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Nutrition Sensitive Agriculture: Linking Agriculture, Food Systems and Nutrition

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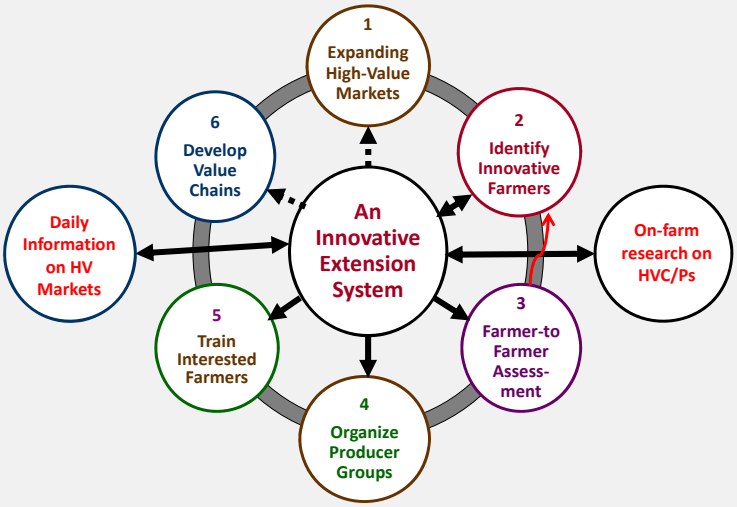
Modernizing Extension and Advisory Services Represents a Paradigm Shift in the 21st Century

Decentralized Extension Systems	• Extension systems should become more decentralized, since agro-ecological conditions & access to markets differs significantly across each country
Creating "Farmer-led " Extension Systems	• Producer & women's groups • Then, using these group leaders to create "farmer-led" Extension Steering and/or Advisory Committees
Creating a more "Market-driven" Extension System	• Given economic growth in most countries, Extension should focus more attention on new market opportunities for High Value (HV) crops, livestock, fish and other products
Tailoring Extension Programs to Target Groups	• Given key resource differences, small scale men and women farmers should refocus their farming systems so they can increase farm incomes and improve their rural livelihoods, which will result in healthy families, etc.
Collaborating with the Private Sector	• Public extension should coordinate with and begin building public-private partnerships (PPP); as well as helping farmers get organized and linked to new markets and opportunities
Innovative Extension Systems	• In a more innovative extension system, the field extension workers become facilitators and/or knowledge brokers • Disseminating both process and product innovations

Elements of an Innovative Extension System



Key Messages

Rethinking

- Food Systems, Integrating Nutrition into Extension and Advisory Services
- Extension policies, strategies, programs, methods, training, research,
- Needs Assessment, SWOT Analysis, Find your niche!
- Look for your own outcomes, think about low-cost and efficient extension outreach activities

Inclusiveness

- Diverse community members, multi-stakeholders from GO, NGO, FBO, CBO, Schools, Colleges, Universities, Training Institutes/Centers/ Schools

Motivation

- Farmers -Technology (Low Cost) + Value Added + Market + Nutrition
- Field extension workers - knowledge, transport, performance

Encouragement

- Extension programs: Innovative, Creative, Experience-based, Research-based
- Extension methods: Participatory, farmers field school, farmers visits, field demonstration
- Institutional Linkages: Education-Research-Extension (Collaboration, cooperation and coordination)

Research

- Translational research focusing on community needs and farmers needs
- Low-cost, effective and efficient research activities, micro-level research with existing resources

Respect and Recognize

- Glocalization, Local Knowledge, Global Expertise, Community Development
- NOT Teaching Farmers, Reaching Out Farmers!!!

What's Nutrition Sensitive Agriculture?

Nutrition-sensitive agriculture is a food-based approach to agricultural development that puts nutritionally rich foods, **dietary diversity**, and **food fortification** at the heart of overcoming **malnutrition** and **micronutrient deficiencies**.

This approach stresses the multiple benefits derived from enjoying a variety of foods, recognizing the nutritional value of food for good nutrition, and the importance and social significance of the food and agricultural sector for supporting rural livelihoods. The overall objective of nutrition-sensitive agriculture is to make the local food system better equipped to produce good nutritional outcomes.

Nutrition Indicators

Dietary Diversity Exclusive Breastfeeding
Anemia
Stunting Wasting
Underweight
Complementary Feeding
Micronutrients
Hypertension Body Mass Index
High Blood Pressure
Food Fortification
IRON Protein Iodine ZINC
Cardiovascular Cancer Diabetes Stroke
Vitamins Minerals Macronutrients
Obesity Undernutrition Overnutrition Overweight

Dietary Diversity & Dietary Diversity Score (DDS)

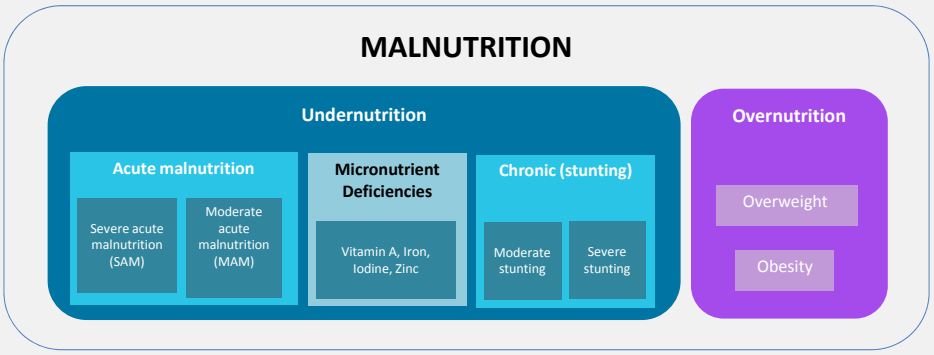
- Dietary diversity is a measure of the number of individual foods or food groups consumed in a given time period.
- Dietary diversity score (DDS). The DDS can be scored on a household or individual basis. Household dietary diversity is defined as the number of unique food groups consumed by household members over a given period. The HDDS has been validated to be a useful approach for measuring household food access, particularly when resources for undertaking such measurement are scare.

What's Food Fortification?

The addition of one or more essential nutrients to a food, whether or not it is normally contained in the food, for the purpose of preventing or correcting a demonstrated deficiency of one or more nutrients in the population or specific population groups.

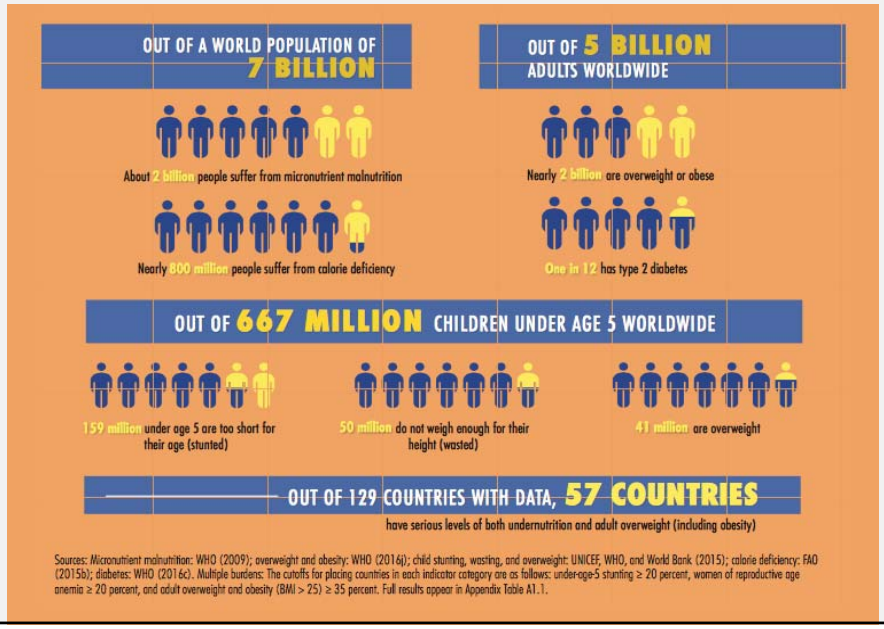
Biofortification: Biofortification is the process of breeding food crops that are rich in micronutrients, such as vitamin A, Zinc, and Iron. These crops "biofortify" themselves by loading higher levels of minerals and vitamins in their seeds and roots while they are growing. When eaten, they can provide essential micronutrients to improve nutrition and public health.

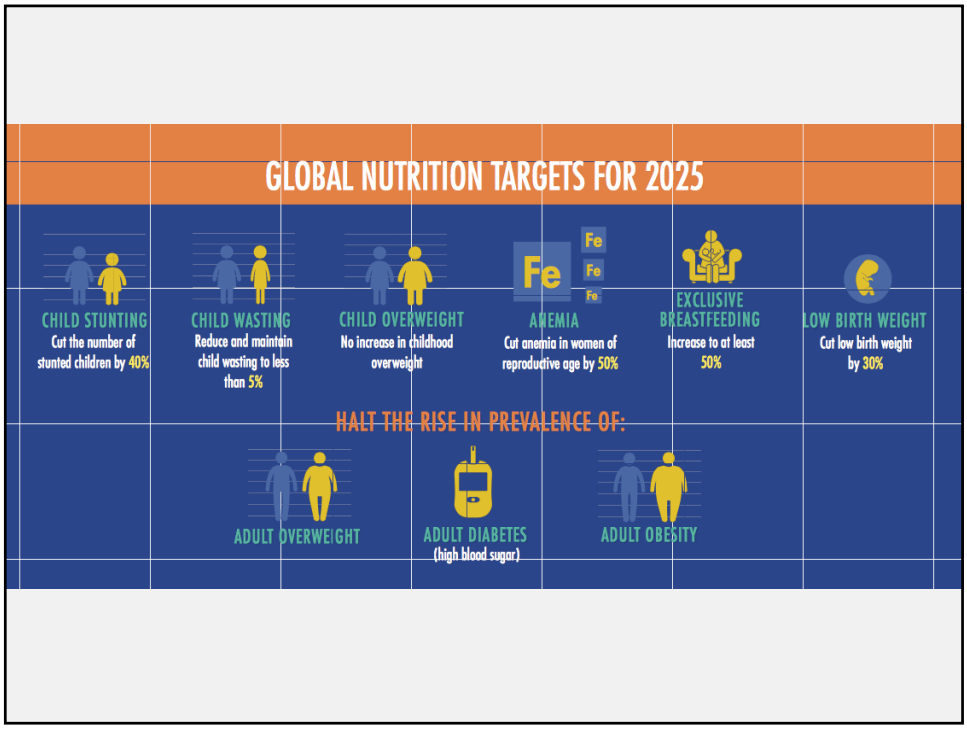
Malnutrition Everywhere!



Malnutrition – can be caused by eating too little food, too much food, the wrong/not proper combination of foods or foods with no or little nutritional value, as well as foods that are contaminated with harmful bacteria, viruses or parasites.

The Scale of Malnutrition in 2016



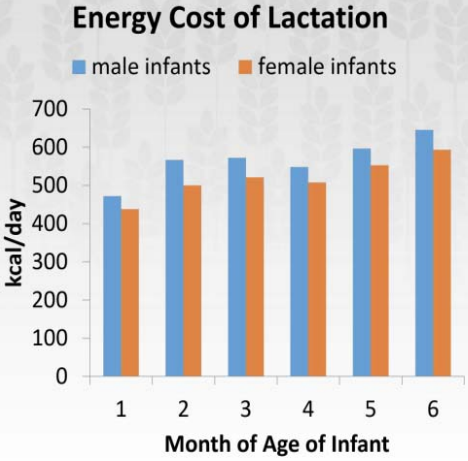


Exclusive Breastfeeding (EBF)

Breast milk contains all the nutrients an infant needs in the first six months of life. It protects against common childhood diseases such as diarrhea and pneumonia, and may also have longer-term benefits such as lowering mean blood pressure and cholesterol, and reducing the prevalence of obesity and type-2 diabetes.

Infants receive only breast milk, no other liquids or solids - not even water- for the first six months of life, to achieve optimal growth, development and health (WHO recommendation on EBF)

Why are women vulnerable?



Pregnant woman need 250-300 additional kcal/day

~500 additional kcal/day

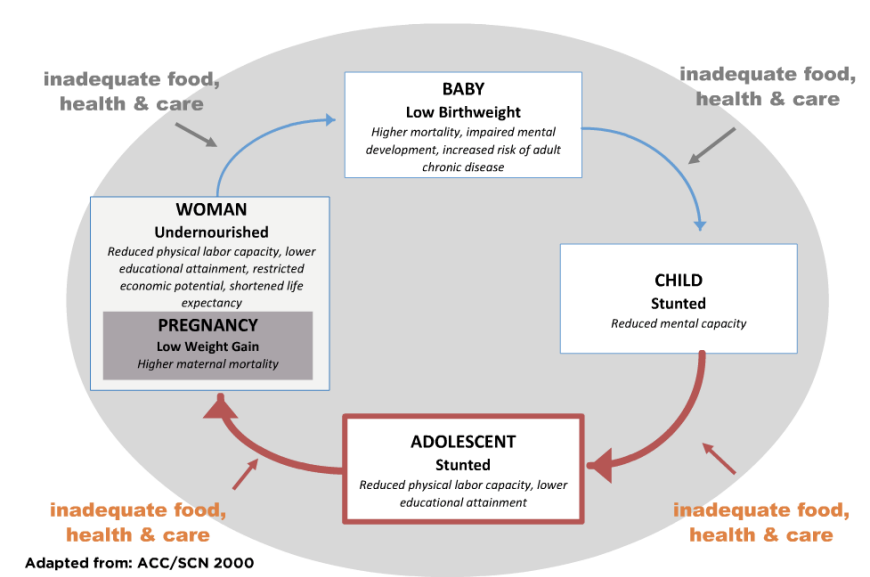
Based on data from USDA FNS (2009)

First 1000 Days

throughout the pregnancy → 2 years of age

What makes kids so vulnerable during this 1,000 day window?

Consequences of Undernutrition



Infant and Young Child Feeding

Infant and Young Child Feeding (IYCF): Term used to describe the feeding of infants (less then 12 months old) and young children (12-23 months old). IYCF programs focus on the protection, promotion and support of exclusive breastfeeding for the first six months; timely introduction of complementary feeding and continuous breastfeeding for two years and beyond.

What's Complementary Feeding?

The transition from EBF to complementary feeding – typically covers the period from 6-24 months of age. This is a critical period of growth during which nutrient deficiencies and illnesses contribute globally to higher rates of undernutrition among children under five years of age.

- Infants should be exclusively breastfeed for the first six months of life. Thereafter, infants should receive nutritionally adequate and safe complementary foods, while continuing to breastfeed for up to two years or more (WHO recommendation).

Food Security

"when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life."

- World Food Summit of 1996

Challenges to Food Security

- Decreasing public investment in agricultural research over the last 15 years
- Unmet needs of rural poor in low-income countries (food security, roads to take food to market, storage and food processing capability, food waste management, access to good land and good water)
- Activists who campaign against agricultural biotechnologies
- Chronic malnutrition still an issue (870M undernourished, 2B suffer nutritional deficiencies- impact mental and physical development in children- FAO)
- Skyrocketing food prices (increase in global food insecurity due to unstable food prices that contributing to social unrest and poverty)
- Climate change
- Global population increase (over 7.5 Billion)

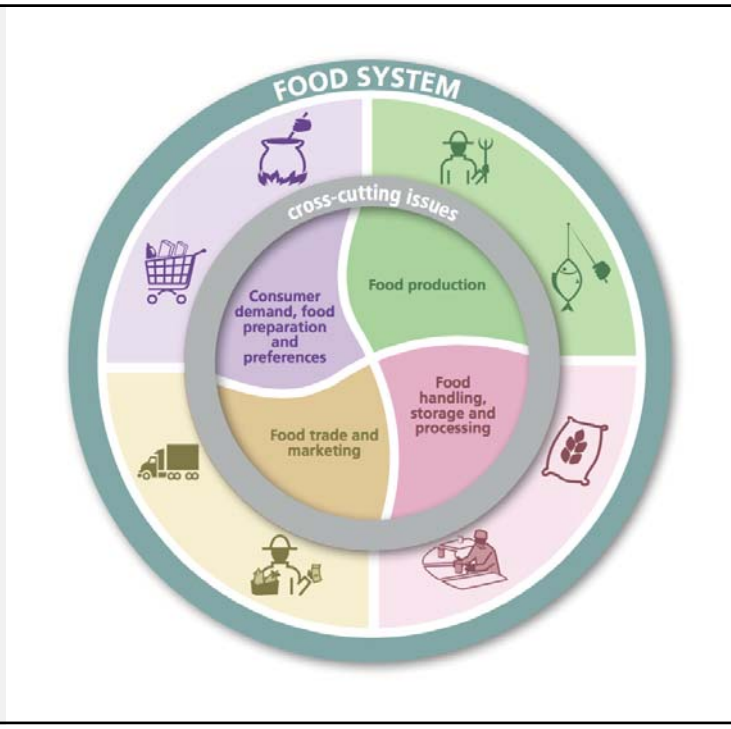
Population of Greater Mekong

Country		Million
Cambodia		15.76
Lao PDR		6.758
Myanmar		52.89
Thailand		68.86
Vietnam		92.7
Source: World Bank 2016.		

Understanding Food Systems

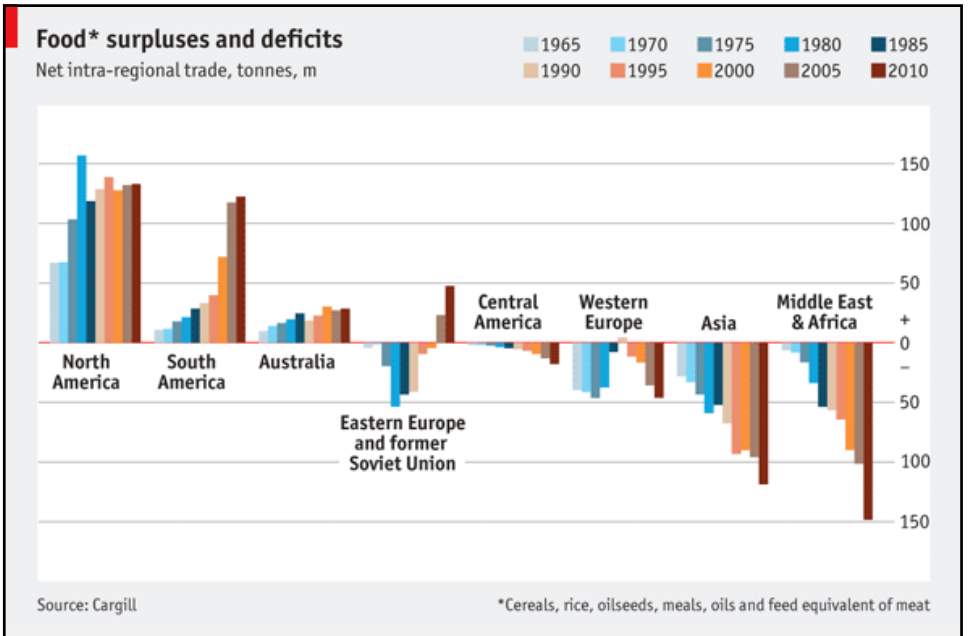
A **food system** includes all processes and infrastructure involved in feeding a population: growing, harvesting, processing, packaging, transporting, marketing, consumption, and disposal of **food** and **food**-related items. It also includes the inputs needed and outputs generated at each of these steps.

***** Community-local-regional-national-global food systems



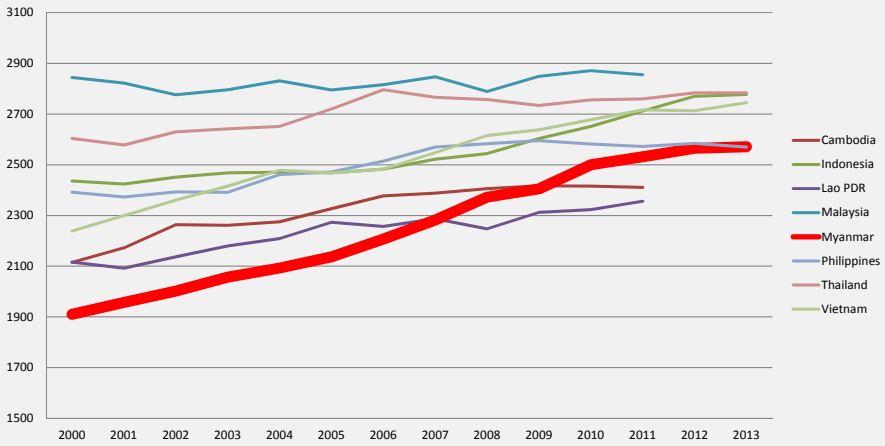
Linking Agriculture and Nutrition for Food & Nutrition Security

- Food Availability
  - Food production
  - Food processing
  - Food marketing & distribution
  - Local and seasonal food
- Food Accessibility
  - Household income & Family size
  - Food purchasing, food prices volatility
  - Financing food with debt - urban and rural poor
- Food Utilization
  - Food preparation
  - Food consumption & Eating Behaviors
  - Food diversification/food balancing -Dietary diversity
  - Food safety, sanitation & good hygiene practices



From the Economist Online, 28 May 2012

ASEAN FOOD SUPPLY (kcal/capita/day)



Source: FAO STAT Food Balance Sheet Database. 14 November 2016
http://faostat.fao.org/beta/en/#data/FBS

Nutritional Outcomes

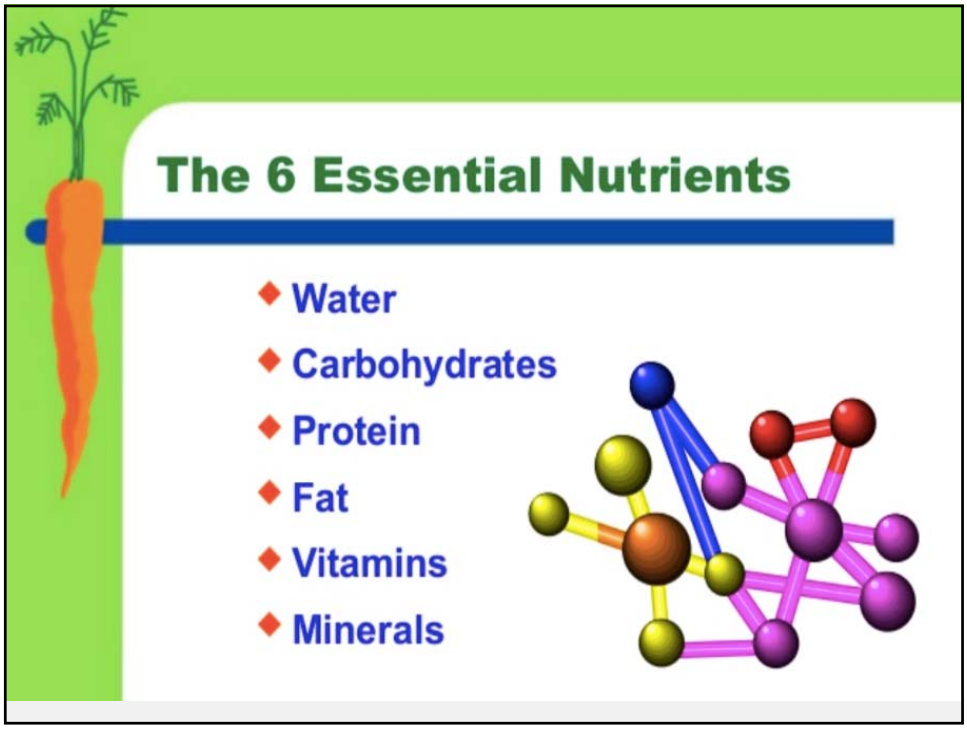
Global Initiatives: Sustainable Development Goals (SDG 2.2) targets for 2025 Children Under 5 Year-old

- Reduce stunting by 40%
- Reduce wasting to less than 5% of the population

Myanmar Demographic Health Survey (MDHS), 2015-16- Children Under 5 Year-old

- Stunting 29%
- Wasting 7%
- Underweight 19%

Micronutrient deficiencies - Invisible problem but limits physical and mental development

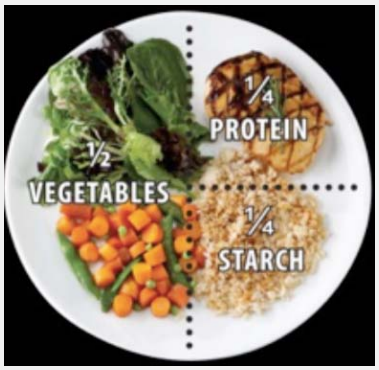


What's on Your Plate!

What food groups, how much & how often do you eat!

What's on Your Plate!

Recommended diet



Typical diet

Eat Local, Seasonal, Fresh, Affordable, Accessible, Nutritious, and Healthy Food!

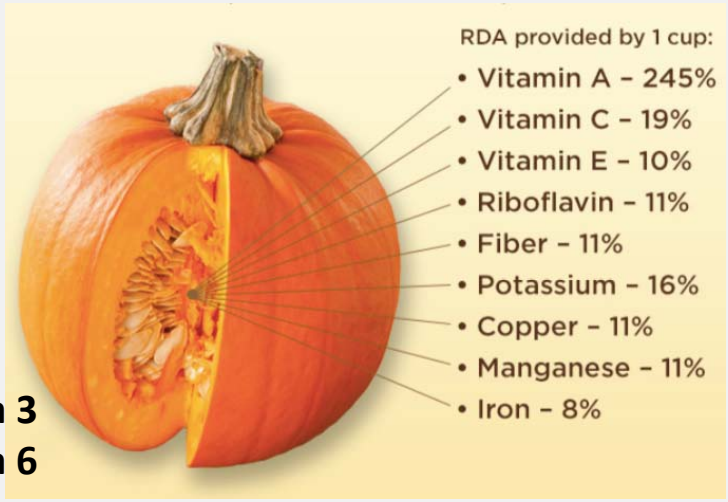
Nutrition Facts (1 Medium Avocado)

Calories	322
Protein	4.02 g
Fiber	13.5 g

Minerals	
Potassium	**975 mg**
Phosphorus	105 mg
Magnesium	58 mg
Calcium	24 mg
Sodium	14 mg
Iron	1.11 mg
Selenium	0.8 mcg
Manganese	0.285 mg
Copper	0.382 mg
Zinc	1.29 mg

Vitamins	
Vitamin A	293 IU
Vitamin B1	0.135 mg
Vitamin B2	0.261 mg
Niacin	3.493 mg
Folate	163 mcg
Pantothenic Acid	2.792 mg
Vitamin B6	517 mg
Vitamin C	20.1 mg
Vitamin E	4.16 mg
Vitamin K	**42.2 mcg**

Pumpkins are Healthy!



Omega 3
Omega 6

Moringa/Drumstick (Leaves, Pods) Nutrition and Health Benefits

Protein, Vitamin A, B & C, Calcium, Potassium, Magnesium, Iron

- Blood purifier
- chest congestions
- coughs and sore throats

Rainbow of Vegetables Raw/Stew/Stir-Fried!

Green
Broccoli
Beans/Peas
Cabbage
Chayote
Cucumber
Gourd
Bitter Gourd
Eggplant
Kale/Mustards
Okra
Peppers
Scallions
Spinach
Squash
Water Crass

Red/Orange
Carrots
Onions
Peppers
Pumpkins
Potatoes
Sweet Potatoes
Tomatoes

Yellow/White
Bamboo shoots
Cauliflower
Cabbage
Corn
Onions
Potatoes
Peppers
Pumpkins
Radishes
Squash
Sweet potatoes

Purple
Eggplant
Sweet Potatoes

Soy Sauce

Soy sauce is a condiment made from a fermented paste of boiled soybeans, roasted grain, brine, and Aspergillus oryzae or Aspergillus sojae molds.

Nutrition Facts
Soy sauce, shoyu

Amount Per 1 tbsp (16 g)			
Calories 9			
			% Daily Value*
Total Fat 0.1 g			0%
Saturated fat 0 g			0%
Polyunsaturated fat 0 g			
Monounsaturated fat 0 g			
Cholesterol 0 mg			0%
Sodium 879 mg			36%
Potassium 70 mg			2%
Total Carbohydrate 0.8 g			0%
Dietary fiber 0.1 g			0%
Sugar 0.1 g			
Protein 1.3 g			2%
Vitamin A	0%	Vitamin C	0%
Calcium	0%	Iron	1%
Vitamin D	0%	Vitamin B-6	0%
Vitamin B-12	0%	Magnesium	3%

*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.

FNEC 2015: Dr. Khin Mar Cho, International Agriculture, Food, and Nutrition Specialist, Cornell University, New York, USA

Fish Sauce

Fish sauce is an amber-colored liquid extracted from the fermentation of fish with sea salt. It is used as a condiment in various cuisines.

Nutrition Facts
Fish sauce

Amount Per 1 tbsp (18 g)			
Calories 6			
			% Daily Value*
Total Fat 0 g			0%
Saturated fat 0 g			0%
Polyunsaturated fat 0 g			
Monounsaturated fat 0 g			
Cholesterol 0 mg			0%
Sodium 1,413 mg			58%
Potassium 52 mg			1%
Total Carbohydrate 0.7 g			0%
Dietary fiber 0 g			0%
Sugar 0.7 g			
Protein 0.9 g			1%
Vitamin A	0%	Vitamin C	0%
Calcium	0%	Iron	0%
Vitamin D	0%	Vitamin B-6	5%
Vitamin B-12	1%	Magnesium	8%

*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.

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Oyster Sauce

Oyster sauce describes a number of sauces made by cooking oysters. The most common in modern use is a viscous dark brown condiment made from sugar, salt, and water thickened with cornstarch, flavored with a little oyster essence or extract.

Nutrition Facts
Oyster sauce

Amount Per 1 tbsp (18 g)			
Calories 9			
			% Daily Value*
Total Fat 0 g			0%
Saturated fat 0 g			0%
Polyunsaturated fat 0 g			
Monounsaturated fat 0 g			
Cholesterol 0 mg			0%
Sodium 492 mg			20%
Potassium 10 mg			0%
Total Carbohydrate 2 g			0%
Dietary fiber 0.1 g			0%
Sugar 0 g			
Protein 0.2 g			0%
Vitamin A	0%	Vitamin C	0%
Calcium	0%	Iron	0%
Vitamin D	0%	Vitamin B-6	0%
Vitamin B-12	1%	Magnesium	0%

*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.

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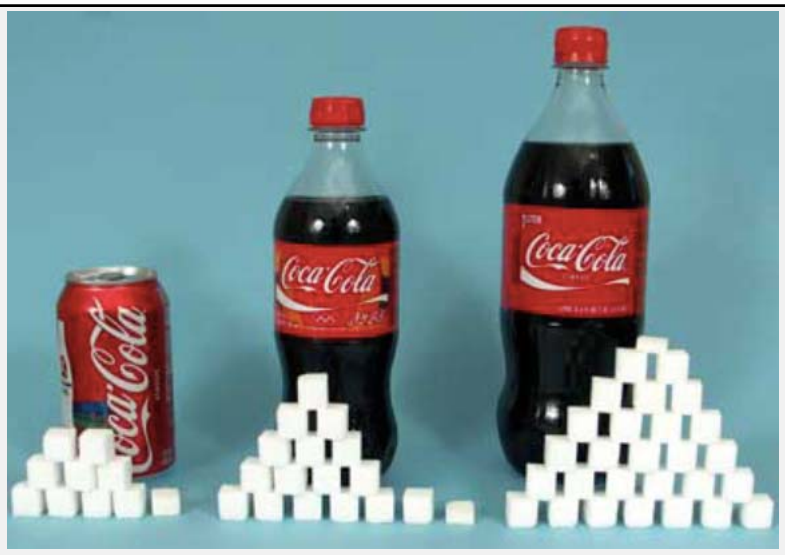

12 oz (355 ml) Can		20 oz (590 ml) Bottle		1 Liter (34 oz) Bottle	
Sugars, total:	**39g**	**Sugars, total:**	**65g**	**Sugars, total:**	**108g**
Calories, total:	140	Calories, total:	240	Calories, total:	400
Calories from sugar:	140*	Calories from sugar:	240	Calories from sugar:	400

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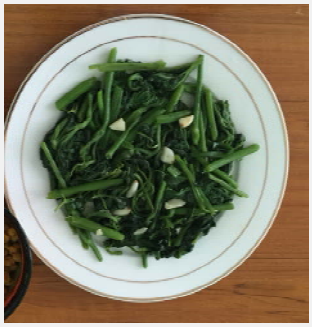
Eating Local, Seasonal, Fresh!

Phytochemicals found in most grains, legumes, vegetables and fruits are associated with the prevention and/or treatment of at least four of the leading causes of death, such as cancer, diabetes, cardiovascular diseases, hypertension and high cholesterol levels. (FNRI 2015)



Food Safety

- Hand Washing and Personal Hygiene
- Washing Fruits and Vegetables
- Cooking Meat at Proper Temperature

Fight Bac Principles!

- Clean
- Cook
- Separate
- Chill

How do we provide education and information about Nutrition Sensitive Agriculture and Food Systems to farmers and community members?

Dietary Diversity & Modifying Recipes

Putting Lessons into Practices

Modifying Recipes

Rainbow Vegetables Stew

- Pumpkin
- Sweet potato
- Taro
- Chayote
- Carrot
- Cauliflower
- Green beans
- Onion, Garlic, Ginger, Green Chili, Coriander
- Peanut oil, salt

Tomato Salad with Avocado

Quick Sauteed Mixed Veggies

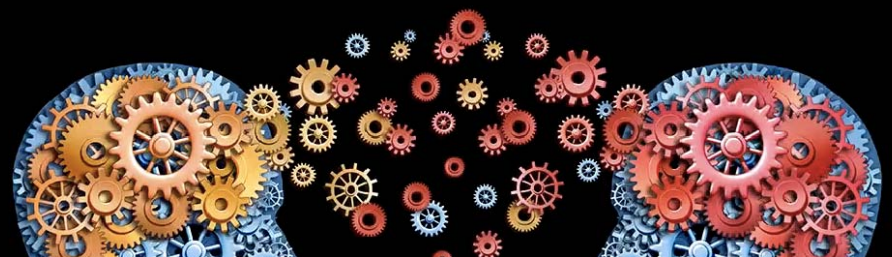
Add Rainbow Vegetables

- Broccoli
- Cauliflower
- Carrot
- Chayote
- Green beans
- Green mustard
- Kale
- Onion, Garlic
- Peanut oil
- Salt

Cabbage Salad with Apple

- Apple
- Cabbage
- Tomato
- Green mustard
- Coriander
- Green Chili
- Onion
- Garlic
- Peanut, grounded
- Peanut oil
- Salt

How to integrate Nutrition information in Agricultural Program?



How to integrate Nutrition information in Agricultural Program?

Key Messages:

- Nutritional Sensitive Agricultural programing: Multi-sectoral strategies (Improve Nutrition, Improve Economic Productivity)
- Focus on intervention of your work as an Agriculture officer
- How do we combine strategies? – Agriculture and Nutrition (for example, teaching communities about crop diversification, home gardening, ------dietary diversity, breastfeeding, complementary feeding)
- Cooperate nutrition objectives into your work when it is feasible and it makes sense to your work
- Collaboration is the key, integrate your work in Agriculture with other sectors
- Win-Win for Nutrition & Health for Women and Children
- Opportunity & Long Term: Strong Economy, Improve Livelihoods and Wellbeing

THANK YOU!

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