduced to vegetables" is certainly very concerning. This is the fault of parents in the upbringing of their children, especially in terms of introducing vegetables that should be done since childhood. Changing food consumption patterns and vegetable choices when they are adults is relatively difficult, except because there is an element of "compulsion" due to illness and others. Therefore, parents should introduce their children to various types of healthy foods and vegetables from an early age.

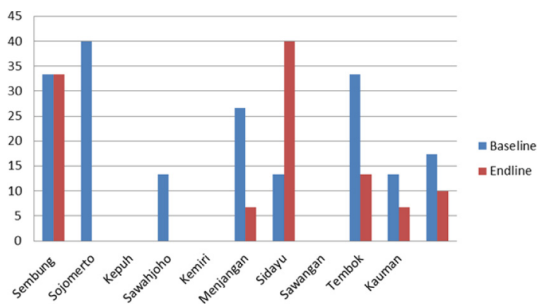


Fig. 2. Comparison of dislikes eating vegetables.

Table 4. Proportion of dislike eating vegetables

No.	School Name	Proportion of Dislike Eating Vegetables (%)	
		Baseline	Endline
1	Sembung	33,3	33,3
2	Sojomerto	40,0	0,0
3	Kepuh	0,0	0,0
4	Sawahjoho	13,3	0,0
5	Kemiri	0,0	0,0
6	Menjangan	26,7	6,7
7	Sidayu	13,3	40,0
8	Sawangan	0,0	0,0
9	Tembok	33,3	13,3
10	Kauman	13,3	6,7
Average		17,3	10,0

Source: processed data

3.3 Proportion of Non-sick JART

From Fig. 3 and Table 5 shows that family members who do not get sick after consuming vegetables. On average, there was a decrease of 13.3% from the baseline of 25.3% to the endline of 12.0%.

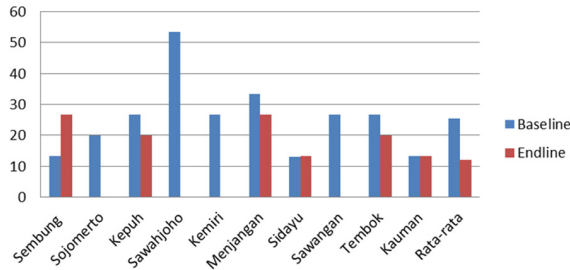


Fig. 3. Comparison of sick JART.

Table 5. Proportion of sick JART

No.	School Name	Proportion of sick JART (%)	
		Baseline	Endline
1	Sembung	13,3	26,7
2	Sojomerto	20,0	0,0
3	Kepuh	26,7	20,0
4	Sawahjoho	53,3	0,0
5	Kemiri	26,7	0,0
6	Menjangan	33,3	26,7
7	Sidayu	13,0	13,3
8	Sawangan	26,7	0,0
9	Tembok	26,7	20,0
10	Kauman	13,3	13,3
	Average	25,3	12,0

Source: processed data

4 Conclusion

Some things we can conclude from the Vegetables Go to School (VGtS) activity are as follows:

1. The perceived impact of VGtS activities is an increase in beneficiary participation in growing vegetables from 43.2% to 91.3%. Meanwhile, the dislike of eating vegetables also decreased from 17.3% to 10.0% and another impact of consuming vegetables was that it could reduce sick family members from 25.3% to 12.0%.
2. Integrate the development of school gardens and sanitation in UKS activities as well as enrich the curriculum for physical education and health, natural science, other subjects with local content about school gardens, the benefits of vegetables and fruit as well as the importance of environmental hygiene and sanitation and the development of a healthy school model.

3. Involving all students and teachers in structured activities for the development of school gardens, integrated with efforts to increase physical activity for obesity prevention and natural science subjects for nurseries, as well as character education.
4. The recommendation from the VGtS activity for parents of respondents is that parents should bring lunch to their children with healthy provisions that meet nutritional needs, such as vegetables, animal foods and fruits that are processed according to children's tastes and ready to be served and eaten. Children's supplies should also vary every day both in terms of the type of food and its processing so that the children do not get bored.

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