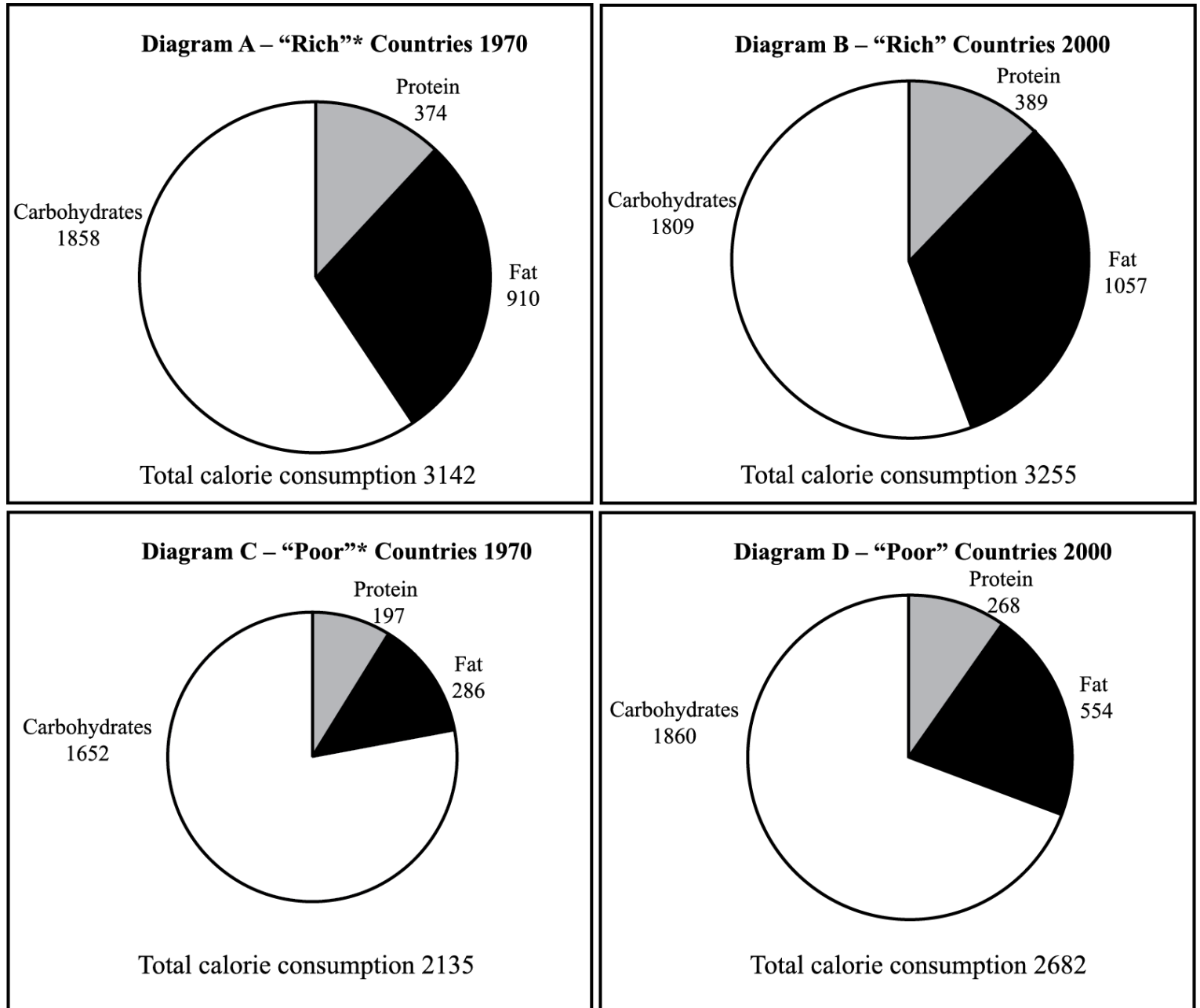


## SL Paper 2

The diagrams show the average daily consumption of calories per person.



[Source: FAO Statistics Division]

\* Rich and Poor countries according to FAO classification

- ai. Outline **two** changes in calorie consumption in poor countries from 1970 to 2000. [2]
- aii. Outline **two** differences between calorie consumption in rich countries and poor countries in 2000. [2]
- b. Explain why food availability has increased in some areas of the world. [6]

c. Evaluate the sustainability of modern agricultural systems.

[10]

a(i). Briefly describe what is meant by “diseases of affluence”.

[2]

a(ii) State **two** examples of diseases of affluence.

[2]

b. Explain why health-adjusted life expectancy (HALE) is a better way to quantify the health of a community than infant mortality.

[6]

c. To what extent have the management strategies for **one named** disease been successful? Refer to **one** country or region in your answer.

[10]

a. Briefly describe what is meant by “obesity”.

[2]

b. Suggest why heart disease is considered a “disease of affluence”.

[4]

c. With the aid of a diagram or diagrams, explain the spatial process of a disease spreading through “diffusion by relocation”.

[4]

d. Examine the factors which have led to more food becoming available in some areas in recent years.

[10]

The map shows the energy efficiency ratios for agriculture in selected provinces in Canada.



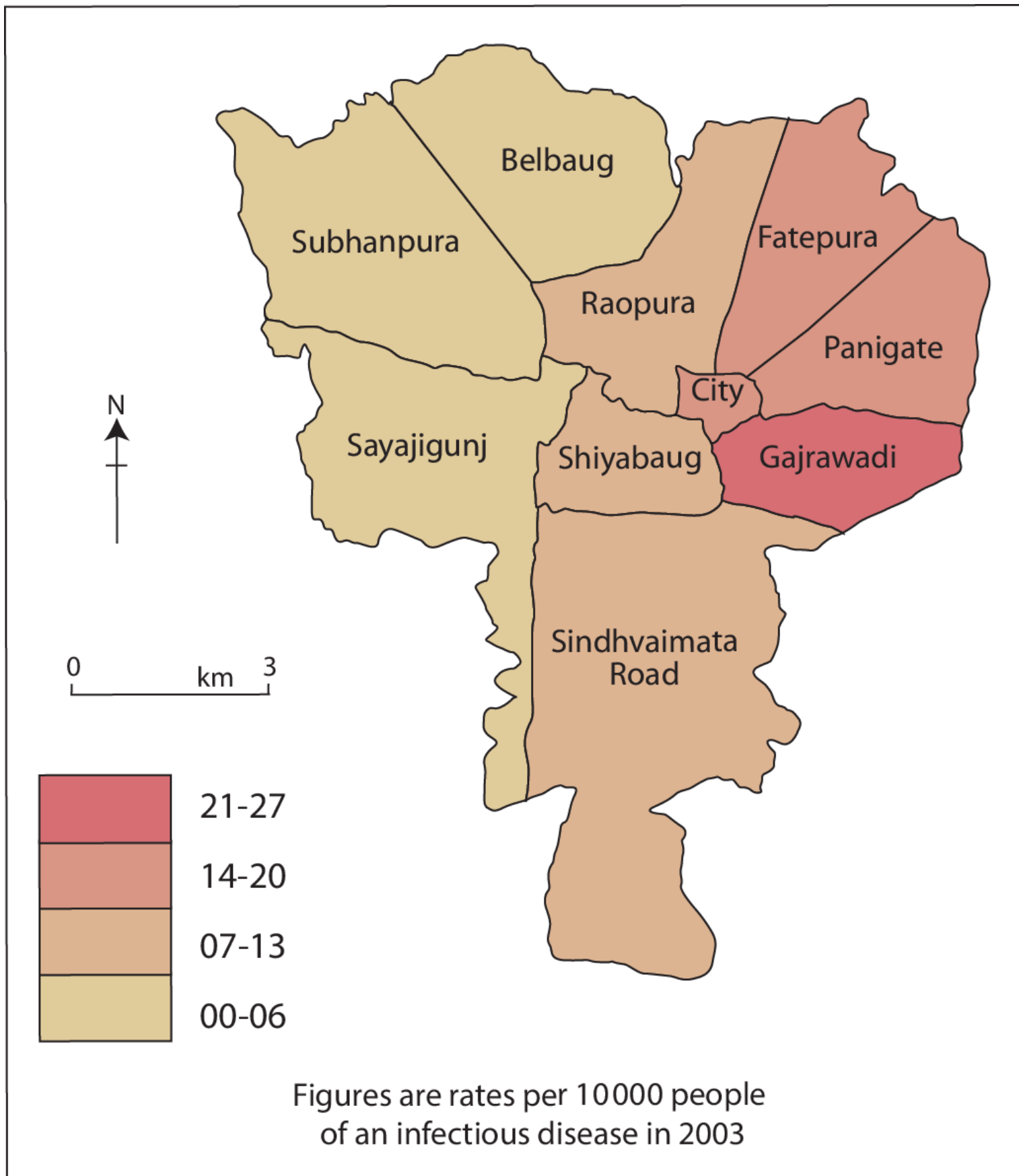
[Source: adapted from T McRae, CAS Smith and LJ Gregorich (eds.), (2000), *Environmental Sustainability of Canadian Agriculture: Report of the Agri-Environmental Indicator Project. A Summary*. Ottawa: Agriculture and Agri-Food Canada]

- a. Identify the province with the most efficient energy ratio. [1]
- b. Describe the pattern of energy efficiency ratios shown on the map. [3]
- c. Suggest **three** reasons why energy efficiency ratios vary within a country or region. [2+2+]
- d. Examine recent changes in agricultural systems that have led to increased food availability in some areas. [10]
- 

- a.i. Briefly outline what is meant by the term “food security”. [2]
- a.ii. Outline **one** way in which the health of a population can be affected by chronic hunger. [2]
- b. Explain **three** geographic impacts at a national scale of **one named** water-borne **or** sexually transmitted disease. [6]
- c. To what extent were physical factors responsible for **one** recent famine? [10]
- 

- ai. Define the term *health-adjusted life expectancy*. [2]
- aii. State **one** reason why health-adjusted life expectancy is a better measure of the health of a population than child mortality. [2]
- b. Referring to **one or more** diseases, explain how **three** geographic factors influence the spread of disease. [2+2+]
- c. “Affluent societies are less affected by disease than those with a high level of poverty.” Discuss this statement. [10]
- 

The map shows the rates of infection (number of cases per 10 000 people) for a water-borne disease in a city in India in 2003.



[Source: Figure 2 ('Vadodara: Trend in the occurrence of diseases') from De, J. (2007) 'Development, environment and urban health in India', Geography, 92,2, pp.158-60www.geography.org.uk]

ai. State **one** other indicator besides infection rates which could be used to map the health of people in this city.

[1]

- iii. Referring to the map, describe the pattern of this disease in the city. [3]
- b. Explain **three** possible reasons, one environmental, one social and one economic, for the pattern considered in part (b). [3x2]
- c. "Poverty is the main cause of food insecurity." Discuss this statement. [10]

- a.i. State **two** diseases of poverty. [1]
- a.ii. Describe the distribution of diseases of poverty. [3]
- b. Explain **two** types of diffusion in relation to the spread of disease. [6]
- c. To what extent have recent changes in agriculture increased the production and availability of food in low-income countries? [10]

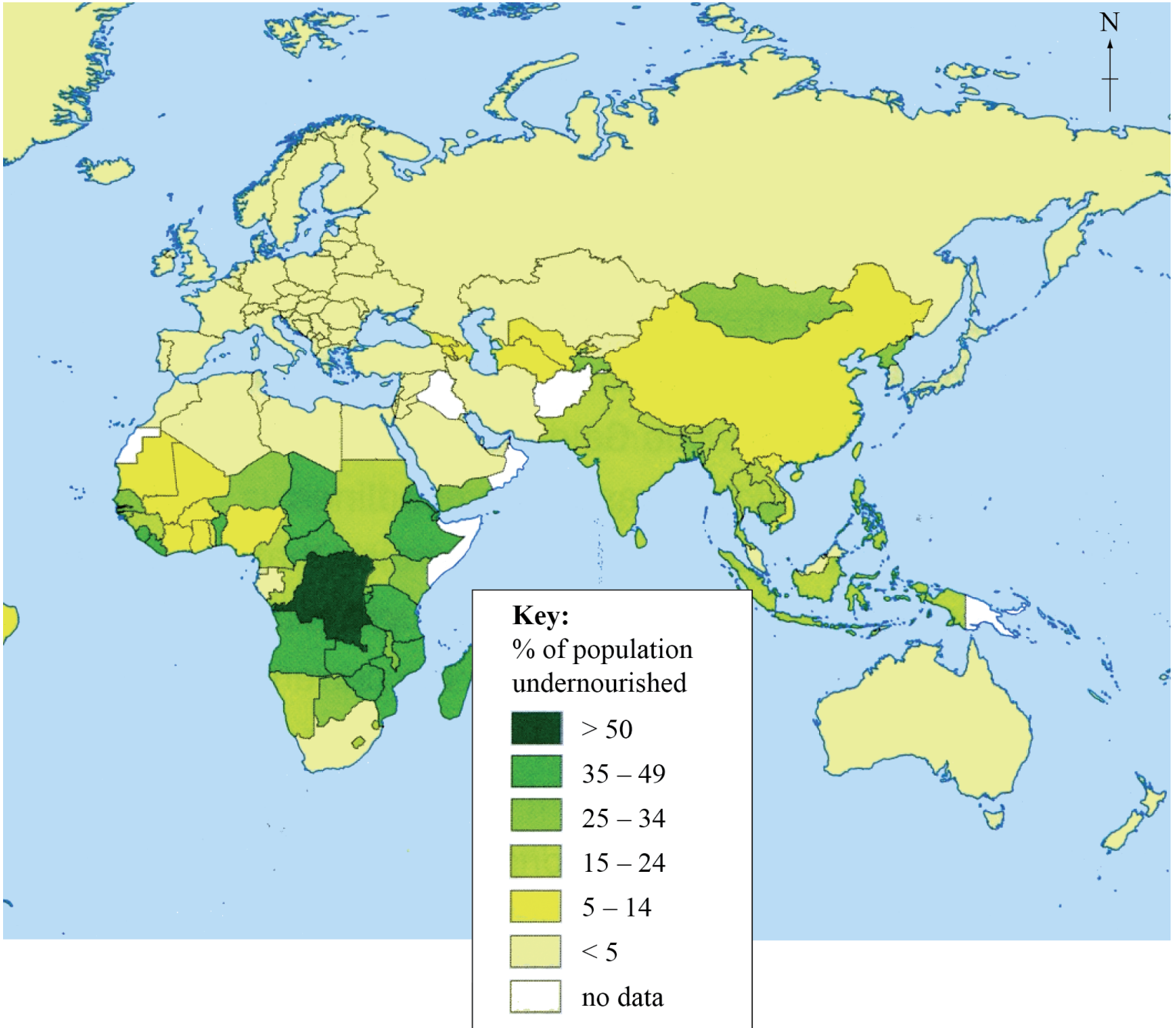
The graph shows the rates of disease in a city in India between 1991 and 2001.



[Source: Jayasree De, (2007), This Changing World: Development, Environment and Urban Health in India. Geography, volume 92, issue 2, pages 158–160]

- ai. Describe the trend in diseases spread by diffusion between 1991 and 2001. [2]
- aii. Describe what is meant by "diffusion by relocation" with reference to a disease. [2]
- b. Explain the global distribution of diseases of poverty. [6]
- c. Referring to **one or more** diseases, discuss the factors that determine the relative importance of policies of disease prevention as opposed to policies of treatment. [10]

The map shows part of the global pattern of low calorie intake (undernourishment).

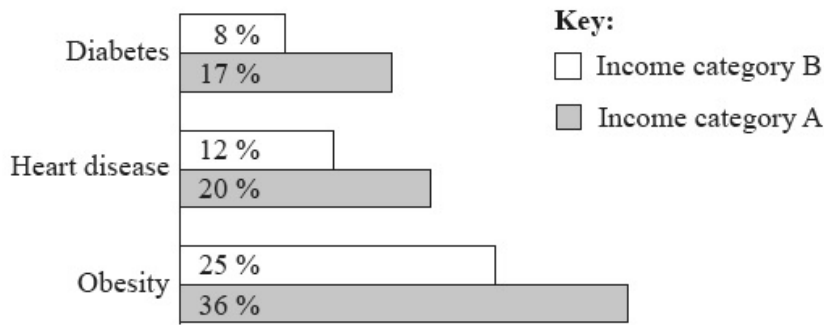


[Source: E M Young, (2010), Deadly Diets: Geographical Reflections on the Global Food System. *Geography*, volume 95, issue 2, pages 60–69]

- Describe the difference between malnutrition and low calorie intake. [2]
- Describe the pattern of undernourishment shown on the map. [4]
- Explain **two economic** causes of food deficiency. [2+2]
- With reference to any **one** vector-borne, water-borne or sexually transmitted disease, compare its geographic impacts at the local and international scales. [10]

- a. Define the health measure HALE and explain how it differs from life expectancy. [2+2]
- b. Analyse the advantages and disadvantages of **two** other indices (other than HALE) used to measure the health of populations. [3+3]
- c. Discuss the connections between affluence and health. [10]

The graph shows the percentages of people, aged 55 to 64, experiencing three major health-related conditions in a developed country.

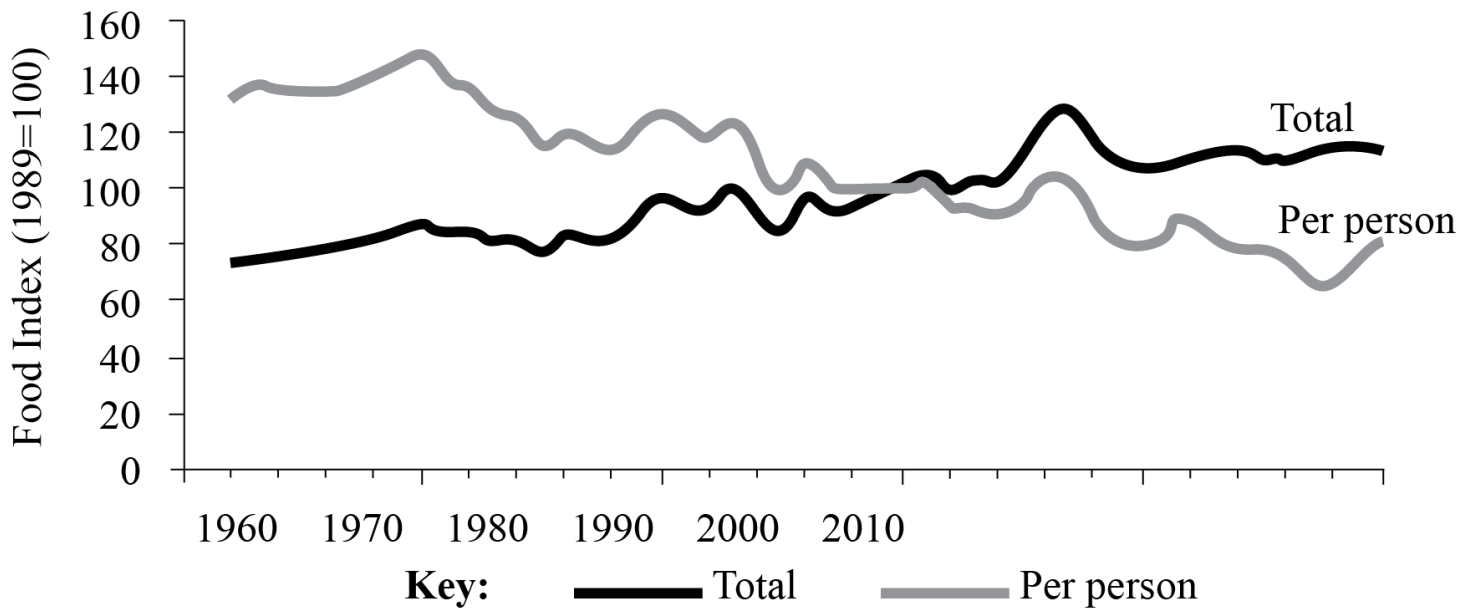


[Source: J Banks, M Marmot, Z Oldfield, JP Smith, New Scientist, 17 July 2010. Original data from the *Journal of the American Medical Association* (JAMA), "Disease and disadvantage in the United States and in England," **295**(17): pages 2037–2045, 3 May 2006]

- a. (i) State which income category is likely to represent the wealthier individuals in this country, and justify your choice. [4]
- (ii) State which of the three health conditions shown on the graph is most related to income category, and justify your choice.
- b. Using examples of diseases, distinguish between diseases of affluence and diseases of poverty. [6]
- c. To what extent was **one** recent **named** famine caused by crop failure? [10]

- a. (i) Outline what is meant by the term "diseases of affluence". [4]
- (ii) Briefly describe the global distribution of diseases of affluence.
- b. Referring to **one named** water-borne or vector-borne disease, distinguish between policies relating to its prevention and policies relating to its treatment. [6]
- c. Examine the effects of transnational corporations (TNCs) and fair trade on the level of sustainability of agriculture. [10]

The graph shows the total food production and food production per person in Country A, 1962–2010.



[Source: Geofile (Nelson Thornes, 2005)]

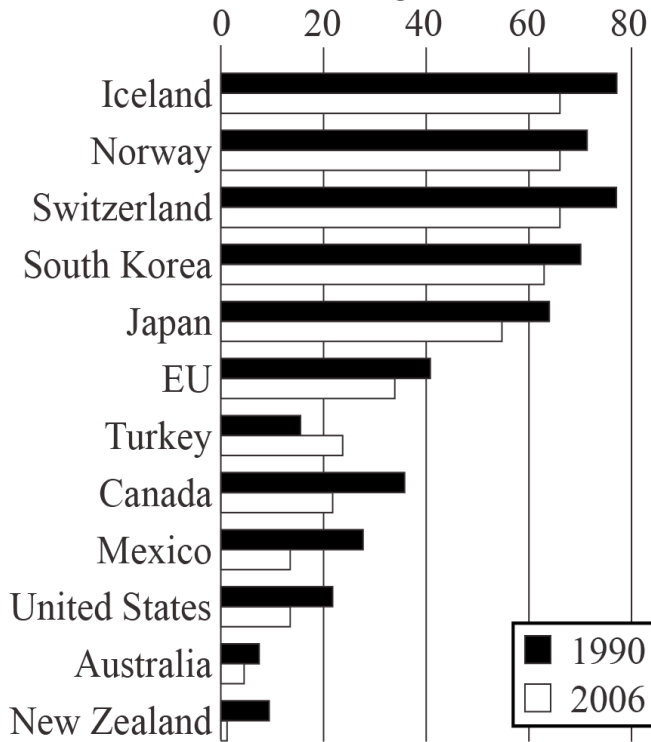
- ai+4j). State the year when the index of total food production was greatest. [1+1]
- (ii) State the value of the food index per person in 1970.
- b. Describe the trend in total food production shown on the graph. [2]
- c. Suggest reasons for the trends in total food production and in food production per person from 1962 to 2010. [6]
- d. Examine the geographic connections between food availability and health. [10]

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The graph shows the percentage of farm income from agricultural subsidies in 1990 and 2006 for 11 countries and the European Union (EU).



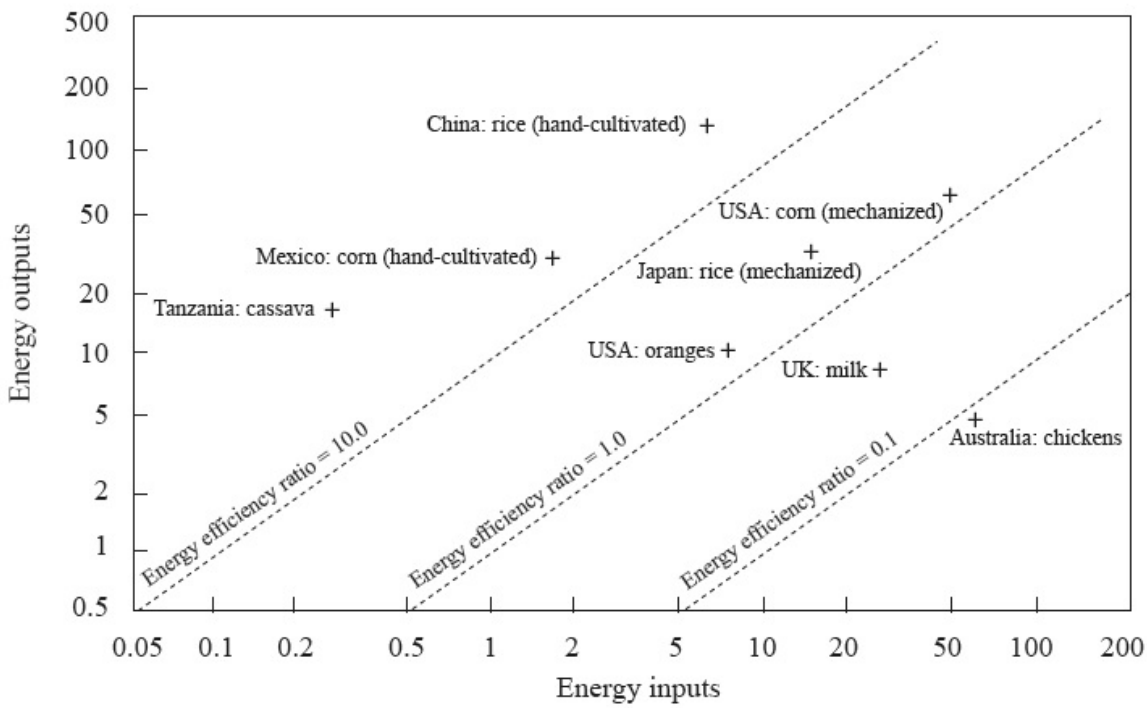
% of farm income from agricultural subsidies



[Source: OECD data, cited in *The Economist*, 10 November 2007]

- ai. Describe the pattern of agricultural subsidies in 2006. [2]
- aii. State **two** reasons why agricultural subsidies have declined in most countries since 1990. [2]
- b. Explain how the actions of TNCs can reduce the availability of food. [6]
- c. To what extent were human factors responsible for a recent famine? [10]

The graph shows the energy inputs and outputs for a number of different farming systems (the units are gigajoules per hectare per year).

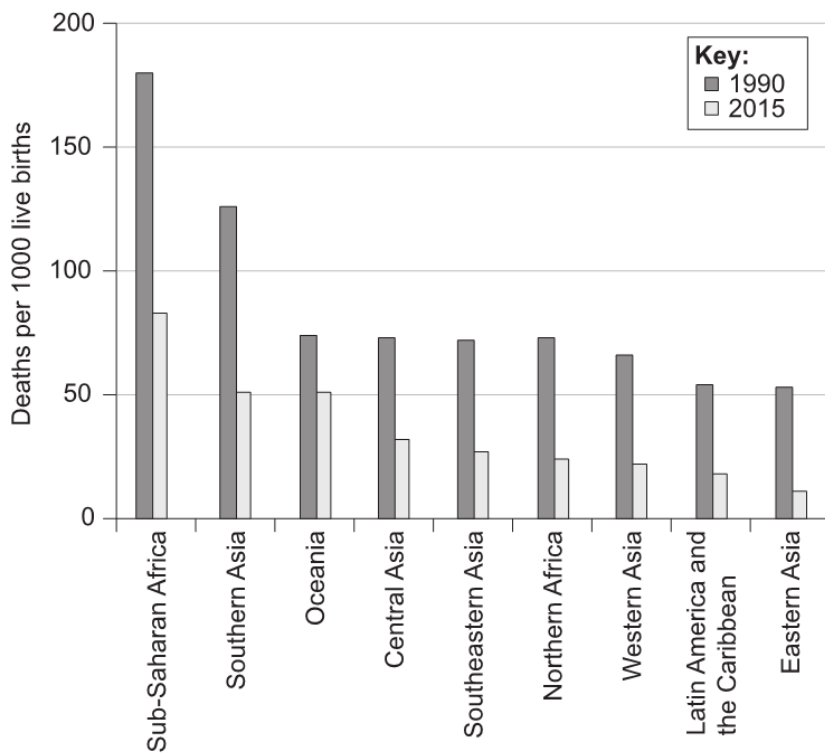


[Source: Reprinted from *Food Policy*, volume 1, Gerald Leach, Energy and food production, 1975, with permission from Elsevier]

- a. (i) Identify the farming system shown on the graph which has the highest energy output. [2]
- (ii) Identify the farming system which has the highest energy efficiency ratio.
- b. Referring to the graph, suggest how mechanization contributes to the different energy flows (inputs and outputs) for rice farming systems shown [4]  
in China and Japan.
- c. Explain **two** changes in agriculture, **other than** mechanization, that have helped to boost food production in some areas. [4]
- d. "Free trade is more important than food aid in helping to solve (alleviate) food shortages." Discuss this statement. [10]

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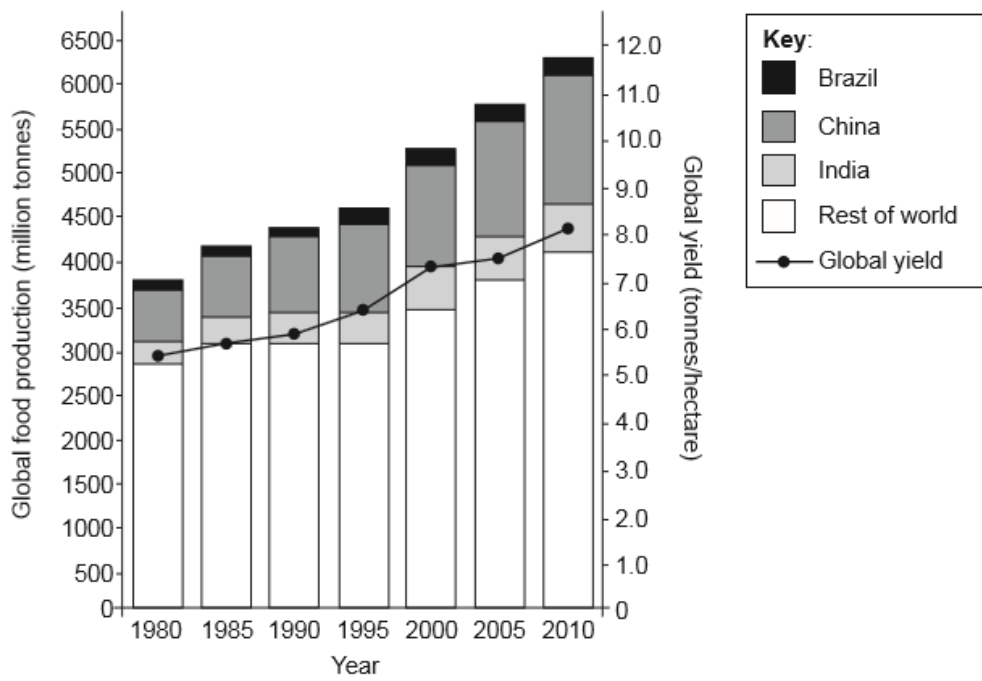
The graph shows the mortality rates for children under the age of five for world regions between 1990 and 2015.



[Source: United Nations Inter-agency Group for Child Mortality Estimation (UN IGME), 'Levels & Trends in Child Mortality: Report 2015,' Estimates Developed by the UN Inter-agency Group for Child Mortality Estimation, United Nations Children's Fund, New York, 2015.]

- a.i. Describe the changes in Sub-Saharan Africa between 1990 and 2015. [1]
- a.ii. Identify the region with the greatest **relative** change in mortality rate between 1990 and 2015. [1]
- a.iii. Outline why HALE is a better indicator of a nation's health than child mortality. [2]
- b. Explain how the application of **two named** barriers to limit the spread of disease has reduced child mortality rates. [6]
- c. Evaluate the relative importance of fair trade and food aid in overcoming food shortages in low-income countries. [10]

- 
- a. The graph shows changes in global food production and global yields of food crops from 1980 to 2010. [4]



[Source: adapted from Ellen MacArthur Foundation, (2013), *Towards the Circular Economy 2*, page 22]

(i) Referring to the graph, briefly describe the change in food production in India from 1980 to 2010.

(ii) **Other than** increasing global yield, state **one** reason why global production has increased.

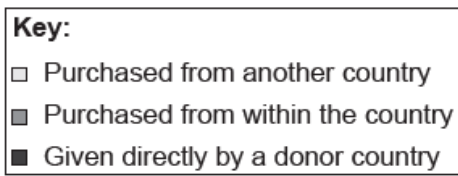
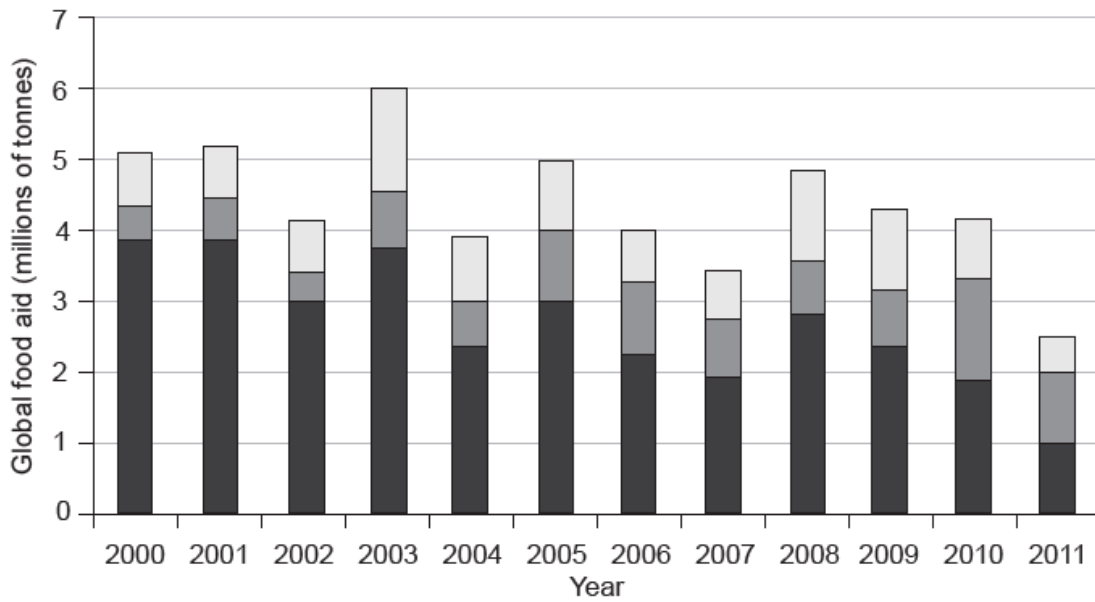
b. Explain **two** ways in which the yield of some food crops can be increased.

[6]

c. Referring to **two** diseases, compare the factors affecting their spread from place to place

[10]

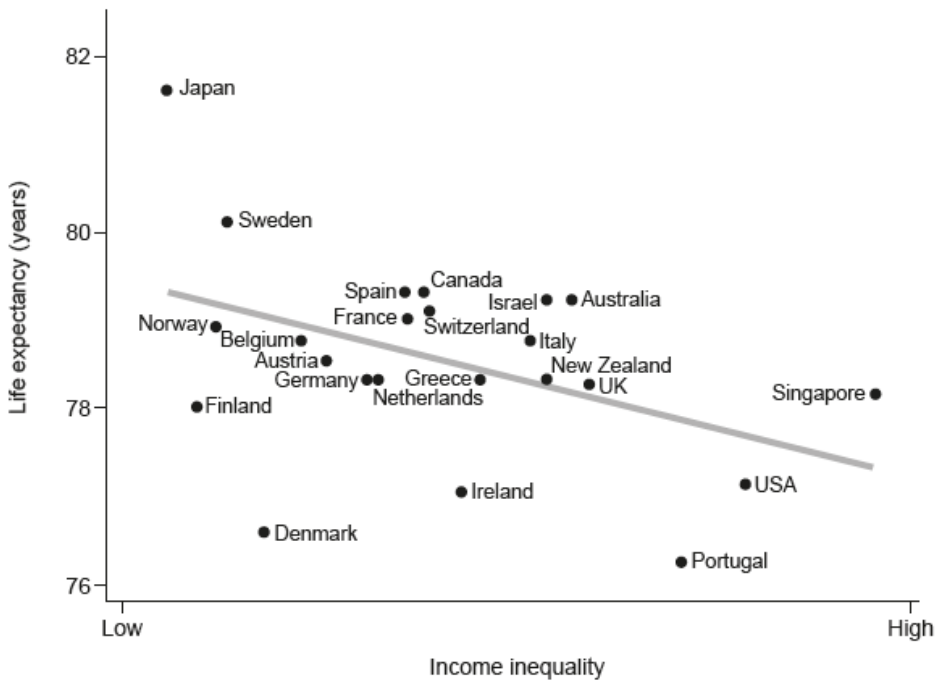
The graph shows the amount of global food aid in millions of tonnes, from 2000 to 2011.



[Source: World Food Programme / FAIS]

- a. Describe the trends in food aid between 2000 and 2011. [4]
- b. Explain **two** possible disadvantages of food aid for a community that is currently experiencing food shortages. [6]
- c. "Prevention should always be prioritized over treatment." Discuss this statement, with reference to specific diseases and communities. [10]

The graph shows the life expectancy (in years) and income inequality (from low to high) for high-income countries.

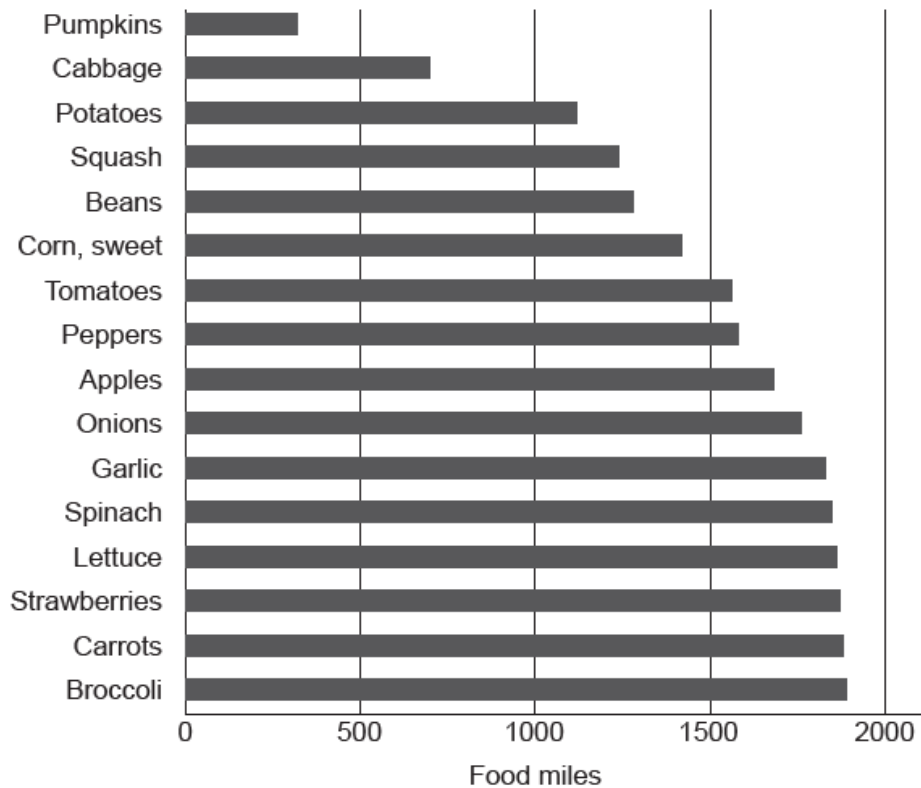


[Source: R Wilkinson and K Pickett, *The Spirit Level: why equality is better for everyone*, reproduced in *The New Internationalist*, (Nov 2012), <http://newint.org/>]

- a. Describe the relationship between life expectancy and income inequality shown on the graph. [3]
- b. Suggest **one** possible reason for the relationship you have described in (a). [3]
- c. Using **one** example, explain how agricultural subsidies can affect food production. [4]
- d. Examine the relative importance of the human **and** physical factors that led to a recent **named** famine. [10]

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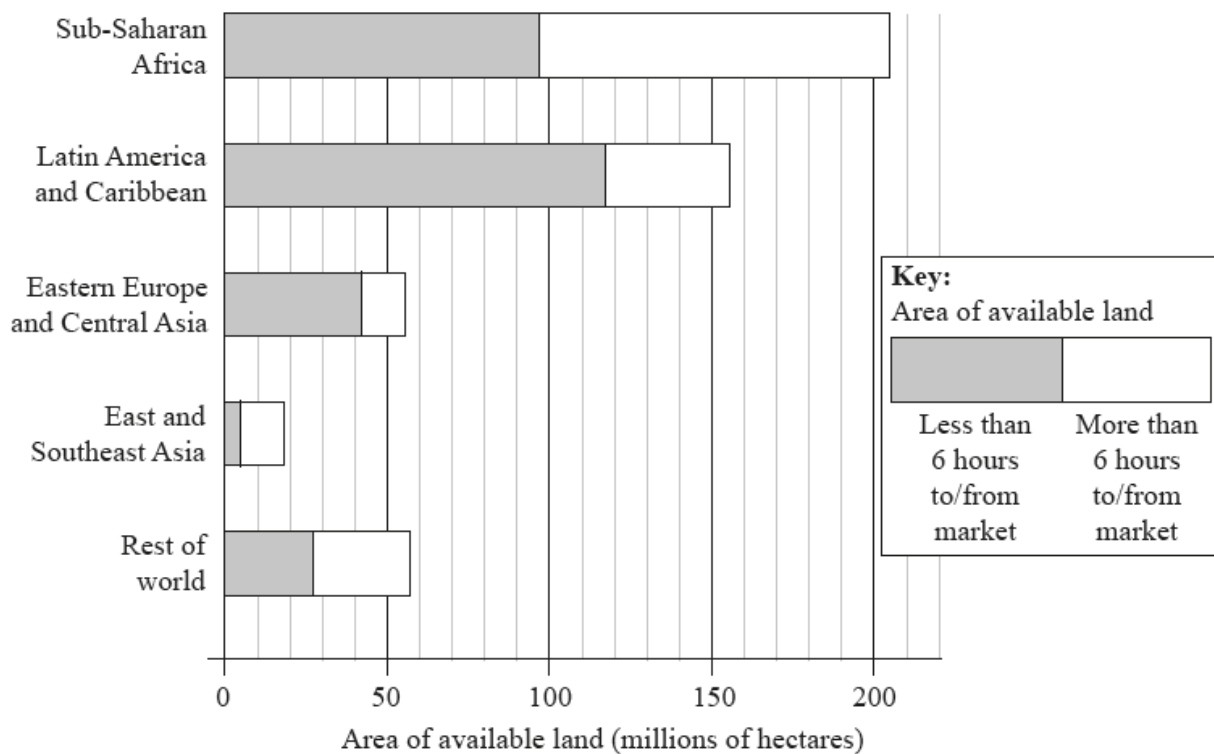
The graph shows the food miles for fruit and vegetables supplied to institutions in the state of Iowa, USA.



[Source: [www.leopold.iastate.edu](http://www.leopold.iastate.edu)]

- a. (i) Define the term *food miles*. [4]
- (ii) State the fruit or vegetable that ranks sixth in terms of the highest number of food miles.
- (iii) Estimate the average (mean) food miles for the fruit and vegetables shown in the graph above.
- b. Suggest **one** advantage **and two** disadvantages of using food miles as an indicator of the environmental impacts associated with food production. [6]
- c. To what extent are food availability, malnutrition and diseases of poverty connected with one another? [10]

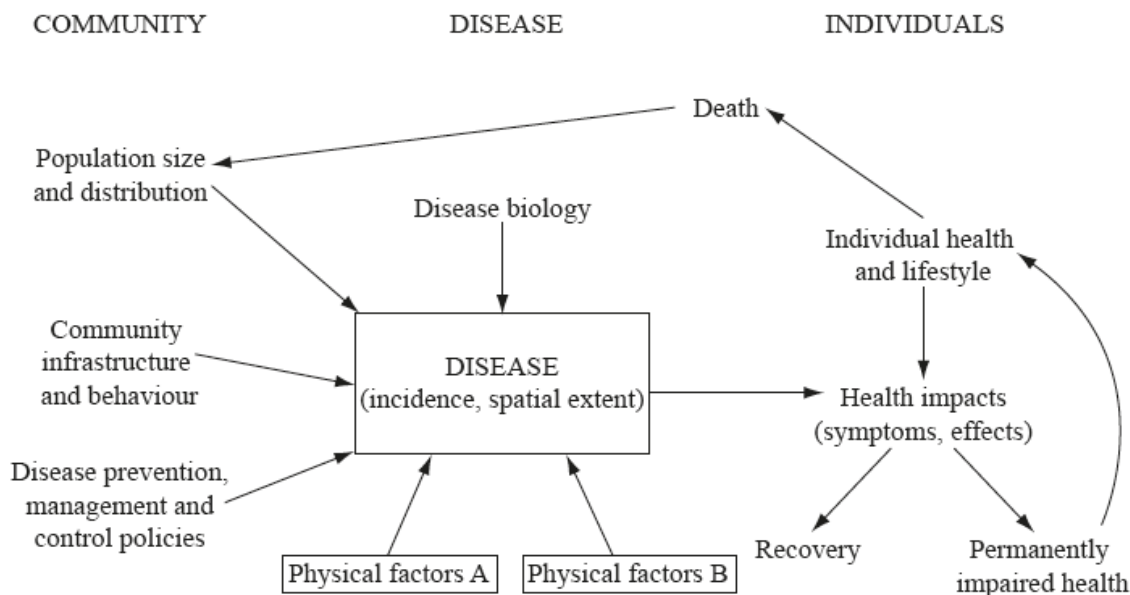
The graph shows how much unused land is still available for farming in several major regions, and how accessible it is to local markets.



[Source: ©The Economist Newspaper Limited, London (February 26, 2011). Data sourced from the World Bank.]

- a. Referring to the graph, describe the global pattern of land available for farming. [4]
- b. Using examples, explain how trade barriers and/or trade agreements can affect the production of food. [6]
- c. Contrast the geographic impacts of **two named** diseases. [10]

The diagram shows some of the factors that affect the likely impacts of a disease on individuals and the community in which they live.

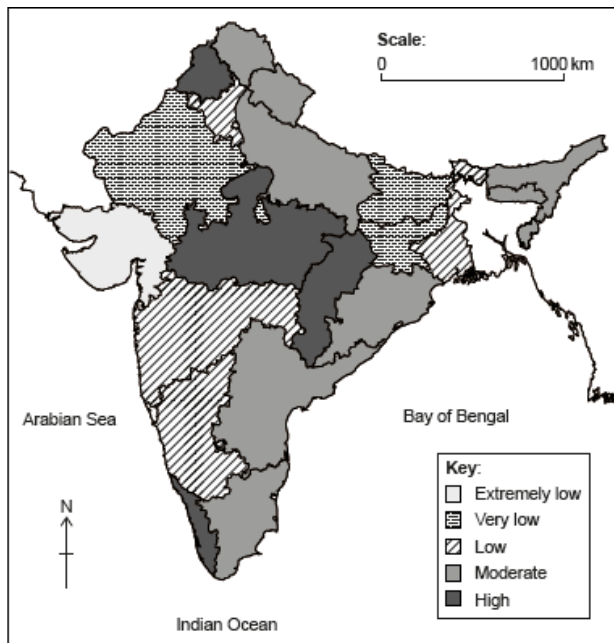


[Source: ©International Baccalaureate Organization 2015]



- Identify **two** possible physical factors (A and B) that may affect the incidence and/or spatial extent of the disease. [2]
- Briefly outline how population distribution can affect the incidence of the disease. [2]
- Explain **two** management strategies that have been used to limit the spread of **either one named** water-borne disease **or one named** vector-borne disease. [6]
- “For all communities, the prevention of disease is at least as important as its treatment.” Discuss this statement, referring to **one or more** examples of disease. [10]

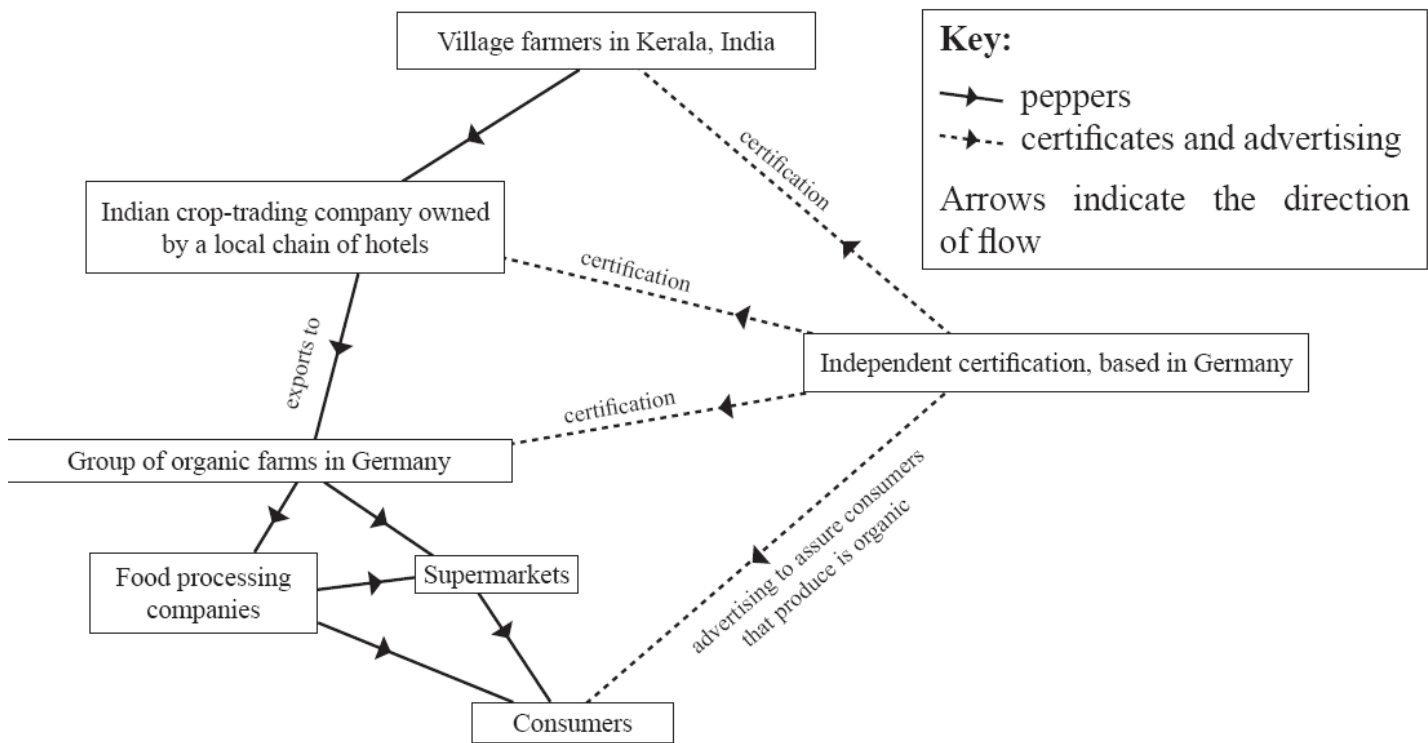
The map shows food availability in rural areas of India.



[Source: *Food Insecurity Atlas of Rural India*, M S Swaminathan Research Foundation / World Food Programme (2001)]

- Describe the pattern of food availability in rural areas of India shown on the map. [4]
- Distinguish between food availability and food security. [6]
- Examine how the impacts of diseases are affected by diffusion **and** barriers. [10]

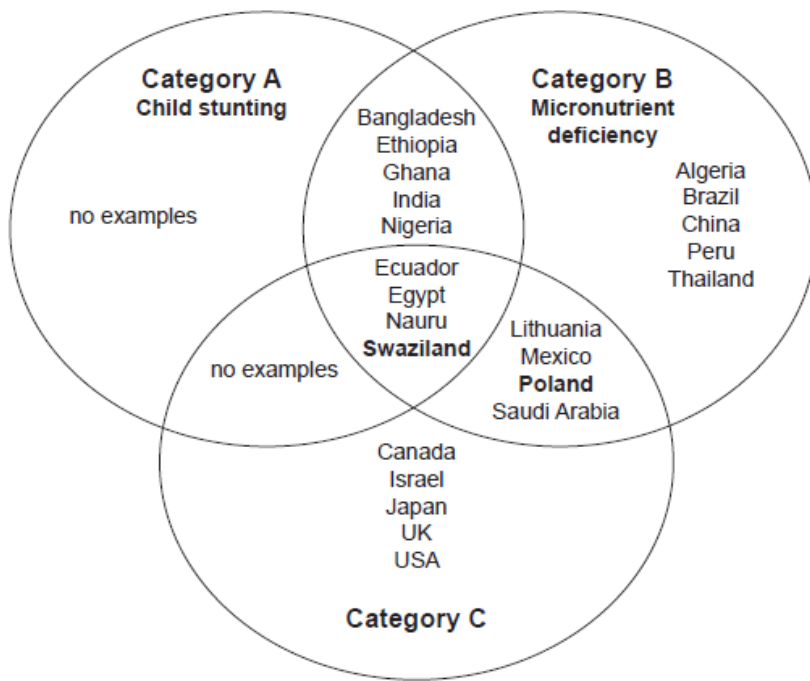
The diagram shows a simplified fair trade system for the export of peppers from Kerala, India, to consumers in Germany.



[Source: ©International Baccalaureate Organization 2013]

- a(i). Describe what is meant by *fair trade*. [2]
- a(ii). Referring to the diagram, identify **two** features of this system that make it an example of fair trade. [2]
- b. Explain how fair trade can help to alleviate local food shortages in regions where food crops are grown. [6]
- c. "Food miles are an excellent indicator of agriculture's environmental impact." Discuss this statement, referring to examples. [10]

The Venn diagram shows overlapping categories of malnutrition, with some examples of countries in different categories.

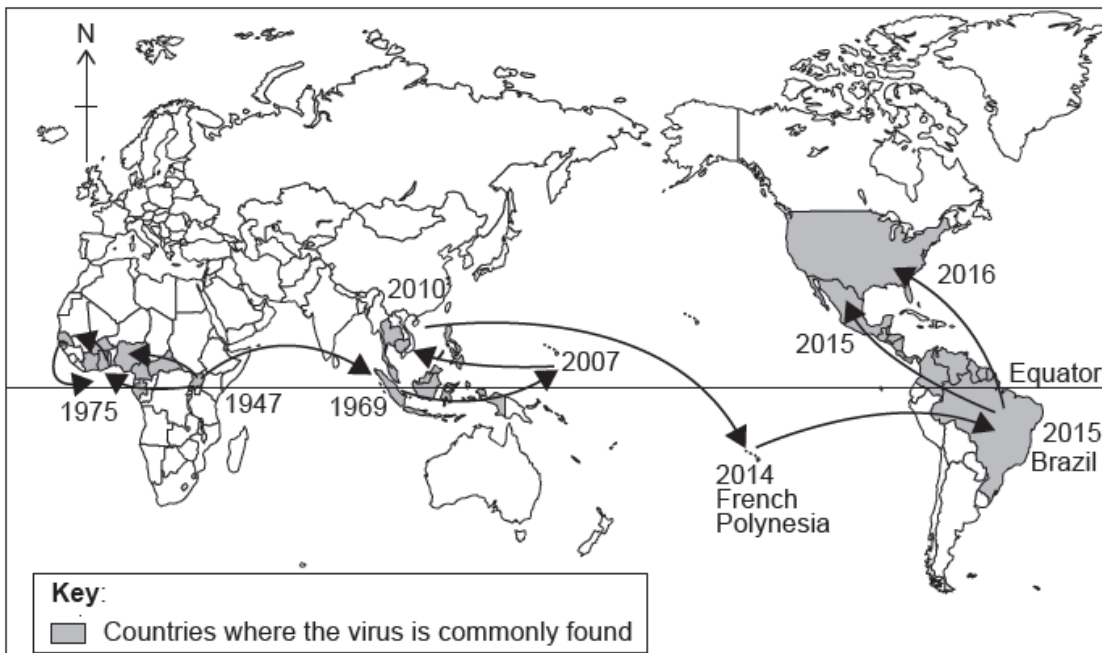


[Source: data from Food and Agriculture Organization, *The state of food and agriculture*, (2013), [www.fao.org](http://www.fao.org)]

- a. (i) Identify the malnutrition category experienced in Swaziland, but **not** in Poland. [4]
  - (ii) Briefly describe how the malnutrition category you have identified in (a)(i) affects an individual.
  - (iii) Identify malnutrition category C.
- b. Briefly describe what is meant by the term famine. [2]
- c. Referring to **one** type of agricultural system, explain what is meant by the term energy efficiency ratio. [4]
- d. To what extent is access to safe water a good indicator of the health of a population? [10]

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The map shows the spread of the Zika virus between 1947 and 2016.

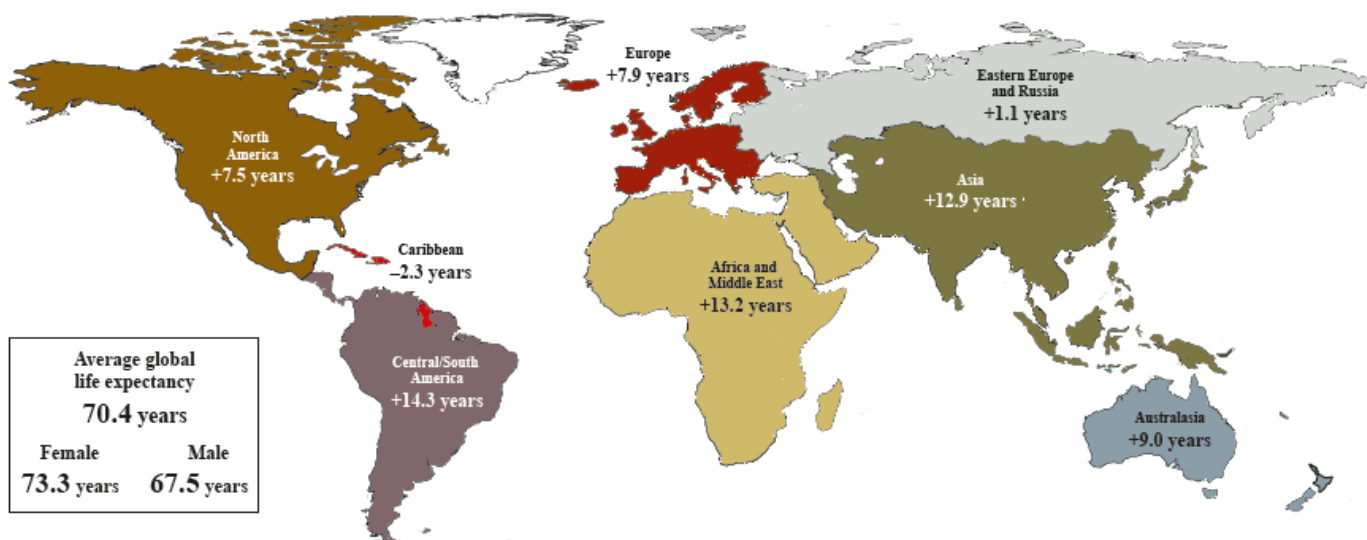


[Source: Adapted from 'Zika virus: a previously slow pandemic spreads rapidly through the Americas' in *Journal of General Virology* by D. Gatherer and A. Kohl. Lancaster University.]

- a.i. Referring to areas on the map, describe the spread of the Zika virus between 1947 and 2010. [3]
- a.ii.State what type of diffusion accounts for the spread of the Zika virus from French Polynesia to Brazil. [1]
- b. Explain **three** health improvements that have led to an increase in life expectancy in many low-income countries in recent years. [6]
- c. Examine the strengths and limitations of the energy efficiency ratio as an indicator of sustainable agriculture. [10]

**Option F – The geography of food and health**

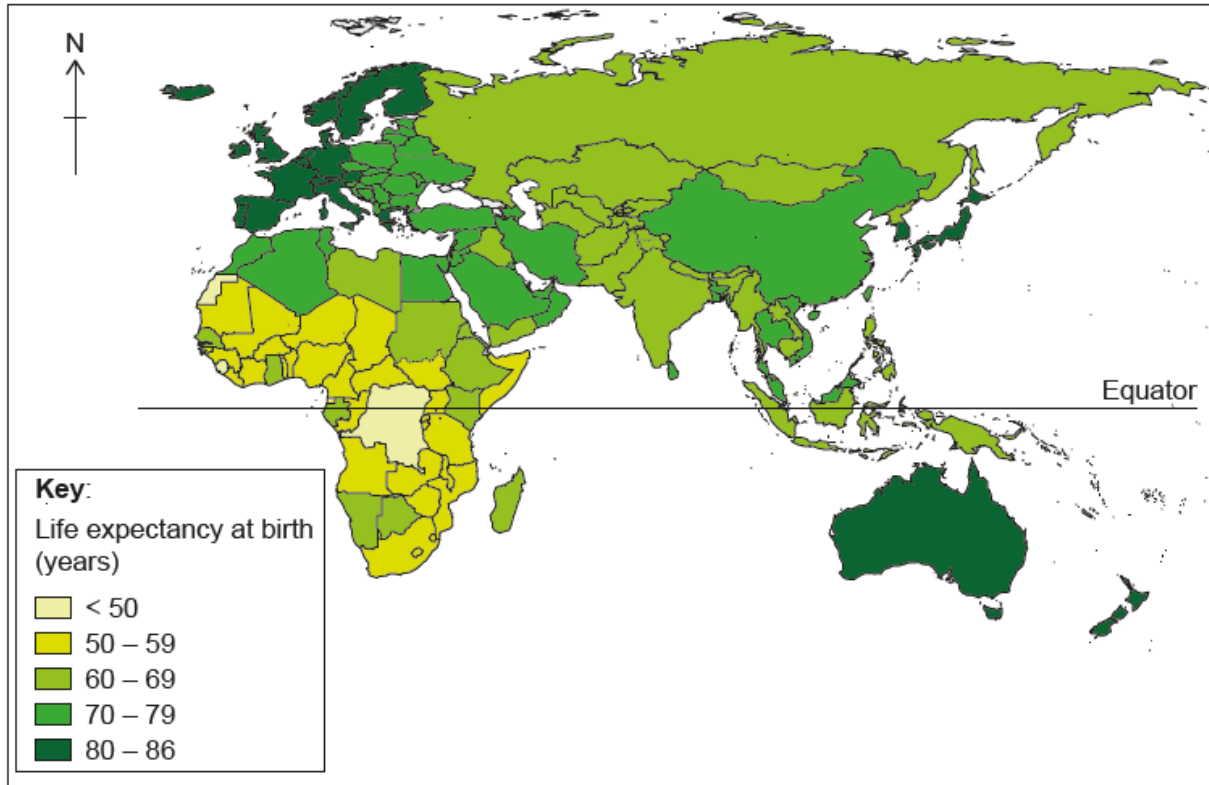
The map shows the changes between 1970 and 2010 in the average life expectancy for different regions of the world.



[Source: adapted from J Hamzelou, (2012), Global Health Report Card, *New Scientist*, 216 (2896–2897) pages 6–7]

- Describe the pattern of the changes in average life expectancy shown on the map. [4]
- Suggest **three** reasons, **other than** improved health programmes, why life expectancy has increased in **named** regions in recent years. [6]
- Referring to examples, examine how transnational corporations (TNCs), including agribusinesses, affect food production and food availability. [10]

The map shows the life expectancy at birth for countries other than those in the Americas.

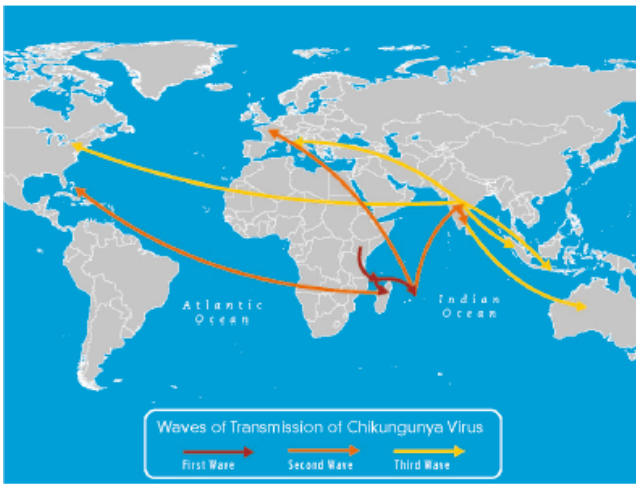


[Source: Reprinted from WHO: Life Expectancy, [http://www.who.int/gho/mortality\\_burden\\_disease/life\\_tables/situation\\_trends/en](http://www.who.int/gho/mortality_burden_disease/life_tables/situation_trends/en), accessed 2015]

- Describe the pattern of life expectancy shown on the map. [4]
- Explain **three** indicators, **other than** life expectancy, which can be used to measure the health of the population in a country. [6]
- “Food miles are an excellent indicator of the environmental impact of agriculture.” Discuss this statement. [10]

#### Optional Theme F — The geography of food and health

11. The map shows the spread of a disease between 2005 and 2009.

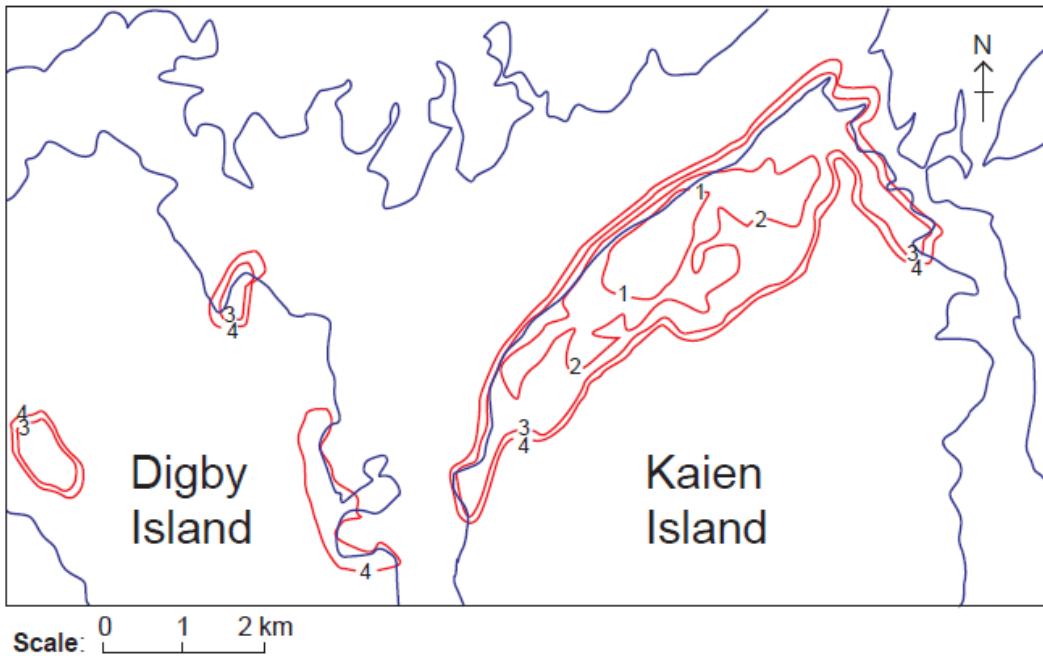


[Source: Used with permission from the CDC.]

- Referring to the map, describe the spread (diffusion) of this disease between 2005 and 2009. [4]
- Suggest **three** possible reasons why the disease spread to some countries and not others. [6]
- Referring to **named** areas, examine the reasons why their populations may experience food deficiency. [10]

Map A shows the spread of an influenza (flu) outbreak in the area over a four-week period. All people catching flu in the first week lived inside the area marked 1, all people catching flu in the second week lived inside the area marked 2, and so on.

**Map A**

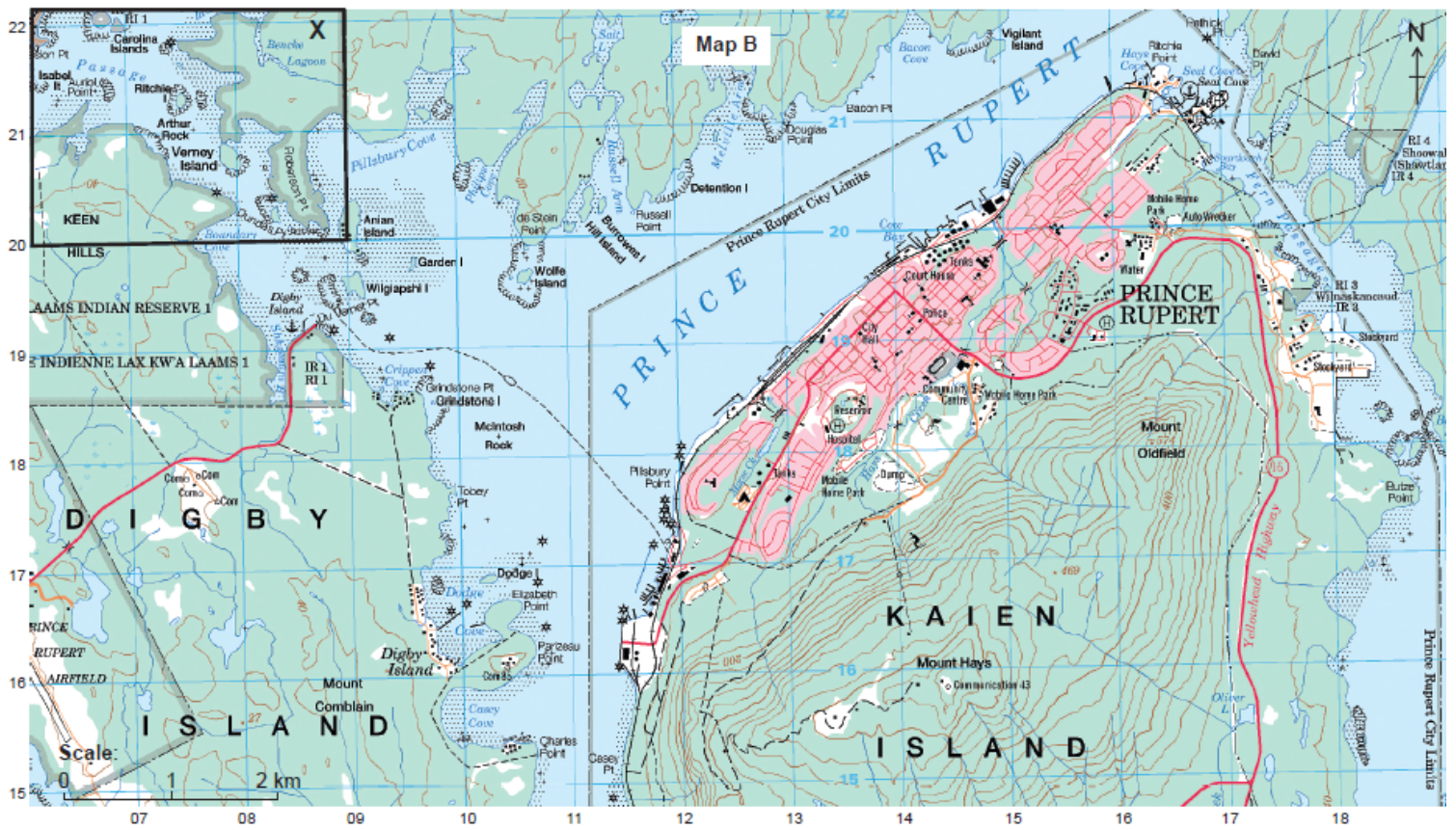


[Source: copyright International Baccalaureate Organization, 2015]

**Map B**

Map B shows the area around the city of Prince Rupert (population: 13 000) on the west coast of Canada. The scale of the map is 1:50 000. The contour interval is 40 metres.





[Source: <http://geogratis.gc.ca>]

**Key (refers to Map B):**

- Dual highway, hard surface
- Road, hard surface, more than 2 lanes, highway route number
- Road, hard surface, 2 lanes
- Road, loose or stabilized surface, all season, 2 lanes or more
- Road, loose or stabilized surface, all season, less than 2 lanes
- Vehicle track or winter road; gate
- Trail, cut line or portage; portage, short
- Built-up area; street; park/sports field
- Railway, single track, multiple tracks, side track; station
- Bridge; footbridge; tunnel
- Cut, embankment, causeway
- Seaplane base; heliport; navigation light
- Building(s)
- Church; non-Christian place of worship; shrine
- School; elevator; fire station
- Cemetery; historic site or point of interest; greenhouse
- Golf course; ski area; mine
- Oil or natural gas facility; electrical facility
- International boundary with monument
- Boundary, ninth class
- Dam: small; large; carrying road
- Watercourse or shoreline: definite; indefinite
- Rapids; falls (with height in black)
- Lake or pond; slough; intermittent lake or pond
- Foreshore flats or sand in water
- Rocks in water or small island
- Rocky ledge; rocky reef
- Marsh; swamp
- Contour: index; intermediate; approximate
- Cliff or escarpment
- Sand; esker; pingo
- Glacier: ice cap; snowfield
- Wooded area; orchard; vineyard; hopfield

- a. (i) Identify the type of diffusion shown on map A by the spread of flu in the first two weeks. [4]
- (ii) Identify the type of diffusion shown on map A by the spread of flu in week four to new areas such as the settlement of Digby Island.
- (iii) Using evidence from map B, suggest why the flu outbreak started in square 1419.
- b. Using evidence from map B, suggest **three** reasons for the spread of this disease between the end of week one and week four. [6]
- c. Examine the reasons why some communities enjoy greater food security than others. [10]

