World Vegetable Center

# Vegetables and Nutrition for Schools in **Indonesia**

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# CONTRIBUTORS

## Concept and Information

World Vegetable Center
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"Vegetables and Nutrition for Schools in Indonesia" is a product of the Project "Vegetables Go to School" (2013-2016). We are grateful for the financial support of the Swiss Agency for Development and Cooperation.



Publication Number: 17-812

***Suggested citation:***
Luoh JW, Yang RY, Mecozzi M, Luther G, Schreinemachers P, Syawal R, Sulihanti S. 2017. Vegetables and Nutrition for Schools in Indonesia. World Vegetable Center, Taiwan. Publication No. 17-812. 55 p.

# Contents

# INTRODUCTION TO GOOD NUTRITION

Good nutrition means eating healthy foods and a balanced diet to provide the energy and nutrients we need for proper growth and to stay healthy for work, study, and fun. Without good nutrition, people easily become sick and suffer from diseases, infections, and poor energy. Healthy foods help the family fight common diseases and save money on hospital visits.

Good nutrition comes from eating plenty of different types of foods every day.

## NUTRITION IN INDONESIA

### Malnutrition

Nutrition is important for Indonesians. When people make poor diet and food choices, problems of malnutrition can happen.

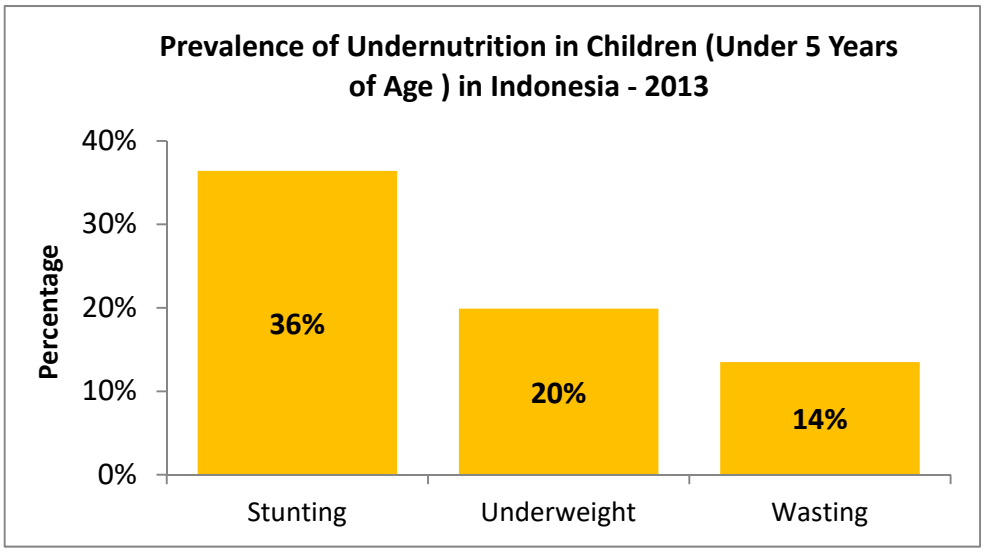
In Indonesia, many children face undernutrition conditions every day. In the picture below, we can see that about 1 out of 3 children under the age of 5 are stunted, 1 out of 5 are underweight and about 1 out 10 are wasted for their age.

**Malnutrition** can be one of two kinds:

- **Undernutrition**: Not eating enough healthy and nutritious foods
- **Overweight and obesity**: Having an imbalanced diet and eating more than enough foods for the body's use

**Undernutrition** can cause stunting, underweight and wasting in children:

- **Stunting** is when the child's height is shorter than an average child his or her age due to malnutrition
- **Underweight** is when the child's weight is less than an average child his or her age due to malnutrition
- **Wasting** is when the child's fat and muscles are wasting away, making them thin due to being hungry or starving recently




Source: NLiS, 2014

## Nutrient Deficiencies

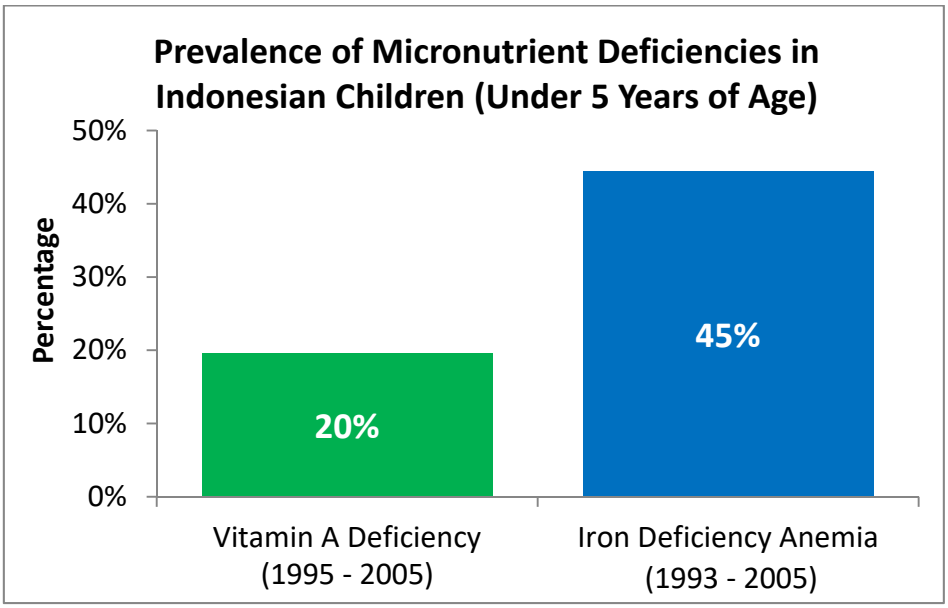
Malnutrition can lead to many nutrient deficiencies. The nutrients we receive from different foods help our bodies maintain normal functions. When one or more of the nutrients are lacking, our bodies become weak and do not function properly.

This table outlines the nutrients in foods and signs of nutrient deficiencies:

| Nutrient | Function | Signs of Deficiency |
|---|---|---|
| **Protein** | Used to build new cells, repair wounds, and for energy | Stunted growth, lack of energy, often sick |
| **Water** | Needed for body processes and cooling; especially important with excessive sweating, diarrhea, and fever | Dehydration; small amount and dark urine |
| **Vitamin A** | Prevents infection; essential for eye health; important for growing children; support immune system | Night blindness and other eye problems; weak immune system |
| **B Vitamins** | Help body use nutrients | Weakness, tiredness |
| **Vitamin C** | Needed for healthy bones and blood vessels; protects immune system | Swollen, bleeding gums |
| **Folate** | Helps red blood cells carry oxygen to the body; may help prevent anemia | Anemia – fatigue, reduced productivity, slower learning |
| **Calcium** | Strong teeth and bones; very important for growing children | Thin bones, muscle spasms |
| **Iron** | Needed for red blood cells to carry oxygen; especially important for girls and women ages 10-55 | Fatigue, reduced productivity, slower learning |
| **Magnesium** | Needed for strong bones and teeth; protects immune system | Muscle spasm, tiredness, loss of appetite |
| **Potassium** | Needed to rehydrate the body; important with excessive sweating and diarrhea | Dehydration |

| Nutrient | Function | Signs of Deficiency |
|---|---|---|
| **Zinc** | Important for proper growth for children | Stunted growth |
| **Fiber** | Improves digestion and nutrient absorption; food has more bulk, gives feeling of fullness | Hard stools, constipation |

Vitamin A and iron are nutrients that are most often deficient in children and adults, especially pregnant and young mothers. In Indonesia, about 1 out of 5 children under 5 years old lack vitamin A in their diet, leading to long-term eye problems such as night blindness, xerophthalmia (extremely dry eyes), and eventually going blind. Approximately half of children under 5 years old are iron-deficient. The immediate consequence is iron deficiency anemia, which is often seen as being physically very tired, slow in learning and unmotivated, and not being able to work or study.




Source: WHO, 2008 and WHO, 2009

## GOOD NUTRITION FOR INDONESIAN PEOPLE

To help guide Indonesians with their eating choices, Indonesian Dietary Guidelines for the general population were developed by the Ministry of Health (MoH) in 1995 with the following messages:

- Eat a wide variety of foods
- Consume foods to provide sufficient energy
- Obtain about half of total energy from complex carbohydrate-rich food
- Obtain not more than a quarter of energy from fats or oils
- Use only iodized salt
- Consume iron-rich food
- Breastfeed your baby exclusively for 4 months
- Eat breakfast
- Drink adequate quantities of fluid that are free from contaminants
- Do physical activity regularly
- Avoid drinking alcoholic beverages
- Consume food that is prepared hygienically
- Read the labels of packaged foods

It is important to follow these recommendations and establish a healthy eating lifestyle.

## Tumpeng Gizi Seimbang (Cone of Balanced Nutrition)

The Institute of Danone in Indonesia has designed an unofficial yet useful guide for healthy eating. The guide is called “Tumpeng Gizi Seimbang” or Cone of Balanced Nutrition. It tells people what kinds of foods to eat and how much to eat each day for a healthy diet.

A balanced diet means eating from the different food groups. The 5 food groups recommended by the Tumpeng Gizi Seimbang are:

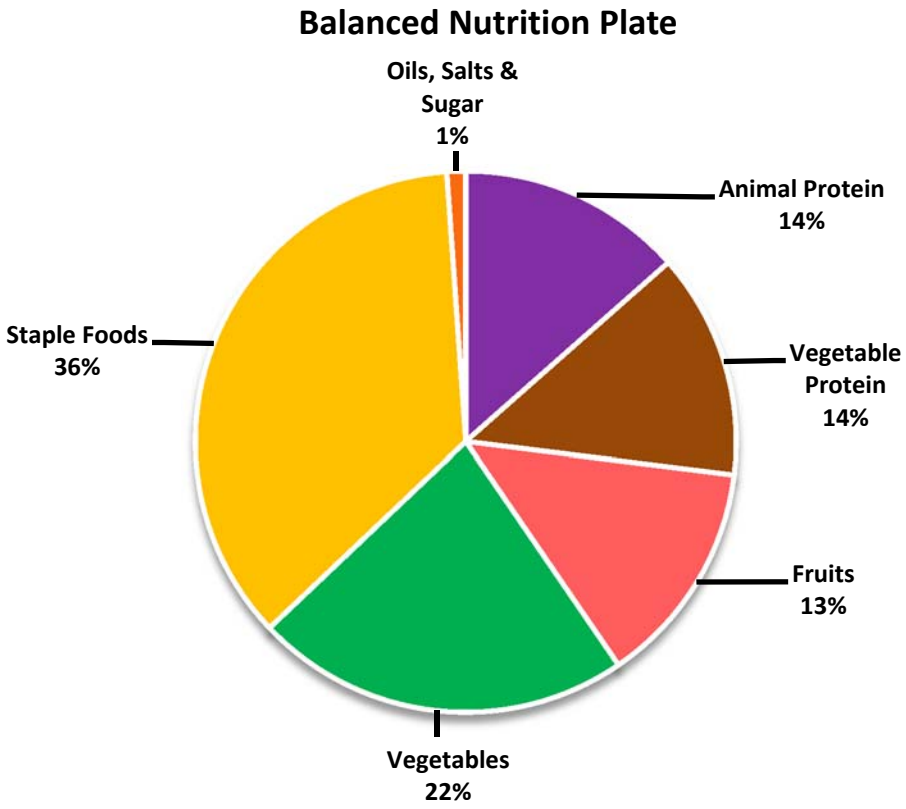
- Animal Protein (meat, egg, and milk): 2-3 servings daily
- Vegetable Protein (beans, peas, tempeh/tofu, nuts): 2-3 servings daily
- Fruits: 2-3 servings daily
- Vegetables (all other vegetables): 3-5 servings daily
- Staple Food (rice, cereals, bread, noodles, and corn): 3-8 servings daily

Apart from guidelines for eating, the cone recommends drinking 8 cups of water and exercising every day for an overall healthy lifestyle.

Oils, salt, and sugars should only be used when needed and not in large quantities.

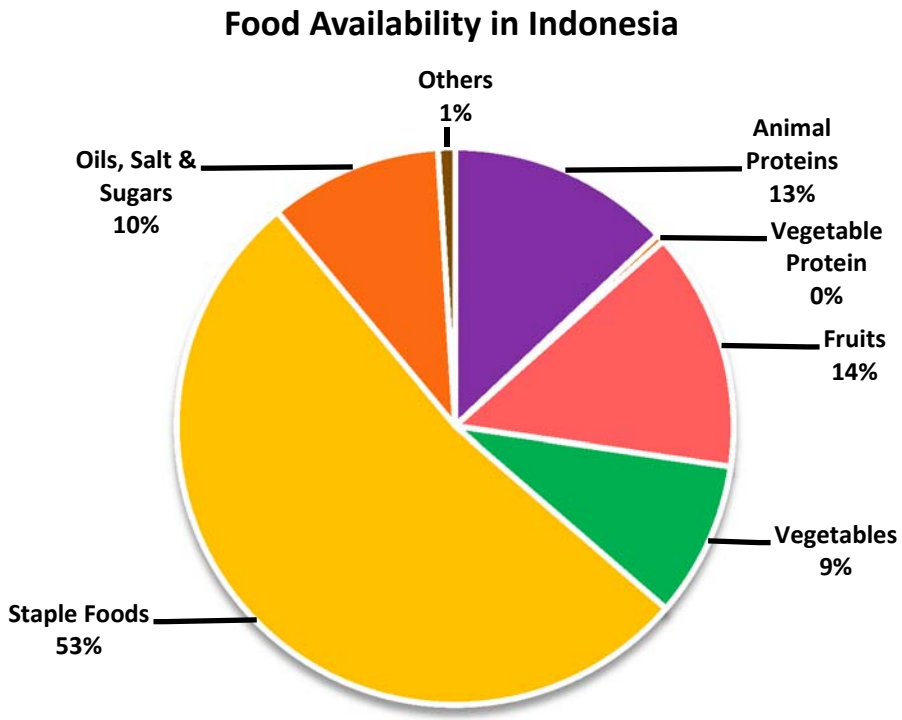
Source: Soekirman, 2011

According to the cone principle, the recommended portions of foods from each food groups that should be eaten daily are roughly represented in the plate below:




## Indonesian Food Patterns

Let us take a closer look at what kinds of foods are available for the Indonesian people. The chart below shows the distribution of foods available daily for each person.




Source: FAOSTAT, 2014

Staple foods such as cereals and starchy tubers make up more than half of the foods available in the Indonesian diet followed by some fruits, animal proteins and vegetables.

Compared to the Balanced Nutrition Plate above, the supply of animal proteins and fruits follow the recommendations. However, the supply of vegetable protein and vegetables are low. It should be noted that this information did not take into account the foods that could be made available through import from other countries. Moreover, staple foods and oils, salt and sugars are much higher than the recommended amount.

Simple modifications to eat more vegetables, vegetable proteins and reduce staple foods, oils, salt and sugar in the diet will make the diet more balanced.

The specific food items available daily for each person (per capita) are listed below:

| Food Availability in Indonesia | |
|---|---|
| **Food Items** | **g/capita/day** |
| **Animal Protein** | |
| Meat | 35 |
| Offal | 5 |
| Animal Fats | 2 |
| Eggs | 12 |
| Milk | 38 |
| Fish, Seafood | 78 |
| **Vegetable Protein** | |
| Pulses | 4 |
| Tree Nuts | 2 |
| **Fruits** | |
| Fruits | 181 |
| **Vegetables** | |
| Vegetables | 118 |
| **Staple Foods** | |
| Cereal | 522 |
| Starchy Roots | 165 |
| **Oils, Salt & Sugars** | |
| Vegetable Oils | 27.5 |
| Oil Crops | 63.8 |
| Sugar Crops | - |
| Sugar & Sweeteners | 40.3 |
| **Others** | |
| Stimulants | 7 |
| Spices | 3 |
| Alcohol Beverages | 3 |
| Energy (kcal) | 2713 |

Source: FAOSTAT, 2014

# NUTRITION THROUGH LIFE

Good nutrition is especially important for infants, children, adolescents, pregnant and breastfeeding women, and elderly people.

**Newborn infants (0-6 months old):** It is recommended by the World Health Organization (WHO) to feed only mother's breast milk to infants from 0 – 6 months of age. Breast milk is the best source of nutrition for newborn infants.

Breast milk:

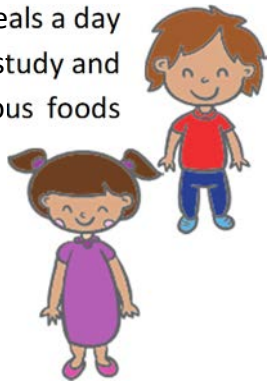
- Provides all the nutrients a baby needs
- Is easily digested and used by the baby's body
- Is clean and safe
- Protects against infections
- Helps the bonding between mother and baby
- Costs less than infant formula or cow's milk

**Infants (6 months and older):** Start feeding soft and healthy foods to infants by 6 months of age along with mother's breast milk. When preparing food for babies, it is important to use boiled and clean water. Start with small amounts of soft foods and increase the amount as the baby grows. Mothers can continue to breastfeed the children until they are ready to be weaned.

Foods suitable for babies at this age include:

- Soft, well-cooked and clean porridge made from cereals and legume flour
- Well-cooked vegetables, fruits, meats, fish and eggs
- Add a small amount of oil or fat to the baby's food
- Give healthy snacks (for example: fruits, boiled potato, sweet potato, or taro, and snacks made from cereals/legume flours)

**Older children and adolescents:** Eat three healthy meals a day (breakfast, lunch, and dinner) to help children grow, study and play. Adolescents need greater amounts of nutritious foods than children as they are growing fast and becoming adults.



Foods suitable for older children and adolescents:

- Cooked potato and sweet potato or whole grain rice and porridge made from wholegrain cereals eaten with milk, eggs, other animal foods, fruits and vegetables

**Pregnant and breastfeeding women:** Eating nutritious meals many times throughout the day will help mothers provide important nutrients for their babies' growth.

- Eat more animal foods (for example: meat, fish, poultry, dairy, eggs)
- Eat more colored (yellow, orange, red, purple) fruits and vegetables, and dark leafy green vegetables
- Eat extra snacks (for example: a fruit, a vegetable, a starchy tuber, a bowl of porridge) to provide more nutrients during pregnancy and breastfeeding
- Avoid smoking tobacco and drinking beverages with high amounts of caffeine and alcohol during this time

**Elderly people**: As people age, nutrition is especially important to keep the body strong against diseases.

- Eat more small portions and frequent healthy meals
- Avoid foods high in fat and salt
- Eat soft and well-cooked foods

# HEALTH BENEFITS OF VEGETABLES

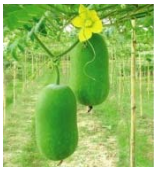
Vegetables are an important part of a healthy diet and provide many health benefits. They are especially rich in fiber, vitamins and minerals.

Vegetables are low in fat. They are good foods for keeping our weight healthy. Eating vegetables can help reduce illnesses such as high blood pressure, high blood glucose or diabetes, heart diseases, obesity, cancers, eye and digestive problems.

**What are the nutrients in vegetables that help keep my body healthy and strong?**

**FIBER** in vegetables helps good **DIGESTION** for healthy stomachs
*Almost all vegetables are good sources of fiber*

Ash gourd



Bitter gourd

Eggplant

Beans

**PROTEIN** in vegetables builds **MUSCLES** that helps our arms, legs, and body move

*Peas and beans are good sources of protein*

Peas and beans

**CALCIUM** in vegetables builds healthy **BONES, TEETH** and **NAILS**

*Dark green leafy vegetables are good sources of calcium*

Amaranth

Drumstick

Spinach

**IRON** in vegetables is good for our **BLOOD** and protects against **ANEMIA**

*Dark green leafy vegetables are good sources of iron*

Amaranth

Pumpkin leaves

Ridge gourd leaves

Spinach

**VITAMIN A** in vegetables keeps our **EYES** healthy and prevents **NIGHT BLINDNESS**

*Orange-colored vegetables and dark green leafy vegetables are good sources of Vitamin A*

Carrot

Pumpkin

Sweet potato


Malabar spinach

Amaranth

Spinach

**VITAMIN C** in vegetables helps heals **WOUNDS** and **CUTS**

*Most vegetables are good sources of Vitamin C*

Bitter gourd

Cauliflower

Amaranth

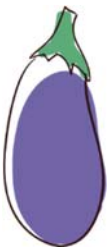
Kohlrabi

**Functions and sources of main nutrients present in vegetables**

| Nutrient | Role/Function | Vegetable Sources |
|---|---|---|
| Fiber | • Aids proper digestion of foods and maintains healthy stomach and intestines<br>• Makes the food bulkier and gives the feeling of fullness | ***Almost all vegetables***<br>Examples: Cassava leaves, French bean, garden pea, red |

| Nutrient | Role/Function | Vegetable Sources |
|---|---|---|
| | • Absorbs water and makes the stools soft, which prevents constipation and other gut-related diseases such as diverticulitis<br>• Reduces cholesterol and glucose absorption, lowering the risk of heart diseases and diabetes<br>• Promotes good gut bacteria that aids in digestion and absorption of nutrients | bean, yam bean, young jackfruit |
| **Minerals** | | |
| Calcium | • Helps build strong bones and teeth<br>• Maintains normal heart and muscle functions<br>• Helps blood clotting and regulation of blood pressure<br>• Important in immune functions | ***Most dark green leafy vegetables***<br>Examples: Amaranth, cassava leaf, celery, carrot, French bean, garden pea, garlic, green papaya, kangkong |
| Iron | • Makes red blood cells<br>• Helps brain and immune functions<br>• Plant-based iron is not as efficiently absorbed as animal-based iron | ***Most dark green leafy vegetables and beans***<br>Examples: French bean, red bean, spinach |
| **Vitamins** | | |
| Vitamin A | • Beta-carotene is found in high amounts in orange and yellow vegetables<br>• In the body beta-carotene is converted to vitamin A | ***Orange colored vegetables***<br>Examples: Carrot, sweet potato<br>***Dark green leafy vegetables*** |

| Nutrient | Role/Function | Vegetable Sources |
|---|---|---|
| | • Essential for maintaining healthy skin, immune system, vision and promote normal growth and development<br>• Fat soluble vitamin<br>• Eating or cooking orange and vegetables with a small amount of oil can promote absorption of vitamin A | Examples: Amaranth, bunching onion, cassava leaf, Chinese cabbage, kangkong, lettuce, mustard greens, spinach |
| Vitamin C | • Helps heal cuts and wounds and keeps teeth and gums healthy<br>• Aids in iron absorption and uses calcium and other nutrients in building the body<br>• Water soluble vitamin, can easily be lost when food is cut, heated or boiled for a period of time | ***Most vegetables***<br>Example: Bitter gourd, broccoli, cassava leaf, cauliflower, chili, mustard greens, sweet pepper |
| Folate (Folic acid) | • Helps body form red blood cells and other cells<br>• Reduces the risk of central nervous system in developing fetus such as neural tube defects, spina bifida, and anencephaly | ***Beans and leafy vegetables***<br>Example: Amaranth, bitter gourd, Malabar spinach, moringa, snap bean, spinach, taro leaves, and yard long bean |



**Do all vegetables have the same kind of nutrients?**

***No. Every vegetable contains different amounts of nutrients that are good for our body.*** Eating one type of vegetable cannot supply all the nutrients our body needs for good health. ***It is important to eat 2-3 types or more of vegetables every day or every week to have a variety of nutrients for good health.***

## How many vegetables should I eat?

The World Health Organization suggests eating **at least 200 g of vegetables and 200 g of fruits every day**. Since vegetables are low in sugar and fat, eating more than 5-7 servings a day is encouraged.

An easy way to estimate serving size is using the adult fist. One serving of cooked vegetables or raw, leafy greens similar to the size of a fist would be considered one serving size.

**Portion size for 1 serving of vegetable**

| 1 serving of vegetable is equivalent to 75-80 g of vegetables | | |
|---|---|---|
| OR | 1 cup* of raw leafy vegetables |  |
| OR | 1/2 cup* of non-leafy vegetables |  |
| OR | 1/2 cup* of cooked or canned vegetables |  |

| | | |
|---|---|---|
| OR | 1/2 cup* of vegetable juice |  |
| OR | Vegetables the size of an adult fist |  |
| *1 cup = 250 ml | | |

## What type of vegetables should I eat?

***When selecting vegetables, it is important to choose vegetables that are fresh and in season. Eat different types and colors of vegetables, such as dark leafy greens, bright orange, red, yellow and dark purple vegetables to add diverse nutrients to your plate.***

Eating one single type or color of vegetable will not help meet daily nutrient needs. It is important to eat many types of vegetables every day or during the week.

For example, orange-colored vegetables (such as carrot) are especially rich in vitamin A, which is good for our eyes. Red-colored vegetables such as tomatoes and red peppers are especially high in antioxidants called lycopene and capsanthin. Dark green vegetables are good sources of folate and minerals. Purple vegetables contain antioxidants. All these nutrients have protective effects on many important body organs such as the eyes, heart, lungs, liver, and digestive system.

## How do I use vegetables?

***Clean vegetables thoroughly before cutting or cooking***

***Eat vegetables raw, blended in juices or cooked in any family dishes***

Before cooking or eating, it is important to handle fresh vegetables safely. Be sure to wash the vegetables thoroughly with clean water to remove any dust, bacteria and pesticide residues. Only scrub vegetables with a tough outer skin (for example, carrots, cucumbers, and pumpkins) that do not bruise easily.

Use a clean chopping board to cut vegetables. If possible, use a separate chopping board for fruits and vegetables and another one for raw meats.

Vegetables can be eaten raw, blended into juices or prepared with any suitable cooking methods such as boiling, steaming, stir-frying, stewing and braising. To maximize the nutrient content of vegetables, it is recommended not to cook for a long period of time at a high temperature. It is advisable to avoid adding too much salt, sugar and cooking oil.

Generally, raw vegetables are highly nutritious, as cooking can reduce the nutrient content. However, adding a small amount of cooking oil, preferably vegetable oil, when eating and cooking can increase the absorption of fat-soluble vitamins (vitamin A, D, E, and K) in vegetables. Water-soluble vitamins (vitamin B and C) are easily lost through heat, and in the water when boiled. Minerals that are resistant to heat can also be lost in the cooking water. Therefore, the cooking water or left-over broth should be saved for use in soups, juices, and sauces to maximize the nutritional benefits of vegetables.

## Grow your own vegetables!

Apart from buying vegetables, why not grow your own vegetable garden to feed your family?

- Grow vegetables near your home
- Grow different types of vegetables
- Grow vegetables all year round
- Harvest, eat and share the treasures from your garden
- Raise fish and livestock to add more nutritious foods for your family

# NAMES OF COMMON VEGETABLES

| English | Indonesian Name | Scientific Name |
|---|---|---|
| Amaranth | Bayam | *Amaranthus tricolor* |
| Bitter gourd | Pare | *Momordica charantia* |
| Broccoli | Brokoli | *Brassica oleracea* L. Italica Group |
| Bunching onion | Daun Bawang/Bawang Prei | *Allium fistulosum* |
| Cabbage | Kubis | *Brassica oleracea* L. Capitata Group |
| Carrot | Wortel | *Daucus carota* |
| Cassava leaf | Daun Singkong | *Manihot esculenta* |
| Cauliflower | Kembang Kol | *Brassica oleracea* L. Botrytis Group |
| Celery | Seledri | *Apium graveolens* |
| Chayote | Labu Siam | *Sechium edule* |
| Chili | Cabai | *Capsicum annuum cv.* group longum, |
| | | *Capsicum frutescens* |
| Chinese cabbage | Sawi Putih | *Brassica rapa* L. Pekinensis Group |
| Cucumber | Timun | *Cucumis sativus* |
| Eggplant | Terong | *Solanum melongena* |

| English | Indonesian Name | Scientific Name |
|---|---|---|
| French bean | Buncis | *Phaseolus vulgaris* |
| Garden pea | Kacang Kapri | *Pisum sativum* |
| Garlic | Bawang Putih | *Allium sativum* |
| Green papaya | Pepaya | *Carica papaya* |
| Kangkong | Kangkung | *Ipomoea aquatica* |
| Lettuce | Selada | *Lactuca sativa* |
| Mustard greens | Sawi Hijau | *Brassica juncea* L. Czerniak |
| Potato | Kentang | *Solanum tuberosum* |
| Pumpkin | Labu Kuning | *Cucurbita moschata* |
| Radish | Lobak | *Raphanus sativus* |
| Red bean | Kacang Merah | *Vigna umbellata* |
| Ridge gourd | Oyong | *Luffa acutangula* |
| Shallot | Bawang Merah | *Allium ascalonicum* |
| Spinach | Bayam | *Spinacia oleracea* |
| Sweet pepper | Paprika | *Capsicum annuum* var. *annuum* Grossum group |
| Sweet potato | Ubi Jalar | *Ipomoea batatas* |
| Tomato | Tomat | *Solanum lycopersicum* |
| Yam bean (Jicama) | Bengkuang | *Pachyrrhizus erosus* Urban |
| Yard-long bean | Kacang Tunggak/ Kacang Tolo | *Vigna unguiculata* |
| Young jackfruit | Nangka Muda | *Artocarpus heterophyllus* |

Amaranth

Bitter gourd

Broccoli

Bunching onion

Cabbage

Carrot

Cassava leaf

Cauliflower

Celery

Chayote

Chili

Chinese cabbage

Cucumber

Eggplant

French bean

Garden pea

Garlic

Green papaya

Kangkong

Lettuce

Mustard greens

Potato

Pumpkin

Radish

Red bean

Ridge gourd

Shallot

Spinach

Sweet pepper

Sweet potato

Tomato

Yam bean (Jicama)

Yard-long bean

Young jackfruit

# VEGETABLE PLANTING CALENDAR

| Crop name | Scientific name | Sowing time | Days to harvest |
|---|---|---|---|
| Amaranth | *Amaranthus tricolor* | Year-round* | 40-52 days from sowing |
| Bitter gourd | *Momordica charantia* | Year-round* | 90-120 days |
| Broccoli | *Brassica oleracea* L. Italica Group | Year-round* | 100-150 days from sowing |
| Bunching onion | *Allium fistulosum* | Year-round* | 75 days from sowing |
| Cabbage | *Brassica oleracea* L. Capitata Group | Year-round* | 80 -180 days from sowing |
| Carrot | *Daucus carota* | Year-round* | 90 days |
| Cassava leaf | *Manihot esculenta* | Year-round* | 65-100 days after transplanting |
| Cauliflower | *Brassica oleracea* L. Botrytis Group | Year-round* | 80 -130 day from sowing |
| Celery | *Apium graveolens* | Year-round* | 65-120 days from sowing |
| Chayote | *Sechium edule* | Year-round* | 70-110 days |
| Chili | *Capsicum annuum cv.* group longum, *Capsicum frutescens* | Year-round* | 60-95 days from sowing |
| Chinese cabbage | *Brassica rapa* L. Pekinensis Group | Year-round* | 25-65 days |
| Cucumber | *Cucumis sativus* | Year-round* | 55-90 days from sowing |
| Eggplant | *Solanum melongena* | Year-round* | 70-80 days from sowing |
| French bean | *Phaseolus vulgaris* | Year-round* | 60-90 days |

| Crop name | Scientific name | Sowing time | Days to harvest |
|---|---|---|---|
| Garden pea | *Pisum sativum* | Year-round* | 60-70 days |
| Garlic | *Allium sativum* | Year-round* | 120 days |
| Green papaya | *Carica papaya* | Year-round* | 6-9 months |
| Kangkong | *Ipomoea aquatica* | Year-round* | 25-40 days from sowing |
| Lettuce | *Lactuca sativa* | Year-round* | 65-90 days |
| Mustard greens | *Brassica juncea* L. Czerniak | Year-round* | 75-90 days |
| Potato | *Solanum tuberosum* | Year-round* | 90-180 days |
| Pumpkin | *Cucurbita moschata* | Year-round* | 60-90 days |
| Radish | *Raphanus sativus* | Year-round* | 60 days |
| Red bean | *Vigna umbellata* | Year-round* | 75 days |
| Ridge gourd | *Luffa acutangula* | Year-round* | 40-70 days |
| Shallot | *Allium ascalonicum* | Year-round* | 75-100 days |
| Spinach | *Spinacia oleracea* | Year-round* | 21 – 30 days |
| Sweet pepper | *Capsicum annuum* var. *annuum* Grossum group | Year-round* | 60-95 days from sowing |
| Sweet potato | *Ipomoea batatas* | Year-round* | 3 months for leaves; 3.5-5 months for tubers |
| Tomato | *Solanum lycopersicum* | Year-round* | 80-140 days from sowing |
| Yam bean (Jicama) | *Pachyrrhizus erosus* Urban | Year-round* | 6 months |
| Yard-long bean | *Vigna unguiculata* | Year-round* | 110-125 days from sowing |
| Young jackfruit | *Artocarpus heterophyllus* | Year-round* | 2-3 years |

*Vegetables can be grown anytime throughout the year with the exception of carrot, cabbage and broccoli, which are grown in highland climates. It is suggested that schools grow the vegetables depending on their terrain and local climate.

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# NUTRITIONAL INFORMATION OF VEGETABLES

| | Nutrients in 100 g of vegetable | | | | |
|---|---|---|---|---|---|
| | **Energy** | **Protein** | **Fat** | **Carbohydrate** | **Fiber** |
| | **kcal** | **g** | **g** | **g** | **g** |
| Amaranth | 36 | 3 | 0 | 5 | - |
| Bitter gourd | 17 | 1 | 0 | 4 | 3 |
| Broccoli | 26 | 3 | 0 | 1 | 3 |
| Bunching onion | 39 | 2 | 1 | 5 | 3 |
| Cabbage | 25 | 2 | 0 | 3 | 2 |
| Carrot | 35 | 2 | 0 | 5 | 4 |
| Cassava leaf | 65 | 6 | 1 | 6 | 5 |
| Cauliflower | 30 | 3 | 0 | 4 | 2 |
| Celery | 25 | 1 | 0 | 3 | 3 |
| Chayote | 21 | 1 | 0 | 5 | 2 |
| Chili | 24 | 1 | 0 | 3 | 3 |
| Chinese cabbage | 18 | 2 | 0 | 2 | 2 |
| Cucumber | 16 | 1 | 0 | 3 | 1 |
| Eggplant | 22 | 1 | 0 | 3 | 2 |
| French bean | 299 | 20 | 2 | 39 | 24 |
| Garden pea | 341 | 24 | 1 | 59 | 25 |
| Garlic | 149 | 6 | 1 | 33 | 2 |
| Green papaya | 28 | 2 | 0 | 5 | - |
| Kangkong | 26 | 3 | 0 | 2 | 2 |
| Lettuce | 15 | 1 | 0 | 1 | 2 |
| Mustard greens | 18 | 2 | 0 | 1 | 2 |
| Potato | 76 | 2 | 0 | 16 | 2 |
| Pumpkin | 44 | 1 | 0 | 8 | 2 |
| Radish | 20 | 1 | 0 | 3 | 1 |
| Red bean | 305 | 21 | 2 | 40 | 21 |
| Ridge gourd | 21 | 1 | 0 | 3 | 1 |
| Shallot | 62 | 2 | 0 | 12 | 2 |
| Spinach | 21 | 25 | 1 | 0 | 3 |
| Sweet pepper | 23 | 1 | 0 | 3 | 2 |
| Sweet potato | 94 | 1 | 0 | 20 | 4 |
| Tomato | 23 | 1 | 0 | 3 | 1 |
| Yam bean (Jicama) | 38 | 1 | 0 | 9 | 5 |

| | Nutrients in 100 g of vegetable | | | | |
|---|---|---|---|---|---|
| | Energy | Protein | Fat | Carbohydrate | Fiber |
| | kcal | g | g | g | g |
| Yard-long bean | 47 | 3 | 0 | 8 | - |
| Young jackfruit | 38 | 2 | 1 | 3 | 8 |

"-": no data

| | Nutrients in 100 g of vegetable | | | | |
|---|---|---|---|---|---|
| | Calcium | Potassium | Iron | Vitamin A | Vitamin C |
| | mg | mg | mg | µg (RE) | mg |
| Amaranth | 221 | - | 2 | 292 | 21 |
| Bitter gourd | 19 | 296 | 0 | 48 | 84 |
| Broccoli | 34 | 261 | 1 | 48 | 107 |
| Bunching onion | 55 | 137 | 2 | 474 | 42 |
| Cabbage | 51 | 243 | 1 | 8 | 32 |
| Carrot | 80 | 237 | 1 | 724 | 12 |
| Cassava leaf | 158 | 28 | 2 | 648 | 211 |
| Cauliflower | 28 | 205 | 1 | 4 | 68 |
| Celery | 164 | 329 | 3 | 14 | 21 |
| Chayote | 24 | 125 | 0 | 6 | 10 |
| Chili | 10 | 183 | 1 | 8 | 250 |
| Chinese cabbage | 60 | 201 | 2 | 244 | 33 |
| Cucumber | 18 | 118 | 0 | 4 | 8 |
| Eggplant | 15 | 155 | 0 | 2 | 4 |
| French bean | 109 | 211 | 7 | 2 | 0 |
| Garden pea | 186 | 1316 | 3 | 0 | 5 |
| Garlic | 181 | 401 | 2 | 0 | 42 |
| Green papaya | 94 | - | - | 0 | 0 |
| Kangkong | 70 | 239 | 3 | 456 | 28 |
| Lettuce | 62 | 190 | 2 | 260 | 23 |
| Mustard greens | 68 | 319 | 2 | 248 | 63 |
| Potato | 24 | 176 | 1 | 0 | 20 |
| Pumpkin | 31 | 178 | 1 | 170 | 15 |
| Radish | 37 | 113 | 1 | 0 | 25 |
| Red bean | 66 | 4 | 9 | 0 | 3 |
| Ridge gourd | 19 | 119 | 1 | 4 | 6 |
| Shallot | 50 | 256 | 1 | 0 | 9 |
| Spinach | 63 | 533 | 4 | 630 | 37 |

| | Nutrients in 100 g of vegetable | | | | |
|---|---|---|---|---|---|
| | **Calcium** | **Potassium** | **Iron** | **Vitamin A** | **Vitamin C** |
| | **mg** | **mg** | **mg** | **µg (RE)** | **mg** |
| Sweet pepper | 9 | 126 | 1 | 32 | 97 |
| Sweet potato | 64 | 1 | 0 | 126 | 27 |
| Tomato | 17 | 151 | 1 | 88 | 29 |
| Yam bean (Jicama) | 12 | 150 | 1 | 2 | 20 |
| Yard-long bean | 50 | 240 | 0 | 86 | 19 |
| Young jackfruit | 49 | - | 1 | 4 | 14 |

"-": no data

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WorldVeg Nutrient Database. http://www.avrdc-nudb.org/

# VEGETABLE RECIPES

**GREEN PINEAPPLE – LIME JUICE**
http://sajiansedap.com/recipe/detail/13715/jus-buah-sayur#.WDZBoPmLT4Y

**SPINACH JUICE**
http://www.vemale.com/kuliner/resep-makanan/66558-resep-jus-bayam-segar-dan-tidak-langu.html

**TERONG BALADO RECIPE**
http://original-indonesian-recipe.blogspot.tw/2007/05/terong-balado-indonesian-baked-eggplant.html

**COOKED VEGETABLES WITH GRATED COCONUT**
http://tipstriksib.blogspot.co.id/2013/09/resep-dan-cara-membuat-urap-sayur-kacang-panjang-taoge-enak-gurih.html

**KANGKONG STIR FRY**
http://www.bahanresep.com/2015/04/bahan-resep-cah-tumis-kangkung-pedas.html

**CHAYOTE STEW**
http://selerasa.com/resep-masakan-dan-cara-memasak-tumis-sayur-labu-siam-yang-paling-sederhana-dan-enak

**INDONESIAN SALAD**
http://dailycookingquest.com/by-cuisine/indonesian/gado-gado-indonesian-salad-with-peanut-sauce

# PROMOTION

## SCHOOL PROMOTIONAL EVENTS

School is one of the best environments for students to learn about the benefits of growing vegetables, healthy eating and basic sanitation practices. With these hands-on and fun activities, students can apply what they have learned in practical ways and be rewarded.

Choose any of these events for your school to fully engage and stimulate your students' interests in the topic of gardening and health. A certificate can be awarded to students who participate in the events.

### Take the Healthy Pledge

*Students learn to take responsibility for their health and reflect on their achievements in committing to their pledge*

At the beginning of the school year or semester, teachers distribute index-sized pledge cards to students with the pledge: "I promise to eat more vegetables and wash my hands before I eat."

Students sign and date their cards, and post them on a board or wall in the classroom. The pledge board is a reminder of the commitment each student has made. The teacher can refer to the pledge board during lessons on nutrition and health.

Each student takes five (or more) pledge cards to distribute to their family members and neighbors, asking them to also sign the pledge.

At the end of the year, each student interviews one of the people they gave a pledge card to, and asks them if they were able to follow the pledge and what changes they made to their daily routine as a result of taking the pledge. In the classroom, students discuss their own achievements and challenges on committing to the pledge and the responses they have collected from their family and friends.

*Sample Pledge Card*

# HEALTHY PLEDGE

**I promise to eat more vegetables and wash my hands before I eat.**

_____ (Print name)

_____ (Signature)

_____ (Date)

## Veggie Spokesperson

*Students will be encouraged by their peers to participate in school events*

Each school or class chooses 2-3 student veggie spokespeople who will help promote school events and raise awareness on topics related to vegetables, gardening, nutrition and health to the students. Veggie spokespeople will wear a special pin or hat for students to recognize them. Teachers and spokespeople will meet to plan fun and engaging events that will promote growing and eating vegetables in the school and community.

They will announce school events, competitions and distribute promotional materials. Leading by example, the spokespeople will eagerly participate in the events and encourage active student participation.

## Vegetable of the Month

*Students learn about a vegetable every month*

Every month, feature one vegetable in the school and incorporate this vegetable in the lesson plans and school events. If schools have feeding programs, include the vegetable in the meals. This promotion is designed to expose students to the vegetable many times in the whole month. The goal is to increase students' knowledge and excitement about the vegetable, which will help encourage eating more vegetables.

Ideas to promote the Vegetable of the Month include:

- An announcement to present the monthly vegetable
- Teach students on the nutritional value of the vegetable
- Tell stories that mention the vegetable
- Distribute newsletters about the vegetable with fun facts, recipes, and activities for students and their families to enjoy
- Include at least one meal with the vegetable in the lunch program
- Hold a vegetable tasting session

## Cook and Taste the Veggies

*Students learn how to cook vegetables from the garden and share a meal with their classmates*

After harvesting vegetables from the garden, it is a good time to teach students how to cook these vegetables. Find a simple recipe using local and available ingredients. Show them how to clean and wash the vegetables, chop, cook, and season the dish. Ask student volunteers to help throughout the cooking process and to distribute the dish to the class.

For younger students, cooking and cutting could be handled by the teacher or an adult community volunteer. For older students, the class could be divided into groups of 5-10 students and each group can cook a vegetable dish.

The students will be able to make a vegetable dish and taste the vegetables they have harvested. Have the students discuss what they learned in the cooking session, how they like/dislike the taste of the vegetable, and the nutritional benefits of the dish. Finally, encourage the students to cook the same recipe at home with the family.

For schools with lunch programs, at least once a week, cook and serve students vegetables harvested from the garden. Whenever vegetables are served, announce or write the vegetable names and their nutritional benefits on a board in the lunch room. Make it fun and exciting for students to eat vegetables.

## Veggie Chefs

*Students use creative ways to cook delicious vegetable dishes*

Hold a cooking contest in the school! Depending on your school, the contest could be between classrooms, groups of 3-4 students, or individual students.

Choose a theme vegetable for the cooking contest. Ideas for theme could be:

- Vegetables from the Garden
- Vegetable of the Month
- Vegetables in Season (for example, in Autumn use vegetables harvested in this season)

The school can provide simple ingredients, such as the main vegetables, salt, sugar, and oil. Each participating group will create a dish that is both appealing and tasty. Encourage students to decorate the dishes in fun and creative ways. The dishes will be judged by a panel of 3-5 judges, which could be the school principal, teachers, staffs, parents, or important community members. Students who are not participating can taste the dishes and vote on their favorite dishes.

The dishes will be awarded based on:

- Taste
- Appearance
- Creativity
- Use of Themed Vegetable
- Popularity of the Dish

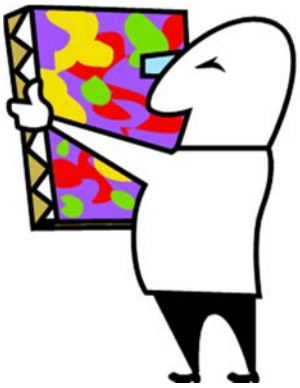
Students who win the top places in the contest will be named “Veggie Chef of the Year”.

## Veggie Art Gallery

*Students use art to create their vegetable masterpieces and display lively art in the school*

Using drawing, painting or collage, ask students to create a picture of any of the following topics:

- Their favorite vegetable
- A vegetable they learned about
- School vegetable garden scene



Students are free to explore different art media and use any material to create the pictures. Each picture should have the student's name, class, and title of his/her work. The pictures will be hung in the classrooms and hallways to create a beautiful art gallery.

The school can have an art gallery day where parents and the local community are invited to visit the school and see the masterpieces created by the students. Each student can introduce the vegetable and their inspiration for the picture to the guests.

*Make it a competition!* Visitors and students can vote on their favorite pictures. At the end of the day, students with the highest votes will be awarded a special prize for the top pictures.

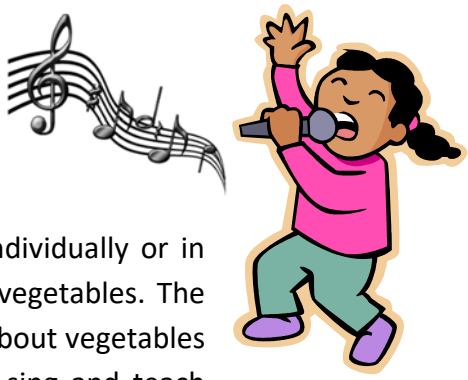
## Veggie Stories

*Students write about and share their experiences growing and eating vegetables, or practicing WASH*

Ask the students to write about their experiences, what they have learned from the school garden, the nutrition and WASH lessons, and participating in the school promotional events. Challenge the students to come up with solutions to help encourage people to eat more vegetables and apply WASH in the school and community. Once a week, a couple of students will present their stories to the class. Students can ask questions and respond to each student's story. The best personal stories will receive an award.

*Voice it Out!* From each class, select a couple of students with the best stories. During the school assemblies, have the students share their stories to the whole school.

## Sing the Veggie Song



*Students write songs to teach others about vegetables*

Singing to a tune is one of the best ways to remember nutrition messages. Ask the students, either individually or in groups of 4-5 to write a song about vegetables. The song should help people know more about vegetables and their benefits. The students will sing and teach their song to the class.

*Make it a Motto Song!* Students can vote on their favorite songs. The song with the highest vote can be named the school "Veggie Song". The whole school will learn the song and sing it during school assemblies and events for the year.

## FAMILY PROMOTIONAL EVENTS

Students can continue their learning at home and encourage their family to grow and eat vegetables. Sharing what they have learned at school can benefit the whole family.

Here is a list of ideas of family-oriented activities for everyone to enjoy!

### Plant Your Own Home Garden

*Students guide and help their family establish a home garden*

In class, distribute small packets of vegetable seeds to each student to bring home. Ask the students to plan and grow a home garden with their family. Using the gardening skills and knowledge learned in class, students can guide their family through the process.

If there is no space for a garden, vegetables can be grown in pots and containers as long as there is sufficient sunlight and water.

Each week, record the progress of the home garden and post the progress on a “My Home Garden” board in the classroom. The students are encouraged to share about their home garden in the class.

### Home Veggie Meals

*Students learn to cook vegetables with their family*

Students can ask their parents to help them cook a meal with vegetables. The vegetables could be harvested from the school garden, home garden, or

bought from the market. The parents can teach them how to cook a local vegetable dish. Students can also share recipes they have learned in school.

During the cooking process, the students can write down the ingredients and cooking instructions to share with the class.

During dinner time, students can share with their family the nutritional benefits of these vegetables.

## Family Day – Show and Tell

*Students show their family the vegetables in the school garden*

On School Garden Day, students invite their family to the school garden. Students act as guides and show their family the vegetables in the garden. Students also describe their experiences in tending the garden and teach about the nutritional benefits of vegetables.

During the garden day, the school can organize some fun family activities for parents and children to join. Ideas include:

- Vegetable tasting sessions
- Vegetable quizzes and trivia
- Transplant seedlings to the garden
- Vegetable arts and crafts – make a decoration for the home
- Relay or obstacle course races around the garden

## COMMUNITY PROMOTIONAL EVENTS

Involving the community in school programs can help the students raise awareness on growing and eating vegetables. The school interaction with the community is important for establishing friendly and long-lasting mutual support for learning and sharing resources. Students will be able to apply what they learn in the classroom to promote real change in the community.

### Poster Promotion

*Students design attractive posters to promote vegetables in the community*


From the lessons learned at school, students can design and make posters to promote vegetables in the community. The posters will have key promotional messages and images to raise awareness on the benefits of eating and growing vegetables. Each class can discuss the importance of vegetables and the messages they would like the public to know. The posters should be attractive and easy to understand.

The posters can be posted on announcement boards or in public locations where people from the community gather. In some locations, permission from responsible local authorities must be obtained before putting up the posters.

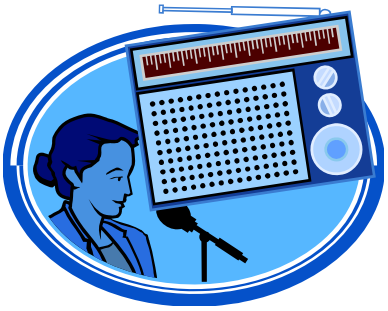
## Drama Promotion

*Students perform skits in community events to promote vegetables*

Each class performs a skit to promote growing and eating vegetables to the public. As a class, the students will write their own script and make their own props. The skits could include acting, dance, and music. Encourage the students to be creative and interact with the audience.

On School Garden Day or in community events, the students will perform their skits for the public and teach them about the importance of vegetables.

## Radio Promotion



*Students take part in a local radio program to promote vegetables in the community*

Connect with a local radio station. Brief the radio announcer on the topic of vegetables and nutrition, and the importance of growing and eating vegetables. Ask students from the school to promote the program date and time to their family, friends and neighbors, so they will listen to the program.

If possible, ask the radio staff if students from the school can promote vegetables on the radio. Choose 2-3 student representatives to join in the radio program to tell their experiences growing vegetables and their importance in health.

The next day, ask students if they have listened to the program with their family and their responses.

## Open School Garden Day


*Students act as guides to the community in introducing vegetables grown in the school garden*

Choose a day as the School Garden Day to open the school garden to the community. This day could also be combined with the Family Day. Before this day, students will prepare invitation cards to distribute in public areas and encourage people to participate in the event. Students can shout a slogan, perform a skit, or sing a song to promote the event. Students can also invite their family, friends and neighbors.

On the School Garden Day, students act as guides and show the public the school garden, simple gardening activities, and explain the nutritional benefits of eating vegetables.

The event could also include other fun activities for the community to participate in. Ideas include:

- Vegetable tasting sessions
- Vegetable quizzes and trivia
- Transplant seedlings to the garden
- Vegetable arts and crafts – make a decoration for the home
- Veggie Art Gallery (see School Promotional Events)
- Drama, songs and dance to promote vegetables

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