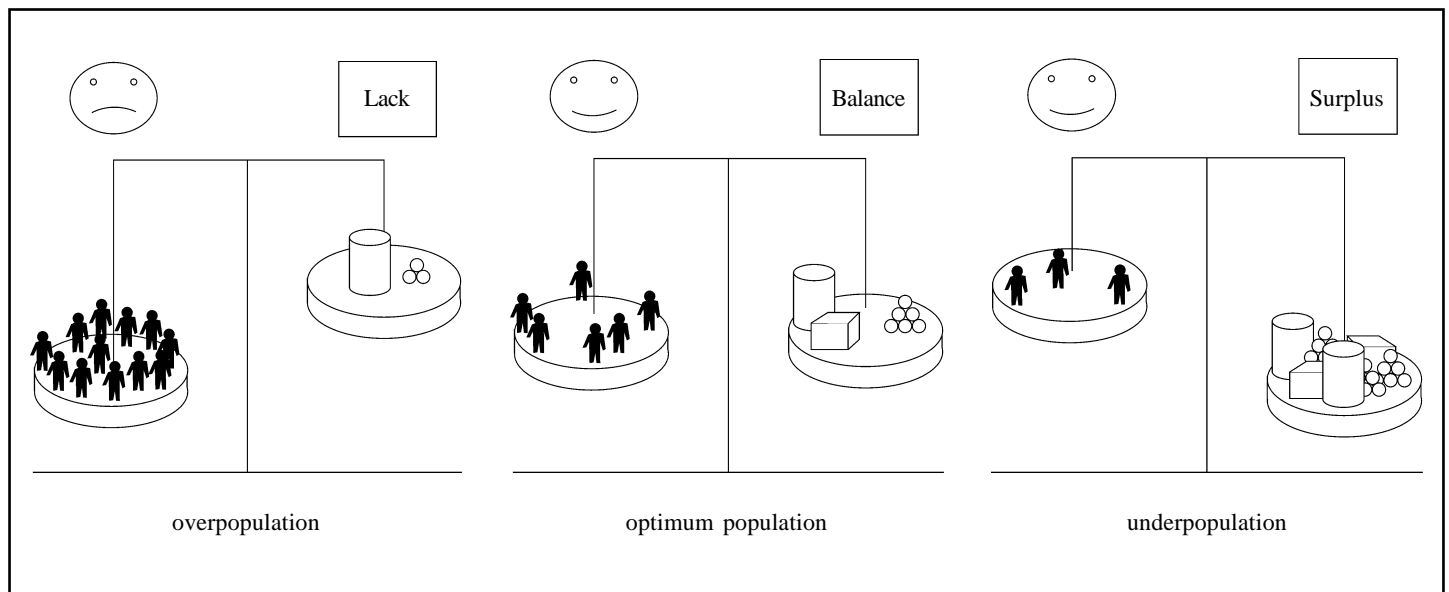




The Causes & Consequences of Underpopulation

Underpopulation is frequently thought of as being a good thing or, at least, much less of a problem than overpopulation. This belief is reinforced by Fig 1, which often appears in GCSE and some A Level texts. However, underpopulation can also be a serious problem. This Factsheet examines the causes and consequences of underpopulation.

Fig 1. Relationship between population and resources in areas with varying populations



The three terms **overpopulation**, **optimum population** and **underpopulation**, all refer to relationships between an area's **total population** and its **natural resources** i.e. climate, soils, mineral deposits, water supplies etc. Any geographical area has what is known as a **carrying capacity** (C.C.) which is the maximum number of people it can sustainably support with the available natural resources. This C.C. will vary through time with changes in technology and economic and social development. For example an area in a LEDC may have a C.C. of 50 per km² before tractors and tube wells are introduced but a C.C. of 80 per km² afterwards. The C.C. can vary widely e.g. **Bangladesh** with its fertile, low-lying, delta plains has a C.C. of 500 per km². Semi-arid **West Africa**, on the other hand, with its poor soils, unreliable rainfall etc. has a C.C. of 10 per km².

Overpopulation occurs where the size of population is too big for a country's resources.

i.e. Population Density/km² > C.C./km²

Optimum population is a theoretical situation that would exist if the population total was ideal for the available resources.

i.e. Population Density/km² = C.C./km²

Underpopulation exists when the population numbers are too small to fully exploit an area's resources or conversely where the resources could support a much bigger population than they do, without lowering the standard of living.

i.e. Population Density/km² < C.C./km²

Exam Hint - This figure implies that underpopulation is a good thing. Many economic geographers would disagree. Message: Do not blindly accept everything you read in textbooks. Think critically. If it doesn't make sense, don't try to remember it.

Exam Hint - Before we look in detail at the causes of underpopulation it is important to point out two common misunderstandings about underpopulation:

- Underpopulation in an area does not necessarily mean that there is a low population density. This may be the case e.g. Canada which is underpopulated and has an overall population density of only 8 per square mile. However, California is also underpopulated but has a density of just over 300 per square mile.
- Underpopulation does not necessarily mean that a country is poor, undeveloped or under-developed. If we take Gross National Product (GNP) as a measure of development/wealth, Canada and Brazil, both regarded as underpopulated, have GNPs of \$19570 and \$3370 respectively.

Do watch these points and when writing exam answers remind yourself constantly of exactly what you are writing about. It is easy to get carried away and forget halfway through an answer.

Causes of underpopulation

1. Environmental disadvantages: The majority of underpopulated countries have certain physical disadvantages e.g. climate, vegetation, soils, etc. which discourage people from living there and without enough people, economic development is restricted.

(a) **Climate:** Very extreme climates i.e. too hot, too cold, too wet, or too dry are usually unfavourable for concentrations of population. Canada and Siberia have extremely severe winters with many months when temperatures are below freezing-point. The equatorial climate of the Amazon Basin with its high humidities, and the hot desert conditions of the Central Australian Desert also discourage people from settling there. All these areas have vast mineral resources but unless the companies involved can make substantial profits and afford to pay workers very high wages for working in such physical conditions, settlement and development will not occur.

(b) **Vegetation:** The natural vegetation of an area can prove an obstacle to settlement and economic development if it is costly and difficult to clear for building houses, roads etc. e.g. the northern coniferous forests of Canada and Siberia (taiga) or the tropical rainforests (TRF) of Brazil.

(c) **Soils:** Both of the forest types mentioned above, taiga and tropical rainforest (see Factsheet #35 - Forest and Soils), have infertile soils once the natural vegetation has been removed which can again deter settlers. Soil conditions can also limit development such as in the Canadian tundra where the ground is permanently frozen in winter and in a marshy condition for most of the rest of the year. Both states limit the construction of houses, roads etc. and make them more costly. Thus, many underpopulated areas suffer from physical disadvantages which makes it unfavourable for settlement and economic development even if there are abundant supplies such as natural resources e.g. minerals present.

2. Accessibility: Physical drawbacks often restrict the development of communications, which result in underpopulation. If people and companies find it difficult or costly to travel to an area, they are reluctant to make the journey. The actual size or area of a country is relevant here. Many underpopulated countries have large areas (Table 1) so the development of a successful network of communications is obviously far more expensive than in a small one. New Zealand is the exception to the rule here; it is small and yet underpopulated.

3. Communications: Establishing a basic communications network is often a major problem in an underpopulated area.

(a) **Roads:** These can be difficult to construct in tundra (ground frozen or marshy), tropical rainforest and taiga (tree-felling needed). The cost per head of population likely to use the routes is also often prohibitive in the initial stages. However, without a basic road system little can be done to increase the population numbers.

(b) **Railways:** These are usually a much quicker means of travel but again the cost of an extensive system to be developed is usually far too great, much higher than for roads.

(c) **Air:** If the ground conditions are suitable i.e. if it is feasible to clear the land for landing strips, this is a very fast, efficient and flexible system. Forests and tundra ground conditions can again be a problem.

(d) **Water:** River transport is often highly developed in underpopulated areas as there is little actual initial cost involved e.g. Amazon Basin and Northern Canada, and can be very convenient, especially for bulky goods. However, in the northern areas of Canada and Siberia the rivers can be frozen for many months in the winter, which is limiting.

4. Remoteness: This is very closely linked to accessibility. Many underpopulated areas are a long way from large centres of population. On a world scale this is shown by New Zealand which is a considerable distance from its nearest sizeable neighbour. Such isolation can have social drawbacks, discouraging large present-day population concentrations or past migrations. It can also cause economic and trading difficulties when competing in world markets. On a continental scale the most underpopulated areas in Canada are those which are furthest from the more settled southern parts. These peripheral areas have the problems common to any such region. Roads, railways etc. do not pass through the area; they terminate there: there is nowhere to go to beyond that point. This remoteness is an important cause of underpopulation, as workers and their families want access to varied shopping, educational, recreational facilities etc. which these areas do not have. Potential workers are reluctant to move from a well-serviced urban environment to live in a relatively backward frontier settlement.

5. Historical: Many underpopulated areas have been linked in the past with a European nation in a 'colonial' relationship, such as Canada and Australia with Britain or Brazil with Portugal. They became producers of primary goods for the Europeans - wheat from Canada, wool and meat from Australia and coffee from Brazil.

Table 1. Size, population density and economic development

Country	Area (000s sq. miles)	Population (to nearest million)	Density (per square mile)	Urban %	G.N.P. (U.S. Dollars)	Workforce		Inflation %	Unemployment %
						Farming %	Industry %		
Canada	3,560	29	8	75	19,570	3	36	2.4	10.3
Australia	2,940	16	5	86	17,980	5	34	1.9	9.7
New Zealand	100	4	34	83	13,190	11	33	1.7	8.1
Brazil	3,260	162	49	73	3,370	11	39	33.4	5.3
Bangladesh	50	120	2,400	15	230	43	15	3.6	1.9
USA	3,540	263	75	74	25,860	2	31	2.6	6.0
U.K.	93	59	690	89	18,410	2	37	3.6	9.6

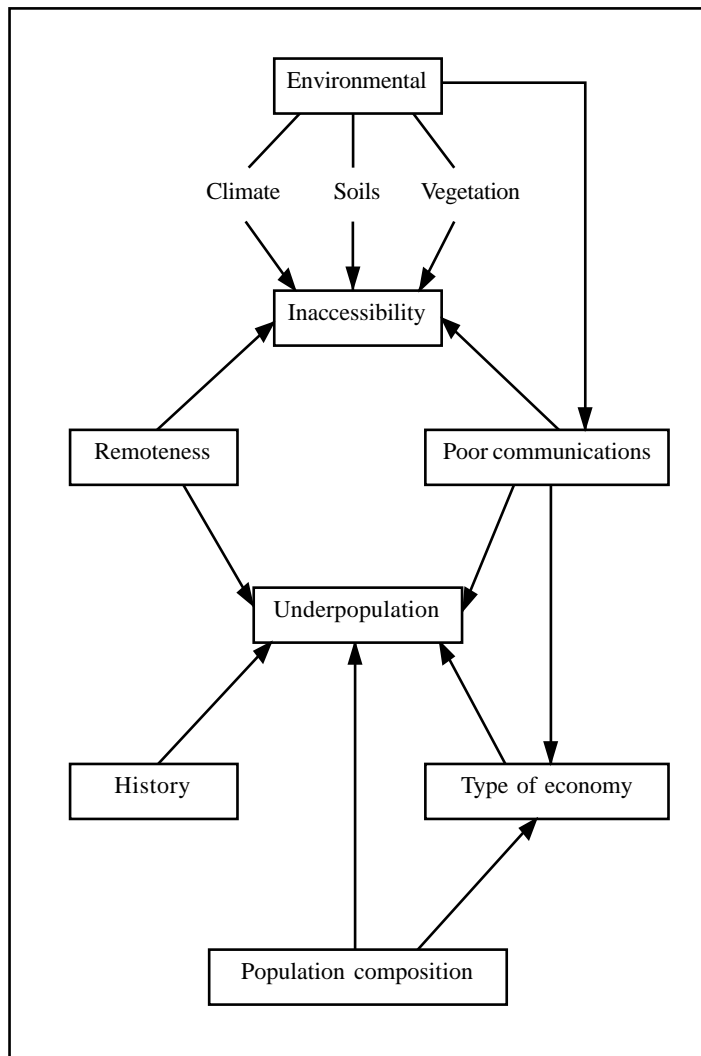
6. Type of Economy: The Prairies of Canada and the Murray-Darling Basin of south east Australia both developed commercial, extensive farming systems which were highly mechanised and could function economically with few workers. The volume of goods that they produce today could support far more people than actually live there. People in such areas are usually members of prosperous farming communities with a good standard of living.

The tropical rainforest area of Brazil has a traditional subsistence shifting cultivation economy practised by the Amerindians, the indigenous population (original inhabitants). Such a farming type can only support fairly small numbers of people. The vast timber resources and mineral deposits were largely untapped by the immigrants into the country until this century.

7. Population composition: Most underpopulated areas are ones where the indigenous population were only fairly small in number and when they did undergo colonisation were largely left to carry on with their traditional lifestyle whilst the newcomers developed the country's economy. In Brazil the Amerindians now only number about 0.25 million out of the total population of 162 millions! These groups now live in the areas that are classed as underpopulated.

The causes of underpopulation are summarised in Fig 2.

Fig 2. Causes of underpopulation



Consequences of underpopulation

Countries that are underpopulated exhibit certain characteristics both economically and socially.

1. High rate of immigration:

Underpopulated countries tend to be ones which encourage immigration as they need more people to achieve their full economic potential. Foreign workers can help to develop the economy but if they are more qualified than the locals or are prepared to accept lower rates of pay, or take their earnings out of the country, they can create problems even if they are needed to help the economy develop.

2. Foreign economic involvement:

Many underpopulated countries have foreign companies involved in their economic activities as they lack the population to support a large number of major corporations themselves, e.g. in Canada 40% of businesses are foreign-owned, especially by the USA. These companies are perceived to be using Canada's resources and taking the profits back to their own countries. In Brazil, many of the beef cattle ranches of Amazonia are owned by European multinationals. Such large amounts of foreign investment can be useful for an underpopulated country's economy especially if it is a LEDC but involvement needs to be carefully controlled.

3. Regional disparities:

Underpopulation is usually relative rather than absolute within a country i.e. it affects certain areas rather than all of it. There are therefore often quite large regional differences in wealth and development within such countries due to settlement and economic activity being concentrated in the most favourable areas. This can cause problems of unrest in the less fortunate areas and also exaggerate the situation of underpopulation if people migrate from the more remote regions to the wealthier ones in search of an improved lifestyle. This has occurred in Brazil and increased housing and other social problems in, for example, Sao Paulo.

4. Service provision:

Due to an overall lack of demand many underpopulated countries have a lower than average service provision for their inhabitants. The threshold population necessary for certain services may not be met.

5. Urban population:

Underpopulated countries tend to exhibit a high degree of urbanisation because the people tend to live in the more settled urban areas rather than in the less favourable remote areas. Also, many such countries have many physical drawbacks and people are less likely to be involved in rural occupations.

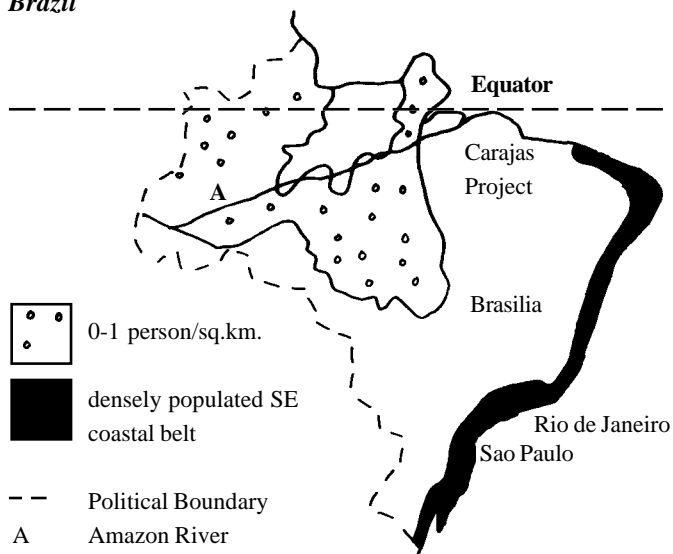
6. High standard of living:

The majority of underpopulated countries are MEDCs. (Brazil is the exception here). They tend to have high levels of technology, (if population resource ratios are low this is vital), high income levels, (if workers are in demand they can obtain higher wages) and a good standard of living. It is likely that the standard of living would rise even further if the population rose due to an increase in production and exploitation of resources.

The majority of underpopulated areas are what we could class as **economically developed**. Brazil is an exception for a variety of reasons, size, environment, etc. We will look at three main case-studies - Brazil, Canada and Western Australia.

Exam Hint - Stronger candidates understood the causes of underpopulation and were able to illustrate these causes by reference to actual examples on different scales.

**Case Study
Brazil**



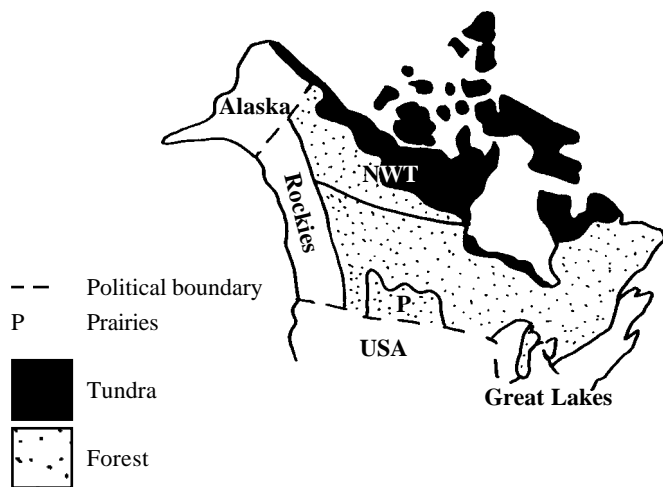
Brazil has a total population of nearly 162 million, 90% of whom live in the south east coastal belt. Much of the rest of the country is underpopulated with considerable resource potential that is virtually untouched. It is not, however, merely a lack of people that is the problem. Brazil is an LEDC and there is:

- A lack of capital to develop the area
- A shortage of scientific and technological know-how within the country itself.

There have been attempts to attract people to the interior by various government schemes.

- Brasilia, a new capital, was created in the 1960s, nearly 1000km from the coast. A network of highways was built linking the interior with the coastal area using the new city as its focus. It was hoped that these roads would act as a basic infrastructure framework and encourage the spread of further development and settlement into the interior. However, only the area immediately around the city has shown any substantial development. In fact the city has acted like a magnet on its immediate surroundings causing rural-urban migration as people move in hope to find employment and an improved way of life there.
- Brazil has recently adopted a more comprehensive regional development programme for the interior, especially the plateau region and Amazonia. This will involve further road building as well as the establishment of **secondary growth points** to encourage rural development.
- An important development scheme has been **The Great Carajas Project**. The main features of this scheme are:
 - Large-scale, covering an area the size of the UK and France together, including mining, ranching, forestry, industry etc.
 - World's largest known deposits of iron are being developed.
 - Foreign finance (USA, Japan, World Bank, EC) is being used to help to fund the project. These countries will benefit from their investment by having access to iron-ore supplies etc.
 - Environmental side-effects: unfortunately forest destruction, flooding of large areas of land for HEP etc. forced relocation of indigenous people.

**Case Study
Canada**



NWT North-West Territories

Canada has a total population of 27 million. It is very different to Brazil and yet is also **underpopulated**.

Canada's economy is based on its natural resources of fish, timber and wood products (pulp, paper etc.) minerals, natural gas, oil and HEP. Only 5% of its land is arable (mainly cereal-growing in the Prairies) but wheat and barley are important exports. The average income and employment levels have both fallen over the past 10 years and it is becoming increasingly difficult for the country to maintain its previous wealth and high standards of living.

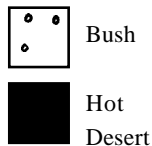
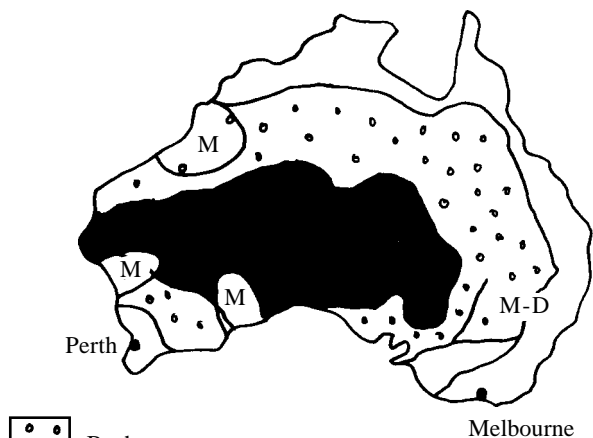
One of the most underpopulated parts of Canada is the **North West Territories (NWT)** occupying one third of Canada's total area. This province is the size of India but has a population of less than 55, 000! (India's population is nearly 940 million!). NWT has vast deposits of zinc, tin, gold, lead, silver, oil and gas. One of its problems, apart from the environmental disadvantages, is that 60% of the population of the NWT are indigenous tribes such as Eskimos, who still practise traditional ways of life to a large extent.

In the last 30 years various attempts have been made to develop the area. The road network has been expanded, but even now there are only 350km of paved roads and 2430km of all-weather ones. 90% of the area is more than 100km. from the nearest road and half the population depend on air transport for year-round access. Even air transport is dated with old planes and runways that are unpaved or too short. In summer, river transport is used, although that again is out-moded and limited. Mining operations have been increased, although some of the private ones have had to be discouraged, they were using outside labour and merely exploiting the resources, giving very little in return and not investing locally. Most of the resources are what are termed as 'frontier resources' i.e. hard to get at, expensive to develop, and subject to world market price fluctuations which again limits development. Canada has great potential wealth in NWT but a major problem as to how to realise it.

Exam Hint - Case-studies enable examiners to see how you can apply your theoretical knowledge to an actual situation. It is not necessary to be able to regurgitate lots of data, it has been used here simply to illustrate the points. Concentrate on familiarising yourself with the general geography of the 3 countries concerned.

Case Study Western Australia

Long distance commuting - solving a problem?



M-D Murray-Darling River System
M Mining Areas

*In Western Australia, (and in a few parts of Canada), a solution to developing some of the more remote underpopulated areas has been found by the use of **long distance commuting** similar to that used by the North Sea oil and gas Industry. i.e. the work is so isolated from the workers' homes that food and accommodation are provided at the work site and the workers' schedule involves a fixed number of work days followed by a number of days home leave. This is widely used in Western Australia, (over 40 mining operations), and has several advantages:*

- Lower costs as fewer facilities are needed for workers' families e.g. schools etc.
- Air transport is cheaper than building roads and more flexible, if mining locations change as deposits become exhausted
- Easier to attract workers with less family upheaval.

Disadvantages include:

- Local communities do not benefit from these developments as labour is imported as well as supplies etc. In fact local teenagers move 1000km to cities for work.
- Many of the mining companies are also multi-nationals which have been accused of merely using Australia as a source of raw materials for their many overseas plants and not contributing to Australia's economy.

Underpopulation as a result of depopulation

Underpopulation can also be found in some of the areas in the rural periphery of Western Europe and other 'fringe regions'.

More and more younger people are leaving these rural areas to work in the cities and leaving the country to migrate to the more prosperous south. It must be mentioned here that the development of North Sea oil and gas has helped Scotland's economic position considerably, although here again workers have often been imported from elsewhere.

Case Study Peripheral Britain

e.g. South West England; Central Wales; Highlands of Scotland. These areas have suffered from rural depopulation due to:

- Agricultural changes such as a decline in hill-sheep-farming, which has become more difficult due to foreign competition, EU reform etc.
- Decline in traditional industries such as textile crafts due to increased mechanisation and mass-production as well as cheaper imports from abroad.
- Membership of the EU and the recent building of the Channel Tunnel has also meant that these areas are becoming more economically isolated from the centre of economic activity.

Conclusion

You should now have some ideas as to what causes underpopulation and what the consequences are for the areas that experience it. Two very different countries, Canada, one of the wealthiest MEDCs, and Brazil, a poor LEDC, have been used to illustrate our study. Underpopulation is a problem. It may not be as obvious or as immediate as overpopulation but nevertheless it is there and in some ways it is more difficult and challenging to overcome.

Practice Questions

1. Explain what is meant by the terms overpopulation and underpopulation. (5 marks)
2. Name a country that is underpopulated. Outline why it is underpopulated and describe how it has attempted to deal with the problem. (10 marks)

Answer Hints

1. Explain the relationships between numbers of people and the resources of a country. Say what the consequences of both over and underpopulation are.
e.g. Overpopulation - starvation, malnutrition, health problems, lack of jobs, slow economic development, financial problems for government in supporting its people etc.
e.g. Underpopulation - High rate of immigration, foreign economic involvement, regional disparities, service provision, high levels of urbanisation and standards of living.
2. Take one of the Case Studies from this Factsheet e.g. Brazil or Canada. Describe what the problems are and why the country is underpopulated. Mention any schemes that there are to reduce underpopulation. e.g. Immigration schemes, settlement/decentralisation plans, communication improvements, independence from foreign influences, national development, regional development etc.

Acknowledgements; This Geo Factsheet was researched and written by Barbara Melbourne Curriculum Press, Unit 305B, The Big Peg, 120 Vyse Street, Birmingham, B18 6NF

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