

Subject: Geography

Topic: Food Resources

Gateway 1: How and why have food consumption patterns changed since the 1960s?

How do food consumption patterns vary between DCs and LDCs over time?

- **Food:** Any nutritious substance consumed by the body
- Global food consumption patterns vary over time between:
 - Developed countries (DCs)
 - Less developed countries (LDCs)
- Food consumption patterns vary in terms of:
 - Indicators of food consumption
 - Changing food preferences

Developed countries (DCs) and less developed countries (LDCs)

- Classified according to their levels of developments based on a combination of indicators:
 - Economic indicators
 - Gross Domestic Product (GDP) per capita
 - Employment opportunity
 - Social indicators
 - Adult literacy rate
 - Life expectancy

Economic indicators	
Gross Domestic Product (GDP) per capita	Employment opportunity
• The total value of all final goods and services produced by a country in a given year divided by the total population. • The higher the GDP per capita, the more developed a country is likely to be. • Countries with high GDP usually have a large number of productive industries coupled with a well-developed service industry (i.e. schools, hospitals).	• The availability of jobs in a country. • More employment opportunities in a country will result in more jobs for the local population. • When people are employed, they will have an income. Thus, their standard of living will improve.
Social indicators	
Adult literacy rate	Life expectancy
• Measures the percentage of those aged 15 and above who can read and write a short, simple statement on their everyday life. • Countries with a high literacy rate tend to generate more professionals who can contribute their skills and expertise in driving the country's economy. • The higher the adult literacy rate, the more developed a country is.	• Refers to the average number of years a person born in a country is expected to live • Influenced by the level and quality of health care, water, sanitation, food supply and living conditions in a country. • An area affected by war, disease, and poverty generally results in • its local population having a lower life expectancy.

- **Developed countries (DCs)** are countries that rank high across the development indicators mentioned.
Example: Australia, Japan, South Korea, Singapore, Taiwan, USA
- **Less developed countries (LDCs)** are countries that rank low or moderate across many or all of the indicators mentioned.
Example: Bangladesh, Brazil, Indonesia, Uganda, Myanmar, Cambodia
- Countries in either classification are not homogenous, but are different in areas such as:
 - Scientific and technical capabilities
 - Economic structure
 - Social structure
 - Inequalities of income and wealth
- High GDP countries are often, but not always, classified as DCs and low GDP countries are often classified as LDCs

Indicators of food consumption

- Variations in global food consumption patterns between DCs and LDCs are measured using indicators
 - Food consumption per capita
 - Daily calorie intake
 - Starchy staples as a percentage of all calories
- Food consumption per capita
 - **Food consumption per capita:** Average amount of food a person consumes per year (in kg per capita per year)
 - Recorded for individual food groups, *e.g. cereals, meat and vegetables*
 - Used to determine changes in food consumption patterns over time
 - Compared to LDCs, DCs consume higher amounts of meat and vegetables per capita as well as higher amounts of food overall
- Daily calorie intake
 - **Daily calorie intake:** Energy obtained from food consumed per person each day
 - Measured in kilocalories
 - DCs are likely to have a higher daily calorie intake than LDCs
 - Average amount of food a person requires each day is 2,586 kilocalories
- Starchy staples as a percentage of all calories
 - **Staple food:** forms the main part of the diet
 - Supplies a major proportion of a person's energy and nutrient needs
 - High in starch, which is the main source of energy intake for both DCs and LDCs
 - Cereals (*e.g. wheat, rice*), a type of staple food, are the world's main source of energy intake for both DCs and LDCs
 - LDCs to account for about 84.1% of global demand for cereals between 1995 and 2020
 - Table below shows the characteristics of staple and non-staple food.

Staple/ Non-staple	Food groups	● Nutrient characteristics	● Examples of food types

Staple	Cereals	● High in carbohydrates ● Low in fat	● Wheat ● Rice
Non-staple	Meat	● High in protein and fats	● Beef, Chicken, Fish ● Eggs ● Dairy products
	Fruits and vegetables	● High in vitamins, minerals and fibre ● Low in fat	● Spinach ● Banana ● Apple

Changing food preferences

- **Food preference:** Choice of one food type over another
- Food preferences change due to a variety of reasons, *e.g. increase in income*
- When a country develops economically and its income per capita increases, the diet changes from crop-based products to meat-based products, *e.g. China. Compared to 20 years ago, China now consumes less cereals but more meat, eggs, fish and fruits and vegetables*
- World food consumption patterns have changed for different food groups, *e.g. cereals, meat, fruits, vegetables*
- Food consumption patterns have changed for different food groups.
 - Cereals
 - Meat
 - Fruits and vegetables
 - Cereals
 - Most important food source in the world. Contribute up to:
 - 50% of global calorie intake
 - 70% of calorie intake in Africa and parts of Asia
 - 30% of calorie intake in DCs
 - Consumption of cereals per capita declines at higher income levels
 - As income goes up, one type of cereal (i.e. rice) is substituted with another (i.e. wheat) to make bread and noodles, *e.g. Japan, China and South Korea*
 - Meat
 - **Livestock:** Domesticated animals such as cows, pigs, sheep or chickens from which meat and dairy products are obtained
 - High in **protein**
 - **Increase in income** is linked with increase in meat consumption

- **Demand** for livestock has increased since the 1960s due to rising incomes
 - Livestock consumption in DCs is still high but DCs are starting to consume less red meat due to its link to health problems
 - Consumption of red meat and milk in LDCs have risen over the years due to rising incomes
- **Impact:** Increased consumption of red meat in LDCs has led to an increase in health problems
- Fruits and vegetables
 - Consumption of fruits and vegetables **has increased** for both DCs and LDCs
 - In **LDCs**, increased consumption is mainly due to **increase in incomes**, *e.g. China, India*
 - In **DCs**, people became more aware of the **health benefits** of fruit and vegetable consumption
 - *Example: From 1976 to 2009 in the USA, vegetable consumption increased by 13% and fruit consumption increased by 3%*
 - Reduces risk of diseases, *e.g. heart disease, cancer*
 - International organisations promoted its consumption

Changing patterns of food consumption between DCs and LDCs may be explained by the following factors:

● **Economic**

- Disposable income
- Pricing

● **Socio-cultural**

- Food preferences
- Population growth

● **Political**

- Stability of food supply
- Food safety

Economic: Disposable income

- **Disposable income:** Amount of income left to an individual after taxes have been paid
 - Disposable income is increasing in DCs and LDCs, although people in DCs generally have more.
 - Increase has different effects on food consumption patterns. More disposable income means more purchasing power to consume a **larger amount** and **variety of food** (*e.g. more meat and less cereals*)
 - *Example: After Taiwan's economic growth:*
 - Rice consumption per capita declined by half
 - Meat consumption increased four times
 - Fruit consumption increased five times
 - Fish consumption doubled
 - When disposable income rises in DCs, the **quality of diets** tends to increase. People in DCs can afford food that have certain **health benefits** (generally more expensive), such as organic food and olive oil

Economic: Pricing

- People in LDCs are generally more affected by food prices than people in DCs
- People in LDCs often have less disposable income
- Increase in food prices tends to affect LDCs more than DCs

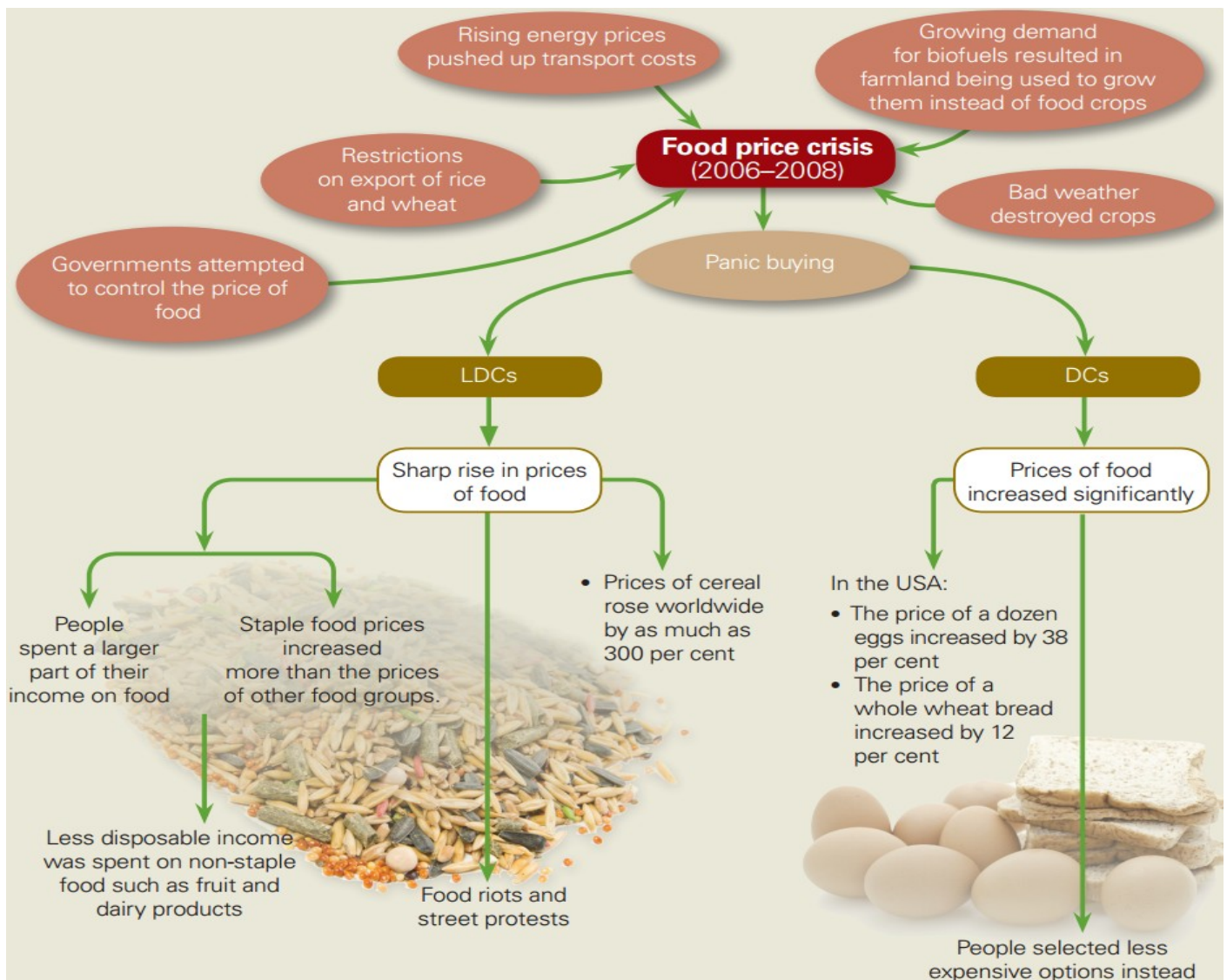
- Between 2006 and 2008, food prices rose dramatically worldwide and created a global food crisis
- Food price crisis resulted in political and economic instability

In LDCs,

- Prices of staple food rose significantly
- Many people could not afford staple food
- Pushed 100 million more people worldwide into chronic hunger and poverty
- Sparked food riots and street protests
- Sparked attempts by governments to control the price of food

In DCs,

- Food prices rose significantly in DCs.
- In the USA, price of a dozen eggs increased by 38% while price of whole wheat bread increased by 12%
- Price increases caused people in DCs to select less expensive options
- Financial traders speculated on food shares
- Speculation increased food prices and caused market to be dangerously volatile
 - *Example: Wheat, which trades between US\$3 to US\$6 per bushel, was trading at US\$25 per bushel on 25 February 2008*
- Crisis worsened by failure of governments to protect citizens from rise in prices of staple food
 - *Example: China*
 - Domestic prices of soya bean rose in 2007 and 2008
 - Government did not control trade in soya bean
 - Imports a large share of the soya bean, so export restrictions are irrelevant



Socio-cultural: Food preferences

- People choose to consume certain foods due to concerns relating to health, moral principles, income and environment. For example:
 - Fast food
 - Organic food

Food preferences – Fast food

- Fast food: Food that can be prepared easily and quickly, and may be eaten as a quick meal or packaged for take-away
- Well-received due to its convenience and affordable price
- Standardised production and handling process ensure the quality of food served
- Some young adults prefer to spend time at fast food outlets

In LDCs:

- Globalisation has made it possible for fast food chains to set up restaurants in many LDCs
- *Example: India*
 - Opened up its economy to foreign investors in 1991
 - Transnational corporations entered the Indian market, *e.g. Domino's Pizza, McDonald's, Pizza Hut*
 - More people choose to patronise these outlets rather than local food stalls

In DCs:

- Fast foods are popular but there is a trend to move away from too much fast food due to its potentially harmful effects on human health
- Increased concern over how fast food is being prepared and processed especially on the large amounts of oil used, the use of processed meat and chemicals

Food preferences – **Organic food**

- In DCs, there are health concerns about conventional methods of growing food, *e.g. risk of cancer from pesticides*
- **Organic food:** Food grown without the use of artificial inputs, such as chemical fertilisers or growth hormones
- People choose organic food due to perceived health benefits, *e.g. avoidance of potentially harmful pesticides*
- Shift towards consumption of organic food in DCs:
 - 2011 survey (USA): 58% prefer organic food to non-organic food
 - 2009 report (Asia): Demand for organic food has grown at about 20% every year since 1997

	Organic food	Non-organic Food
Fertiliser	• Use of organic fertiliser • E.g. manure, compost	• Use of chemical fertiliser • E.g. nitrogen, potassium
Labour	• Required more labour to manage tasks such as hand-weeding	• Reduced dependant on labour
Crop yield	• Smaller crop yield	• Larger crop yield
Cost	• Higher production costs • Organic certification	• Lower production costs
Health impact	• Perceived healthier due to lack of chemicals	• Perceived less healthier due to the use of chemicals

Socio-cultural: Population Growth

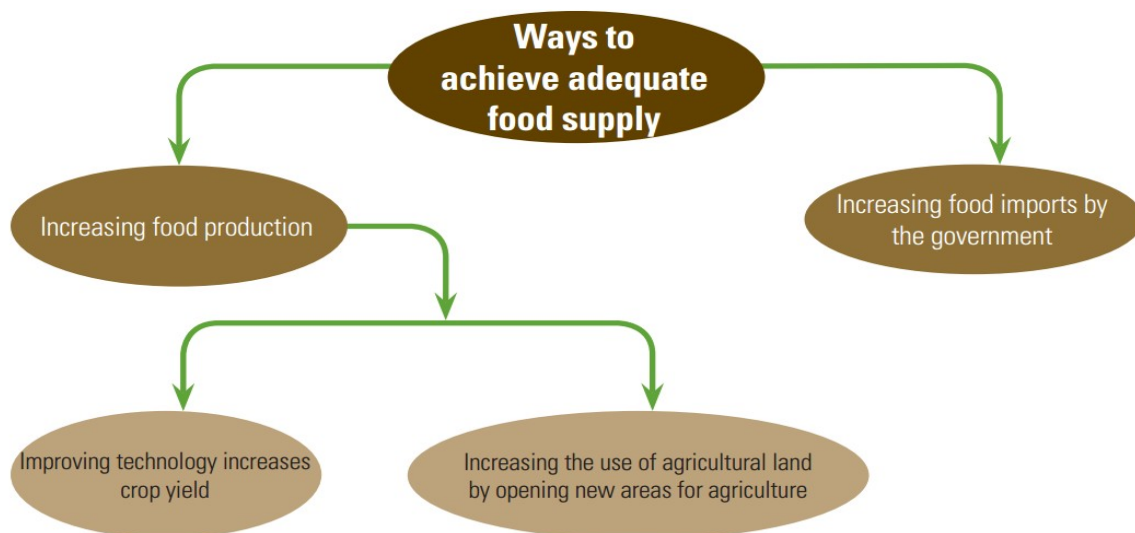
- Key driver in increasing demand for food worldwide. World's population set to increase from 7 billion in 2012 to 10 billion in 2050
- Increasing demand for food over the years is greater in LDCs than in DCs due to higher birth rates

Political:

- **Stability of food supply**
- **Food safety**

Political: Stability of food supply

- A country has a stable food supply when safe and nutritious food is available to all people at all times
- Governments may try to stabilise food supply by increasing food production and increasing food imports
- Increasing food production can be done by:
 - Improving technology to increase crop yield
 - Opening new areas for agriculture
- LDCs have lower ability to increase food supply due to:
 - Lack of access to technology
 - Lack of finances to implement technology on a large scale

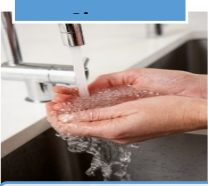


- Increasing food imports:
 - DCs can increase food imports more easily than LDCs
 - LDCs are less able to deal with fluctuations in food prices
 - *Example: In the aftermath of a hurricane disaster in 2004, Jamaica was not able to import food because it was too expensive*
 - DCs such as Singapore may rely on food imports to make up more than 90% of their food supply
- Stability of food supply can be affected by:
 - Civil war
 - *Example: Libya*
 - At the height of the civil war in Libya in April 2011, food stocks were rapidly being depleted and were not being replenished
 - Cities and areas with heavy fighting had food and water shortages
 - Safety concerns restricted people from venturing out to find or buy food
 - Natural disasters
 - *Example: Zimbabwe*
 - Food shortage in 2008 after a severe drought

- Extremely low rainfall destroyed most of the corn harvest
- Rural and neglected regions of the country were worst-affected

Political: Food Safety

- **Food safety:** System that provides guidelines and ensures proper handling, preparation, and storage of food that prevents foodborne diseases and removing those foods from the shelves
- Crucial to ensure that food is safe for consumption
- Government plays active role in ensuring food safety
 - Setting food safety standards
 - Ensuring standards are met
 - Tracking down contaminated foods
 - Removing contaminated foods from the shelves



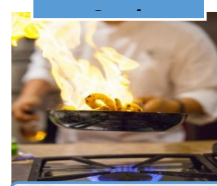
Wash hands and surfaces often.



Do not cross-contaminate.



Refrigerate promptly.



Cook at proper temperature.

- *Example: Japan*
 - Nuclear radiation contaminated farmland and water resources in 2011
 - Seafood imports from Japan to Singapore were restricted for many months to ensure consumer safety
 - People avoided Japanese cuisine due to news of nuclear contamination
 - Threats to food safety may come from unexpected events, *e.g. outbreaks of foodborne diseases*
- *Example: 'Mad cow disease'*
 - Outbreak took place in Europe in the 1990s and in the USA and Canada in 2005
 - US government took actions to prevent its spread
 - Decrease in beef consumption
 - Decline in imports and exports of beef

What are the consequences of variations in food consumption patterns?

- Impact of inadequate food consumption on individuals and countries
- People may become sick more often, be less productive at work, or go to work fewer times than they normally would
- Impact of **excess** food consumption on individuals and countries
 - Health
 - Economic
 - Social

Inadequate food consumption has various impacts:

1. Health
2. Economic
3. Political
4. Social

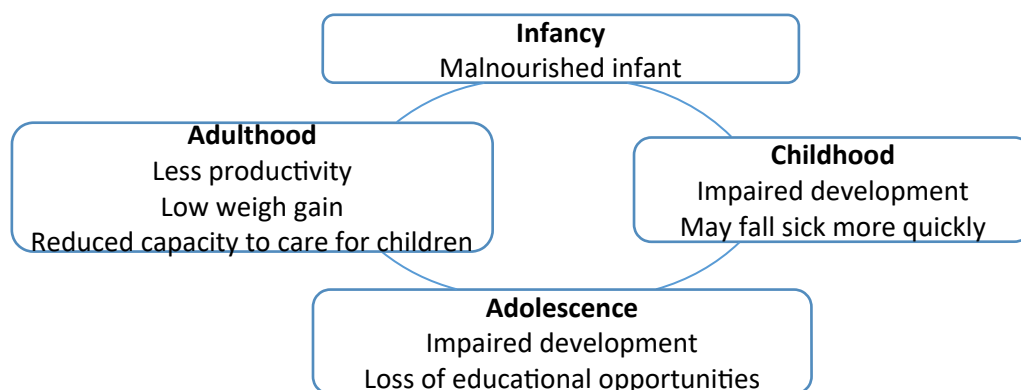
1. **Inadequate** food consumption has various impacts: **Health**

- **Health:** State of complete physical, mental and social well-being and not merely the absence of disease or infirmity
- Inadequate food consumption may lead to one or more of the following:
 - Malnutrition
 - Ill-health
 - Starvation

1.1 Health – Malnutrition

- **Malnutrition:** Condition in which the body does not get the sufficient or balanced amount of nutrients it needs to maintain healthy tissues and organ functions
- Results in death or long-term development problems in individuals
- Measured through person's weight, by considering person's weight in relation to gender, height and age
- Malnutrition is the underlying cause of child deaths associated with diarrhoea, pneumonia, malaria and measles in 2009
- Attributed mostly to malnutrition are:
 - 52.5% of all deaths in young children under 5

- 148 million underweight children, majority of whom are in South Asia and Sub-Saharan Africa
- Death of five million children under 5 annually in LDCs
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- Malnutrition affects people in DCs
 - Thousands of elderly people in the USA die annually from lack of nutrients
 - Elderly people found to be eating too little because of difficulty in digesting or chewing food
 - People with eating disorders (*e.g. anorexia nervosa, bulimia nervosa*) develop malnutrition as a result of ingesting too little food
- LDCs are more heavily affected by malnutrition than DCs.
 - 16% of people in LDCs suffer from malnutrition
 - *Example: 75% of the population in the Democratic Republic of the Congo suffer from malnutrition*



Specific symptoms and consequences may arise from the lack of certain nutrients:

Nutrient	Functions	Symptoms of deficiency	Consequences
Vitamin A	Maintains good eyesight, especially in low light Keeps the skin, tissues, bones and immune system healthy	Visual impairment and blindness Diarrhoeal diseases and measles	Loss of educational opportunities
Calcium	Makes strong and dense bones	Osteoporosis	Loss of work days and productivity
Vitamin D	Makes strong and healthy bones		

	Enables the muscles, heart, lungs and brains to work well Helps the body to fight infection			
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1.2 Health – Starvation

- **Starvation:** State of extreme hunger from a severe lack of food
- An extreme form of malnutrition
- Body becomes skeletally thin and organs become permanently damaged
- Person will eventually die if starvation is not addressed
- Starvation is much more common in LDCs due to:
 - Greater number of people living in poverty
 - Lack or absence of resources to counter effects of natural disasters
 - Unstable political situation, *e.g. rebellions, wars*
- For example, in Mali in 2012, 5 million people were threatened with starvation due to poor harvest and a civil rebellion that took place earlier in the year.
- 98% of people facing starvation are in LDCs
 - More than 60% of these are found in LDCs throughout Asia alone.
 - The rest are found in LDCs throughout Sub-Saharan Africa, South America and Central America.
 -

2. **Inadequate** food consumption has various impacts: **Economic**

Economic

- Lower productivity
- Diversion of financial resources to health care
- Long-term debt due to food and financial aid

2.1 Economic – Lower productivity

- **Productivity:** The rate at which goods or services are produced, measured in output per unit of labour
- Lower productivity will lead to lower income due to inability to work as productively as before
 - Workers may fall sick more often, and have lower productivity and lower income.
 - Children may fall sick more often. This leads to:
 - Loss of school days
 - Loss of educational opportunities
- Significant link between nutrition and productivity
 - Low levels of nutrition intake over medium to long term associated with lower levels of productivity, *e.g. Sierra Leone, India, Sri Lanka, Ethiopia*
 - Due to poor health caused by malnutrition, farmers may be:
 - Less innovative
 - Less experimental
 - Unable to implement improvements

2.2 Economic – Diversion of financial resources to health care

- Public health expenditure increases when the demand for health services increase. This is because of more people falling sick thus increases the overall cost of providing health care.
- For LDCs, the higher spending on health care means that limited financial resources are diverted from other areas such as education, housing, transportation or even agriculture.
- Thus a country's economic development and growth is slowed down

2.3 Economic – Long-term debt due to food and financial aid

- Food aid and financial aid can be given to help people and countries cope with insufficient supply of food.
- However, the financial aid may lead to long-term debt problems for the receiving country,
- For example, the USA contributes about half of all global aid. However, most of the food must be bought from their suppliers and transported on their ships.
- The Human Development Report in 2009 have found that food supplied as aid is up to 34 per cent more expensive than if purchased locally. LDCs incurred losses amounting to between US\$5

to US\$7 billion. Thus, rather than helping the country, such aid often called tied aid, serves to increase the national debt of LDCs to DCs.

3. Inadequate food consumption has various impacts: **Political**

- Inadequate food supply leads to inadequate food consumption causing people to become malnourished, starve or even die. Such conditions often cause political instability in the form of war and social unrest.

3.1 **Political – Social Unrest**

- Social unrest is a political situation in which people protest or behave violently, often to communicate their unhappiness about a political system.
- For example, food prices in Mozambique increased by as much as 30% in 2010, caused by drought in Russia that decreased its wheat production, thus increasing the price of wheat sold to Mozambique
- Resulted in initially peaceful protests that turned violent, leaving 400 people injured and at least 10 people dead

4. Inadequate food consumption has various impacts: **Social**

- Some people may resort to survival responses such as scavenging to overcome their inadequate food supply.

4.1 **Social – Scavenging**

- **Scavenging:** Searching through things that other people throw away
- Food is so hard to come by that scavengers eat whatever they can find to prevent starvation
- Carries health risks as scavenged food may contain high levels of bacteria or chemicals, such as heavy metals of mercury and lead
- Place people in dangerous or illegal situations in search for food, such as trespassing private property
- Scavengers are also perceived as a nuisance to the public, and thus are sometimes verbally or physically harassed.
- For example, in the poorest part of Manila, Philippines, people without money to buy food sift through rubbish for meals that have been thrown out. In the large landfill known as Smokey Mountain, many poor families had set up their makeshift homes near the dump to have easy and

quick access to waste. They make their living by picking through the landfill's rubbish.

Impact of **excess** food consumption on individuals and countries

1. Health
2. Economic
3. Social

1. **Excess** food consumption has various impacts – **Health**

1.1 Health – Obesity and related illnesses

- Excessive consumption of food will have adverse effects on health
- **Obesity** is the condition of being overweight due to excessive consumption of nutrients which are eventually stored as body fats
- Accumulation of body fats over time have adverse impacts on health
 - Obesity affects most of the body's systems
 - Obesity leads to health problems, *e.g. high blood pressure, coronary heart disease, certain cancers*
- Obesity may reduce a person's lifespan by 9 years
- Other illness include kidney failure, liver diseases and hypertension due to the excessive consumption of salt, sugar, alcohol, processed food and red meat, among others.

DCs:

- Obesity is more common in DCs than in LDCs.
- DCs, such as the USA, have a high percentage of adult population with obesity as compared to LDCs such as India.
 - Due to higher disposable income and stronger purchasing power leading to higher calorie intake of people
- Obesity is increasing in DCs, such as the USA, Australia and Canada
 - Caused by the higher consumption of sweetened beverages, potato chips and fast food

LDCs

- The rising disposable income in LDCs, such as Brazil, South Africa, China and India

2. **Excess** food consumption has various impacts – **Economic**

- Excessive food consumption often leads to obesity, lowers economic productivity and diverts financial resources from other sectors of the economy to health care

2.1 **Economic – Lower productivity**

- More workers are absent from work due to obesity-related health issues
- Absence leads to lower productivity and lower income
- Children may fall sick more often, leading to:
 - Loss of school days
 - Loss of educational opportunities
- On a national level:
 - Employees absent from work due to sickness cost companies millions in productivity and insurance costs
 - Poor health can make present employees less productive
- *Example: Employees of Duke University*
 - Those with Body Mass Index (BMI) of over 40 were twice as likely to fall sick or be injured while doing work
 - University pays higher compensation claims to workers (Compensation claims: Wages and medical payments to employees who fall sick or are injured while doing work)

2.2 **Economic – Diversion of financial resources to health care**

- Public health expenditure increases as a result of treating obesity-related health conditions, e.g. *cardiovascular disease, diabetes*

- Governments have to channel more funds to the health care system
- Higher public health expenditure reduces the amount of funds remaining for economic development
- When the other sectors of the economy receive less monetary support, the overall progress of a country can decline over time.

3. **Excess** food consumption has various impacts – **Social**

3.1 **Social – Food wastage**

- Societies may waste food when they have excess food
- Consumers in DCs waste as much food as the entire amount of food available in Sub-Saharan Africa for local consumption, *i.e. 230 million tonnes each year*
- Food wastage is a serious problem in DCs with both food producers and consumers throw away food that is still edible
- Amount of wasted food:
 - DCs: 95–115 kilogrammes per capita
 - LDCs: 6–11 kilogrammes per capita
- Wastage puts more strain on landfills
- Resources (*e.g. water, oil*) used to produce the food are wasted as well

3.2. **Social – Dieting**

- People may become overweight due to excessive food consumption and may choose to go on a diet to lose weight
- Dieting: Practice of regulating the amount of food consumed in order to maintain an ideal body weight
- People who are dieting also engage in physical exercise
- Dieting provides employment and value to an economy, *e.g. diet books, medication, medical*

procedures for losing weight

- Example: In 2012, the weight loss industry in the USA was valued at US\$20 billion
- Dieting has to be done in a healthy manner
- Inappropriate dieting may lead to:
 - Depression
 - Dieting-related physical illnesses, *e.g. iron-deficiency anaemia*