

# **Food Security and Malnutrition in Pakistan - Addressing through Sustainable Agriculture and Public Education**

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# **Sustainable Agriculture** (in simplest terms)

is the production of food, fiber, or other plant or animal products using farming techniques that **protect the environment, public health, human communities, and animal welfare**

It has been defined as "an integrated system of plant and animal production practices having a site-specific application that will last over the long term", for example:

- Satisfy human food and fiber needs
- Enhance environment quality and the natural resource base upon which the agricultural economy depends
- Make the most efficient use of non-renewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls
- Sustain the economic viability of farm operations
- Enhance quality of life for farmers and society as a whole

# Some Challenges that we Face

- **Climate Change and Global Warming**
- **Shortage of food and Population growth**
- **Massive Urbanization (Migration from rural to urban)**
- **Impure food and growing health issues**
- **Weak S & T System to cope with challenges**
- **Weak IPR (required to protect indigenous knowledge)**
- **Insensitivity to Sustainable Agriculture**
- **Depleting/Wasting natural resources**
  - **Water**
  - **Nutrient (Soil quality)**
  - **Forests/Mountains (Environment?)**

# Food Security: Dimensions



## 01. Food Availability

"Supply side" of food security determined by level of food production, stock levels, and net trade.



## 02. Food Access

Economic and physical access, including policy focus on incomes, expenditure, markets, and prices in achieving food security.



## 03. Food Use/Utilization

Sufficient energy and nutrient intake, including attention to good care and feeding practices, food preparation, diet diversity, etc.



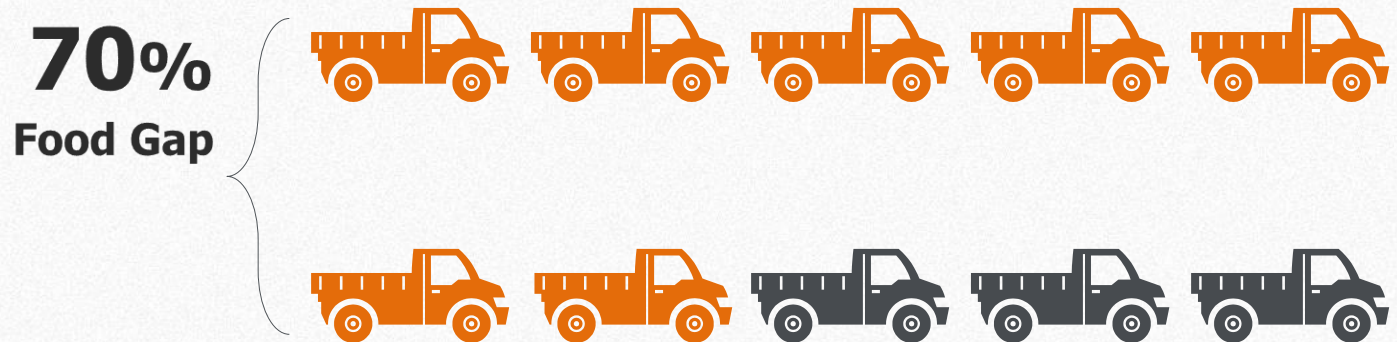
## 04. Food Sustainability

Adequate access to nutritious food at all times, including focus on weather conditions, political stability, and economic factors.

With courtesy of Shamika N. Sirimanne

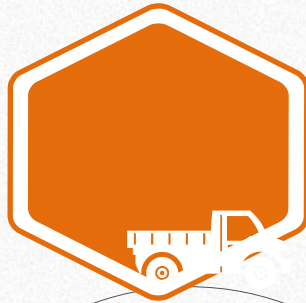
# Food Availability: Food Gap

**Science, Technology, and Innovation can play a critical role in producing more food**



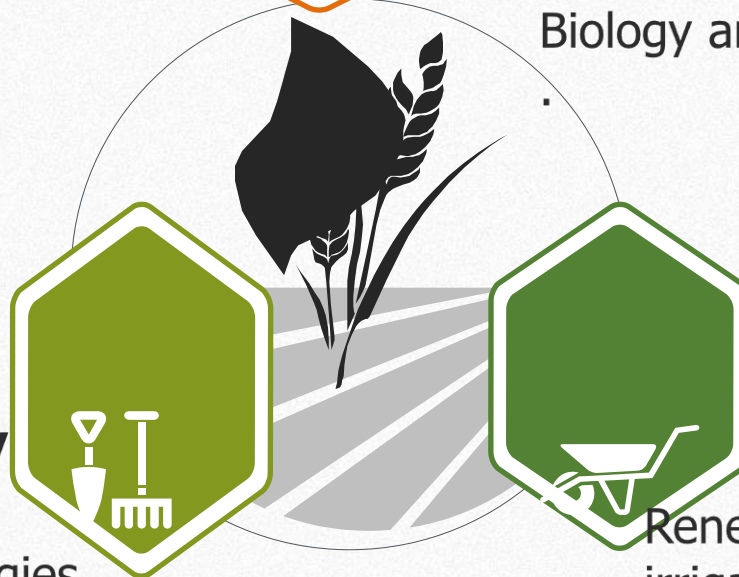
FAO (2006) identified a “food gap” close to 70 per cent between the **crop calories available in 2006** and the **expected calorie demand in 2050**. With courtesy of Shamika N. Sirimanne

# Food Availability: Innovations



## Genetic Modification

Conventional cross-breeding, transgenic crops, and synthetic Biology amongst other methods



## Improved Soil Fertility

Nitrogen fixation, technologies for creating biological fertilizers, and precision agriculture.

## Irrigation Technologies

Renewable energy-powered irrigation pumps, rainfall storage systems, planting technologies for increased water efficiency, and "big data."

**With courtesy of Shamika N. Sirimanne**

# Food Access

## Food Loss and Waste

One key aspect of accessing food is **minimizing** food losses during production, storage and transport, and food waste.



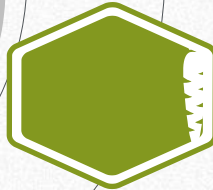
## New technologies

**Harvest** and post-harvest technologies for storage, handling, refrigeration, transport, and processing.



## Local capacity-building

**Investing** in local talent to fabricate and repair post-harvest technologies can improve affordability and availability.



## Links to International Markets

**Improving** capabilities of smallholder farmers to produce for international markets can contribute to productive trade.



With courtesy of Shamika N. Sirimanne

# Food Use/Utilization



With courtesy of Shamika N. Sirimanne

## 1 billion people

### Insufficient calories and nutrients

Only 3 billion people have sufficient and not excessive calories and sufficient nutrients. Undernutrition can lead to hidden hunger, wasting, and stunting, with irreversible damage to individuals and society.

## Bio-fortification

### 40 countries, 10 million people

Bio-fortification has emerged as an effective approach for combating malnutrition. The orange-fleshed sweet potato developed at the International Potato Center has been recently recognized by the World Food Prize.



A vibrant outdoor market scene. In the foreground, a woman wearing a large, wide-brimmed straw hat and a floral-patterned shirt is sorting through a large pile of green beans on a green tarp. To her left, another woman in a red and black patterned shirt and a colorful hat sits on the ground, surrounded by various bowls and bags of produce. The background is filled with more people, including a man in a white shirt and tan pants, and several motorcycles parked nearby. Large woven baskets and sacks of goods are scattered throughout the scene, creating a sense of a bustling, active marketplace.

# Food Stability

## Climate Change Adaptation/Mitigation

Carbon sequestration, locally adapted breeding for drought and heat tolerant varieties

## Precision Agriculture

Big Data and the Internet of Things (IoT) for decision support and index-based insurance

## Early Warning Systems

Satellite and meteorological data for adaptation to changing climate and environment

With courtesy of Shamika N. Sirimanne

# Malnutrition

is a condition that results from eating a diet in which one or more nutrients are either **not enough or are too much** such that the diet causes health problems.

It may involve calories, protein, carbohydrates, vitamins or minerals.

# Malnutrition, in all its forms, includes

- **undernutrition (wasting, stunting, underweight),**
  - **Micronutrient-related malnutrition-inadequate vitamins/minerals,**
  - **Overweight, obesity, and resulting diet-related NCDs**
- 
- **2 billion adults are overweight or obese, while 462 million are underweight.**
  - **52 million children under 5 years of age are wasted,**
  - **17 million are severely wasted and 155 million are stunted, while 41 million are overweight or obese.**

Around **45% of deaths among children under 5 years of age** are linked to **undernutrition**. These mostly occur in low- and middle-income countries. At the same time, in these same countries, rates of childhood overweight and obesity are rising.

The developmental, economic, social, and medical impacts of the global burden of malnutrition are serious and lasting, for individuals and their families, for communities and for countries.

- **Pakistan** has been reported to have one of the highest levels of prevalence of child **malnutrition** compared to other developing countries [12].

**According to the National Nutrition Survey:**

- 33% of all children were underweight,
- over 40% were stunted,
- 15% were wasted,
- 50% were anemic, and 33% with iron deficiency.
- 18 % Obese

# Food Shortage or Inequality?

- ❑ 805 M people suffer-chronic hunger
- ❑ 161 M children are stunted (> 40 % children in Pakistan)
- ❑ 2 B people suffer - micronutrient deficiency, or “hidden hunger”

## Gross Comparison

> 500 M adults are **obese**, while over 42 M children (<5) are **overweight**

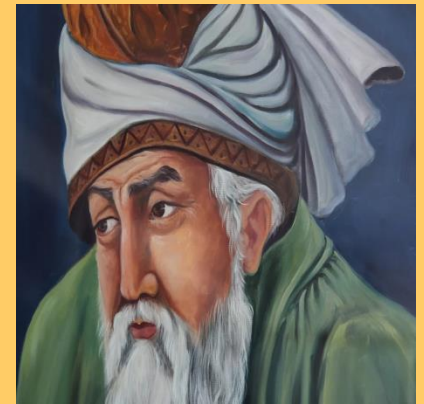
Non-communicable diseases related to diet, such as heart disease, cancer & diabetes growing with rapid pace, posing major health issues



A habit of overeating is a slow poisoning, as it leads to **OBESITY**, which is now considered a root cause of multiple diseases

*Any thing which is more than our necessity is Poison*

**Rumi**



“All substances are poison; there is none which is not a poison. *The right dose differentiates a poison and a remedy*”

**Paracelsus (1493-1541)**

# THE WORLD IS GETTING FATTER



## HOW DO I KNOW WHETHER I AM OVERWEIGHT?

Calculate your body mass index (BMI) using this formula

$$BMI = \frac{\text{weight (kg)}}{\text{height}^2 \text{ (m}^2\text{)}}$$



Underweight < 18.5    Normal 18.5 - 24.9    Overweight 25 - 29.9    Obesity > 30    Severe Obesity > 35

**OBESITY IS KILLING THE WORLD**

**PREVENTABLE**

## ABC TO OBESITY PREVENTION

### SIMPLE RULES TO STAY IN SHAPE

#### A dopt New Healthy Habits



#### B alance Your Calorie Intake



#### C ontrol Your Weight Gain

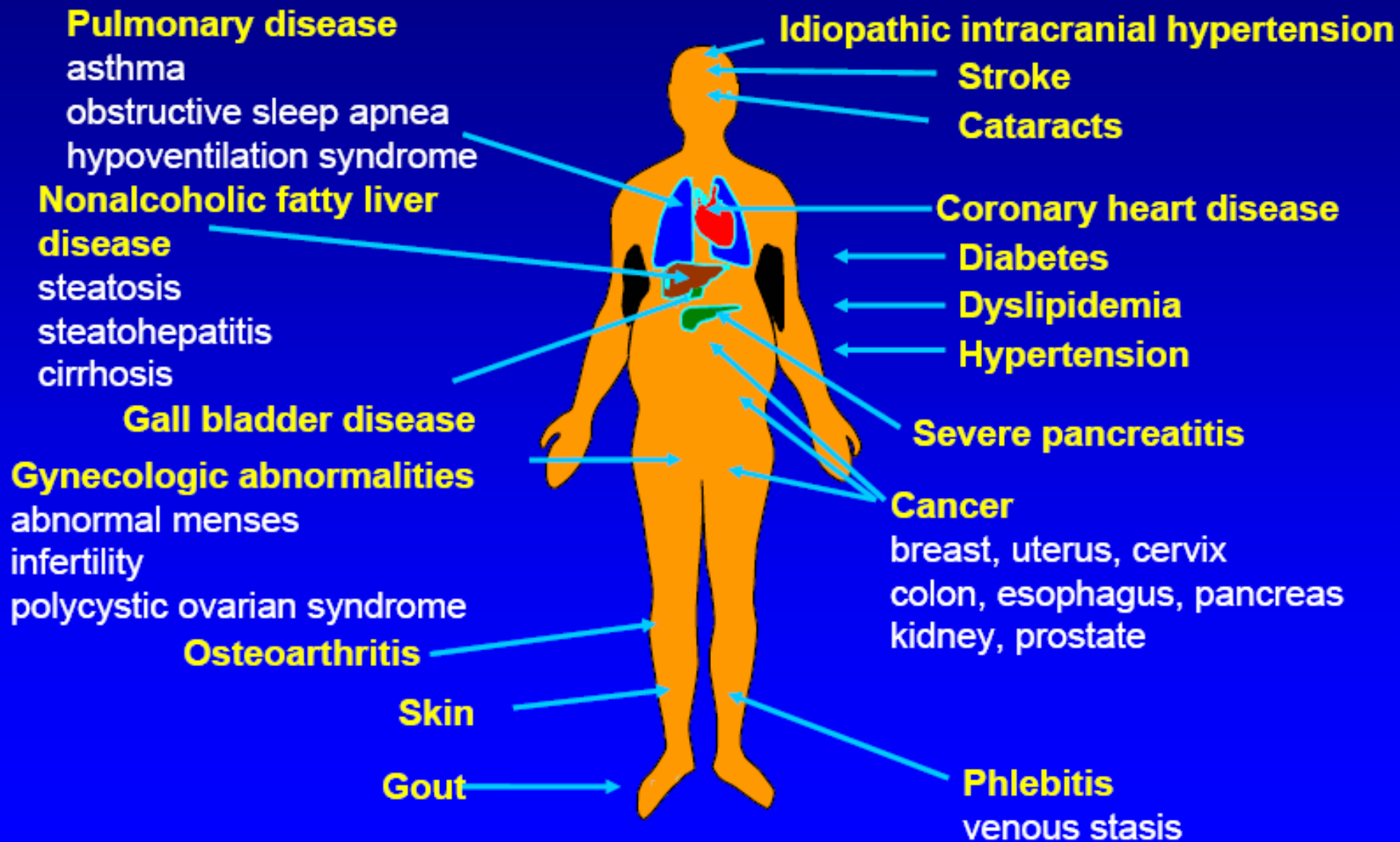


## OBESITY KILLS!

7 common diseases due to obesity:

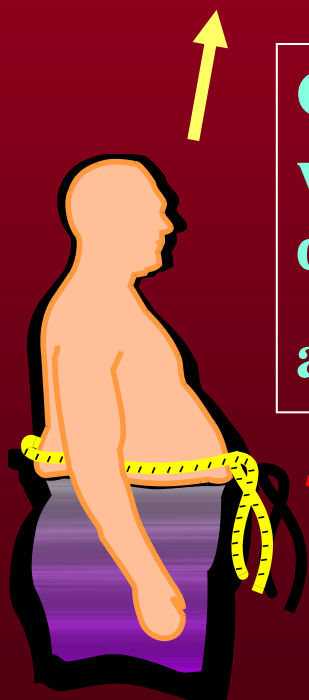
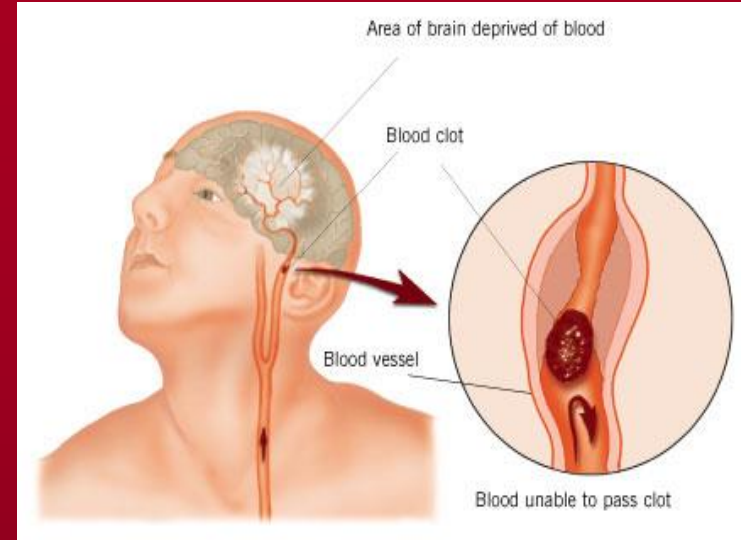
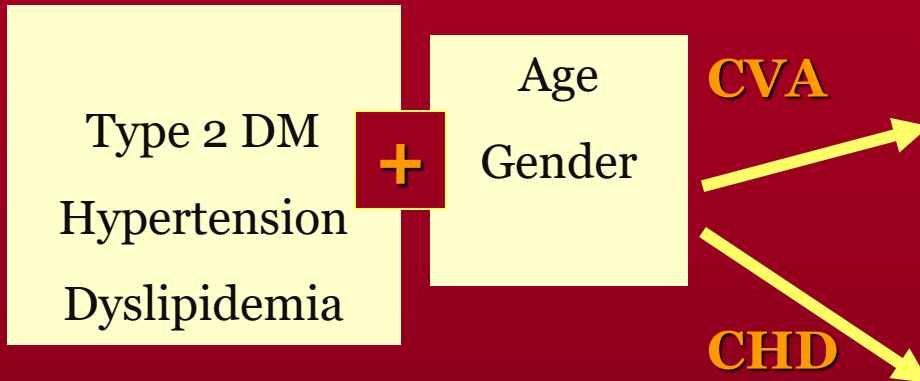
- Arthritis    • Cancer    • Infertility    • Heart Diseases
- Back Pain    • Diabetes    • Stroke

# Medical Complications of Obesity: Almost every organ system is affected





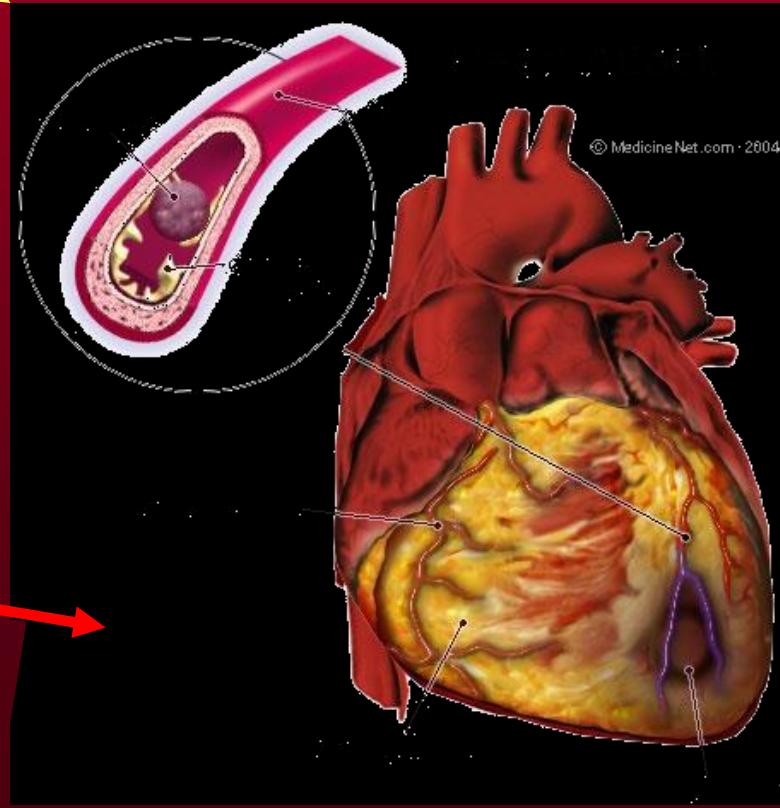
# Cardiovascular Diseases



**Obesity alone or combined with cardio-metabolic diseases can lead to Stroke and Heart attack**

**Obesity**

**? Independent effect**



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# CVDs Morbidity and Mortality

## GLOBAL PICTURE

- **1/3 deaths (> 17 million/yr<sup>1</sup>)**
- **80% deaths due to CVD are in developing countries<sup>3</sup>**

## FUTURE PREDICTIONS

- **By 2030: 23.6 million/yr<sup>2</sup>**
- **Largest increase in South Asia<sup>4</sup> and the Middle-East ?**

1. WHO (2008)

2. Mendis et al. (2007) J Hypertens

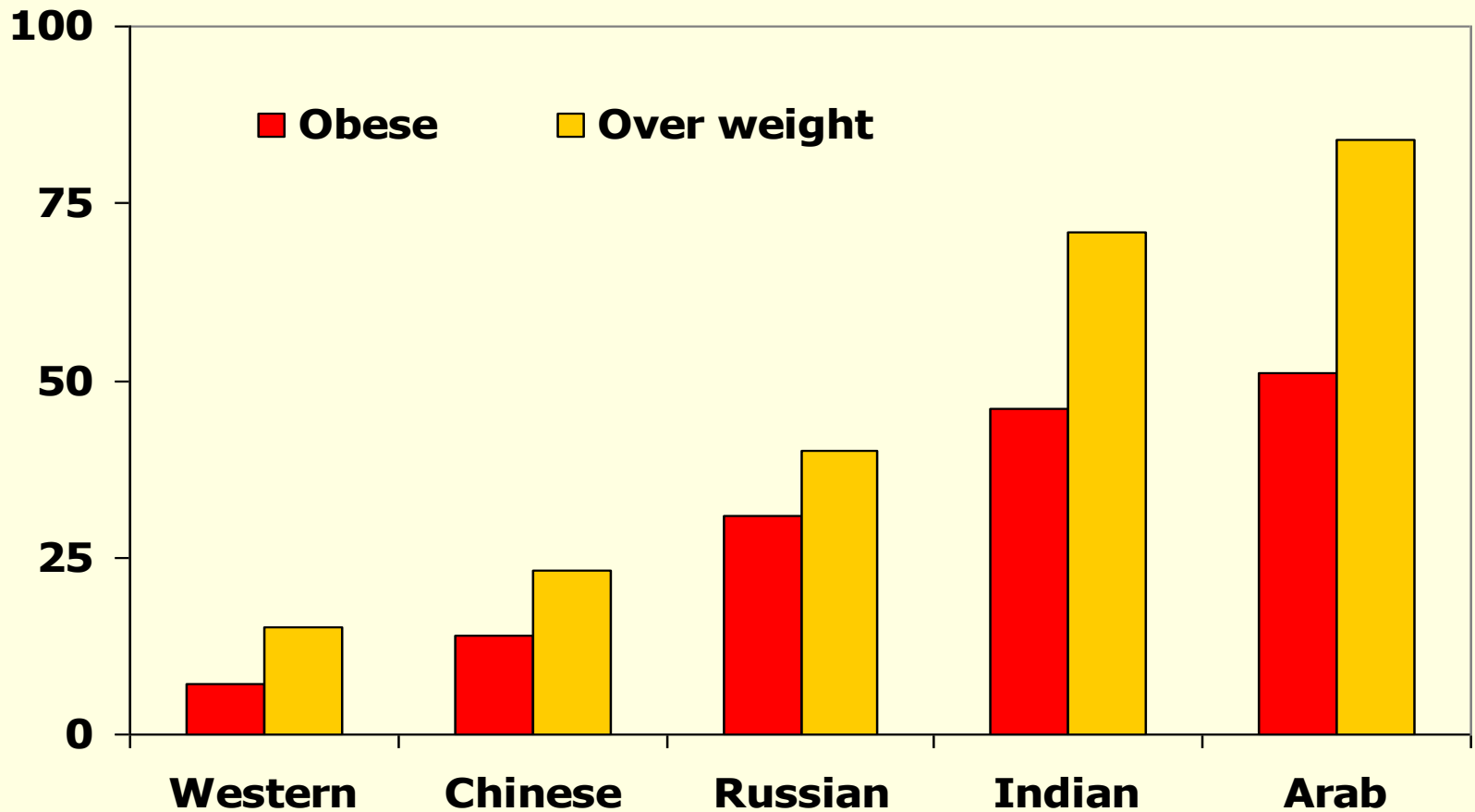
3. Gaziano et al (2010) Curr Probl Cardiol

4. Jafar et al (2005) Circulation

5. National Health Survey Pakistan (1990-1994)

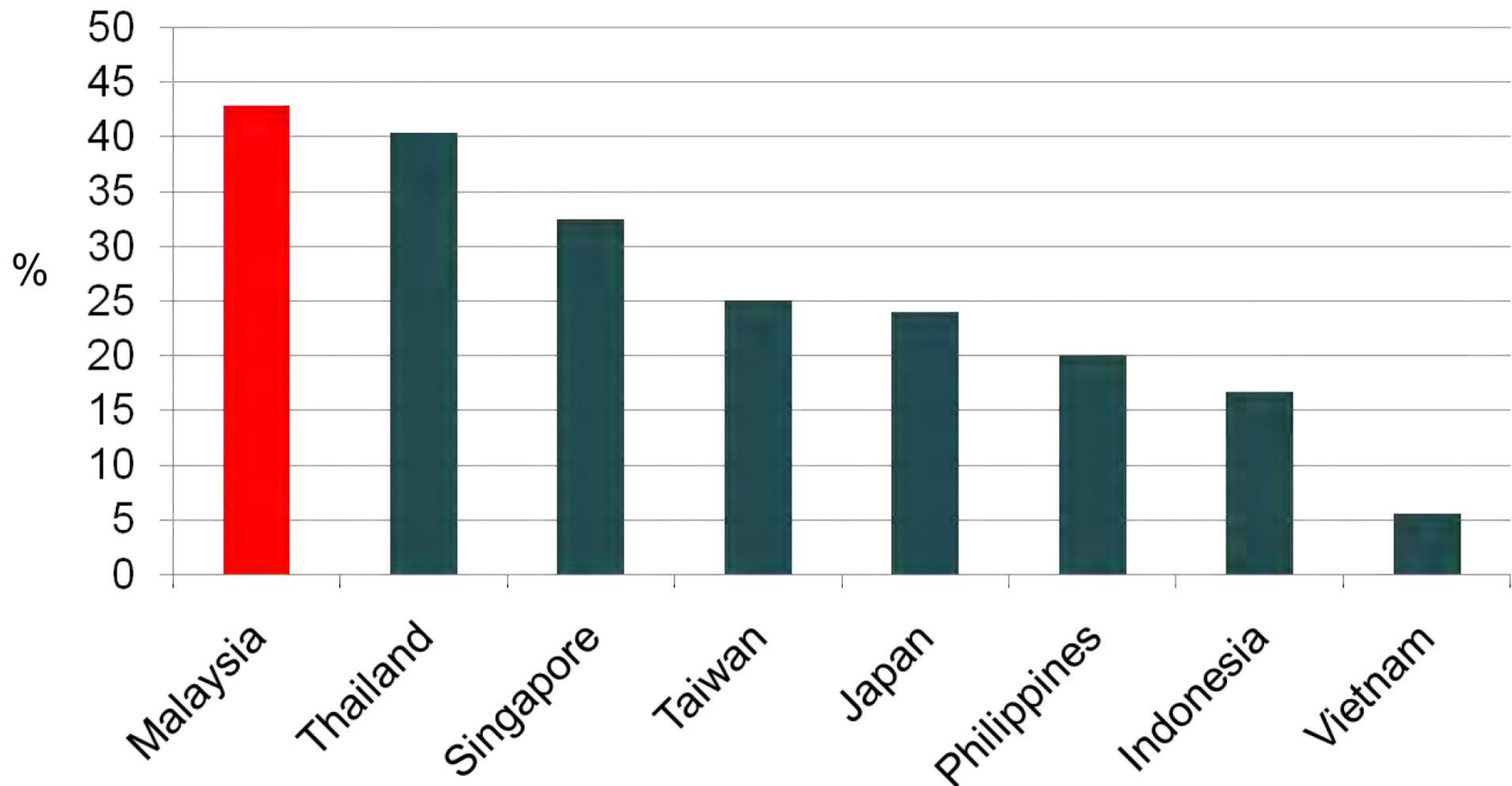
6. Jafar et al, (2005). Am Heart Journal

# OBESITY IN THE MUSLIM WORLD



# Adult prevalence in some Asian Countries

(overweight + obesity)



WHO collaborating centre for obesity prevention- Deakin Uni. Australia

## Dire consequences

# Diabetes Prevalence in Adults

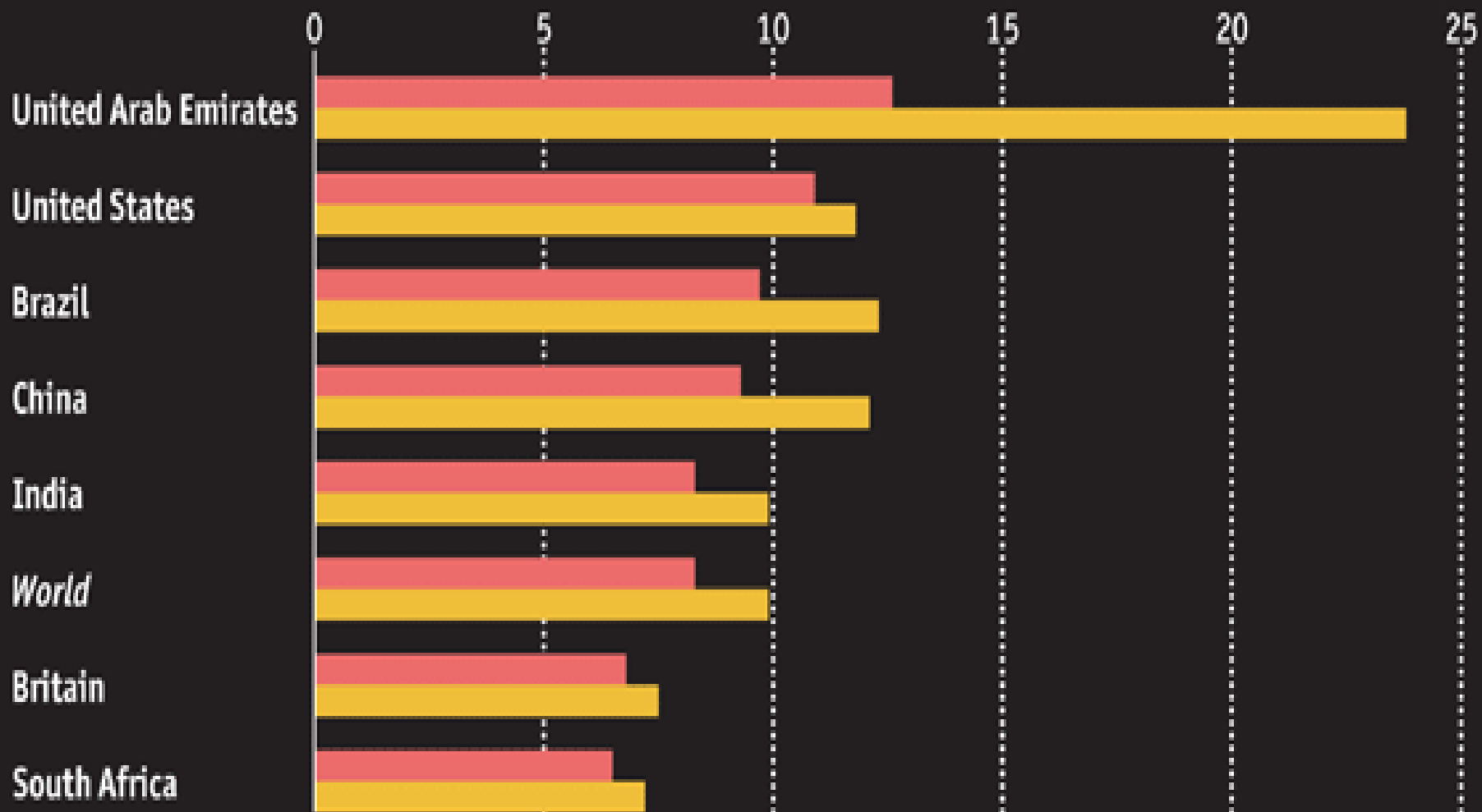
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Diabetes prevalence

% of adults aged 20-79

2011

2030 forecast



Source: International Diabetes Federation

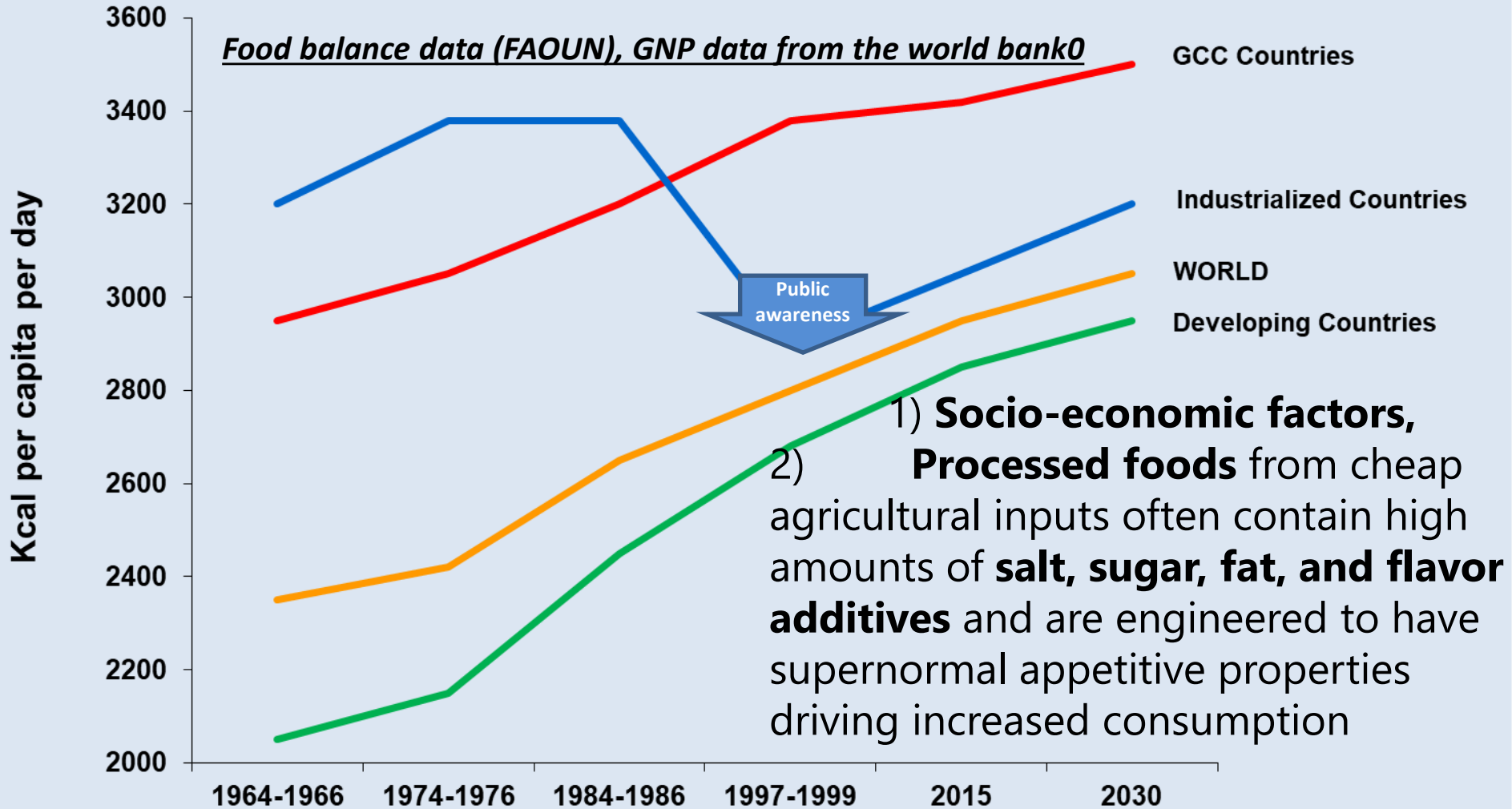
**Why Obesity and related diseases  
like Diabetes are more prevalent  
in the Arab World?**

**Perhaps Because:**

**Food intake is the highest in the  
Gulf countries**

# Global and regional per capita food consumption

(kcal per capita per day)



## Prophet Mohammad said: **Eat Less**

“The son of Adam does not fill any vessel worse than his stomach. It is sufficient for the son of Adam to eat a few morsels to keep him alive. If he must fill it, then one-third for his food, one-third for his drink, and one-third for air.” (al-Tirmidhi – 2380)

*Stop eating before stomach is full*



# Eating Natural

**“Eat of the good and wholesome things but indulge in NO excess therein”**

*Quran, Chapter 20, verse 81*

# Prophetic Teaching on Eating

One's meal being sufficient for two,  
two's meal being sufficient for four, and  
four's meal being sufficient for eight  
*(In other words, Share your meal with others)*

*Saheeh Muslim,* Hadith # 5368 (2059),

*Jaam-e-Tirmezee,* Hadith # 1820;

*Ibne Maajah,* Hadith # 3254

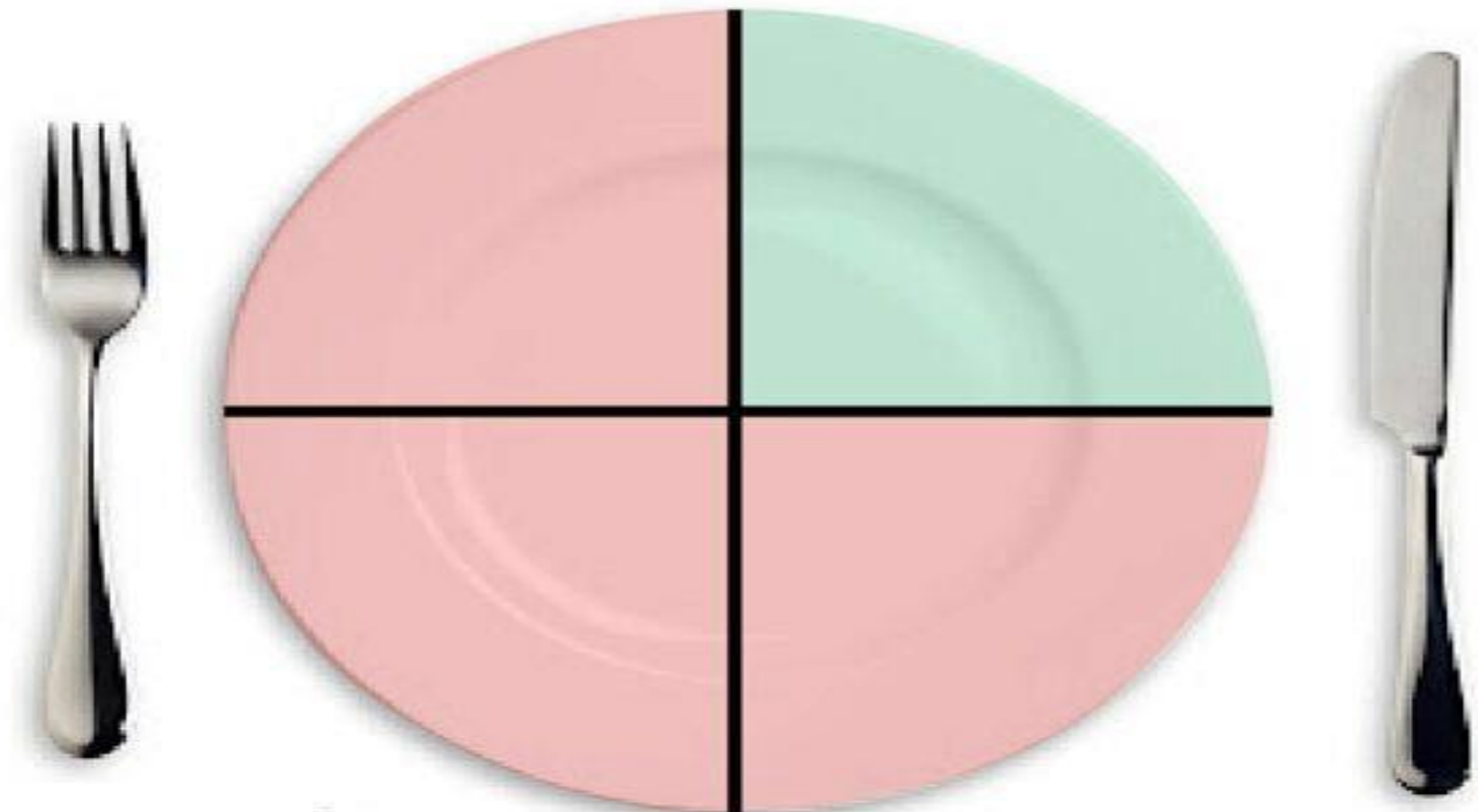
**What Does Science Tells Us**  
**Eat Less - Live Longer**

**“Caloric Restriction Prolongs Life  
and Prevent Age related  
Chronic Diseases”**

**<https://www.fasebj.org/doi/abs/10.1096/fj.05-5263com>**

**"One quarter of what you eat  
keeps you alive.  
The other three-quarters  
keeps your doctor alive."**

*-Ancient Egyptian Proverb*



# Identify Uses of Different Wastes

**Nothing is purposeless**



- Kitchen Garbage –  
good for Kitchen Gardening or Recycling
- Peel/Skin of different food commodity  
Onion/Apple, Almonds, Wheat Bran – useful for human health
  - Egg shell and other kitchen waste – useful for poultry
  - Peanuts shell and Vegetable waste for goats/sheep
- Save Sewerage Water (underground Tank)

# Saving Water for next Generations



Australian water company “Active Organic Spring Water quoting Prophet Muhammad’s teaching with each bottle of water.” *“Do not waste water even if you were at a running stream ”*

**Update:** The bottle tags were created by the Macquarie University Muslim students Association in Sydney during the Islamic awareness week, the water company liked it and used it

# Some Measures to Adopt

- **Make crops more efficient & resilient to climate change**  
(Genetic modification, Soil fertility, Irrigation Technology)
- **Rescue more farmland**
- **Help Biodiversity flourish**
- **Empower Smallholders (Land Reforms)**
- **Promote Agri-Tourism (cut down role of middleman)**
- **Rural Development / De-urbanization**
- **Help People stay safe**
- **Exploiting high market of Organic and Functional foods**
- **Preserving water (attitude as well as technology)**
- **Recycling crop/livestock/human waste**
- **Saving Food through Educating public** – Nutritional aspects as well as consequence of overeating – Health issues

A lush garden scene featuring various plants in recycled tires and a central pond with a pink lotus flower. The garden is set in an outdoor area with trees and a building in the background. The text "THANK YOU" is overlaid in yellow, bold, italicized font across the center of the image.

***THANK YOU***

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