

Special Topic: Vegetarianism and Veganism

COURSE: CHAPTER 10

History

- ❖ Historically, some of the first self-proclaimed vegetarians were the Pythagoreans. A description of his diet appeared in a Greek philosopher's book *On Abstinence from Animal Food* (3rd century B.C.).
- ❖ Many ancient cultures also report consuming a predominantly plant-based diet , including those in Egypt, China, India, Peru, and Mexico.
- ❖ The term *Vegetarian* replaced *Pythagorean* in 1847 in England when the first vegetarian society was formed. Three years later, the American Vegetarian Society was founded in New York City

History

- ❖ 2014 statistics: Worldwide, vegetarians total 375 million. This varied significantly between countries (Example: U.S., 4% of men and 7% of the women, In India, 31%, In Europe, estimated at 10% of the population)
- ❖ Vegetarianism has become more popular in recent years.
- ❖ Despite the popular opinion that vegetarianism is a healthy option, there are some areas for concern and careful planning is necessary.

WHAT **HEALTHY** VEGAN NUTRITION LOOKS LIKE



WHAT **UNHEALTHY** VEGAN NUTRITION LOOKS LIKE



Definition

There are many definitions to Vegetarianism and Veganism

According to the Vegetarian society (UK):

A vegetarian is “someone who lives on a diet of grains, pulses, nuts, seeds, vegetable and fruits, with or without the use of dairy products and eggs. A vegetarian does not eat any meat, poultry, fish, shellfish or byproduct of slaughter”

According to the Vegan society (UK):

Veganism is “excluding all animal products, including milk, honey, eggs and may also exclude any products tested on animals, or any clothing from animals”

Types

Demi-vegetarian (semi-vegetarian): Occasionally eats meat/poultry/fish.

Pesco-vegetarian: Excludes meat and poultry, but includes fish (and possibly other seafood). May include dairy products and eggs.

Lacto-ovo-vegetarian: Excludes all flesh foods. Includes dairy produce and eggs.

Ovo-vegetarian: Excludes all flesh foods and dairy produce. Includes eggs.

Lacto-vegetarian: Excludes all flesh foods and eggs. Includes dairy produce.

Vegan: Avoids all foods of animal origin.

Macrobiotic: 10 dietary regimens of increasing restrictions. Usually vegetarian, but may eat meat or fish if wild/hunted. Diet is usually based on brown rice with some fruit, vegetables and pulses. The final stage of the diet consists of wholegrains and limited liquids.

Fruitarian: Diet is usually based on fresh and dried fruits, nuts, seeds and a few vegetables. The diet generally consists only of foods that do not kill the plant of origin.

Types

- ❖ As noticed earlier, the term 'vegetarian' encompasses a spectrum of dietary patterns, some of which are more restrictive than others.
- ❖ Therefore, nutrient intake can vary considerably, (which may be problematic in research)
- ❖ The diets of individuals may differ markedly, as individuals may have their own definitions based on factors such as:
 - Culture
 - Country of origin
 - Religion
 - Views on animal welfare

Reasons

The following are the most cited reasons for being vegetarian:

- *Ethical reasons*
- *Ecological reasons*
- *Health concerns*
- Sensory and taste preferences
- Philosophical reasons
- Cost
- Family influences
- *A reaction to food safety scares*

Ethical Reasons

Ethical vegetarians/vegans shape their choices by their desire to *avoid cruelty and suffering* to animals.

According to their point of view, even the most humane forms of rearing and killing animals violate the animal's most basic interest - *to continue living*.

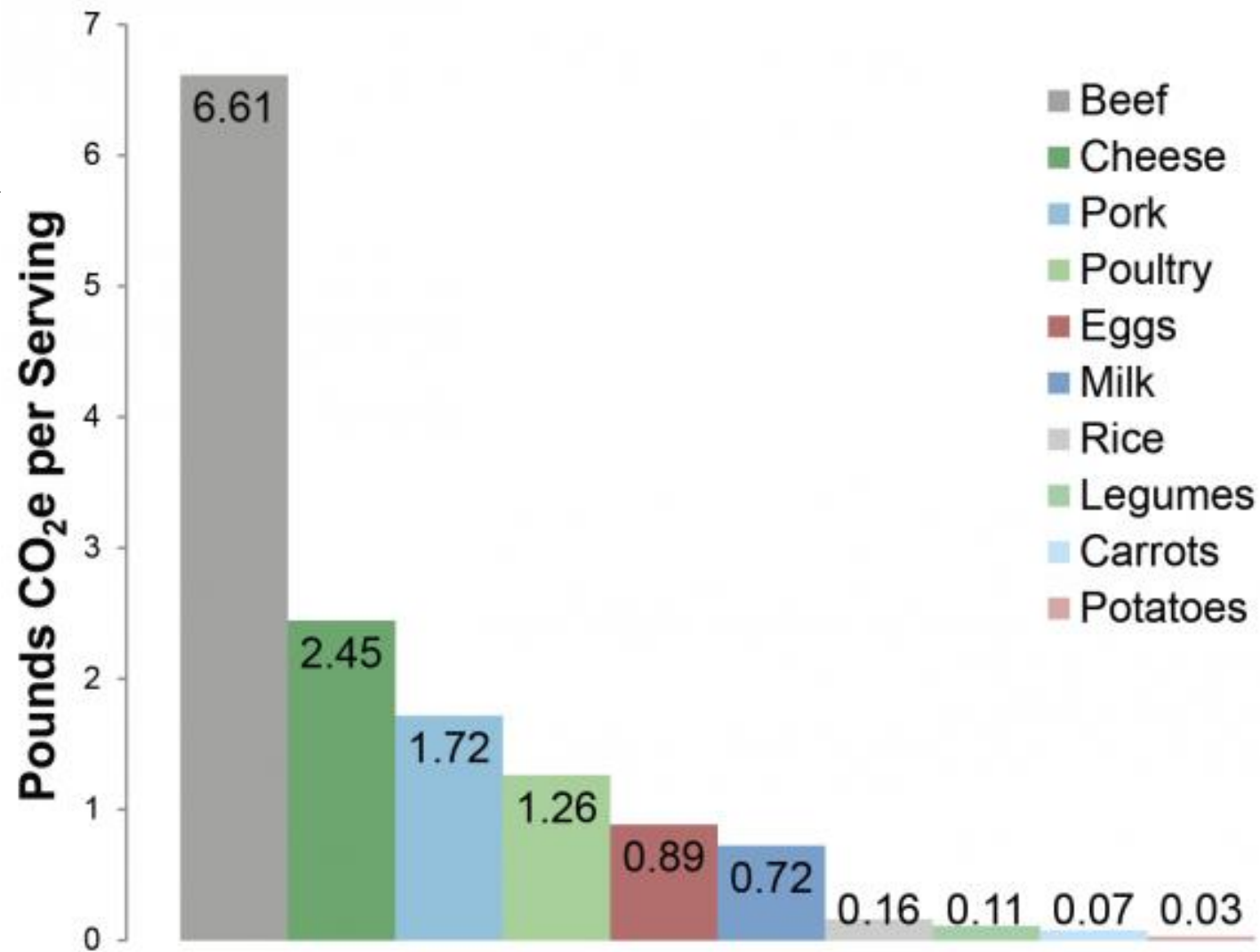
Other violations include:

- To live in natural conditions
- To make free choices
- To be free from fear and pain
- To live healthy lives without needing medical intervention
- To eat a natural diet
- To enjoy the normal social/family/community life of its species

Ecological reasons

Ecological benefits would include:

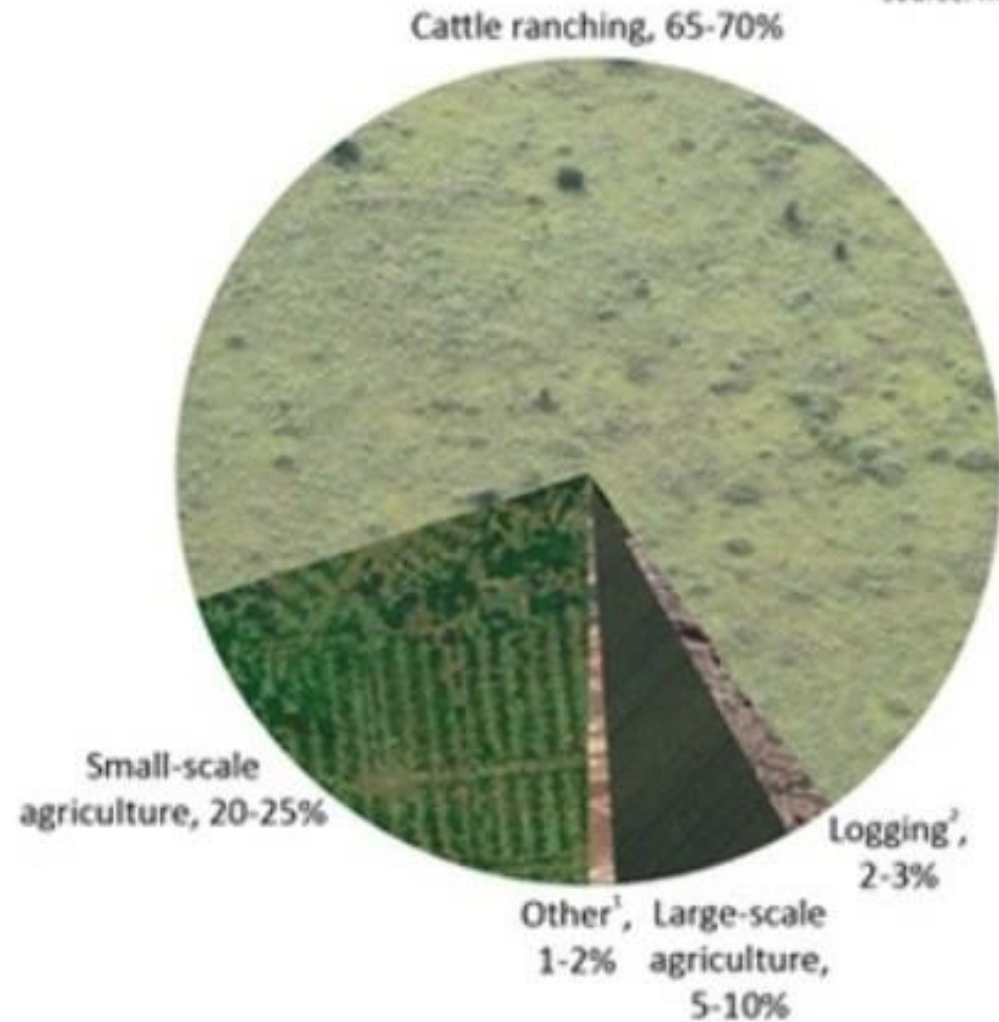
- Reducing Greenhouse Gas Emissions
- Preserving Habitats and Species
- Conserving Water



<http://css.umich.edu/factsheets/carbon-footprint-factsheet>

Causes of Deforestation in the Brazilian Amazon, 2000-2005

source: mongabay.com



Share of deforested land ultimately converted for extensive agriculture³



1) Other includes fires, mining, urbanization, road construction, dams; 2) Logging generally results in degradation rather than deforestation, but is often followed by clearing for agriculture; 3) Data from Holly Gibbs 2009

Water consumption of foodstuff

Foodstuff	Quantity	Water consumption, litres
Beef	1 kg	15,415
Sheep Meat	1 kg	10,412
Pork	1 kg	5,988
Butter	1 kg	5,553
Chicken meat	1 kg	4,325
Cheese	1 kg	3,178
Rice	1 kg	2,497
Cotton	1 @ 250g	2,495
Pasta (dry)	1 kg	1,849
Bread	1 kg	1,608
Pizza	1 unit	1,239
Apple	1 kg	822
Banana	1 kg	790
Potatoes	1 kg	287
Cabbage	1 kg	237
Tomato	1 kg	214
Egg	1	196
Wine	1 x 250ml glass	109
Tea	1 x 250 ml cup	27

What It Takes To Make A Quarter-Pound Hamburger



feed

6.7

Pounds of
grains and forage



water

52.8

Gallons for drinking water
and irrigating feed crops



land

74.5

Square feet for grazing
and growing feed crops



Source: J.L. Copper, Journal of Animal Science, July, 2003.

Credit: Producers: Eliza Barclay, Jessica Stoller-Conrad; Designer: Kevin Uffmeyer/NFW

Health Concerns

Compared to non-vegetarians, vegetarian-style eating patterns have been associated with:

- Lower levels of obesity and BMI, which translate to lower risk of other chronic lifestyle diseases
- Reduced risk of cardiovascular disease
- Lower total mortality
- Lower blood pressure.
- Lower overall cancer risks

Generally, vegetarians consume *a lower proportion of calories from fat (particularly saturated fatty acids); fewer overall calories*; and *more fiber, potassium, and vitamin C* than do non-vegetarians.

Food Safety Scares

Examples include:

1. Bovine Spongiform Encephalopathy (BSE)
2. *E. coli*
3. Salmonella
4. The use of antibiotics or growth hormones in meat production

Vegetarianism and Nutrition

Nutrition Concerns

Concern regarding nutritional adequacy of vegetarian diets includes the following:

- Protein
- Omega-3 Fatty Acids
- Vitamin B12
- Calcium
- Vitamin D
- Iron
- Zinc
- Iodine

Protein

- Animal proteins are considered high-quality or complete proteins because they contain good percentages of essential amino acids.
- An assortment of plant foods consumed over the course of the day can provide all of the essential amino acids and ensure adequate nitrogen retention and use.
- Easier to meet needs on a vegetarian diet that includes high-quality sources such as milk, cheese, cottage cheese, and eggs.
- Legumes, soyfoods, whole grains, nuts, seeds, and some vegetables are good sources of protein.
- One amino acid in particular that may be limited in a vegan diet is *lysine*; the highest plant-based sources include tofu, tempeh, soyfoods, and lentils.
- DRI for vegetarians: 0.8 g/kg BW. Vegans may require a slightly higher intake due to the slight decrease in the digestibility. Studies show that *1 -1.1 g/kg may be appropriate*
- *Plant proteins may provide a better “protein package” compared with animal proteins.*

Omega-3 Fatty Acids

- Fish and seafood are the main dietary source of *EPA and DHA*
- Vegetarians may obtain some EPA and DHA from the eggs of hens given feed rich in ALA and from milk. Vegans, however, *essentially consume no dietary EPA and DHA*.
- The body can convert the ALA into EPA and DHA (low levels)
- Plant ALA sources include *flaxseeds, walnuts, and soy*.
- Alternatives: Marine algae supplements & Stearidonic acid, found in an engineered soybean oil, more readily converts to EPA. More bioengineered sources are being explored.



Vitamin B12

- A significant nutritional concern for vegetarians and vegans.
- Research suggests that vegetarians, and especially vegans, may have inadequate levels
- Foods such as nutritional yeasts, breakfast cereals, and meat alternatives can be fortified with vitamin B12, but requires a regular, consistent supply



Calcium

- Calcium intake of *vegetarians* is similar to or higher than that of nonvegetarians.
- *Vegans'* calcium intake tends to be lower. However, vegan diets may also be high in many bone-protective nutrients (manganese; vitamins A, C, and K; some B vitamins; and magnesium)
- Conversely, high renal acid load (relates to high meat, fish, and dairy intake) can increase urinary losses of calcium. Diets high in fruits and vegetables produce a high renal alkaline load, which slows calcium losses.
- To achieve adequate calcium levels, vegans can consume fortified plant milks, fortified juices, tofu made with calcium sulfate, and leafy greens (may be poor sources due to poor absorption). A calcium supplement may be considered.

Vitamin D

- Vitamin D status primarily depends on sunlight exposure (depends on the season, the time of day, the length of day, cloud cover, smog, skin melanin content, and sunscreen use) and consuming vitamin D–rich foods and supplements.
- Food sources: fatty fish and fish liver oils, and mushrooms exposed to light during production . Smaller amounts in beef liver, cheese, and egg yolks.
- May need vitamin D supplementation to meet recommended levels. (Vegans may want to avoid vitamin D3, but can consume vitamin D2)

Iron

- Because *nonheme iron sources* have lower bioavailability, vegetarians and vegans are recommended to consume *1.8 times* the recommended intake for nonvegetarians.
- Attention should be paid to inhibitors and enhancers of nonheme iron absorption , which include: phytates, calcium, and polyphenolics in tea, coffee, and cocoa.
- Soaking, sprouting, fermenting, and cooking beans, grains, and seeds can diminish phytate levels.

Zinc

- Zinc is found in animal foods such as oysters, red meat, poultry, seafood, and dairy products as well as plant foods, including beans, nuts, legumes, soy products, and whole grains.
- Zinc's *bioavailability in plant foods is lower* than in animal foods (Soaking, sprouting, and leavening beans, grains, and seeds can reduce the binding of zinc by phytic acid and increase bioavailability)
- The National Institutes of Health suggests that vegetarians may need to eat as much as *50% more zinc* than the recommend intakes for the general population.

Iodine

- Iodine is naturally found in foods such as fish and dairy products. It's also found in fruits and vegetables (depending on the soil in which they grew and the fertilizer used)
- It's also added to *iodized salt*.
- Sea vegetables can contain varying levels of iodine and sometimes very high levels.
- Some plant foods, including cruciferous vegetables, soybeans, and sweet potatoes, contain naturally occurring goitrogens, which may help to counteract high iodine intake