



World Vegetable Center



Vegetables and Nutrition for Schools in Nepal

Vegetables and Nutrition for Schools in Nepal

World Vegetable Center



World Vegetable Center

CONTRIBUTORS

Concept and Information

World Vegetable Center

Jen Wen Luoh, Ray-yu Yang, Maureen Mecozzi, Greg Luther and Pepijn Schreinemachers

Horticulture Research Division, Nepal Agricultural Research Council (NARC)

Dhruba Raj Bhattarai, Giri Dhari Subedi

Department of Education, Ministry of Education, Nepal

Narayan Kaji Kashichwa

Ministry of Health and Population, Nepal

Upendra Dhungana

Contact Information

For inquiries or more information please contact Ray-yu Yang:

ray-yu.yang@worldveg.org

“Vegetables and Nutrition for Schools in Nepal” 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.

@2017, World Vegetable Center

Publication Number: 17-809

Suggested citation:

Luoh JW, Yang RY, Mecozzi M, Luther G, Schreinemachers P, Bhattarai DR, Subedi GD, Kashichwa NK, Dhungana U. 2017. Vegetables and Nutrition for Schools in Nepal. World Vegetable Center, Taiwan. Publication No. 17-809. 65 p.

Contents

INTRODUCTION TO GOOD NUTRITION	5
HEALTHY DIET FOR NEPALESE PEOPLE	9
GOOD NUTRITION FOR NEPALESE PEOPLE	12
NUTRITION THROUGH LIFE.....	14
HEALTH BENEFITS OF VEGETABLES	17
NAMES & PHOTOS OF COMMON VEGETABLES	27
VEGETABLE PLANTING CALENDAR	40
NUTRITIONAL INFORMATION OF VEGETABLES.....	46
VEGETABLE RECIPES	51
PROMOTION.....	53
SCHOOL PROMOTIONAL EVENTS	53
FAMILY PROMOTIONAL EVENTS	59
COMMUNITY PROMOTIONAL EVENTS	62
REFERENCES	65

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 NEPAL

Malnutrition

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

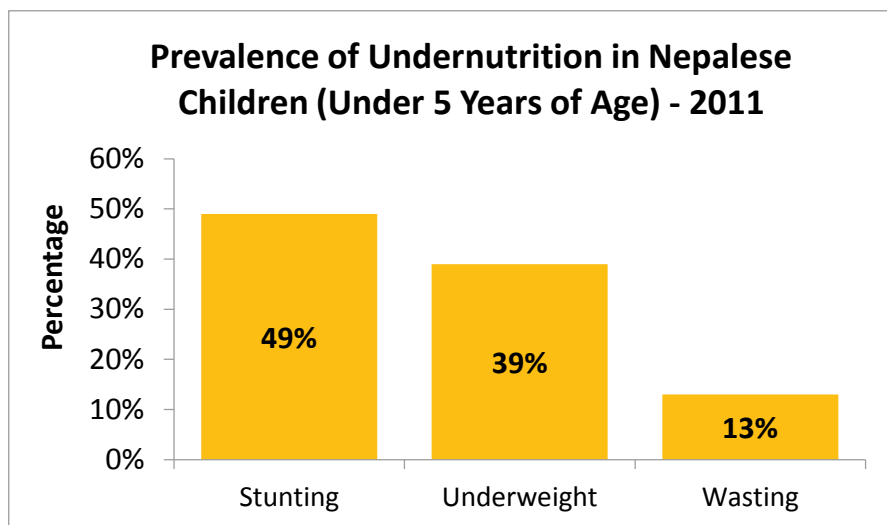
In Nepal, many children face undernutrition conditions every day. In the chart below, we can see that about half of the children under the age of 5 are stunted and 4 out of 10 are underweight for their age.

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

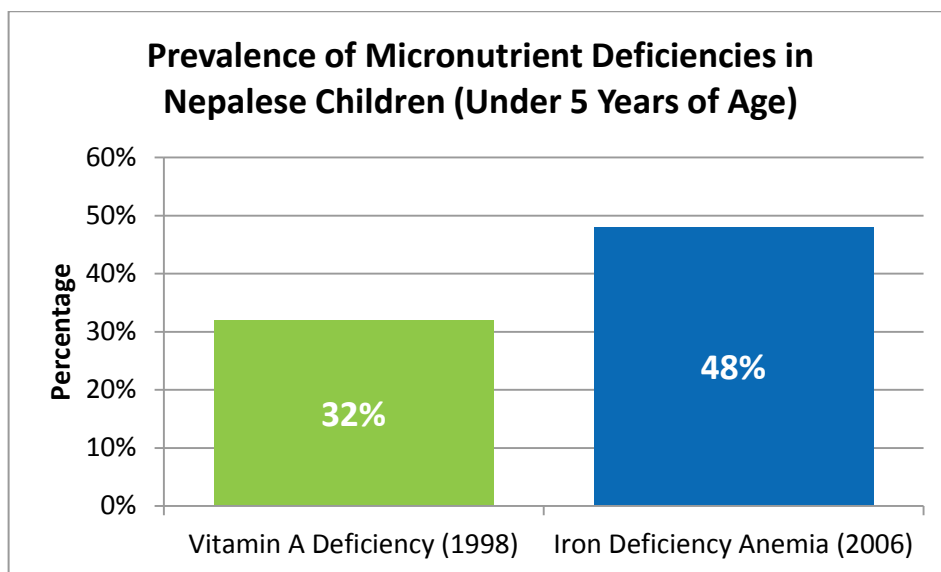
Malnutrition can also lead to many nutrient deficiencies. The nutrients we receive from different foods help our body maintain normal

functions. When one or more 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
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 the nutrients most often deficient in children and adults, especially pregnant and young mothers. In Nepal, about one third of children under 5 years old lack vitamin A in their diet, leading to long-term eye problems such as night blindness, xerophthalmia (extreme 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.



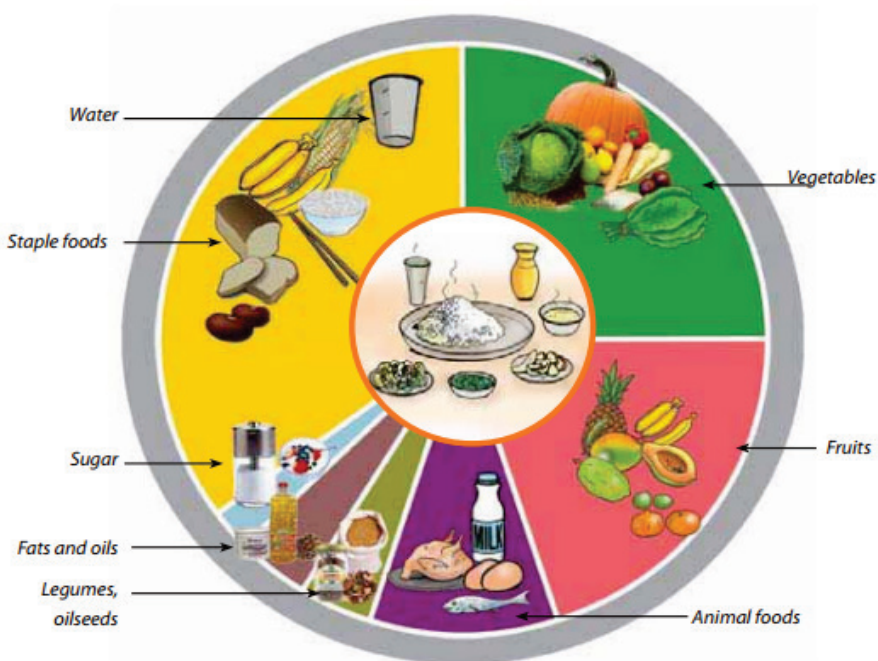
Source: NLiS, 2014

HEALTHY DIET FOR NEPALESE PEOPLE

The Healthy Diet for Nepalese People suggested by the Food and Agriculture Organization (FAO) and the Nepal government is illustrated with the healthy plate below. It recommends roughly the following proportions:

- Around 40% staple foods: cereals, rice, grains, bread and starchy foods (banana, potato, etc.)
- 25% vegetables
- Around 15% fruits
- Around 10% animal foods
- Around 10% legumes, oilseeds, fats and oils, and sugar

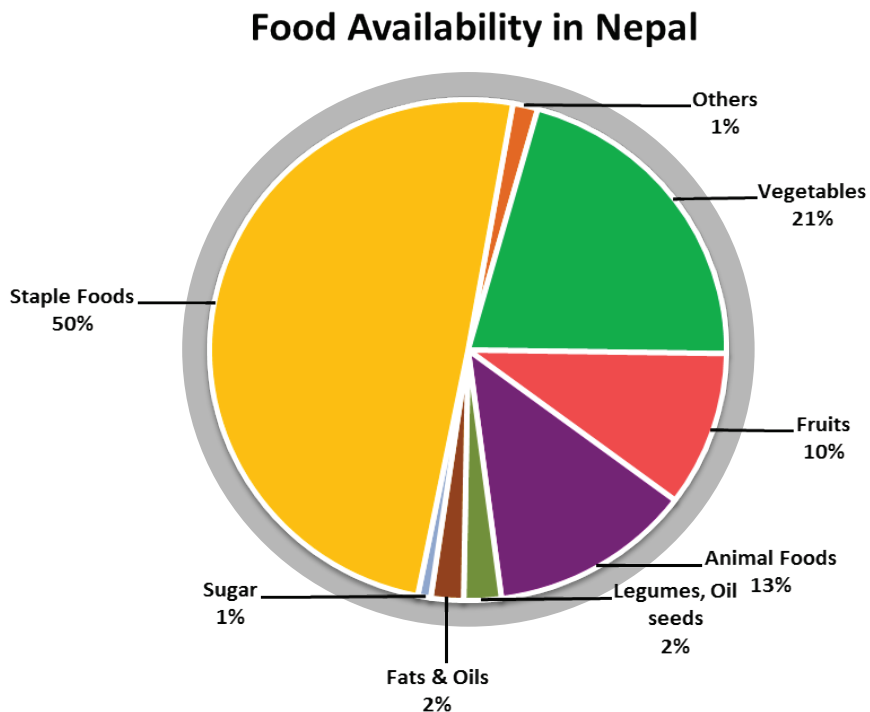
Healthy Diet for Nepalese People



Source: FAO, 2009

Nepalese Food Pattern

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



Source: FAOSTAT, 2014

Comparing this information to the recommended Healthy Diet for Nepalese People, some differences can be pointed out. Currently, Nepalese people have:

- More staple foods available than needed
- Adequate supply of vegetables and animal foods for each person
- Low amount of fruits for each person

For a healthy and balanced diet, the portion of food groups eaten each day could be adjusted by eating slightly less staple foods and increasing

a portion of fruit. The specific food items available daily for each person (per capita) is listed below:

Food Availability in Nepal	
Food Items	g/capita/day
Staple Foods	
Cereal	511
Starchy Roots	220
Vegetables	
Vegetables	307
Fruits	
Fruits	147
Animal Foods	
Meat	33
Offal	5
Animal Fats	4
Eggs	3
Milk	136
Fish, Seafood	6
Legumes, Oilseeds	
Pulses	29
Tree Nuts	6
Fats & Oils	
Vegetable Oils	28
Oil Crops	2
Sugar	
Sugar Crops	97
Sugar & Sweeteners	12
Others	
Stimulants	1
Spices	17
Alcohol Beverages	5
Energy (kcal)	2580

Source: FAOSTAT, 2014

GOOD NUTRITION FOR NEPALESE PEOPLE

To help guide Nepalese people with their eating choices, the National Nutrition Program of the Nepal government has made a healthy eating guide entitled *Five Storey of Good Nutrition*. It tells people what kinds of foods to eat and how much to eat each day for a healthy diet.

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

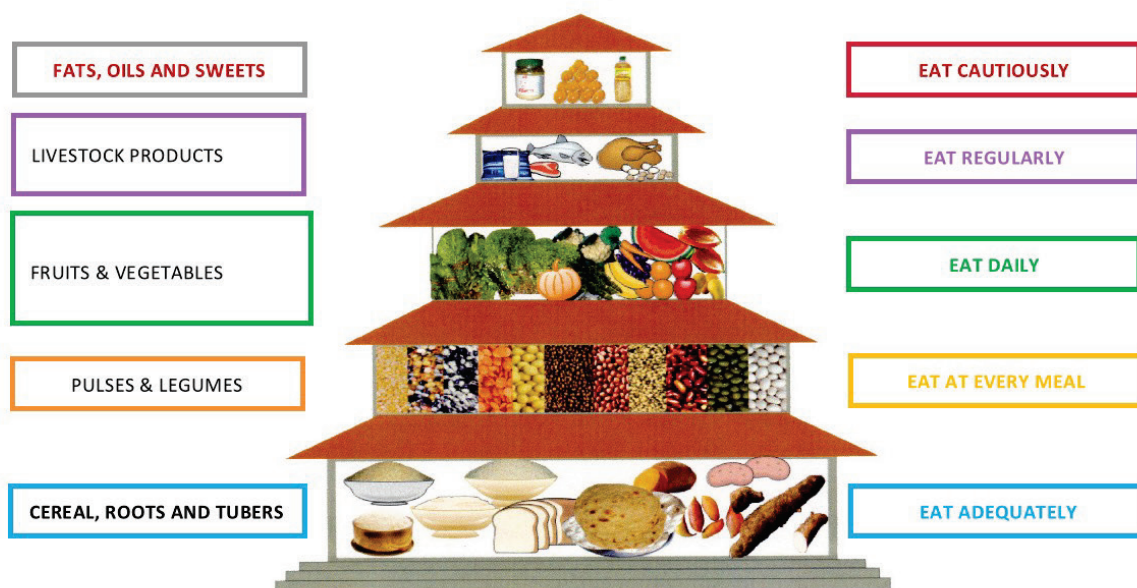
Five Storey of Good Nutrition

A balanced diet means eating from the different food groups. The 5 food groups recommended by the *Five Storey of Good Nutrition* are:

- Fats, oils and sweets
- Livestock products
- Fruits and vegetables
- Pulses and legumes
- Cereal, roots and tubers

GOOD NUTRITION FOR NEPALESE PEOPLE

Five Storey of Good Nutrition



TEN MANTRA OF GOOD NUTRITION



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

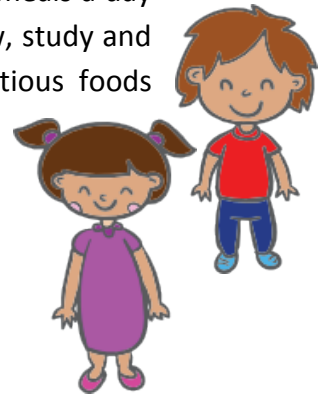


Infants (6 months and older): Start feeding soft and healthy foods to infants by 6 months of age along with mother's breast milk. When preparing food for babies, it is important to use boiled and clean water. Start with small amounts of soft foods and increase the amount as the baby grows. Mothers can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



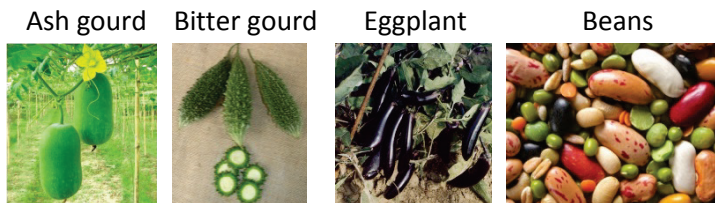
Vegetables are an important part of a healthy diet and provide many health benefits. They are especially rich in fiber, vitamins and minerals.

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



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

Drumstick, peas and beans are good sources of protein



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

Dark green leafy vegetables are good sources of calcium



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 heal **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	<ul style="list-style-type: none"> Aids proper digestion of foods and maintains healthy stomach and intestines Makes the food bulkier and gives the feeling of fullness Absorbs water and makes the stools soft, which prevents constipation and other gut-related diseases such as diverticulitis Reduces cholesterol and glucose absorption, lowering the risk of heart diseases and diabetes Promotes good gut bacteria that aids in digestion and absorption of nutrients 	<p><i>Almost all vegetables</i></p> <p>Examples: Beans such as winged bean, hyacinth bean and broad bean; green leafy vegetables such as pumpkin leaves, taro leaves, spinach and kohlrabi</p>
Minerals		
Calcium	<ul style="list-style-type: none"> Helps build strong bones and teeth Maintains normal heart and muscle functions Helps blood clotting and regulation of blood pressure Important in immune functions 	<p><i>Most dark green leafy vegetables</i></p> <p>Examples: Amaranth, broad leaf mustard, coriander, dill, fenugreek leaf, garden cress,</p>

Nutrient	Role/Function	Vegetable Sources
		Malabar spinach, pumpkin leaf, stinging nettle and turnip leaf
Iron	<ul style="list-style-type: none"> • Makes red blood cells • Helps brain and immune functions • Plant-based iron is not as efficiently absorbed as animal-based iron 	<p><i>Most dark green leafy vegetables</i></p> <p>Examples: Banana blossoms, broad leaf mustard, Chinese leek, dill, garden cress, lamb's quarter, taro leaves and yam</p>
Vitamins		
Vitamin A	<ul style="list-style-type: none"> • Beta-carotene is found in high amounts in orange and yellow vegetables • In the body beta-carotene is converted to vitamin A • Essential for maintaining healthy skin, immune system, vision and promote normal growth and development • Fat-soluble vitamin • Eating or cooking orange and vegetables with a small amount of oil can promote absorption of vitamin A 	<p><i>Orange colored vegetables</i></p> <p>Examples: carrot, pumpkin</p> <p><i>Dark green leafy vegetables</i></p> <p>Examples: Malabar spinach, amaranth, coriander, dill, fenugreek, spinach, taro leaves and turnip leaves</p>
Vitamin C	<ul style="list-style-type: none"> • Helps heal cuts and wounds and keeps teeth and gums healthy • Aids in iron absorption and uses calcium 	<p><i>Most vegetables</i></p> <p>Example: bitter gourd, broccoli,</p>

Nutrient	Role/Function	Vegetable Sources
	<p>and other nutrients in building the body</p> <ul style="list-style-type: none"> Water soluble vitamin, can easily be lost when food is cut, heated or boiled for a period of time 	<p>cabbage, chili, coriander, garden cress, Indian rape, kohlrabi, Malabar spinach, sweet pepper, okra and turnip leaves</p>
Folate (Folic acid)	<ul style="list-style-type: none"> Helps body form red blood cells and other cells Reduces the risk of central nervous system in developing fetus such as neural tube defects, spina bifida, and anencephaly 	<p><i>Beans and leafy vegetables</i></p> <p>Example: Amaranth, bitter gourd, Malabar spinach, moringa, snap bean, spinach, taro leaves, and yard-long bean</p>



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?



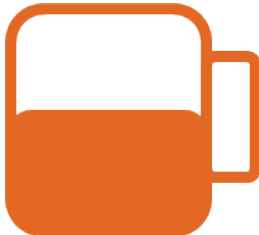

The World Health Organization suggests eating **at least 200 g of vegetables and 200 g of fruits every day**. Since vegetables are low in sugar and fat, eating more than 5-7 servings a day is encouraged.

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 vegetables

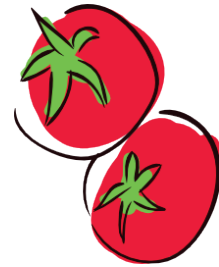
1 serving of vegetables is equivalent to 75-80 g of vegetables		
OR	1 cup* of raw leafy vegetables	

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.

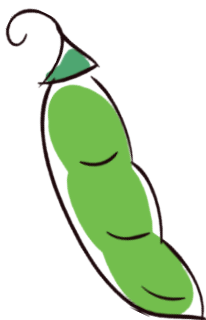


For example, orange-colored vegetables (such as carrot) are especially rich in vitamin A, which is good for our eyes. Red-colored vegetables such as tomatoes and red peppers are especially high in antioxidants called lycopene and capsanthin. Dark green vegetables are good sources of folate and minerals. 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 & PHOTOS OF COMMON VEGETABLES

English Name	Nepalese Name	Scientific Name
Amaranth	Latte	<i>Amaranthus leucocarpus</i>
Ash (wax) gourd	Kuvindo	<i>Benincasa hispida</i>
Asparagus	Kurilo	<i>Asparagus officinalis</i>
Winged bean	Pakhete Simi	<i>Psophocarpus tetragonolobus</i>
Asparagus bean (cowpea)	Tane bodi	<i>Vigna unguiculata</i>
Balsam apple	Barela/Chuche Karela	<i>Momordica balsamina</i>
Banana (blossoms)	Kerako bungo	<i>Musa acuminate</i>
Beetroot	Chukandar	<i>Beta vulgaris</i> var. <i>crassa</i> L.
Bitter gourd	Tite Karela	<i>Momordica charantia</i>
Bok choy	Bok Choy	<i>Brassica rapa</i> var. <i>chinensis</i>
Bottle gourd	Lauka	<i>Lagenaria siceraria</i>
Broad bean	Bakulla Simi	<i>Vicia faba</i>
Broadleaf mustard	Rayo ko sag	<i>Brassica juncea</i> L. Czerniak
Broccoli	Brocauli	<i>Brassica oleracea</i> L. var. <i>italica</i>
Buckwheat (leaf)	Phapar ko sag	<i>Fagopyrum esculentum</i>
Cabbage	Banda	<i>Brassica oleracea</i> var. <i>capitata</i> L.
Carrot	Ganjar	<i>Daucus carota</i>
Cauliflower	Kauli/phulkovi	<i>Brassica oleracea</i> var. <i>botrytis</i> L.
Chayote (fruit/shoots/roots)	Eiskus (phal/munta/tarul)	<i>Sechium edule</i>
Chili	Piro Khursani	<i>Capsicum annuum</i>
Chinese cabbage	Chinese Banda	<i>Brassica rapa</i> var. <i>pekinensis</i>
Chinese leek	Dundu ko saag /Duku ko sag	<i>Allium tuberosum</i>
Choy sum	Choy sum	<i>Brassica oleracea</i> var. <i>parachinensis</i>
Common bean	Simi	<i>Phaseolus vulgaris</i>
Coriander	Dhaniya	<i>Coriandrum sativum</i>
Cucumber	Kakro	<i>Cucumis sativus</i>
Dill	Sauf	<i>Anethum graveolens</i>
Eggplant	Bhanta	<i>Solanum melongena</i>

English Name	Nepalese Name	Scientific Name
Elephant foot yam	Oal	<i>Amorphophallus paeoniifolius</i>
Fenugreek (leaf)	Methi ko sag	<i>Trigonellafoenum-graecum</i>
Fiddlehead fern	Niguro	<i>Dryopteris cochleata</i>
Garden cress	Chamsur	<i>Lepidium sativum</i>
Garden pea (pod/vine shoots)	Matar Kosa/Kerau	<i>Pisum sativum</i>
Garlic (leaf/clove)	Lasun (sag/poti)	<i>Allium sativum</i>
Green onion	Pyaj ko sag	<i>Allium fistulosum</i>
Hyacinth bean	Hiude Simi	<i>Lablab purpureus</i>
Indian rape	Tori ko sag	<i>Brassica campestris</i>
Knolkhol (Kohlrabi)	Gyath Kopi	<i>Brassica oleracea</i> L. var. <i>gongylodes</i>
Lamb's-quarter	Betheko sag	<i>Chenopodium album</i>
Lettuce	Jiriko sag	<i>Lactuca sativa</i>
Malabar spinach	Poisag	<i>Basella rubra</i>
Okra	Bhindi/Ramtoria	<i>Abelmoschus esculentus</i>
Onion	Pyaj	<i>Allium cepa</i>
Pointed gourd	Parwal	<i>Trichosanthes dioica</i>
Pumpkin (fruit/shoots)	Pharsi (gatta/munta)	<i>Cucurbita moschata</i>
Radish (leaf/root)	Mula (sag/jara)	<i>Raphanus sativus</i>
Shallot	Chhyapi	<i>Allium cepa</i> var. <i>aggregatum</i> Group
Snake gourd	Chichinda	<i>Trichosanthes anguina</i>
Spinach	Palungo	<i>Spinacia oleracea</i>
Ridge gourd	Pate Ghiraula	<i>Luffa aegyptiaca</i>
Sponge gourd	Ghiraula	<i>Luffa aegyptiaca (cylindrica)</i>
Squash	Squash Pharsi	<i>Cucurbita maxima, C. pepo, C. mixta</i>
Stinging nettle	Sisnu	<i>Urtica dioica</i>
Water cress	Simsag	<i>Nasturtium officinale</i>
Sweet pepper	Bhede Khursani	<i>Capsicum annuum</i> L. var. <i>grossum</i>
Swiss Chard	Swiss chard	<i>Beta vulgaris</i>

English Name	Nepalese Name	Scientific Name
Sweet potato	Sakharkhanda	<i>Ipomoea batatas</i>
Sword bean	Tarbare Simi	<i>Canavalia gladiata</i>
Taro (leaf/stalk/corm)	Pidalu (Pat/danth/Gana)	
Tomato	Golbheda	<i>Solanum lycopersicum</i>
Turnip (leaf/root)	Salagam (sag/jara)	<i>Brassica campestris</i> L. ssp. <i>rapifera</i>
Vegetable soybean	Tarakari Bhatmas /Bhatmas kosa	<i>Glycine max</i>
Velvet bean	Kause simi	<i>Stizolobium pruriens</i>
Yam	Tarul	<i>Dioscorea</i> spp.



Amaranth



Ash (wax) gourd



Asparagus



Asparagus (winged) bean



Balsam apple



Banana (blossoms)



Beetroot



Bitter gourd



Bottle gourd



Broad bean



Broadleaf mustard



Broccoli



Buckwheat (leaf)



Cabbage



Carrot



Cauliflower



Chayote (fruit/shoots)



Chili



Chinese leek



Coriander



Cucumber



Dill



Eggplant



Elephant foot yam



Fenugreek (leaf)



Fiddlehead fern



Garden cress



Garden pea (pod/vine shoots)



Garlic (leaf/clove)



Green onion



Hyacinth bean



Indian rape



Knolkhol (Kohlrabi)



Lamb's-quarter



Lettuce



Malabar spinach



Okra



Onion



Pointed gourd



Pumpkin (fruit/shoots)



Radish (leaf/root)



Shallot



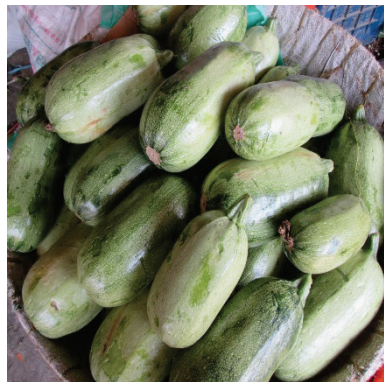
Snake gourd



Spinach



Sponge/Ridge gourd



Squash



Stinging nettle



Sweet pepper



Sweet potato



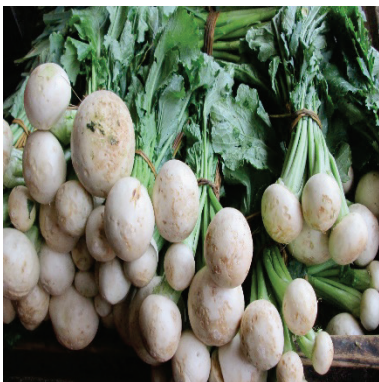
Sword bean



Taro (leaf/stalk/corm)



Tomato



Turnip (leaf/root)



Vegetable soybean



Velvet bean



Yam

VEGETABLE PLANTING CALENDAR

Plain Areas

Lower than 500 m above sea level

	Winter		Summer			Rainy Season				Winter		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Beetroot												
Bitter gourd												
Bottle gourd												
Broad bean												
Broadleaf mustard												
Broccoli												
Buckwheat												
Cabbage												
Carrot												
Cauliflower												
Chili												
Coriander												
Cucumber												
Eggplant												
Fenugreek												
Garden cress												
Garden pea												
Garlic												
Hyacinth bean												
Indian rape												
Kohlrabi												
Lettuce												
Malabar spinach												
Okra												
Onion												

	Winter		Summer			Rainy Season				Winter		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Pumpkin												
Radish												
Shallot												
Spinach												
Sponge (Ridge) gourd												
Sweet pepper												
Sweet potato												
Sword bean												
Tomato												
Turnip												
Vegetable soybean												
Velvet bean												

Planting Time



Mid-Hills

600 – 1500 m above sea level

	Winter		Summer			Rainy Season				Winter		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Amaranth												
Asparagus												
Asparagus (winged bean)												
Balsam apple												
Banana												
Beetroot												
Bitter gourd												
Bottle gourd												
Broad bean												
Broadleaf mustard												
Broccoli												
Buckwheat												
Cabbage												
Carrot												
Cauliflower												
Chayote												
Chili												
Chinese leek												
Coriander												
Cucumber												
Dill												
Eggplant												
Elephant foot yam												
Fenugreek												
Fiddlehead fern (wild)												
Garden cress												
Garden pea												
Garlic												

	Winter		Summer			Rainy Season				Winter		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Green onion												
Hyacinth bean												
Indian rape												
Kohlrabi												
Lamb's quarter												
Lettuce												
Malabar spinach												
Okra												
Onion												
Pumpkin												
Radish												
Shallot												
Snake gourd												
Spinach												
Sponge (Ridge) gourd												
Squash												
Stinging nettle (wild)												
Sweet pepper												
Sweet potato												
Sword bean												
Taro												
Tomato												
Turnip												
Vegetable soybean												
Velvet bean												
Yam												

Planting Time



High Hills

1500 – 2500m above sea level

Vegetable	Winter		Summer			Rainy Season				Winter		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Amaranth												
Asparagus												
Balsam apple												
Beetroot												
Bitter gourd												
Bottle gourd												
Broad bean												
Broadleaf mustard												
Broccoli												
Buckwheat												
Cabbage												
Carrot												
Cauliflower												
Chayote												
Chili												
Chinese leek												
Coriander												
Cucumber												
Eggplant												
Elephant foot yam												
Fenugreek												
Fiddlehead fern (wild)												
Garden cress												
Garden pea												
Garlic												
Green												
Hyacinth bean												
Indian rape												
Kohlrabi												

Vegetable	Winter		Summer			Rainy Season				Winter		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Lettuce												
Malabar spinach												
Okra												
Onion												
Pumpkin												
Radish												
Shallot												
Snake gourd												
Spinach												
Sponge gourd												
Squash												
Stinging nettle (wild)												
Sweet pepper												
Sweet potato												
Sword bean												
Taro												
Tomato												
Turnip												
Vegetable soybean												
Velvet bean												
Yam												

Planting Time



NUTRITIONAL INFORMATION OF VEGETABLES

	Nutrient in 100 g vegetable				
	Energy	Protein	Fat	Carbohydrate	Fiber
	kcal	g	g	g	g
Amaranth	45	4	1	6	1
Ash (wax) gourd	10	0	0	2	1
Asparagus	25	3	0	3	1
Asparagus (winged) bean	45	3	34	8	2
Balsam apple	-	-	-	-	-
Banana (blossoms)	-	2	0	-	-
Beetroot	43	2	0	9	1
Bitter gourd	25	2	0	4	1
Bottle gourd	12	0	0	3	1
Broad bean	48	5	0	7	2
Broadleaf Mustard	34	4	1	3	1
Broccoli	50	5	0	7	1
Buckwheat (leaf)	31	4	0	4	1
Cabbage	27	2	0	5	1
Carrot	48	1	0	11	1
Cauliflower	30	3	0	4	1
Chayote (fruit)	19	1	0	5	2
Chili	53	4	1	8	1
Chinese leek	23	2	0	2	3
Coriander	44	3	1	6	1
Cucumber	13	0	0	3	0
Dill	43	3	1	7	2
Eggplant	24	1	0	4	1
Elephant foot yam	79	1	0	18	1
Fenugreek (leaf)	49	4	1	6	1
Garden cress	67	6	1	9	1
Garden pea	93	7	0	46	4
Garlic	76	2	1	15	2

	Nutrient in 100 g vegetable				
	Energy	Protein	Fat	Carbohydrate	Fiber
	kcal	g	g	g	g
Green onion	41	1	0	9	2
Hyacinth bean	46	2	0	9	3
Indian rape	27	3	0	5	3
Kohlrabi	27	2	0	6	5
Lamb's-quarter	30	4	0	3	1
Lettuce	21	2	0	3	1
Malabar spinach	32	3	0	4	
Okra	35	2	0	6	1
Onion	47	1	0	10	1
Pointed gourd	20	2	0	2	3
Pumpkin (leaf)	53	5	1	7	2
Radish (root)	32	1	0	7	1
Shallot	72	3	0	17	3
Snake gourd	18	1	0	3	1
Spinach	26	2	1	3	1
Sponge/Ridge gourd	26	1	0	5	0
Squash (pumpkin)	25	1	0	11	1
Stinging nettle	53	7	0	5	2
Sweet pepper (yellow)	73	1	0	17	0
Sweet potato (red)	126	1	1	29	1
Sword bean	44	3	0	8	2
Taro (leaf/stalk/corm)	56	4	2	7	3
Tomato	21	1	0	4	1
Turnip (leaf)	67	4	2	9	1
Velvet bean	-	-	-	-	-

Nutrient in 100 g vegetable

	Calcium	Phosphorus	Iron	Vitamin A	Vitamin C
	mg	mg	mg	µg (RE)	mg
Amaranth	397	83	3	920	9
Ash (wax) gourd	30	20	1	0	1
Asparagus	31	41	1	0	13
Asparagus (winged) bean	26	51	-	-	3
Balsam apple	-	-	-	0	-
Banana (blossoms)	33	53	43	0	-
Beetroot	18	55	1	0	10
Bitter gourd	20	70	1	21	88
Bottle gourd	20	10	0	0	0
Broad bean	50	64	1	2	12
Broadleaf Mustard	155	26	16	437	33
Broccoli	45	109	2	105	89
Buckwheat (leaf)	-	-	-	308	82
Cabbage	39	14	1	20	124
Carrot	80	530	1	713	3
Cauliflower	33	57	1	5	56
Chayote (fruit)	17	18	0	0	8
Chili	10	183	1	8	250
Chinese leek	68	46	7	252	18
Coriander	184	71	1	1153	135
Cucumber	10	25	1	0	7
Dill	208	66	7	772	85
Eggplant	18	17	0	12	12
Elephant foot yam	50	34	1	43	
Fenugreek (leaf)	395	51	2	390	52
Garden cress	360	110	29	0	69
Garden pea	20	139	2	14	9
Garlic	53	42	1	141	36
Green onion	50	50	7	99	17
Hyacinth bean	50	49	1	86	13
Indian rape	115	58	2	302	70

	Nutrient in 100 g vegetable				
	Calcium	Phosphorus	Iron	Vitamin A	Vitamin C
	mg	mg	mg	µg (RE)	mg
Kohlrabi	24	46	0	4	62
Lamb's-quarter	150	80	42	290	35
Lettuce	50	28	2	165	10
Malabar spinach	200	35	1	1240	87
Okra	66	56	0	9	13
Onion	47	50	1	0	11
Pointed gourd	30	40	2	26	29
Pumpkin (leaf)	392	112	2	83	11
Radish (root)	50	20	0	0	17
Shallot	37	60	1	0	8
Snake gourd	26	20	2	16	0
Spinach	73	21	1	508	28
Sponge/Ridge gourd	28	30	1	0	5
Squash (pumpkin)	10	30	0	8	2
Stinging nettle	981	-	-	0	6
Sweet pepper (yellow)	17	34	2	0	116
Sweet potato (red)	146	34	2	0	2
Sword bean	60	40	2	2	0
Taro (leaf/stalk/corn)	227	82	10	1713	12
Tomato	15	27	1	71	23
Turnip (leaf)	710	60	24	356	180
Velvet bean	-	-	-	-	-
Yam	20	74	1	16	1

Note: "-" data not available

Sources:

Institute of Nutrition, Mahidol University. (2014) *ASEAN Food Composition Database*.
Electronic version 1, February 2014, Thailand,
http://www.inmu.mahidol.ac.th/aseanfoods/composition_data.html

Nepal Government. (2012) *Food Composition Table for Nepal 2012*. Nepal Government, Ministry of Agriculture Development, Department of Food Technology and Quality Control, National Nutrition Program. Kathmandu.

U.S. Department of Agriculture, Agricultural Research Service. (2012) *USDA National Nutrient Database for Standard Reference*, Release 25. Nutrient Data Laboratory Home Page, <http://www.ars.usda.gov/ba/bhnrc/ndl>

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

VEGETABLE RECIPES

MIXED VEGETABLE CURRY

Ingredients

Vegetables

1 cup cabbage, chopped
1 cup green beans
1 cup cauliflower, chopped
½ cup green peas
2 medium potatoes, boiled and diced into ½ inch cubes
2 medium onions, thinly sliced
3 tablespoon vegetable oil
1 green chilli, chopped (add more according to preference)
1 teaspoon cumin powder
1 teaspoon fresh ginger (finely chopped)
½ teaspoon garlic paste
salt to taste

Optional

½ teaspoon coriander powder
¼ (pinch) teaspoon cinnamon powder
¼ (pinch) teaspoon cardamom powder
¼ (pinch) teaspoon cloves powder

Garnish

Juice from ½ a lemon
2 tablespoon cilantro, finely chopped

Cooking Instruction

1. Heat the oil and stir fry onion till golden brown
2. Add all spices. Cook and stir for a minute or so.
3. Add vegetables and cook until fully cooked.
4. Remove from heat and add lemon juice.
5. Garnish with cilantro and serve hot.

OTHER RECIPES

Kwati (Nepali Sprout Soup)

<http://www.weallnepali.com/recipe/festival-special>

Tomato and Cilantro (Coriander) Pickle (Golveda Ra Dhaniya Ko Achaar)

<http://www.food-nepal.com/recipe/R009.htm>

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 will 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 will 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 Veggies

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

Ask the students to write about their experience, what they have learned from the school garden, the



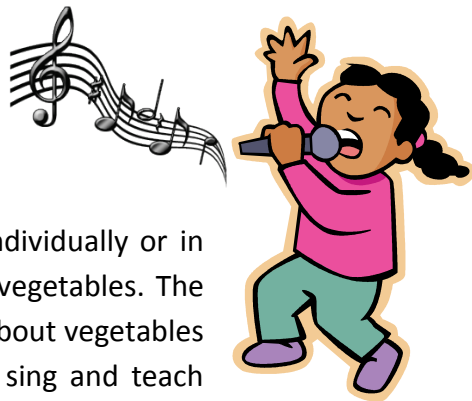
nutrition and WASH lessons, and participating in the school promotional events. Challenge the students to come up with solutions to help encourage people to eat more vegetables and apply WASH in the school and community. Once a week, a couple of students can present their stories to the class. Students 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 will 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 make 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 will 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 will 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 could 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 will 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. 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 students raise awareness about 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 about 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 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 during community events, the students perform their skits for the public and teach them about the importance of vegetables.



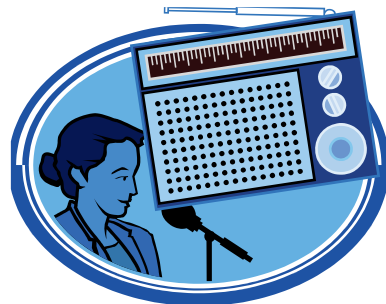
Radio Promotion

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 the radio program to tell about their experiences growing vegetables and their importance in health.

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



Open School Garden Day

Students act as guides to introduce community members to vegetable crops 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 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

REFERENCES

- FAO. (2009) Nutrition Handbook for the Family. Joint Publication of Food and Agriculture Organization of the United Nations, Government of Nepal and Government of Spain: Rome.
- FAOSTAT. (2014) Food Balance Sheets. Food and Agriculture Organization of the United Nations. Retrieved on July 20, 2014.
<http://faostat.fao.org/site/354/default.aspx>
- Institute of Nutrition, Mahidol University. (2014) ASEAN Food Composition Database. Electronic version 1, February 2014, Thailand,
http://www.inmu.mahidol.ac.th/aseanfoods/composition_data.html
- King, Felicity Savage, and Ann Burgess. (1993) Nutrition for Developing Countries. Oxford University Press: New York.
- Nepal Government. (2012) Food Composition Table for Nepal 2012. Nepal Government, Ministry of Agriculture Development, Department of Food Technology and Quality Control, National Nutrition Program. Kathmandu.
- NLiS. (2014) Nutrition Landscape Information System. World Health Organization. Retrieved on August 5, 2014. <http://apps.who.int/nutrition/landscape/report.aspx>
- U.S. Department of Agriculture, Agricultural Research Service. (2012) USDA National Nutrient Database for Standard Reference, Release 25. Nutrient Data Laboratory Home Page, <http://www.ars.usda.gov/ba/bhnrc/ndl>
- WorldVeg Nutrient Database. (2016) <http://www.avrdc-nudb.org/>

avrdc.org

World Vegetable Center
Headquarters
PO Box 42
Shanhua, Tainan 74199
Taiwan

T +886 (0) 6 583-7801
F +886 (0) 6 583-0009
E info@worldveg.org

