



ZIMBABWE

**Ministry of Primary and
Secondary Education**



Geography Module Level II Volume 2



Lifelong and
Continuing Education
2020

Introduction

The last thirty years have seen resurgence in Open Distance learning as a pedagogical approach and this trend is envisaged to continue. The knowledge-based society that we live in has enabled learning to take place anywhere or everywhere. The concept of a classroom without walls continues to grow in Zimbabwe. Due to the demand for open distance learning, the Ministry of Primary and Secondary Education has revamped its non-formal education department to embed distance learning as a tool for learning in order to address the learning needs of the growing numbers of out of school learners or school drop outs that cannot access formal education systems. The module is written in a simple manner with lots of friendly and interactive activities to make learning interesting and easier for the out of school learners. The module develops critical thinking skills, problem solving skills among other 21st Century skills. It is the Ministry's hope that out of school learners are going to take advantage of this module and benefit immensely in advancing their learning endeavours.

Acknowledgements

The Ministry of Primary and Secondary Education (MoPSE) wishes to acknowledge Primary Secondary and Non-Formal Education (PSNE) department for coordinating this programme and the Curriculum Development and Technical Services (CDTS) department. Special mention goes to Chabikwa Blessing – Education Research Officer (CDTS) the team leader who compiled, edited and proof read the Module.

The writing of this Non- Formal Level 2 Geography Module was made possible by the contributions from the following dedicated and hardworking Senior Teachers who authored units of this module:

Frank Phiri of Inyathi High School in Bubi district, Matabeleland North

Edith Mushayavanhu of All Souls High School in Mudzi district, Mashonaland East

Erasmus Chiketa of St Johns Chikwaka High School in Goromonzi district, Mashonaland East

Maryline Muchena of Uzumba High School in Uzumba district in Mashonaland East.

MoPSE would also want to extend special mention to Mr. Frank Phiri for being both the author and the artist for the illustrations and designs in the module, without him, the work was going to be compromised.

Above all special consideration goes to UNICEF for providing funding for this Module.

How to use this module

This module is meant to be a distance learning tool. It is designed in such a way that you can study the topics on your own and go and write examinations. An attempt has been made to simplify the language so that that you understand every concept clearly. As you read the module, however, you may still find words that are new to you. We have made a list of *key words* at the beginning of each unit. The whole module also has a glossary at the back. Check the new words there. In some cases, the words may not be in the module glossary or keys words. When this happens, it will be best to consult your dictionary and other such books that may help you understand what we are saying to you.

The module is divided into units. Units are what you can call topics. In this module there are 25 units. Each of these units can be read independent of other units. However, we strongly recommend that you read related units together. Check for related topics in the module as they are grouped into *themes*. The themes and related topics that you will find in this module are as follows:

Theme	Units	Description of the theme
1	1 to 4	Weather and climate
2	5 to 8	Landforms
3	9 to 12	Natural resources, Energy and Power
4	13	Geographic Information Systems
5	14 to 16	Mining and Environmental management
6	17 to 18	Agriculture
7	19 to 20	Industry and tourism
8	21 to 24	Population Geography
9	25	Transport and trade

You will also find that the module has *in-text activities*. These are small task that we will engage you in so that you fully get the ideas being discussed. You are therefore encouraged to do all these. Do not hurry to go through the text by omitting these in-text activities. They will be very useful for understanding the geographical concepts we have in the module.

Meanwhile, the module also has *activities*. Activities are exercises that are meant for you to check your understanding as you read through different topics. The activities generally come after every main topic within the unit. The activities in the module have answers. You are expected to check your answers against those provided at the back of the module. The activities can be done in the module in the spaces provided.

Watch out for *tips* as you read the module. These are short hints and guides on some of the issues you will meet in the module. The tips will offer you ways of doing something, clues to an answer and even point you to the next concept. In the same way, the module has ways of emphasising points to you. Important points are italicised or made bold.

At the end of each unit there is a *summary* of the whole unit. The summary is in point form. It lists the main ideas discussed in the module. You are advised to use the summary to revise the ideas of each unit. After the summary there is a *unit test*. The unit test is a set of questions that you must answer in order to test yourself on all concepts covered in the module. Meanwhile, each theme ends with an *end of theme assessment*. This consists of exam type of questions. These questions are multiple-choice and structured questions for you to test your understanding of the module.

Moreover, in order to help you check how much you have understood from a unit there is a check list. Use the check list to evaluate how much of the unit you have understood. The check list will help you evaluate the *objectives* that are listed at the beginning of the unit. We also included a recommended list of textbooks that you can refer to in order to deepen your understanding of the concepts covered in each unit. It is our hope that you find using this module easy to use and interesting. As you read it learn and enjoy.

This module has been subdivided into two volumes, that is, Volume 1 Volume 2. You are advised to study Volume 1 first before going to Volume 2.

Wish you the best!

Table of Contents

Introduction	i
Acknowledgements	ii
How to use this module	iii
UNIT 12: ENERGY AND POWER	1
12.1 Production and evaluation of energy sources	2
12.2 Energy crisis in Zimbabwe	14
End of Unit Assessment	17
UNIT 13: GEOGRAPHY INFORMATION SYSTEMS AND MAP WORK	20
13.1 What is the Global Positioning System (GPS)?	21
13.2 The uses of GPS	24
13.3 Calculation of time using lines of longitude	25
13.4 Remote sensing	29
13.5 Interpretation of remote sensing photographs	35
13.6 The uses of remote sensing	38
13.7 Spatial analysis in Geographic Information systems.	39
13.8 Using Boolean logic in spatial analysis	41
13.9 Using relational and conditional statements to make maps	50
End of Unit Assessment	52
UNIT 14 MINERALS AND MINING: SMALL-SCALE MINING IN ZIMBABWE	55
14.1 Small scale mining	56
14.2. Contributions of small-scale mining to the economy of Zimbabwe	60
14.3. Challenges faced by small-scale miners	61
14.4. Solutions to challenges faced by small-scale miners	63
14.5. Legislative framework on mining and mining rights	64
14.6 The processing of selected minerals in Zimbabwe	65
14.7 The beneficiation of minerals in Zimbabwe	68
14.8 Issues of health and safety in mining	69
End of Theme Assessment	72

UNIT 15 SUSTAINABLE USE OF MINERALS, EIA AND COST BENEFIT ANALYSIS	74
15.1 Sustainable use of minerals	75
15.2 Environmental Impact Assessment in mining	76
15.3 Sustainability and challenges	78
15.4 Cost benefit analysis	79
End of Theme Assessment	82
UNIT 16: ENVIRONMENTAL MANAGEMENT	85
16.1 What is landuse planning?	86
16.2 Types of landuse planning	87
16.3 Landuse planning as an environmental management tool (Risk informed land use management)	92
16.4 Challenges in land use planning	96
16.5 Solutions to challenges of landuse planning	98
16.6 What is environmental management legislation?	100
16.7 International environmental treaties and protocols	103
16.8 Domesticating international treaties and protocols.	107
16.9 The effectiveness of legislation on environmental management.	109
16.10 Solutions to challenges of implementing environmental management legislation.	110
End of Unit Assessment	113
UNIT 17: AGRICULTURE AND LAND REFORM: LAND TENURE, LAND REFORM AND SMALL-SCALE FARMERS	115
17.1 Land tenure	116
17.2 Land reform	120
17.3 Land Resettlement in Zimbabwe	121
17.4 What were the challenges associated with Phase 2 Land Reform Programme	125
17.5 Solutions to Phase 2 land reform problems	126
17.6 Small-scale farming and food security	127
End of Unit Assessment	129

UNIT 18: CLIMATE CHANGE AND AGRICULTURE, DISEASES, PESTS AND SOLUTIONS, URBAN AGRICULTURE AND AGRIBUSINESS	133
18.1 What are the effects of climate change on agriculture?	135
18.2 Mitigation in Agriculture	138
18.3 Adaptation	140
18.4. Agricultural pests	142
18.5 Common diseases affecting Agriculture	148
18.6. What are effects of pests and diseases on productivity?	149
18.7. Biological, Chemical and Physical control of pests	150
18.8. Urban Agriculture	152
18.9. What is Agri-business?	156
End of Unit Assessment	159
UNIT 19: INDUSTRY: SMALL TO MEDIUM ENTERPRISES AND THE ROLE OF INFORMAL INDUSTRIES	162
19.1 Small to Medium enterprises (SMEs)	163
19.2 The role of informal industries in Zimbabwe	165
19.3 Occupational safety and health	171
19.4 Problems of manufacturing industries in Zimbabwe	172
End of Unit Assessment	174
UNIT 20: TOURISM AND ITS IMPORTANCE IN ZIMBABWE	177
20.1 What are service industries?	178
20.2 Tourism in Zimbabwe	179
20.3 The importance of tourism	187
20.4 Problems associated with tourism in Zimbabwe	190
20.5 Solutions to problems associated with tourism in Zimbabwe	193
20.6 Problems associated with service and quaternary industries in Zimbabwe	196
End of Unit Assessment	200
UNIT 21: POPULATION	205
21.1 Population terms	206
21.2 Population data collection, presentation and interpretation	210
End of Unit Assessment	217

UNIT 22: POPULATION DISTRIBUTION AND DENSITY IN ZIMBABWE, AFRICA AND THE WORLD	221
22.1 Population distribution in Zimbabwe, Africa and the world	222
22.2 Population distribution in Zimbabwe	223
22.3 Variations in population density in Africa	224
22.4 Factors affecting population distribution and density	226
End of Unit Assessment	231
UNIT 23: POPULATION GROWTH AND CHANGE	234
23.1 Population growth and decline	235
23.2 Factors influencing population growth	236
23.3 Effects of population growth	238
23.4 The Demographic Transition model	240
23.5 Critiques of the Demographic Transition Model	243
End of unit assessment	246
UNIT 24: MIGRATION, POPULATION POLICIES AND DISEASES	249
24.1 Migration and its Causes	250
24.2 Types of migration	259
24.3 Effects of migration	263
24.4 What is a Population Policy?	270
24.5 Population and Diseases	276
End of Unit Assessment	281
UNIT 25: TRANSPORT AND TRADE	283
25.1 Regional imbalances in trade	284
25.2 Trading blocs	292
End of Unit Assessment	301

Unit 12. Energy and Power

- 11.1 Production and evaluation of energy sources
- 11.2 Energy crisis in Zimbabwe
- 11.3 Ways of reducing the impact of energy crisis
- 11.4 Conservation of energy sources in the local area

Introduction

In Level 1, we classified energy sources into renewable and non-renewable energy sources. We also looked at the production of each energy source and the advantages and disadvantages of using each energy source. We guess you still remember these concepts. However, if you feel you have forgotten, quickly go through the Level 1 unit on energy to refresh your memory. In this unit, we continue with this topic looking at conservation of energy sources in our local areas. We hope you are going to enjoy your study through this interesting unit.



Objectives

After going through this unit, you should be able to:

- explain the production of different energy sources
- justify the use of each energy source
- explain the effects of shortage of energy sources
- explain how energy problems can be reduced
- analyse how the energy sources can be conserved



Key words

Renewable sources	those sources which can replenish or regenerate themselves naturally e.g. solar, water
Non-renewable sources	are those sources that are exhaustible and they get used up and run out with more exploitation and use such as coal e.g. coal, oil
Energy crisis	a situation where there is a critical shortage of power in the country



Time

You are expected to take an average of **10 hours** to go through this unit.



Study skills

You are advised to revisit your Level 1 work on Energy and power and see how each energy source is produced before you proceed with this unit. You are also encouraged to take down notes and attempt all activities to enhance better understanding of concepts.

12.1 Production and evaluation of energy sources

We all use energy be it at home or work places. Can you name any two sources of energy at work places? What about at home? You are correct if you mentioned that at work it powers machines in factories. It moves vehicles and it is used for cooking and lighting at home. There are different sources of energy and these can be renewable or non-renewable. Renewable sources are those which can replenish or regenerate themselves naturally. This means that they do not get used up such as solar. Non-renewable sources are those that are exhaustible and they get used up and run out with more exploitation and use such as coal.



Activity 12.1 Renewable and non-renewable energy

To check if you still remember your Level 1 work, complete Table 12.1 below by classifying the following into renewable and non-renewable sources of energy.

wind, water, oil, natural gas, wood, grass/straws, tar sands, nuclear, crop residues, geothermal, atomic power.

Table 12.1 Renewable and non-renewable sources of energy

Renewable	Non-renewable

We are sure you managed to classify the sources correctly. Wind, water, geothermal power, wood, grass/straws and crop residues are renewable while natural gas, oil, nuclear, tar sands and atomic power are non-renewable sources. If this is how you classified them, you are a star! We now look at each source of energy and find out how they are produced and how energy can be conserved.

12.1.1 Hydro-electric power (HEP)

In Level 1 we learnt how hydro-electric power (HEP) is generated. We guess you still remember that HEP is a renewable source of energy. It is generated from water that leaves a reservoir at high pressure from behind a dam wall or a waterfall through concrete steel pipes called penstock or headrace. As water with high pressure hits the turbines, the turbines will start spinning and as they rotate, they turn the generators to which they are attached. As generators turn, they produce electricity which is then transmitted through cables to the consumers. Try to name examples of HEP stations which you learnt about in Africa. You might remember the Kariba HEP station in Zimbabwe and Zambia, the Nkula Falls HEP in Malawi, the Owen Falls HEP in Uganda, Cabora Bassa in Mozambique, Kainji Dam Project in Nigeria and Akosombo scheme in Ghana.

Do you still remember the conditions necessary for siting an HEP station such as presence of a large head of water, a narrow deep gorge and a hard rock as well as availability of capital and a large market? In this section, we are going to discuss the advantages and disadvantages of HEP as a source of energy.



Activity 12.2 Hydroelectric power

Before you proceed, attempt to label the diagram on Figure 12.1 below which summarises the production process of HEP and check how much you still remember from your previous Units.

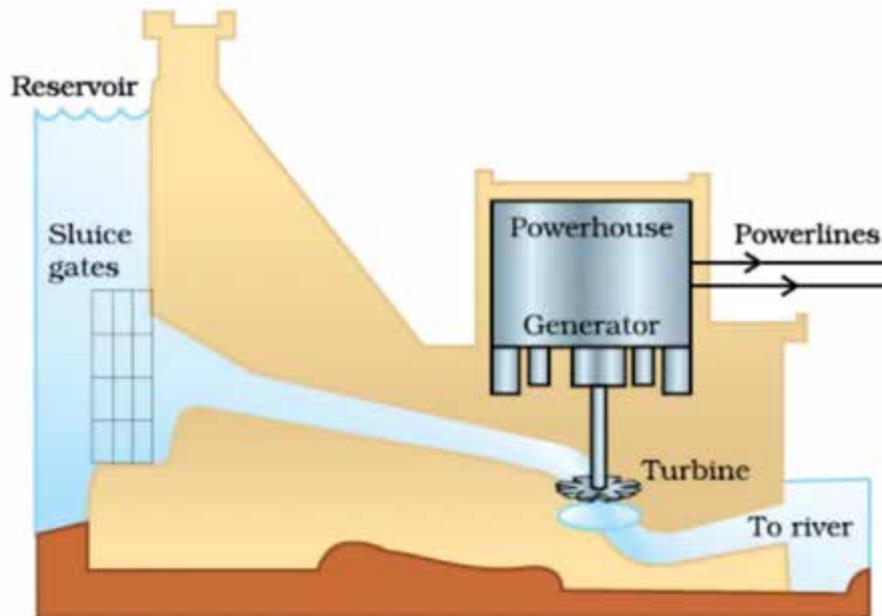


Figure 12.1 The generation of Hydroelectric power

The following are the advantages of hydro-electric power

- It is a renewable source of energy,
- HEP is cheaper to maintain because water transports itself,
- It is a very clean energy source,
- It is easy to use as it involves use of switches,
- It is very versatile. This means it has many uses such as heating, lighting and driving machines.
- Large dams or lakes which were developed for HEP are now multi-purpose. Thus, they are now used for tourism, recreation, sport, irrigation, fishing, water sports and for transport.
- HEP can contribute to growth of industries, towns and cities by providing energy to industries, households and the services sector which include retail shops, banks and offices.
- The dams or lakes provide atmospheric moisture which regulates local temperatures.

Now we look at the disadvantages of hydro-electric power. But before you proceed, can you just brainstorm the advantages of HEP to check how much you have understood from this section?

Disadvantages of HEP are as follows:

- HEP stations are expensive to construct. They need large sums of money.
- Large lakes cause crustal instability or earth tremors because of the weight they exert on the crust. Thus, large water bodies exert pressure on the earth's crust and cause it to shuck. This explains why in Zimbabwe we frequently experience mild earth tremors in areas around Lake Kariba.
- Construction of dams causes little water downstream which may cause destruction of aquatic life. What do you understand by aquatic life? If you mentioned that these are plant and animal life that live in water, you are correct. Just mention some examples.
- Little water downstream may also negatively affect agricultural activities.
- Large dams and lakes are associated with flooding which may destroy nearby settlements, wild life, farmlands, roads and other infrastructure.
- Stagnant water in dams or lakes cause water-borne diseases such as malaria and cholera.
- HEP lifespan can be shortened by reduced volume of water due to siltation. What is siltation by the way? Yes, you are right if you said it is when rivers are filled up with sand due to soil erosion.

We are sure you have learnt a lot from this section. Now, if you were the Minister of energy in Zimbabwe what arguments would you put forward for and against use of hydro-electric power?

Hint: Consider the advantages and disadvantages of hydro-electric power.

12.1.2 Solar energy

In this section we look at solar energy. You might have noted that solar energy is increasingly becoming a very popular source of energy in Zimbabwe. Do you still remember how it is produced? It is obtained by trapping sunlight using solar panels or photovoltaic cells. These convert solar power into electricity and store it in batteries. We now look at the advantages and disadvantages of solar energy.

Advantages:

- It is a renewable energy source,
- It is environmentally friendly,
- It is a cleaner source of energy,
- It is plentiful and inexhaustible,
- It is relatively cheaper than hydro –electric power,
- Solar energy is suitable even in rural and remote areas,
- Solar cookers reduce deforestation,
- Solar power has high energy output,
- Can be stored and used during the night.

Disadvantages

- Solar power can be affected by long periods of cloud cover,
- It is expensive for poor rural communities,
- It needs expensive equipment to store such as solar batteries,
- Solar components and installations are very expensive.

12.1.3 Wind energy

Is it not amazing to note that wind is a source of power as well? If you ever watched the movie, "The Gods must be crazy", where a windmill was used to pump water, you might agree with me that wind can also solve our energy problems. Wind energy is power generated from wind. Windmill blades are turned by blowing wind. As the blades rotate, they turn turbines which then generate electricity. From this description, can you see that the process is just similar to that of hydro-electric power? It can be used for pumping water for irrigation or for watering livestock. Why do you think people would prefer to use wind as a source of energy? Here are some of the advantages.

Advantages

- Wind power is renewable,
- It is a clean source of energy,
- It is relatively cheaper.

Disadvantages

- Windmills on farms spoil the natural beauty of the scenery,
- It can only be used in areas that experience high wind speeds,
- Wind energy is localised and cannot be used on a large scale.

12.1.4 Geothermal energy

Did you know that the term *geothermal* comes from a combination of two terms, *geo* and *thermal*? *Geo* means earth and *thermal* means heat. So geothermal energy is power generated from heat from the earth which results from volcanic activity such as hot springs or from hot rocks underground. Hot rocks heat water above them and convert it into steam. The steam is then directed to turbines with pressure. The turbines turn and in turn, they produce electricity. What do you think are the advantages and disadvantages of geothermal? Mention any two advantages and two disadvantages of this source of energy.

Now let us look at some of the advantages and disadvantages. Hope you mentioned some of them.

Advantages

- Geothermal is a renewable energy source meaning it can regenerate itself,
- It is freely available,
- It is cheap to maintain,
- It is a cleaner source of energy meaning it is non-polluting.

Disadvantages

- It is limited to a few areas or countries where volcanic activities are common such as in Iceland,
- It can be destroyed by tectonic processes and further volcanic activity,
- Now, can you check on how much you have understood in this section before you proceed to other energy sources. With this page closed, try to state the advantages

and disadvantages of geothermal power in your note book. When you are done, compare your answers with what we discussed above.

12.1.5 Biomass fuels

When you hear the word *bio*, what comes into your mind? We guess you remember that *bio* means life. So, biomass fuels are derived from living things such as plants and animals. These include firewood, charcoal, plant residues and animal waste. You might have realised that bio-fuels are widely used in Zimbabwe. Now we discuss some of these fuels starting with wood-fuel or firewood.

a) Wood-fuel

More than 50% of Zimbabwe's population rely on wood as a source of energy especially in communal areas. Why do you think this is so? You might have thought of the following reasons:

- Wood fuel is renewable and readily available.
- It is reliable and affordable for low income households
- It is a traditional source of energy which is locally available. If you happen to live in communal areas or you have ever been there, you might have noted that wood fuel is used by the majority of households.
- Most people are poor and cannot afford electrical appliances in rural areas and they resort to wood energy.

However, use of wood fuel is associated with certain environmental problems. Brainstorm some of the problems associated with use of wood fuel!

If you came up with problems such as increased deforestation which leads to erosion and siltation, you are in the right track. People travel long distances to get firewood and spend more time which could be used for something else productive. Shortage of firewood increases as forests continue to be destroyed. Conflicts over firewood may arise among communal farmers. One of the biggest problems associated with cutting down of trees is global warming. What do you understand by global warming? This is the general increase in temperature across the world. This comes with such problems low average rainfall and frequent droughts which reduces crop yields. You might have noticed some of these problems in your area.

Nevertheless, mitigation measures can be taken to reduce the negative effects of deforestation such as:

- Practising afforestation and reforestation. Remember, afforestation refers to the planting of trees where there were no trees before, whereas reforestation is the planting of trees to replace the ones cut down.
- Educating people about the importance of trees and the dangers of deforestation.
- Using alternative sources of energy such as gas and solar instead of wood fuel.
- Encouraging communities about the need to participate in national events such as the National Tree Planting Day
- Encouraging people to use simple energy saving technologies such as dover (tsotso) stove. Tsotso is a dry tree twig hanging from live trees or lying on the ground. The stove can be made of mud, bricks or metal.



Figure 12.2 Dover (tsotso) stove

b) Biogas

Biogas is another example of bio-fuel as we mentioned earlier. Biogas is derived from decayed biological waste material such as dead plants and animals. The material is digested by bacteria in a bio-digester to produce methane gas. Initially, a pit is dug and a large container like a drum is inserted into the pit. The biomass material is then fed into the container which is then closed tightly. Remember, for the decay to take place there must be moisture, so water is then poured through a pipe. A process called anaerobic decay will take place on the matter and produce biogas which can be used in gas stoves. On Figure 12.3 there is a diagram which might help you to understand the process of biogas production.

What now do you think are the advantages of biogas? Can you quickly brainstorm two advantages and two disadvantages of biogas? Use the table below for your response.

Table 12.1: Advantages and disadvantages of biogas

Advantages	Disadvantages

From your lists, did you mention advantages such as that biogas is renewable, biomass materials (remains of plants and animals) are locally obtained and it is a cleaner source of energy? If you included some of these points, well done! On the other hand, disadvantages may be that some people may find the technology for producing biogas difficult and also in some areas biomass materials might be hard to come by.

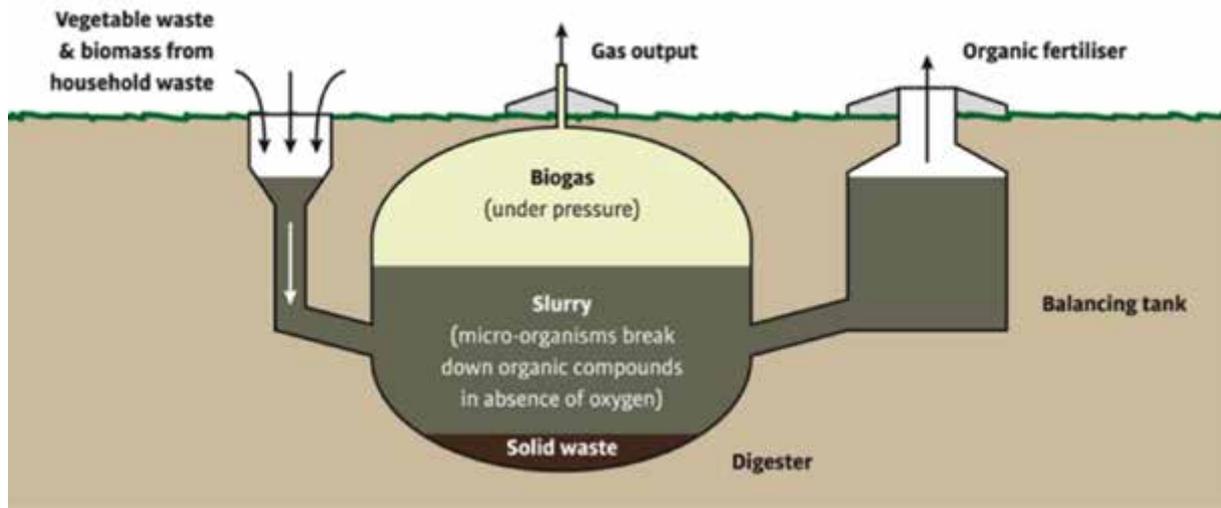


Figure 12.3 Production of biogas

Advantages of bio-fuels.

Remember we said bio-fuels are those from plants and animals such as wood, crop residues and animal waste. These have the following advantages:

- Bio- fuels are cheaper or they are obtained for free in rural areas.
- They are renewable energy sources.
- In rural areas they are easily available.
- The ashes can be used as fertilizer.
- They involve simple technology.

Disadvantages of biofuels

- Deforestation increases rate of erosion, river siltation and desertification.
- River siltation can also cause loss of aquatic life.
- Bio-fuels can cause air pollution when they burn.
- They can cause fire accidents at homes
- Use of bio-fuels such as wood fuel cause deforestation which destroys ecosystems.

12.1.6 Animal power

You might have noted that in communal areas, animal power is one of the most important energy sources. Domestic animals such as cattle and donkeys provide draught power for transport as well as agricultural activities. They are used for ploughing, pulling scotch cuts and other activities. Can you highlight some of the advantages and disadvantages of animal power? We hope you have noted that not everyone can afford this type of power in communal areas. Some households are poor and do not own animals. The advantage of this method is that it is cheap and readily available.

12.1.7 Thermal power

What is thermal power? How is it generated? If you mentioned that thermal power is generated from fossil fuels such as coal, oil and natural gas you are correct! How is this done then?

Coal, for instance, is used as fuel to heat water in huge boilers. The water is heated and converted into steam. The steam is then directed to turbines through pipes at high pressure. The pressure of steam turns the turbines and in turn, they turn the generators and electricity is generated. We also learnt about the factors influencing location of a thermal power station such as proximity to a large market, availability of a large piece of land, proximity to railway lines, roads and water supply. They are also located close to the source of fuel. For example, Hwange thermal power station is located close to the coal fields because it uses coal as fuel.

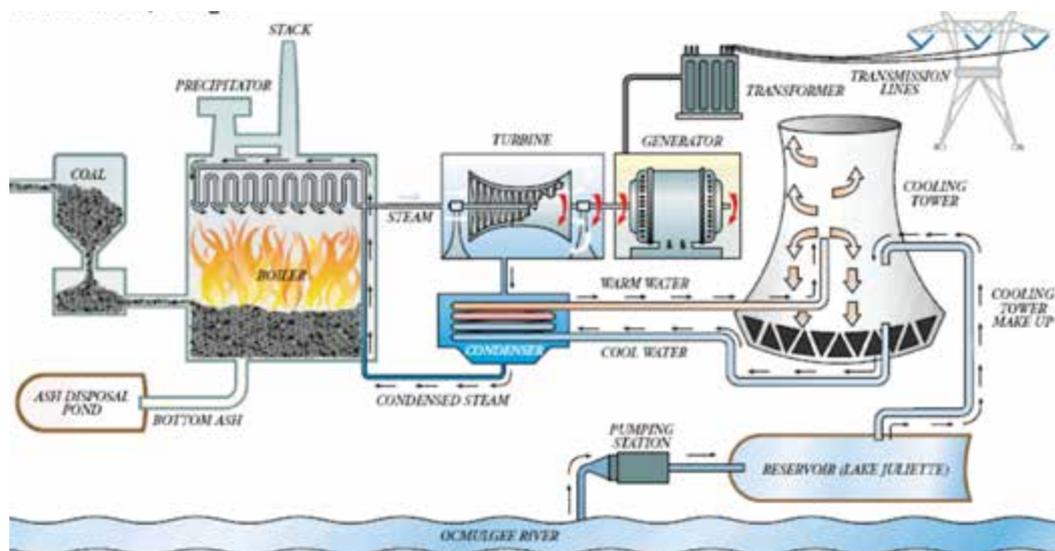


Figure 12.4 Thermal power production

Did you know that thermal power is one of the major sources of energy in Zimbabwe? Yes, it is because of the advantages it offers. What do you think are the advantages and disadvantages of thermal power? Before you proceed, state one advantage and one disadvantage. Now compare what you have with what we have in the discussion below.

Advantages

- It is a relatively cheaper source of energy.
- It creates employment in the production and distribution of thermal energy.
- It has high energy output.
- It is versatile meaning it can be used for many purposes.

Disadvantages

What do you think are the disadvantages of thermal power? Here are some disadvantages. It is a non-renewable energy source. It causes water, air and land pollution through burning of fossil fuels. It cannot power vehicles.

12.1.8 Nuclear energy

Nuclear energy is produced from uranium, plutonium or strontium. For example, when uranium is burnt, heat is produced from radioactive substances which will heat water in boilers and convert it into steam. The steam is then directed through pipes to the turbines and as they turn, they turn the generators and electricity is produced. You might have noted that the process is similar to the production of thermal power. Now, let us discuss the advantages of nuclear power.

Advantages

- It has a very high energy output.
- It is a clean source of energy if safety precautions are taken.
- It has a long lifespan as radio-active substances are said to last for over 4000 years.

Disadvantages

- Nuclear radiation is environmentally unfriendly.
- Waste disposal is a big problem. This explains why most of the nuclear power stations are located in hot deserts where there are low population densities and therefore, plenty of land.
- Countries which produce nuclear energy also produce nuclear weapons which are very destructive.
- Construction and maintenance of nuclear power station is expensive.
- Nuclear energy is expensive.



Activity 12.3 Energy

1. Name any two renewable and two non-renewable sources of energy. (4)

2. With the aid of a diagram describe how thermal power is produced. (7)

3. As a Minister of Energy in your country, put arguments for and against the use of solar power. (7)

12.2 Energy crisis in Zimbabwe

Do you think there is a crisis of energy in Zimbabwe? Yes, energy is always in short supply. The energy crisis can manifest itself in the following ways:

- shortages of petroleum products (e.g. diesel, petrol and gas) which may result in long queues at service stations,
- People spending too much of their valuable time queuing for fuel at service stations,
- Frequent price increases of fuel,
- Rationing of petroleum products,
- Lateness being late at work due to transport blues which lead to reduced economic performance as a result,
- Frequent power cuts or load-shedding by ZESA which also affect economic performance,

- What do you think are the implications for shortages of energy sources?
- Some people may miss their meals as a result of unplanned power cuts,
- In communal areas people may walk for long distances to look to fetch firewood,
- Social conflicts may arise as people poach firewood,
- There could be rapid deforestation in rural and peri-urban areas as people cut down trees for fire wood.

You might have witnessed problems of energy in your area. State some of the effects of such power shortages in your area.

12.2.1 Conservation measures to reduce the effects of energy crisis

Having noted some of the problems associated with shortage of energy, you should by now have an appreciation of the extent of the problem of energy in Zimbabwe or in developing countries and its impact. This then calls for a collective effort to mitigate the problems that result from the crisis. Remember some energy sources are renewable while others are non-renewable. Do you still remember the meaning of these terms? If you have forgotten, go back to the key words. There is, therefore, need for us to use energy resources wisely so that they last long to benefit future generations. Go through the following conservation methods. However, you are free to add your own.

What do you think Zimbabwe can do as a country to solve the energy crisis? One suggestion is that Zimbabwe can import electricity from countries that are overproducing it such as South Africa, Mozambique's Cabora Bassa and Zambia's Kafue and Mulungushi HEP schemes. Since Zimbabwe is producing inadequate electricity, it has to increase its power plants by building the Hwange Phase 2 thermal power station to increase power production. There is also need to develop a new thermal power station in Gokwe North where coal was discovered. Construction of another HEP station at Batoka gorge can as well increase hydro-electric power production.

Now let us discuss ways of conserving electricity at home. Before you proceed, quickly brainstorm the ways of conserving electricity that can be used at home. Now, compare

what you have with what we have in this discussion. We hope you mentioned some of these points. At home we can use modern electric gadgets and other products which conserve energy such as energy- saver bulbs. One should also adjust appliance temperatures e.g. turning down temperatures on stoves and heaters. After use, one should switch off appliances after use. Always remember to turn off lights when they are not in use.

As you have noticed in our previous discussion, shortage of petroleum products is of major concern in Zimbabwe and other developing countries. Can you quickly suggest measures to reduce these shortages? We hope you came up with measures similar to these ones here. The country can enter bilateral agreements with oil producing countries such as Kuwait so as to import fuel at concessionary rates. Bilateral agreements are signed between two countries in which they agree on flexible and favourable trading terms for the two countries There is need for rationing the fuels at service stations. Can you explain how rationing of fuel products help to reduce effects of energy crisis.

People must be educated to conserve petroleum products by reducing unnecessary journeys and sharing vehicles or using public transport instead of driving. There is also need to encourage people to use efficient fuel- burning engines. This reduces fuel consumption by vehicles. Cycling instead of driving can as well help to reduce fuel consumption.

To conserve forests people must replace cut down trees by practising reforestation programmes. By the way, what did we say is reforestation? If you have forgotten revisit your previous sections. The use of a dover (tsotso) or biogas stoves can also help to reduce deforestation as both processes involve use of dead plants. The use of substitute energy sources for wood fuel is another way of conserving forest resources. Substitutes include such as solar power, biogas, coal and crop residue. If we conserve trees it means, we have conserved wood fuel for future generations. In communities, organisations or at school, people should advocate for environmental policies such as joining and participating in the tree planting and recycling clubs.

What activities are being done in your area to reduce deforestation? Compare your answers with points that you picked from what we discussed above.



Summary

In this unit, we looked at the production of different energy sources. We also explained the advantages and disadvantages of each energy sources. We had an insight into the problems associated with energy in Zimbabwe as well as ways of reducing the effects of these challenges. We concluded the unit by looking at ways of conserving energy in Zimbabwe as well as in our local areas. We hope you benefited a lot from this unit and that the information you gained shall help you to understand other related topics.

End of Unit Assessment

Section A: Multiple choice

1. Which of the following sources of energy is non-renewable?
 - A. wind
 - B. solar
 - C. coal
 - D. wood-fuel

2. Which of the following is a bio-fuel?
 - A. animal waste
 - B. geothermal
 - C. nuclear
 - D. hydro-electric power

3. The following are results of use of wood fuel in communal areas except
 - A. extensive deforestation
 - B. shortage of firewood
 - C. accelerated erosion and river siltation
 - D. scarcity of petroleum products

4. The following are signs of the shortage of energy except
 - A. frequent price hikes of fuel
 - B. long queues at service stations
 - C. increased use of private transport
 - D. travelling long distances in search of firewood

5. The most effective way to conserve electricity in Zimbabwe is
 - A. education
 - B. load shedding
 - C. increasing price
 - D. use of renewable energy sources

Structured Questions

6. (a) Classify the following energy sources into renewable and non-renewable. hydro-electric, biogas, thermal, solar. (4)
(b) Describe how biogas is produced (5)
(c) As chairperson of Environment Club in your community, justify the use of solar as a source of energy. (4)

7. (a) Outline the environmental problems associated with use of wood fuel in rural areas. (7)
(b) (i) What do you understand by energy crisis? (2)
(ii) What evidence suggests that there is an energy crisis in a country? (5)
(c) Suggest measures that can be put forward to mitigate the effects of energy crisis in the country. (5)
(d) (i) If you were a Councillor, what measures would you take to conserve energy sources available in your area? (4)
(ii) What challenges are you likely to face in implementing these measures? (3)

Research Work

Develop your own dover or tsotso stove from local resource materials.



Progress Check list

It is now time to go through the objective we listed at the beginning of the unit and check how many of them you have achieved. Tick against those you are sure you have achieved. Put an X against those you feel you have not yet to achieved. Then for any that you put an X against, find the section dealing with it in the unit and go over it again.

Objective	Check Box
Are you now able to...	
• explain the production of different energy sources	
• justify the use of each energy source	
• explain the effects of shortage of energy sources	
• explain how energy problems can be reduced	
• analyse how the energy sources can be conserved?	

Further reading

Gocha, N. M., Ncube, R., & Nembabware, L. (2007). *Dynamics of O'Level Human and Economic Geography*. Harare: College Press.

Munowenyu, E. M. (2008). *Step Ahead:O'Level Human and Economic Geograghy*. Harare: Longman Zimbabwe (Pvt) Ltd.

Unit 13 Geography Information Systems and Map work

- 13.1 What is the Global Positioning System (GPS)?
- 13.2 The uses of GPS
- 13.3 Calculation of time using lines of longitude
- 13.4 Remote sensing
- 13.5 Interpretation of remote sensing photographs
- 13.6 The uses of remote sensing
- 13.7 Spatial analysis in Geographic Information systems
- 13.8 Using Boolean logic in spatial analysis
- 13.9 Using relational and conditional statement to make maps

Introduction

As we begin this unit, we would like you to draw a map of your home, showing the nearest shops, school and health centre or dip tank where applicable. Have you drawn the map? Well done if you have. This is what this unit is all about – map making. However, you will be drawing maps using a computer. We are going to cover the Global Positioning System (GPS). From GPS we will look at calculation of time using longitude. We will also take you through the basic concepts of remote sensing. We will also cover skills of making maps using Geographic Information Systems (GIS) software.



Objectives

After going through this unit, you should be able to:

- explain the concept of GPS
- apply GPS technology in navigation
- calculate time using longitude
- describe the concept of light as a wave
- explain the visible wave bands of the electromagnetic spectrum
- apply the electromagnetic spectrum in the interpretation of photographs
- describe the basic functions of Boolean logic
- apply the Boolean logic in solving simple spatial problems
- describe the concept of overlay analysis
- apply relational and conditional statements in overlay analysis

Equipment necessary for this unit

For you to be able to cover the concepts in this unit well you will have to have the following:

- A laptop or desk top computer
- Quantum GIS (QGIS) or any other GIS software installed
- A smart phone installed with a GPS software

You might not have some of the equipment stated above. The way you can go around this is to arrange for practical lessons with a tutor.



Key Words

Satellite	A satellite is a machine that is computerised to orbit around the earth and collect different type of data about the earth.
Spectrum	A spectrum is a range of objects. In this unit it is a range of colours as they occur naturally together with other types of waves from the sun.
Overlay	An overlay is a way of making a map by putting layers of different features on top of each other to produce a useful map with varied features. This can be by computer GIS software.
QGIS	QGIS is a free geographic information systems application that is available on the Internet.
Wave frequency	Wave frequency is how much fluctuations (called oscillations) a wave has at a given amount of time. It is measured in hertz (Hz).



Time

You are expected to take an average of **10 hours** to go through this unit.

13.1 What is the Global Positioning System (GPS)?

Have you travelled to a place whose location you did not know? Or have you had of someone who travelled to a place whose location they did not know? The biggest fear in such a situation is getting lost. However, you can now use the Global Positioning System (GPS) to find your way around your locality and beyond. GPS is a satellite system that is used for travelling and for finding places or features, on the earth's surface. It is used by travellers to find their way around.

13.1.1 How does GPS work?

You must note that GPS is actually the networking of satellites that are able to pin-point the position of any feature on the earth's surface. At any given time, there are at least three satellites that can pin-point any one feature. We cannot see satellites from the ground level because they orbit very far away from the earth's surface. You will find that some satellites can be as far away as 100 000km from the earth's surface. You would barely see the satellites even if they were closer because they travel very fast. They can be as fast as 10 000km/h. The satellites vary in size. Your average satellite, however, is about the size of a house or a refrigerator.

You have to understand that there are as many as 24 satellites that are devoted to GPS. These satellites communicate with machines like phones computers and hand-held GPS receivers to gather information that makes your finding places easy and getting there even easier. Figure 13.1 shows you how satellites send information to GPS receivers on the earth's surface.

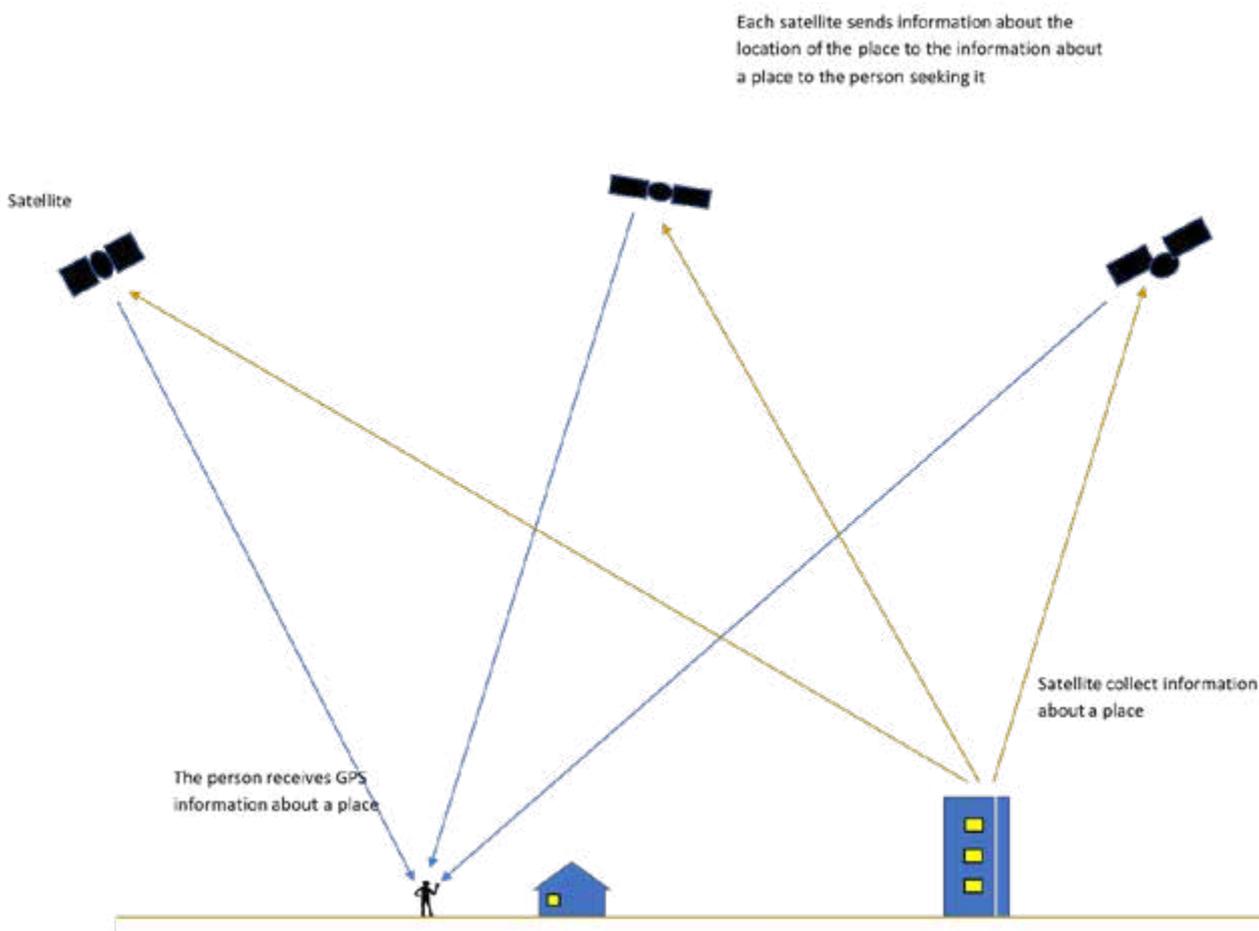


Figure 13.1 The way GPS works. The Illuminator, the target and the receiver.

Do you remember from level 1 the imaginary lines that help location on the earth's surface? We are referring to the lines of longitude and latitude. We use these lines with GPS to locate features on the earth's surface. GPS locate places by giving the longitude and latitude of a place. You can use a smart phone with GPS software right where you are. It will give you the longitude and latitude of the place you are in right now. A gave us this location as we were writing this paragraph:

Latitude:	-20.1325 (20°28' S)
Longitude:	22.875589 (22°52' E)



Activity 13.1 GPS and how it works

1. Give **two** examples of GPS receivers.
2. Explain how the remote process works.

Interesting facts

Did you know that there are now so many satellites orbiting the earth that are no longer being used? Such satellites and broken up pieces are called space junk! There are over half a million piece that have been recognised orbiting around the earth! Figure 13.2 illustrates what it would look like if we were to see all the space junk.

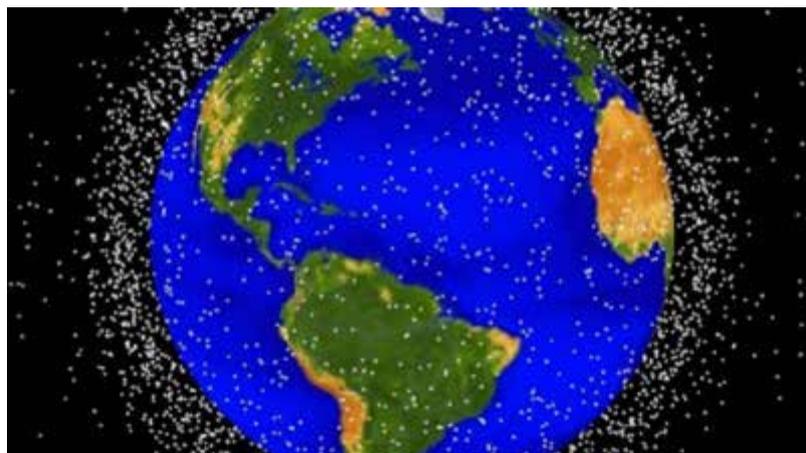


Figure 13.2 Space junk around the earth

13.2 The uses of GPS

Besides travelling and location can you think of other uses for GPS? GPS can be very useful. It functions as an electronic address. There are companies that track their fleet of cars, and lorries and haulage trucks through GPS. Even pets in some countries are now easily located if they get lost because they have been fitted with electronic parts called chips that can transmit a GPS signal to satellites. Perhaps you have seen this sort of thing in spy movies.

If you had a farm and had a boundary problem, GPS would help. It would be used to mark boundaries of the farm by giving the location of corner points on the ground. You can also find GPS in use in marking mine claims in areas where there are small scale miners. Mapping is also now being done more accurately due to the accurate location of features by GPS.

Moreover, you will also find that GPS is also used for recording of earthquake waves. The instruments used for recording earthquake waves are called seismographs. These seismographs use GPS to record the shaking of the earth's surface. We are, thus, protected and informed on earthquakes by GPS-linked machines.

When you call an ambulance or a fire truck these days, they locate your area of emergency through GPS. This makes it easy for help to reach people in need quickly. The emergencies could be a relative who is not well, a neighbour with a house on fire.

You will also find that there are people who can locate their lost pets using GPS. Moreover, some people and old people's homes locate the elderly who may stray far from home. These elderly people are given arm bands that have GPS chips. Even prisoners are tracked and located using GPS. This is common, of course in more economically developed countries than in our country of Zimbabwe.

Activity 13.2 Uses of GPS in everyday life

1. Suggest ways that GPS can be made to benefit subsistence farmer in the communal areas of Zimbabwe?
2. What are the disadvantages of using GPS?

13.3 Calculation of time using lines of longitude

Let us now move on and look at some geographical calculations. What time is it Osaka, Japan now? You can actually calculate time for Osaka if you were given the longitude for Osaka and the one for your current location and its time. Let us go on and look at an example of how this is done. Let us suppose we want to find the time for Osaka whose longitude is 136° , when it is 8:00a.m. in Harare (31°E).

Tip

For you to be able to work out the problems below well you have to have a good understanding of lines of longitude and latitude. These, you might remember were covered in Level 1.

Note, again that you have to work with the simple proportion that the earth rotates through 360° in 24 hours. This means that it rotates through 15° in 1 hour.

When calculating the time, we start by finding the difference in degrees.

Step	Calculation	Explanation
1	<i>Difference in degrees = higher longitude - lower longitude</i>	
2	<i>Difference in degrees = $136^\circ - 31^\circ$</i> <i>Difference in degrees = 105°</i>	
3	<i>Difference in time = $105^\circ \div 15$</i> <i>Difference in time = 7 hours</i>	For every 15° difference in longitude there is a 1-hour time difference.
4	<i>Thus time in Osaka</i> <i>= 08:00 + 7hours</i> <i>= 3:00pm</i>	Because Osaka is ahead of Harare, we add the difference on the Harare time

Note that if we were working out the time of an area that is behind in time, we would subtract the difference. Study the Figure 13.3 that shows you the locations of Osaka and Harare and their longitude.

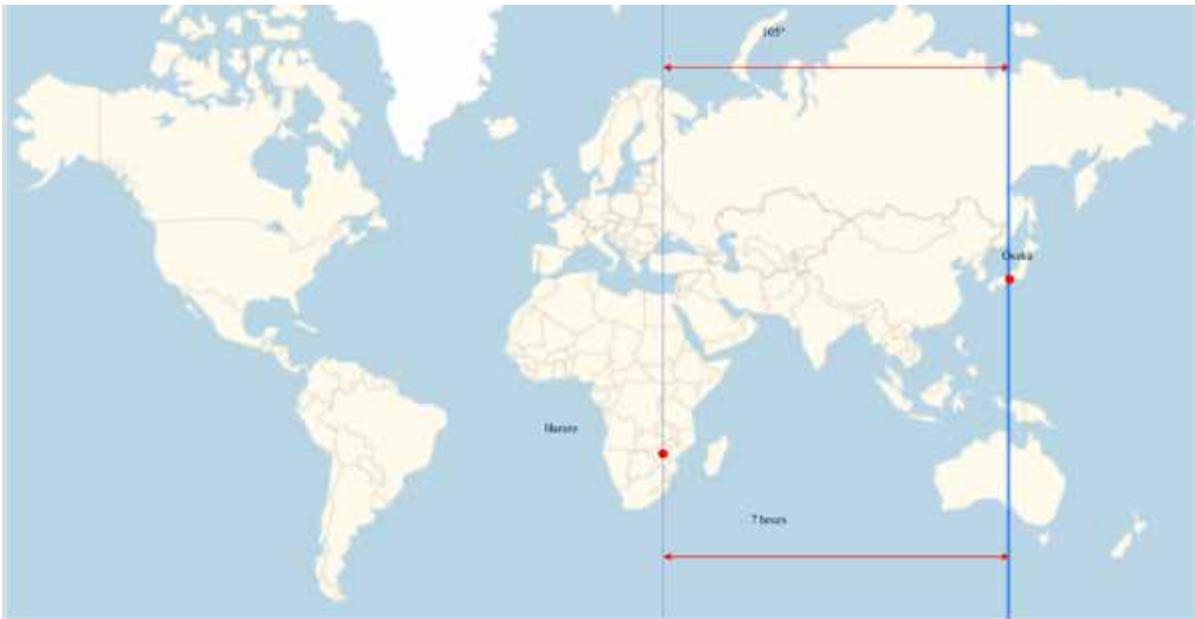


Figure 13.3 The positions of Harare and Osaka and their time difference



Activity 13.3 Calculation of time for places in the same hemisphere

1. A cricket match is being played in Lahore, Pakistan (75°E) at 2p.m. You are watching the same match in Zvishavane in Zimbabwe (30°E). What time is it in Zvishavane?
2. What time is it in Harare (31°E) if you send a message from a hotel room in Manila in the Philippines (121°E) at 10p.m.?

Let us move on and work out the time for a different situation. Let us suppose we want to find the time for New York which is 74°W when it is 5:00p.m. in Harare (31°E). Note that this time one place is in the western hemisphere while the other is in the eastern hemisphere. So, this is how you ought to work it out:

Study Figure 13.4 that illustrates for you the longitudinal difference and the time difference for the example we have worked above.

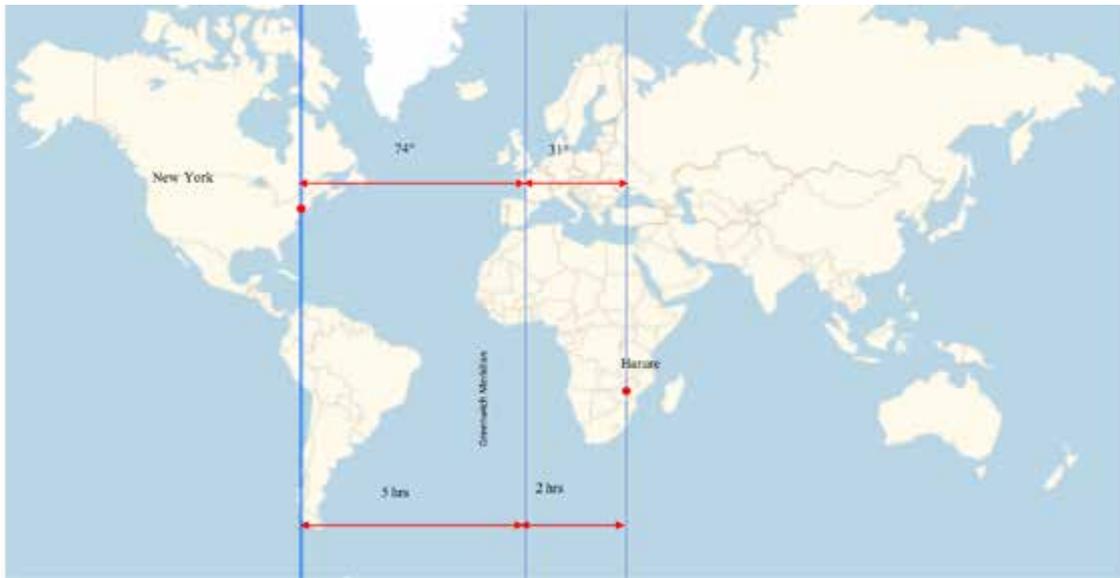


Figure 13.4 The positions of Harare and New York and their time difference

Step	Calculation	Explanation
1	<i>Difference in degrees = western longitude + eastern longitude</i>	We add when the angular distances should in two different hemispheres. Note, we add to find the difference!
2	<i>Difference in degrees = $74^{\circ} + 31^{\circ}$</i> <i>Difference in degrees = 105°</i>	
3	<i>Difference in time = $105^{\circ} \div 15$</i> <i>Difference in time = 7 hours</i>	For every 15° difference in longitude there is a 1-hour time difference.
4	<i>Thus, time in New York</i> <i>= 17:00pm - 7hours</i> <i>= 10:00am</i>	Because New York is behind Harare, we subtract the difference in time from the Harare time.



Activity 13.4 Calculation of time for places in different hemisphere

1. What time is it in Las Vegas, USA (115°W) when the time in Jerusalem, Israel (35°E) is 7 a.m. on a Tuesday?

2. An aeroplane leaves New Orleans (90°W) at 6 a.m. going to Gweru, Manyame airbase (30°E). If it takes 10 hours to fly from New Orleans to Gweru. at what time does the plane arrive in Gweru (local time)?

That is how you can calculate time using longitudes. Now let us also do one example where you are given the times for both places and one longitude. Your task is to calculate the longitude for that which is not given.

In this case we start with the difference in time. Then we calculate the difference in degrees from the difference in time. After that we then either add or subtract the difference in degrees to the longitude that we were given. We subtract if the place whose longitude we are working out is behind in time. We add if it is ahead in time. Let us suppose that our task says:

What is the longitude of Gwanda with its time as 7:30 a.m. when it is 3:30 p.m. in the Australian capital city of Canberra (149°E)?

Step	Calculation
1	<i>Difference in degrees = time that is ahead - time that is behind</i>
2	<i>Difference in time = 3:30pm - 7:30am</i> <i>Difference in time = 15:30pm - 7:30am</i> <i>Difference in time = 8 hours</i>
3	<i>Difference in degrees = 8 hours x 15 hours</i> <i>Difference in degrees = 120°</i>
4	<i>Therefore the longitude of Gwanda = $149^{\circ}\text{E} - 120^{\circ} = 29^{\circ}\text{E}$</i>

We have worked through the examples together now do the problems below to check your progress.



Activity 13.5 Calculation of longitudes

1. Calculate the longitude for Riyadh, Saudi Arabia at 12:00 noon when the time in 6a.m. in Rio de Janeiro, Brazil?
2. What is the longitude of Mutare (32°E) at 10:32 a.m. when it is 10:08 a.m. in Victoria Falls?

You can practically calculate time differences for places that are in one country. For example, Mutare and Victoria Falls, even though they use the same time, they actually have a time difference. Of course, this time difference is only minutes and is often overlooked. Principally, then, you should understand that there are no two areas that have a different longitude that have the same time. Every difference in longitude that you meet means that the time is different. We have done enough on time calculations. Let us move on to remote sensing.

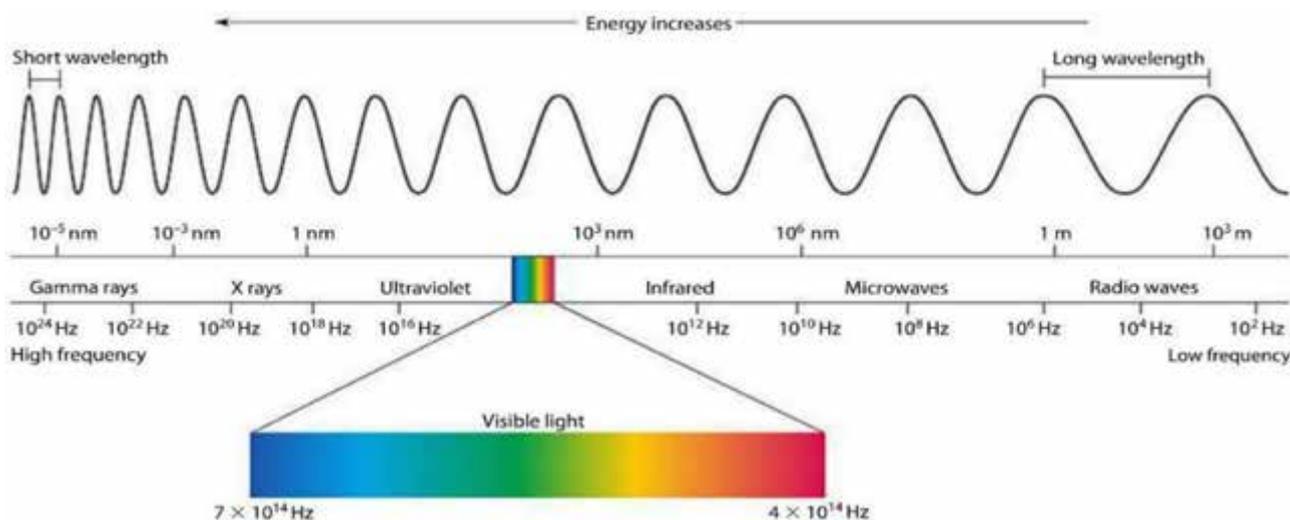
13.4 Remote sensing

You are probably wondering what remote sensing is. Yet we are sure you have done some remote sensing analysis without knowing. If you have observed a photograph of a real place and discussed what you were seeing, you were involved in a remote sensing analysis exercise. So, what is remote sensing? You have to understand that remote sensing is the observing, recording and interpreting of objects on the earth's surface from a distance. The best way of doing this is through the use of images – especially photographs.

You have to note that the remote sensing process depends on the energy from the sun. The energy from the sun makes it possible for us to see features through the light. There are other forms of energy waves from the sun that can make us see earth's surface features in a different way. Therefore, we are sure that a good place for you to start is to look at the energy waves from the sun. This will make you understand different types of remote sensing and types of images. So, we are going to look at the electromagnetic spectrum in the next section.

13.4.1 The electromagnetic spectrum

The term electromagnetic spectrum may sound very scientific and complicated to you. Yet you have to know that it only means the whole range of energy waves from the sun. you must appreciate that there is more than light and heat that comes from the sun. There are other waves that we cannot sense with our naked eye. Some of these waves are very small. Let us take a look at what the electromagnetic spectrum is made up of. Examine Figure 13.4 which shows you the components of the electromagnetic spectrum.



The Electromagnetic Spectrum: The wave lengths increase from the left to the right. The gamma rays are the smallest and the radio waves are the largest. The frequency of oscillation is measured in Hertz (Hz).

Figure 13.5 The electromagnetic spectrum – the carrier of information in Remote sensing

As you can see, in Figure 13.5, the waves range from the smallest in terms of wavelength – the gamma rays to the largest in wave length – the radio waves. You can never see gamma rays with your naked eye. Neither can you see radio waves. It is the effects of these waves that are able to sense. Again, you must have noticed that the smaller the wavelength for any wave, the greater the frequency of the wave. You must have further noticed that visible light is almost in the middle. This is the part of the spectrum that contains all the colours of the rainbow. Take note that these colours range from the smallest– the violet to the largest – the red. This is in terms of wavelength. You can easily remember the colours of visible light by the putting every first letter of the colours together. This produces the abbreviation Red, Orange.

Yellow, Green, Blue, Indigo and Violet (ROYGBIV). Take note of the fact that all these waves are useful in remote sensing because they produce different images. Now that you have gone through the whole electromagnetic spectrum, let us look at different types of remote sensing.

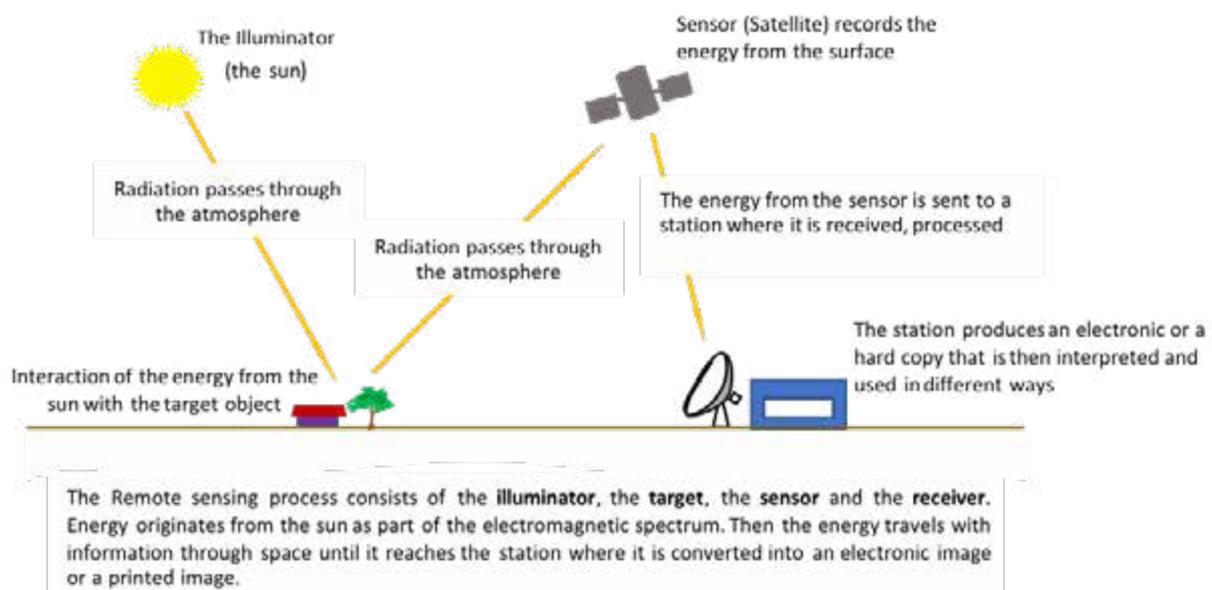


Activity 13.6 The Electromagnetic spectrum

1. What do you understand by the term wavelength in remote sensing?
2. In what traditional ways is the electromagnetic spectrum used?

13.4.2 The remote sensing process

As you have seen, the remote sensing process is actually dependent on the electromagnetic spectrum. The waves actually carry remote sensing information. You must further understand that every feature on the earth's surface interacts with the energy from the sun. The sun is the *illuminator*. To illuminate is to show light on an object so that the object can be seen. Meanwhile, as illustrated for you in Figure 13.6, the earth's surface with its different objects also interacts with the energy from the sun and sends back energy into the atmosphere and beyond.



Source: Chabikwa, B. et al (2019) Figure 13.6 The remote sensing process simplified

As you have already seen in Figure 13.6, the object being remotely sensed is called the *target*. Then the satellite is called the *receiver*. The remote sensing process consists of the illuminator, the receiver and the target interacting with waves that carry information. You have to take note of the fact that satellites then send their information to a station on the earth's surface. At this station you have the information turned into an electronic or hard copy image. It is this image that you have to interpret in remote sensing.

As you might have guessed, different materials interact differently with the electromagnetic spectrum. You will notice that these different materials interact with different waves of the spectrum. This gives rise to different types of remote sensing. This is what we will look at next – different types of remote sensing:

You have to understand that remote sensing can be classified into several types:

(a) Passive remote sensing

Whenever you look at something during the day, you see it because it is lit (illuminated) by sunlight. When you observe objects being lit by the sun the observation is remote sensing. This type of remote sensing only takes place when the sun is shining. The energy of the sun brings information to you about the object you are observing.

(b) Active remote sensing

Active remote sensing done with an artificial source providing the illumination. When we observe an object at night under flood light, our observation is active remote sensing.

(c) Infrared remote sensing

Do you remember the infra-red waves from the electromagnetic spectrum? They are the waves that are sensed by satellites in infra-red remote sensing. These waves are actually heat waves. Everybody and features on the earth's surface emits heat and it is this heat that is picked by satellites to reveal characteristics of the emitting objects.

You must note that different objects absorb and emit heat differently. The way an object emits heat is recognisable and is called the heat signature of that object. Even

you have a heat signature! Infrared remote sensing is used for tracking forest fires by satellites. It can also be used for recording temperatures of the earth's surface to spot any difference called anomalies that could cause harm to us.

(d) **Micro wave remote sensing**

The term microwaves could sound familiar to you as there are cooking gadgets called micro waves. Microwave remote sensing uses the same type of waves used by the microwave oven. In the case of the remote sensing the satellite emit its own microwave frequency waves towards the earth's surface.

Note that the interaction of different types of surfaces and materials with the microwaves is recorded as information by the satellites as the waves are emitted back to the satellite. You must understand that; microwave remote sensing is done in order to check on such important components of the atmosphere like water vapour. Water vapour is important for rainfall.

(e) **Optical remote sensing**

Let us look at simple remote sensing called optical remote sensing. Optical remote sensing is when the way a surface reflects light is observed and recorded. You will have noticed that some surfaces have higher reflectance than others. Each different reflectance provides information about the surface that is being observed. The reflectivity of a surface is called the *albedo*. You will find that the reflectivity of a surface is useful in giving information temperature of the surface and therefore even the climate of the area.

The question that you might be asking yourself that most people often ask themselves is how is the information from remote sensing processed until it is useful. Now, you have to realise that the main product of remote sensing is images. The images that are produced are usually photographs and other recording of different wavelengths on paper. Photographs 13.1.1 and 13.1.2 show you the examples of images that are tied to some of the types of remote sensing you covered above.

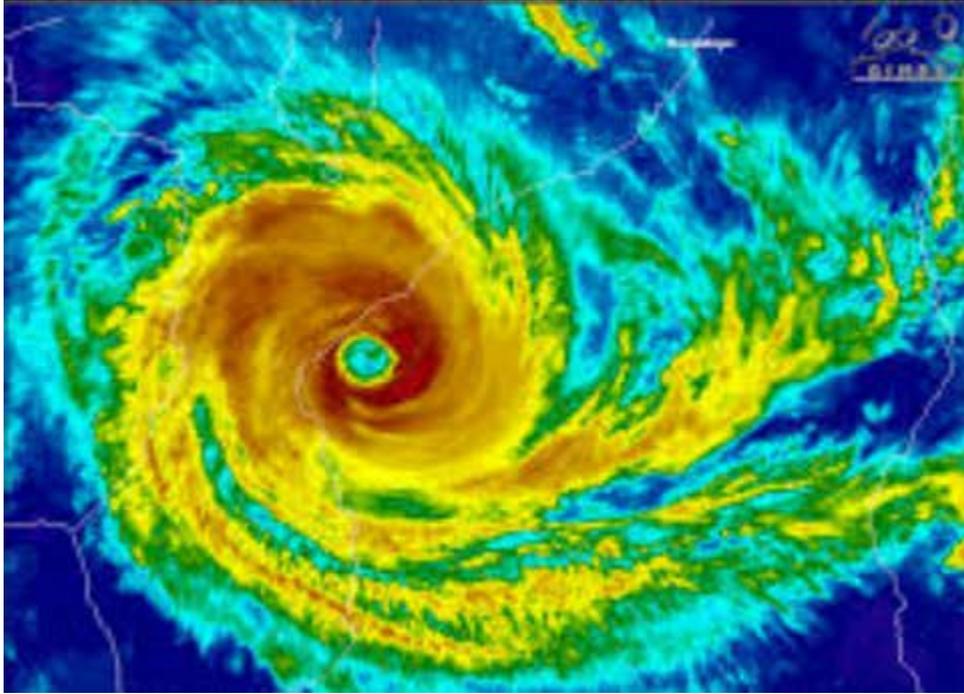


Figure 13.7.1 Infrared image of Cyclone Idai in March 2019 landing on Mozambique



Figure 13.7.2 Infrared image of a tropical storm in the islands in the Pacific Ocean

The answer to the question you might be having that we raised above is image interpretation. Every image that is produced in remote sensing is interpreted. So, we will look at interpretation of remote sensing photographs in the next section.



Activity 13.7 The Remote sensing process

1. Consider the remote sensing process, suggest four factors that make it difficult for remote sensing to be widely used in Zimbabwe?
2. What businesses is the remote sensing process likely to promote if widely used in Zimbabwe?

13.5 Interpretation of remote sensing photographs

What is interpretation, you might be further asking? To interpret is to come up with meaning from an object's features based on facts and specified rules. In this case it is coming up with a meaning from the features of a remote sensing photograph. There are several features of a photograph that you have to consider when interpreting a photograph in remote sensing. These features are discussed for you in the sections that follow.

13.5.1 Size of the features in the image

You may describe the features of a photograph as being large or small. When you do this, you are interpreting the photograph considering the size of features. It is important in some cases to notice a particular aspect in a photograph as being large.

13.5.2 The shape of the features in the image

You must know shapes like circles, squares and triangles. In remote sensing when interpreting the image, you have to check what shape the features in the image are. In most of the cases the shapes will not exactly be regular but more or less like regular shapes. You are likely to use words like circular, square-like and rectangular in interpreting the shape of features in an image. Study Photograph 13.2 that shows features with different shapes. What could you say about the shapes of the features in the image?



Figure 13.8 *Different shapes in an image*

13.5.3 Texture of the image features

You will notice that in a photograph different surfaces tend to appear different in terms of smoothness or roughness of appearance. A paved parking space is likely to appear smoother than a forest of trees. Water body like a dam is likely to be smoother in appearance than a rocky outcrop. Such observations are the tone of the image. So, texture is the smoothness or roughness of feature as they appear in an image. Study Photograph 13.3 which shows you image features that have different texture. Identify some features by their texture.



Figure 13.9 *Texture in an image*

13.5.4 Tone of the image features

You are also going to come up with images that have features with different brightness and colours. Note that images may be coloured or black and white. In both these, brightness and colour play a large role in you being able to identify features and describe them. Study Photograph 13.4 describe the tone.



Figure 13.10 *Tone in an image*

13.5.4 Shadows in the features in the image

You will also need to study an image in terms of the shadows of features in it. You will notice that different features cast different shadows. These shadows appear in an image and help to identify features or tell how tall they are. You can also be able to tell the shape and the size through the shadow of an object. Photograph 13.5 shows you an image with shadows. Describe the shadows and state what they tell you about the image.



Photograph 13.11 *Shadows in an image*

13.6 The uses of remote sensing

Why do we need remote sensing? That is a question that you might be asking yourself. Remote sensing reveals the hidden features of the earth's surface. When you deal with aerial photographs or satellite images there are many features that you will see on a photograph that you would otherwise never know existed.

You will also notice that, remote sensing can help in coming up with solutions to problems that are experienced on the earth's surface. An example of this is, forest fires can be tracked and studied through infrared image of remote sensing. Have you ever heard of *ozone depletion*? Ozone depletion is a problem of the reduction in amounts of a gas called ozone that protects us from harmful rays of the sun in the upper troposphere. Now, this gas has been proven to be getting less every time by images of the earth's atmosphere. You will hear very frequently of campaigns against air pollution as a way of trying to reduce the rate at which ozone is getting depleted. You have probably used a perfume spray with an "Ozone Friendly" label. This is still part of the campaign to save ozone. All this was realised through remote sensing.

Remote sensing also helps us predict problems. You can study a satellite image of a village next to river and be able to tell that in case of a flood the village might be in trouble. You would have studied the positioning and relationship of features in an image. Live satellite tracking of tropical cyclones that we mentioned in Unit 3 is also a form of remote sensing that is meant to help warn people against natural disasters.



Activities 13.8 Photograph interpretation in remote sensing

1. Suggest ways in which remote sensing can be used to benefit villagers in rural Zimbabwe.
2. What problems could be encountered in trying to use some of the ways you suggested in 1. above?

We are now going to turn our attention to making maps using computers. This unit as we stated in the beginning is also about geographic information systems (GIS). You must not proceed with the following section if you have not covered the basics of GIS covered in Level 1. This section picks from where you left off in level 1.

13.7 Spatial analysis in Geographic Information systems.

13.7.1 What is spatial analysis?

Before we can answer the above question and define spatial analysis you have to first understand the meaning of the individual words that form this term. The word spatial means the earth's surface or places. Meanwhile, when you analyse you are looking at something very carefully in order to understand it better and therefore come up with a meaning from it. We can then define spatial analysis, as relationships and possible interaction between natural and man-made features of a place. It involves the collection and compilation of geographic data which you follow up with calculations and combining of features in a GIS in order to solve a problem relating to a given place.

An example of spatial analysis for you would be the production of a map that shows settlements that are within a kilometre of the banks of a large river in your locality. You would produce such a map in order to prevent flooding of the settlements that are too close to your large river. In so doing you would be applying GIS to solve spatial problem. Before the problem is solved, there has to be some analysis that you do.

13.7.2 What are the components of spatial analysis?

Note that spatial analysis involves quite a number of processes. Since you can apply spatial analysis in many fields, the different fields also have certain spatial analyses

that are suitable for them. For if you were a river geographer, you would find that the spatial analysis tools you need would be different from those needed by a psychologist who is studying human behaviour in a certain area. Some common spatial analysis techniques are discussed for you below:

(a) The creation of buffers

The spatial analysis technique you would mostly likely need in most areas are creating *buffers* in order to see the possible spread of a geographic process around its centre. A buffer is the extent of spread of a particular feature or effect up to a specified distance. For example, the possible spread of the waters of your local river. You could also create a buffer round a point-source of pollution to map the possible spread of the pollution

(b) The nearest neighbour index

Spatial analysis also involves the carrying out a *nearest neighbour analysis*. When you do this, you are working out how close to each other in a place certain feature are. You could study all food outlets in your city or nearest urban area. You could also do a neighbour analysis of schools in your locality to see if distances walked by students are long or suitable.

(c) Spatial joins layers

It is possible that you could need a map that shows the location of gold panners in a ward and how close the mines are to farms. Yet you would only be having a map of the location of gold panners and separate map of farms. In GIS it is possible to combine the two and produce one map that would be useful to you.



Activities 13.9 Photograph interpretation in remote sensing

1. What do you understand by the term spatial analysis?
2. Research on how the nearest neighbour index is calculated manually.

13.8 Using Boolean logic in spatial analysis

You must understand that in this section you will learn the skill of doing what are called queries in QGIS. A *query* is request for information from the software storage called a database. Computers uses a simplification language for us called Structured Query Language (SQL) to make the information useful and readable for us in form of graphs or images.

In QGIS, as you build your query you will first have a **field**. A field is a type of information that is contained in the data package. For example, a data package on countries of the world will have fields like sub regions, total population per country and GDP per capita. To make a map, you must tell the computer which data set you want displayed.

We are going to use Boolean logic to perform simple queries in QGIS. Boolean logic is a way of reasoning that uses the three words OR, AND and NOT. These words are called *operators* as they mean inclusion, exclusion and joining of data in dealing with mapping in GIS. Operators are special words or symbols that have a logical or mathematical meaning when used in map making or programming. Study the illustration of these operators as they are simplified in set form for you. These operators will help you choose which data set to have displayed on the map. Study the set Figure 13.7 below that show the operators OR, AND and NOT.

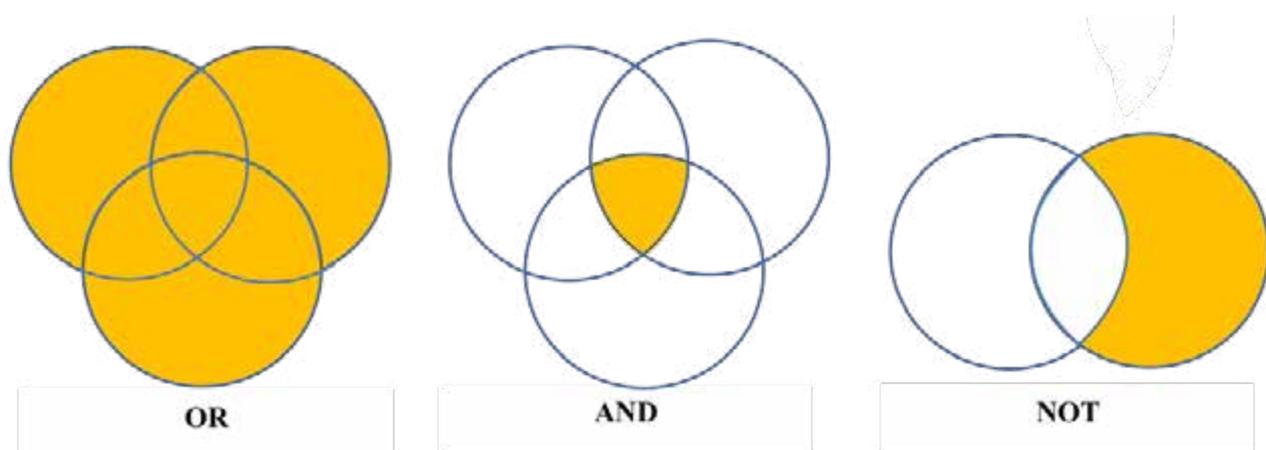


Figure 13.12 Boolean logic in set form. Note that in GIS the sets are actually layers of data

Now let us explain what each operator means. The OR means that if you were making a map and you had data for the whole world but wanted to show only Zimbabwe and Zambia, you would use this operator. What it would do for you is to include every country in the list of your query – that is Zimbabwe and Zambia. The map would therefore display only Zimbabwe and Zambia. Follow the steps below to perform this skill on your computer.

Remember that:

You will require a laptop or desk top with QGIS 2.18 4 software installed as highlighted at the beginning of the unit. Note later version of QGIS can also be used.

You will also need the Natural Quickstart package data.

1. Open your QGIS

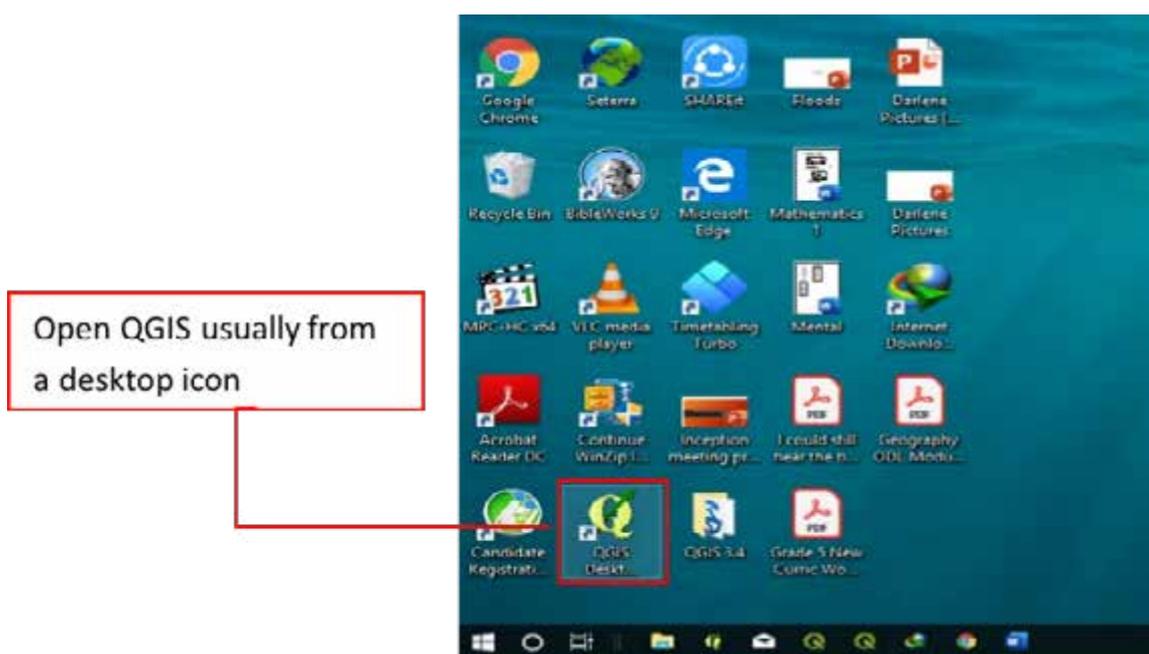


Figure 13.13.1 The QGIS Icon

2. Open the Natural Quickstart layer. It is found in the menu at top of your window
Choose **Layer**, then **Add vector**

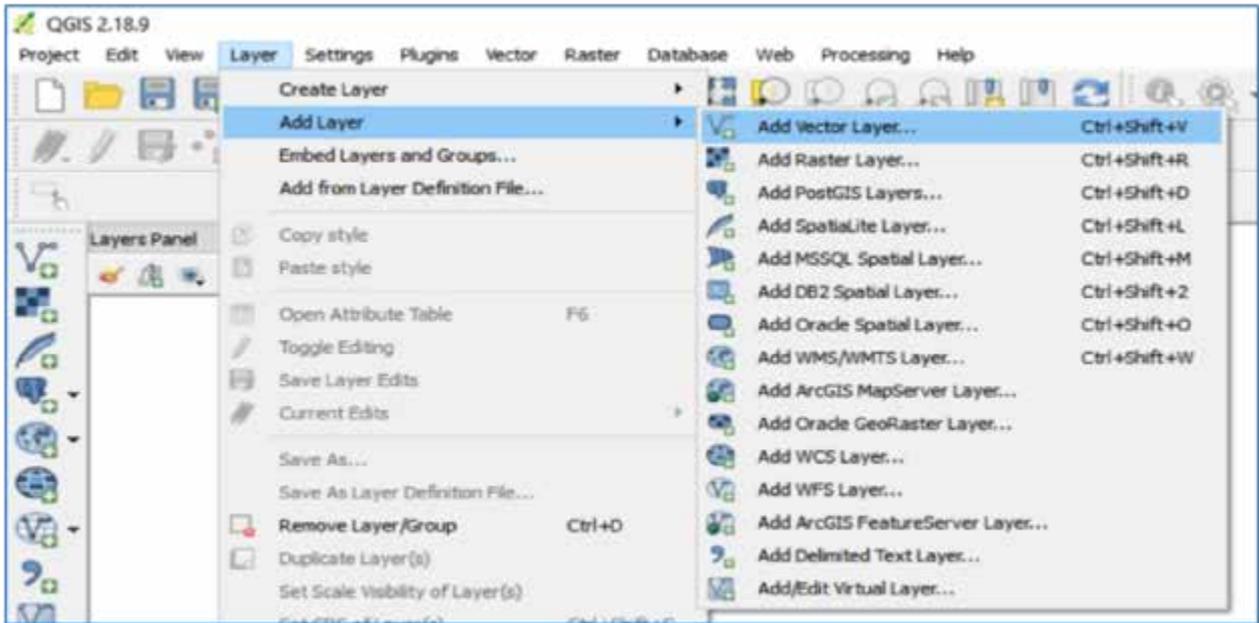


Figure 13.13.2 Adding a vector layer

- 3 In the dialogue box that appears
click on the **Browse** button.

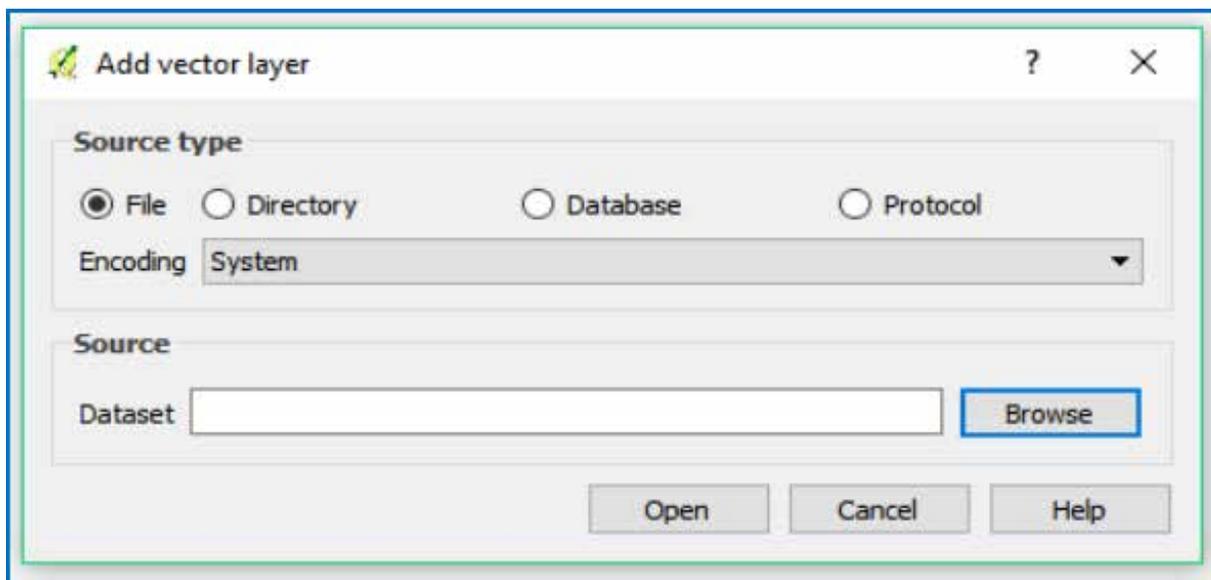


Figure 13.13.3 Opening the vector layer menu

4 Then you choose the 10m cultural layer. From there you then choose the `10m_admin_0_map_units.shp` by double clicking on it.

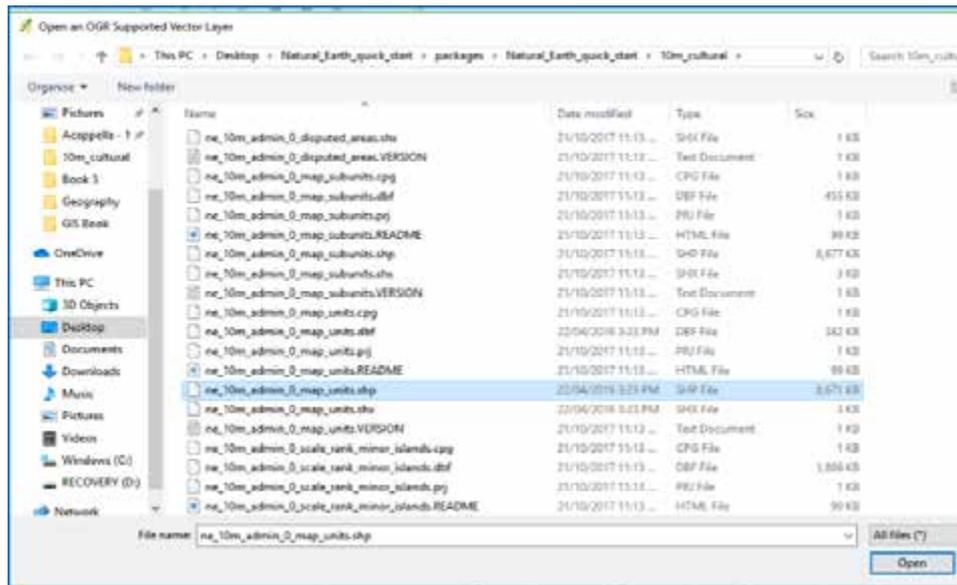


Figure 13.13.4 Choosing the vector layer

QGIS will load the world map as shown in 5 below.

5 When the map is loaded, the left side of the window will show you a Layers panel as well (boxed for you in red).

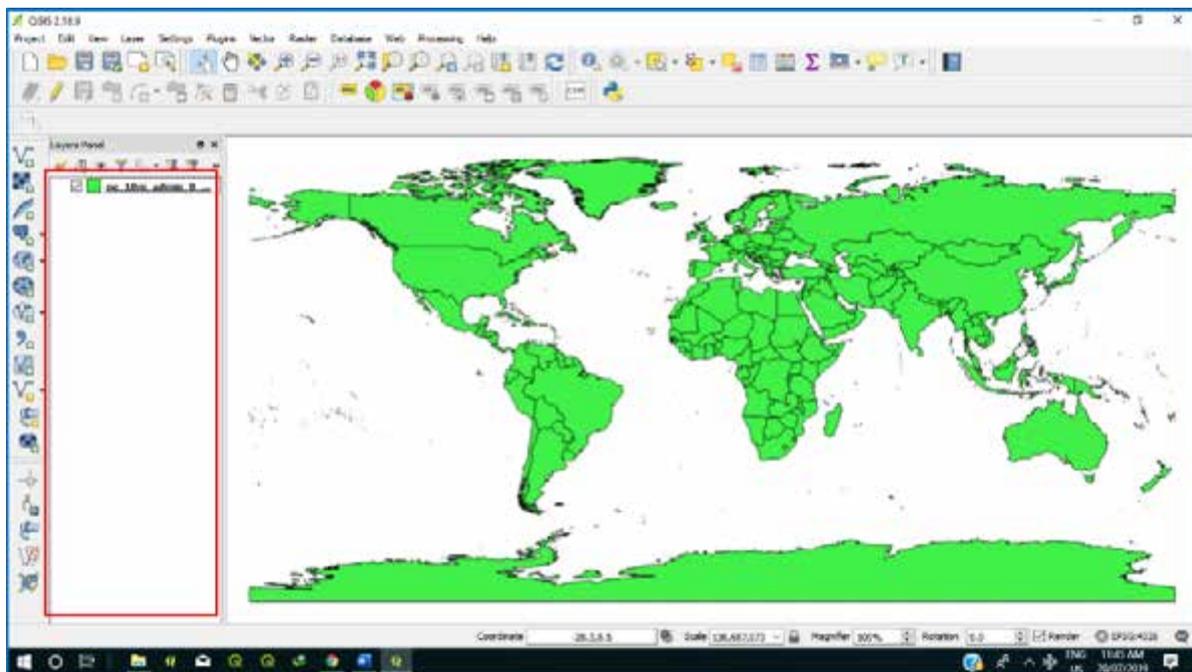


Figure 13.13.5 The displayed `10m_admin_map_units`

6 Right click on the **Layers panel** to reveal a scroll-down menu. On this menu click on **Filter** as shown below. Once you click on Filter QGIS will show you a query builder where you can perform your query.

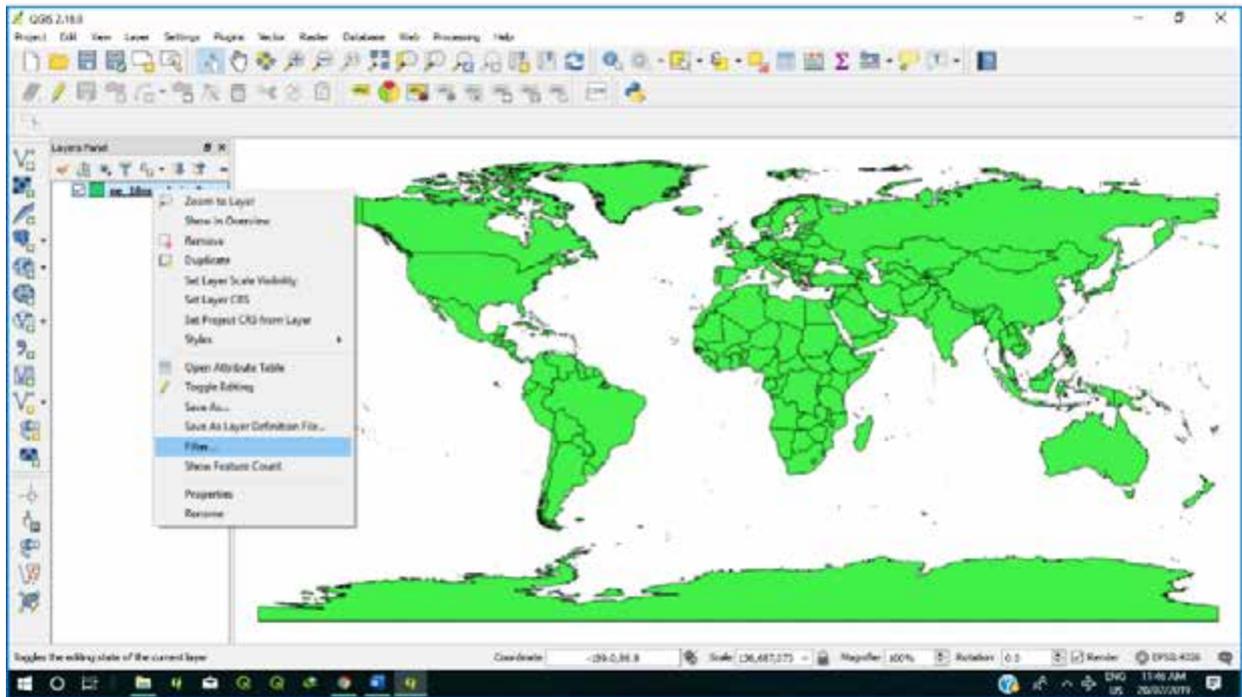


Figure 13.13.6 Opening the filtering, query box

7 In the query builder you will see a box that looks like the one below. The query builder has four areas you should take note of. It has the **Fields** box to the top left; the **Values** box top right. It will show you the **Operators** box at the bottom of the two top ones.

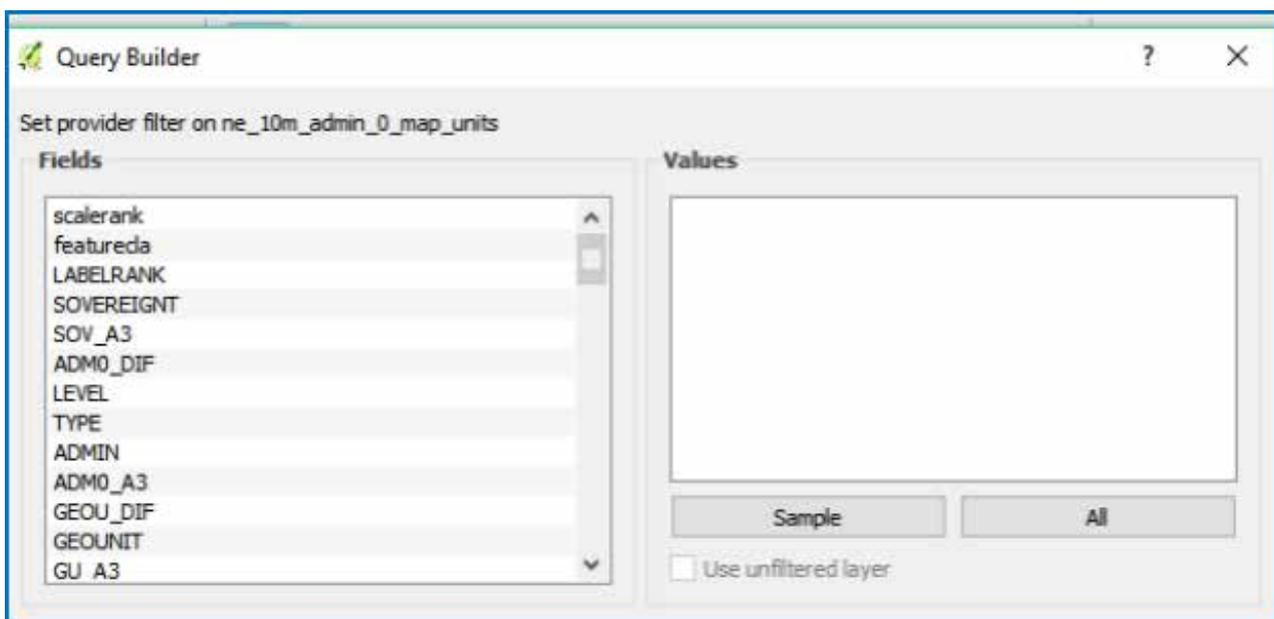


Figure 13.13.7 Choosing the field

Then at the bottom it has the query **Expression** box where your query statement is built.

From the **Fields** box double click on SOVEREIGNT to choose countries. Once you have done that QGIS will enter SOVEREIGNT in the **Expression** box marked "Provider specific filter expression" See Figure 13.8.8 below.

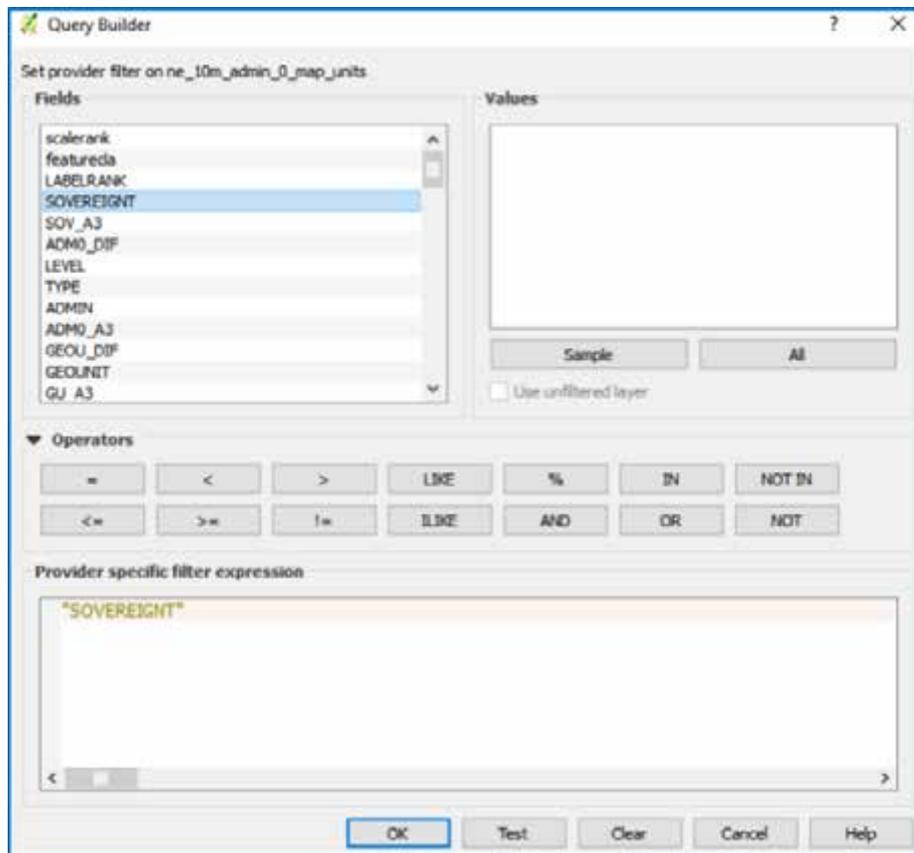


Fig 13.13.8 Starting the query

- 8 Then in the Filter expression space type the equal sign. Then click on **All** under the **Value** space. Once you do this, scroll on the list of countries that appears until you get to Zimbabwe. Click on Zimbabwe. QGIS will write in the express box:

"SOVEREIGNT" = 'Zimbabwe'

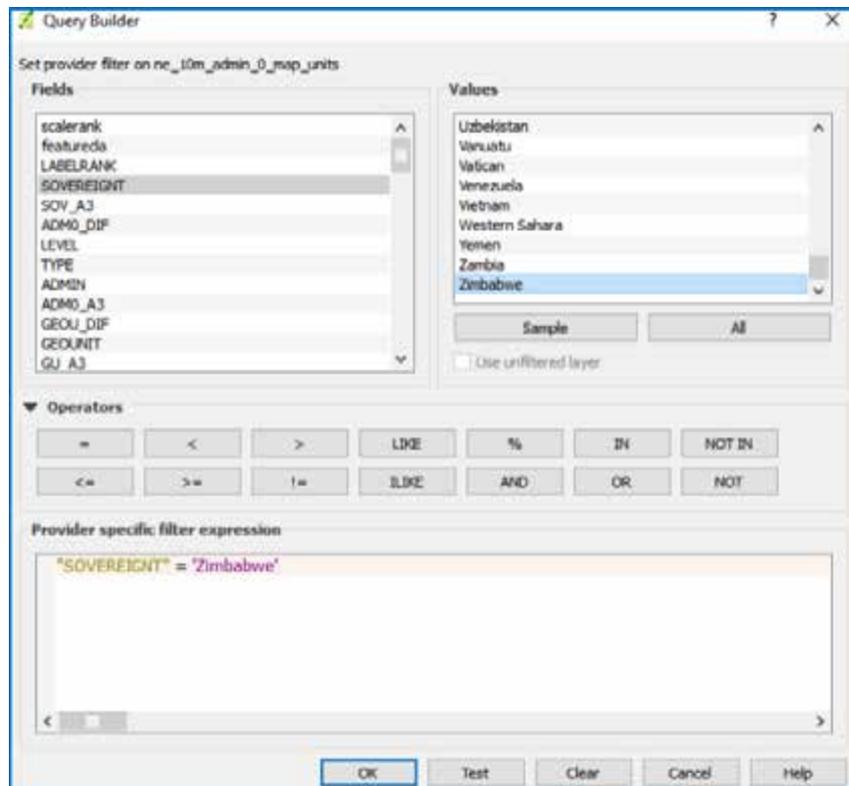


Figure 13.13.9 Choosing the first country

- 9 In order to show Zambia as well on your map you have to click again on SOVEREIGNT in the top **Fields** box. Then select Zambia in the **Value** box

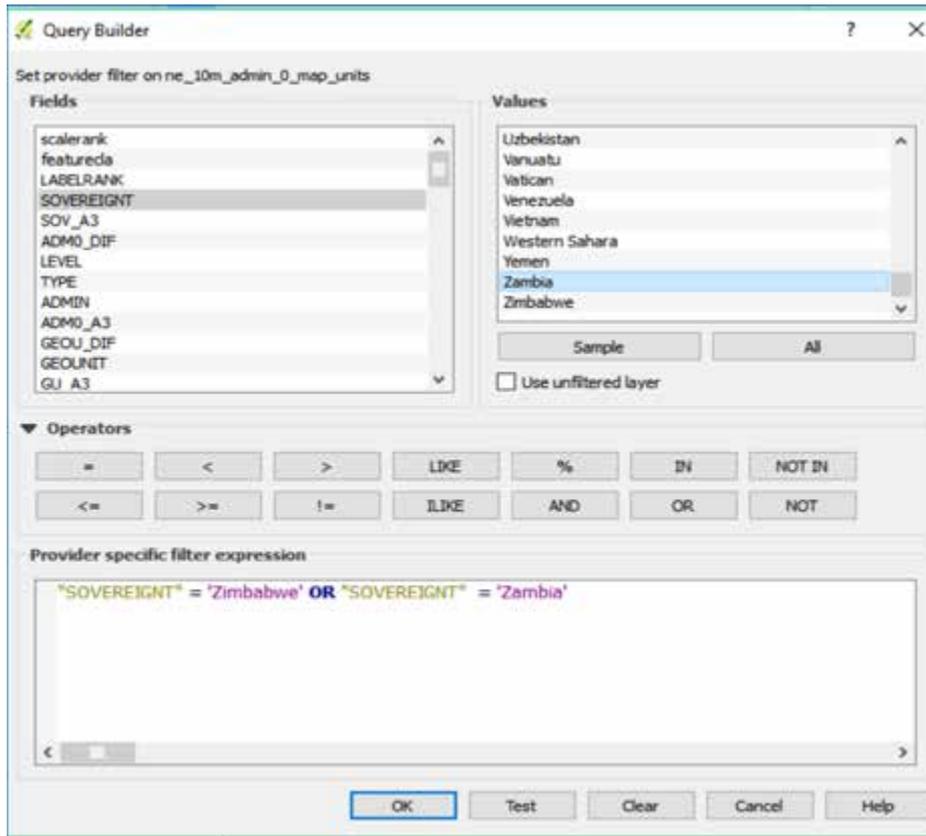


Figure 13.13.10 Writing the query. Choosing the second country

10. Now you can click on **OK** and reveal your map. Take note of the fact that the map will be very small you then click on the **Zoom Full**  to make it big enough as shown below.

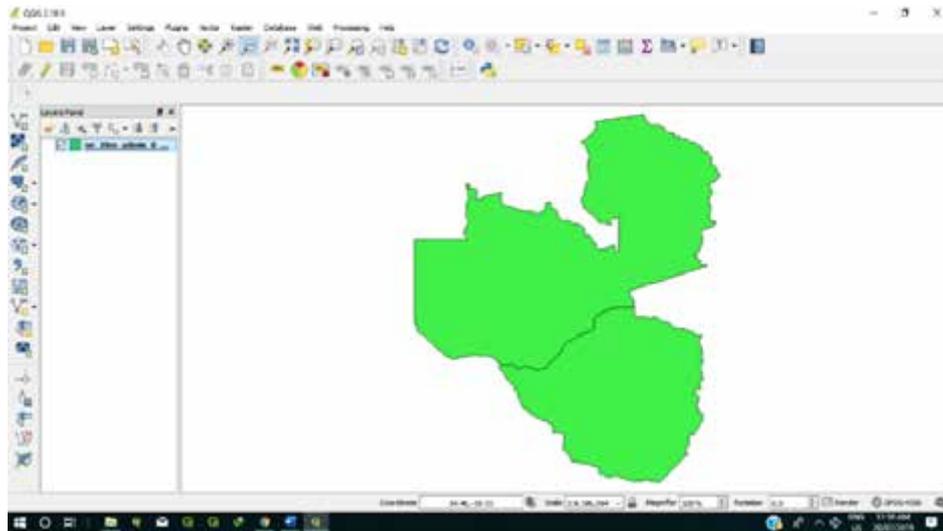


Figure 13.13.11 *The result displayed*

Note that this is just a simple use of the operator OR. What you have done here is to tell QGIS to display any country that is either called Zimbabwe or Zambia. So, QGIS then showed you both these countries and nothing else. It can be used for much more complex spatial analysis that you will learn of in Level 3.

When you use the AND operator it can be used to make a map that shows provinces that are also cities within Zimbabwe. You would follow all the described and illustrated steps above. Follow these steps up to the choosing of the map to display. Choose the [ne_10m_admin_1_states_provinces](#). Then in the query box you would type the following query:

```
"type" = 'City' AND "admin" = 'Zimbabwe'
```

By this query note that you would be initially selecting all the provinces of the world. QGIS should display those that are in Zimbabwe as well because of the AND operator. Not only that, but also that they should be cities as well. Which two provinces are also cities in Zimbabwe? You got it right if you said Harare and Bulawayo. Your map would be as shown in Figure 13.9.

Let us then move on and show how you would use the NOT operator in QGIS. The NOT operator is used for excluding unwanted parts of your map. This is easily done by clipping. You must understand that clipping is the cutting off of unwanted part of a map to remain with what is relevant at that time. You will deal with this in Level 3.

Note that there are many other more queries that link two different data sets. These you will learn in Level 3.

13.9 Using relational and conditional statements to make maps

When you use QGIS it is possible for you to be able to use what are called conditional queries. These are queries that use the words like WHEN, CASE WHEN and THEN. You will use these words when you want to do include features on the map that are not readily available within the layer. These operators are also used to update database tables that contain information used to make maps.

When you use relational operators, you are using the mathematical signs like <, > and =. These signs will give you accuracy when you are making your maps. Let us suppose you want to make a map showing the towns of Zimbabwe with more than 400 000 people. In this case you have to choose your field as in the query box and tell QGIS to only include towns that have a population of more than 400 000. You would first choose the populated places layer. The statement for towns with more than 400 000 people as you type in the query box should look like the one below:

```
"pop_other" > 400000 AND "adm0name" = 'Zimbabwe'
```

The result of this query is a map that shows Bulawayo and Harare. You will notice that the query to show towns with populations greater than 400 000 people is used together with one that shows the one that selects Zimbabwe so that only towns in Zimbabwe are shown.

Well done you have come to the end of this unit. Before you close this module take time to go through the summary below that will help you check what you were supposed to cover. Then after that also check your progress through the question that follow.



Summary

- In this unit you covered the GPS and how it works. You were taken through the GPS process and uses like tracking of pets.
- You also covered remote sensing. Under remote sensing you were taught how the sun is the main illuminator in remote sensing. We stressed the point that the energy in form of waves carries the information that is used in remote sensing.
- Still under remote sensing we took you through the types of remote sensing. We illustrated the various types of images that are used in remote sensing.
- You covered the ways of studying photographs under remote sensing. You learnt on the tone, texture, size, shadow and shape as a way of analysing images in remote sensing.
- You also covered spatial analysis in GIS. We discussed some common techniques of spatial analysis like buffering and the nearest neighbour.
- You were taken through steps of using the OR, AND and the NOT operators in making queries in GIS.
- You were also taught how to use relational statement to create maps.
- You further covered conditional statements in making maps using QGIS.

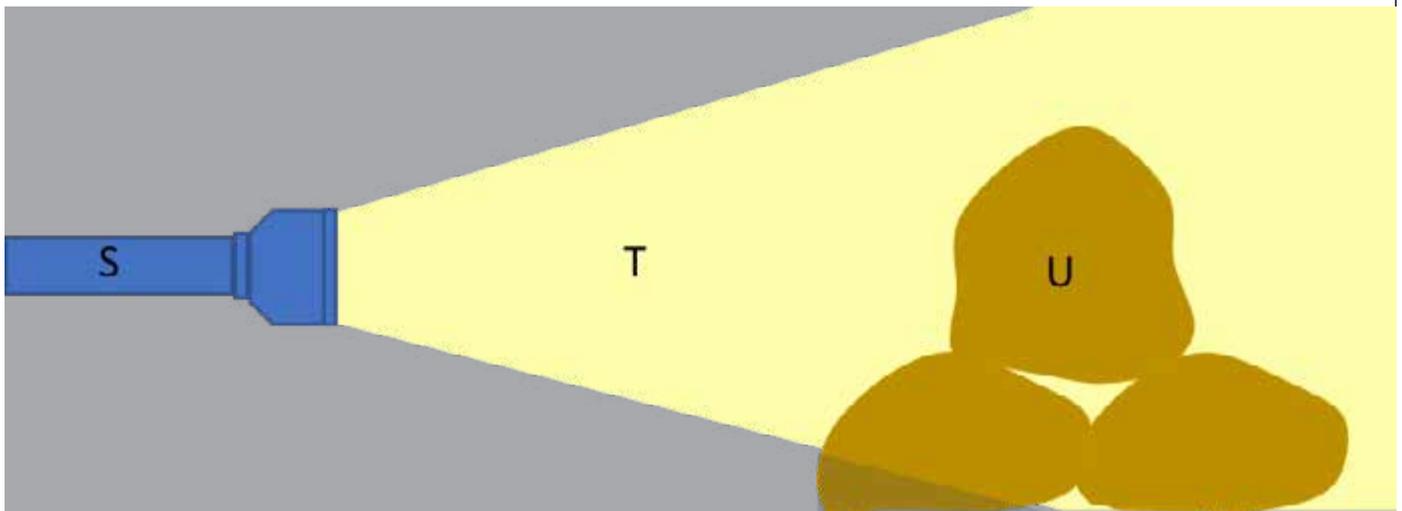
End of Unit Assessment

1. The name given to any light other than the sun as a source of information in remote sensing is:

2. The skill of compiling information and performing calculations and querying to produce desired map is called: _____

3. Tone analysis in remote sensing is concerned with:

4. Study Figure 13.9 below that shows the remote sensing process. Identify the parts labelled S, T and U.



S is

T is

U is

5. In what ways can GIS be used to improve the Zimbabwe transport system?

Research Work

You will have a total of two hours to complete this task

Visit the local council offices and find out the following:

- (a) If at all there is use of GPS, Remote Sensing and/ or GIS.
- (b) If there is, what it is used for.
- (c) If no what it could be used for.



Progress Check list

Now let us go through the objectives we listed at the beginning of the unit and check how many of them you have achieved. Tick against those you are sure you have achieved. Put an X against those you feel you have not yet to achieved. Then for any that you put an X against, find the section dealing with it in the unit and go over it again.

Objectives	Check Box
Are you now able to	
• explain the concept of GPS	
• apply GPS technology in navigation	
• calculate time using longitude	
• describe the concept of light as a wave	
• explain the visible wave bands of the electromagnetic spectrum	
• apply the electromagnetic spectrum in the interpretation of photographs	
• describe the basic functions of Boolean logic	
• apply the Boolean logic in solving simple spatial problems	
• describe the concept of overlay analysis	
• apply relational and conditional statements in overlay analysis	

Further reading

Chabikwa, B., Mapungwana, M., & Phiri, F. (2020). *Total Geography Book 3*. Harare: Priority Publishers.

Bunnet, R.B. (1984). *Physical Geography in diagrams for Africa*. Harlow: Longman Group Limited.

Education, Ministry (1985). *School Atlas for Zimbabwe*. Stockholm: Esselte Map Service.

Waugh, D. (2014). *Geography: An integrated approach*. Oxford: Oxford University Press.

Unit 14 Minerals and Mining: Small-scale mining in Zimbabwe

13.1 Small scale mining

13.2 Contribution of small-scale mining to the economy of Zimbabwe

13.3 Challenges faced by small-scale miners

13.4 Solutions to challenges faced by small-scale miners

13.5 Legislative framework on mining and mining rights

13.6 Processing of selected minerals in Zimbabwe

13.7 Beneficiation of minerals in Zimbabwe

13.8 Issues of safety and health in mining

Introduction

We are sure you are aware that Zimbabwe is a mineral rich country and that you know some of these minerals. In this unit we are going to discuss about the contribution of small-scale mining to the economy, challenges, solutions, legislative framework on mining and issues of safety and health in Zimbabwe. If you are in doubt about minerals have a look at the information in level 1 before you begin to study this unit.



Objectives

After going through this unit, you should be able to:

- describe small scale mining,
- describe the contribution of small-scale mining to the economy of Zimbabwe,
- outline the legislative framework on mining and mining rights,
- explain the challenges to small scale mining,
- explain the processing of selected minerals in Zimbabwe.



Key Words

Study the meaning of words below:

Small scale mining	a mining activity done by small groups, families, or cooperatives with minimal use of machines.
Artisanal mining	an economic activity done by small groups, families or cooperatives involved in the extraction of minerals and is largely manual.
Beneficiation	refers to any process that improves the economic value of a mineral ore, improves the gangue (worthless rock) minerals, and results in higher-grade ore.
Value addition	the processing of raw materials into finished products in a bid to improve the output.
Subsistence miner	one who operates illegally using hand tools and sells ore to established companies.



Time guide

You are expected to take an average of **10** hours to go through this unit.



Study skills

You have to note that this unit is about minerals and mining. You will need to have a good idea on what are precious minerals, their distribution and economic value to the country.

14.1 Small scale mining

You have come across the word small scale mining in the key words section. What did we say it means by the way? If you have forgotten, you have to refer to the key words. We said that small-scale mining is an economic activity done by small groups, families or cooperatives involved in the extraction of minerals with minimum use of machinery. It is done in most river valleys of Zimbabwe including areas such as Mazowe, Runde and Bubi. Study the picture below which shows small scale miners.

After studying the figure 14.1 attempt the questions below.



Figure 14.1 small-scale miners

1. Describe the scene in the photograph.
2. Which minerals do you think they are mining and why do you think so?
3. What do you think are the effects of such an activity on the environment?



Activity 14.1 Small-scale miners

In Figure 14.1, we can see small groups of people, which includes men, women and children. Some are digging, selecting minerals and some are carrying water.

In 14.1 you have done you can see that small-scale mining is done by small groups of people, operating with minimal use of machinery. Operations are mostly manual. The economic activity involves a large percentage of women and children as it is done when people lack the basic personal needs such as food clothing and shelter. The males are involved in the digging and processing of the ores whilst the women and children supply food and help in the carrying of ores to the processing sites.

Small scale mining differs from artisanal mining (ASM) in that in small scale mining some mechanisation can be done and the activity is on a bigger scale as compared to

that of artisanal mining. In artisanal mining work is done manually and most of these miners are unregistered. The difference between the two activities is very small and in other cases, the words can be used interchangeably. Now that we have defined small-scale mining let us look at the common characteristics of the mining activities.

14.1.1 Common characteristics of small-scale miners

Have you ever seen where small-scale mining is done? Probably they are some in your local area. If they are there, visit and see how they operate. Write down what you have observed as the main features of small-scale mining in your area. However, note that small scale miners usually have lower production volumes because mining is done in areas with small amounts of gold and diamonds. The miners usually start mining in an area with a new discovery, which can be called “gold rush” like Charamba village under chief Gororo in Chivi Masvingo province.

Usually the miners carry out their operations during the dry season making their activity seasonal. It is usually done when farmers have finished harvesting their crops from the end of April in most parts of Zimbabwe. Some miners resort to this activity as a way of raising money to buy inputs.

Low levels of occupational health is one of the characteristics of this activity. Most of the areas where this activity is done are disused mines where most of the shafts are old and almost collapsing. This can be seen from figure 14.2



Figure 14.2 A small-scale mine shaft

As you can see on the figure 14.2 miners are exploiting small reserves. In the local area you have identified you can see that; small scale miners usually invade a place when there has been a 'gold rush' that is after news of discovery of a new mineral has been heard. Other areas that come to mind include Marange and Chiadzwa where there was diamond rush and Charamba village under chief Gororo in Chivi where there was a gold rush.

From studies done in the areas you can see that these miners exploit small reserves and quickly abandon a place after exhausting the mineral.

Look at the pictures Figure 14.1 and 14.2, what can you say about their preparedness or readiness in terms of capital? Yes, small scale mining is characterised by insufficient or little capital. Due to lack of capital, small scale miners are usually paid low salaries. If you look at the environment, you can see that there is little consideration on environmental issues, as they want to maintain a "win, win "situation whereby they benefit at all costs without consideration or repairing the damaged environment

Now that you have an understanding of what a small-scale miner is, let us see how small-scale mining contributes to the economy.

14.2. Contributions of small-scale mining to the economy of Zimbabwe

You must note that small scale mining has contributed a lot to the economy of Zimbabwe. Minerals like gold, chrome, diamonds, copper and coal are the most precious minerals in Zimbabwe. The minerals have led to growth of towns and cities and general improvement in the life of Zimbabweans. The minerals have been used as raw materials in the blast furnace, making jewellery and ornaments.

Small-scale miners employ many people in Zimbabwe. Did you know that over 600 000 Zimbabweans are directly employed in the mining sector and over 3 million people are indirectly benefiting from mining? In your local or rural area think of the benefits that small-scale miners have brought?

Yes, we hope you noted that there has been an improvement in social development in rural areas. Small-scale miners have been able to build proper houses, bought cattle, goats and donkeys from the proceeds that they get from mining.

Small-scale mining has a great contribution to the economy as they supply almost 45% of gold deliverables to Fidelity Printers. The small-scale farmers help a lot in increasing the amount of foreign currency received in a country.

We can also see that Small-scale miners have also contributed to agricultural production in Zimbabwe. The miners have been able to buy new farming equipment, chemicals, seeds and fertilisers, which they have used in raising agricultural production. Small-scale miners have helped reduce poverty through raising agricultural production and through provision of foodstuffs.



Activity 14.2 Contributions of small-scale miners to the economy

1. List the minerals that are usually extracted by small scale miners in Zimbabwe
2. Describe the major contributions of small-scale miners to the economy of Zimbabwe

Now that we have looked at the benefits of small-scale mining to the economy. We now want to move on and look at the challenges faced by small-scale mining.

14.3. Challenges faced by small-scale miners

If you have visited a small-scale miner in your area, we want you to reflect on what you observed. Think of how they were extracting the mineral, think of safety and health. What about other social problems? And where do they sell their minerals? There are so many issues that are worrisome about this type of mining. We want you now to brainstorm and write down some of the challenges you think are faced by small-scale miners. Discuss with a friend on what you have written and share notes. Now that you have an idea of the challenges, we would want you to attempt Activity 14.3. we hope you will find it easy and interesting.



Activity 14.3 Challenges faced by small-scale miners

Imagine you are a small-scale mine? What do you think could be some of the challenges that you are likely to face?

The challenges that small-scale miners face include the absence of a government policy that recognises them. Small scale miners' activities have been criminalised in Zimbabwe. Activities done by these miners have failed to get recognition from the generality of the population in Zimbabwe.

Look at the Figure 14.1, the use of poor mining methods is a problem faced by many. Most of the activities are being done in disused mine shafts that are almost collapsing as shown in the picture. The poor mining methods have led to the death of miners through collapse of tunnels and flooding. This has been compounded by lack of enough capital to boost production of minerals.

If you look at figure 14.1, you can also see that many small-scale miners face the problem of diseases. Miners die from diseases such as diarrhoea as they drink water from unprotected sources. The miners that you can see in figure 14.1 are using water directly from the rivers. Small-scale miners use water for domestic purposes from open wells, flowing rivers and stagnant or polluted water.

Look at Figure 14.1 again. Can you give a short description of the health risks they are likely to face?

Yes, small-scale miners suffer from backaches, bone/muscle pains as they are engaged in strenuous work. The miners suffer from long working hours as they work continuously to meet the targets, they set for themselves.

Besides suffering from backaches and muscle pains, small-scale miners also face the problem of sexually transmitted diseases (STI). Most of the small-scale workers suffer from STIs because of reckless sexual behaviour that is practised in the mining areas. Here are some of the challenges that small-scale miners face:

- Small-scale miners face the problem of lack of social security insurance.
- Miners also suffers from backaches and muscle pains
- The miners lack any form of burial or medical support as they live from hand to mouth.
- Shortage of loans to buy equipment. The minerals that these miners extract are not bankable so most of the miners lack proper funding.
- Access to mills is dependent on the availability of one tonnage of mineral ore; this condition makes it difficult for the generality of miners to get into business. Besides the provision of one tonnage of mineral ore to access, the mills the miners also have to wait in the long queue at the mills.
- Small-scale miners in most instances have to contend with high cost of fees and licences charged by the local authorities. The list of different levies, charges, royalties and corporate taxes paid include the following customs duty, value added tax, pay as you earn, capital gains, local authority charges, environmental charges, licences and registration fees, addition tax, standards tax, development levy, radiation protection levy, engineering council levy” pan African minerals” levy among others.
- Presence of ground that has been held for speculative reasons is another problem. Many small-scale farmers have been unable to mine profitably because many pieces of land have been held for speculative reasons. Most of the land with minerals has been left idle thinking that the land will gain value.

In this section, we have seen that small-scale miners face a number of challenges, which include criminalisation of activities, poor mining methods, collapsing of mines, diseases, expensive consultative process and high cost of levies, royalties and levies. Can you try to add to this list?

14.4. Solutions to challenges faced by small-scale miners

I hope you understand that once we see a problem, we need to think of the solution. What should be done to solve the challenges faced by these miners? Imagine you are a small-scale miner and have faced the problems we have discussed in paragraph 14.3. What measures can you take to reduce these problems? The following could be possible solutions to these challenges. Let us discuss them.

- There is need for environmental awareness and education in small-scale mining. This is necessary so that environmental damage is reduced. Remember we said that, these miners' activities cause soil erosion, river siltation, water pollution and deforestation among numerous environmental ills. Therefore, awareness and education will help them to be conscious of the environment and use proper mining methods that reduce these dangers.
- There is need for full recognition of artisanal miners in order for them to progress in business. Activities of small-scale miners should be environmentally sound. Once they are recognised, they will then receive the technical support and advice to properly mine. Therefore, for them to be recognised, they should be licenced.
- They should also comply with occupational health and safety regulations. I guess you have heard of shafts collapsing and disease outbreaks due to various reasons. When health and safety regulations are observed, health related risks would be reduced or even avoided. There is need for regulating access to social infrastructure including medication and schooling.
- Don't you think some miners need assistance in accessing loans just as large-scale miners do? This will certainly improve their mining activities and some of the challenges they face.
- Small-scale miners can have their challenges solved through the formalisation of mining products such as gold, gemstone. The small-scale miners can then process dimensional stones (natural rock materials) in order to formalise their activities.
- There is also need to give incentives and training to small-scale miners rather than removing them using force. Training helps people to have a detailed knowledge of the social and economic context of miners as this reduces the social degradation of local values and encourages continuous operations over a long time.

14.5. Legislative framework on mining and mining rights

I am sure you know what legislation is? These are laws that govern mining activities. The Mines and Minerals Act Chapter 21:05 is the law for the mining industry in Zimbabwe. There are other Acts and Regulations that draw their existence from this Mines and Minerals Act. The Act has been acknowledged as a good piece of legislation by both local and international investors.

14.5.1. Mines and minerals act

The law was put in place in 1961, its role is to govern the registration of miners or prospectors and issuing of licences. It also laid out the rules and regulations on how to carry out mining. This law also guides on the payment of fees to the local authority. Let us look at the environmental management act below:

14.5.2 Environmental management act

The law was introduced in 2005 to protect the environment from the negative effects of mining activities. The environmental management act governs water pollution, hazardous wastes, effluent and sewage discharges by the mining companies. It also governs air and noise pollution and the use of pesticides and toxic substances. This law is very important as it regulates all types of pollution of the environment in Zimbabwe, we move on to the next law that governs mining in Zimbabwe, which is the national social security act.

14.5.3 The National Social Security Authority Act

As you have seen with other laws, this law was meant to cover the social needs of the worker. It also looks at the hazards and risks that workers face at workplaces such as being trapped underground, losing oxygen, spread of poisonous gases. The next law that is important is the Gold trade act.

14.5.4. The Gold Trade Act

As you can see this law deals mainly with gold. It prohibits the dealing and possession of gold, permits to buy or sell gold, penalties on selling of gold, production of licence permit, regulate and control deals in gold. Miners can only deal with gold when it is from their own locality. The gold miners are to keep their licences. We have looked at a number of laws that cover mining now we want to move on and look at the processing of minerals.

14.6 The processing of selected minerals in Zimbabwe

In the previous section, we looked at laws governing minerals, in this section we will look at two important minerals, which are gold and diamond.

14.6.1 Processing of gold

Study the Figure 14.3 which show the processes involved:

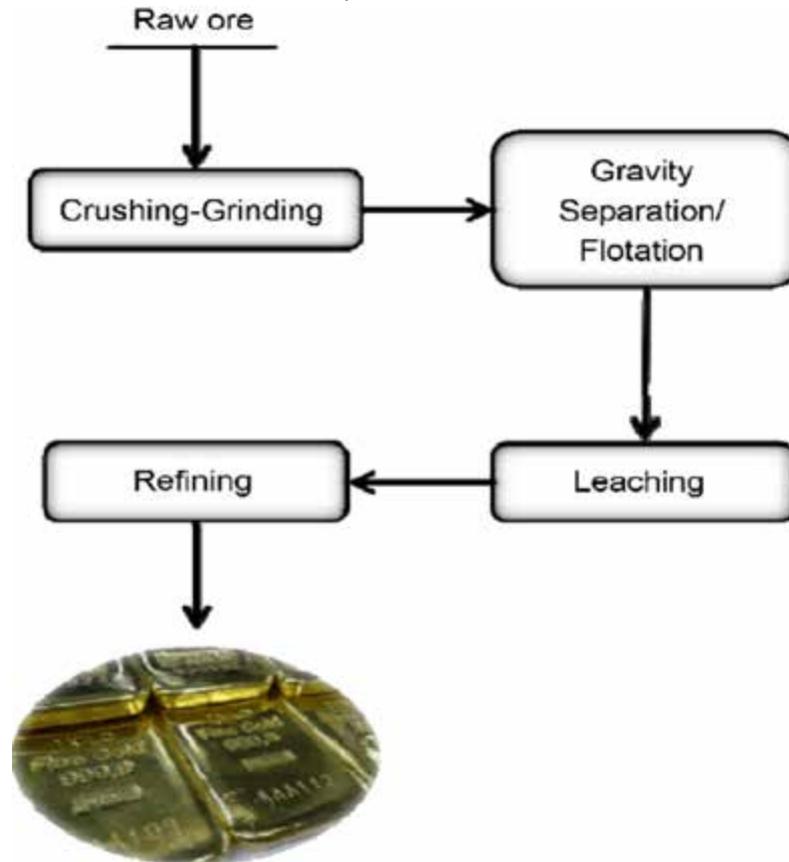


Figure 14. 3 Gold processing stages

The processes involved in Figure 14.3 include extraction of raw ore, which is the first stage. Mineral is then crushed into smaller pieces in the form of grains, after which it is then separated from wastes by placing it in water and cleaning it with mercury. Gold is a heavy metal so it is collected at base. It is cleaned and heated at high temperatures and then stored as bars.

From Figure 14.3, you can see how gold is processed. As it occurs in small grains in a solid rock, so it has to be crushed first into fine powder. The crushing is usually done by heavy machinery or by hand if mining is being done on a small scale. The pounded ore is then washed and mixed with mercury to recover very small pieces of gold mixed with soil and sediments and cyanide to separate the gold, after mixing the gold with mercury it is then smelted using gas with a lot of heat. When it is being smelted, you will see that gold is a hard metal and will remain whilst other metals turn into vapour. The metal is then poured into moulds to produce metal bars that are sold to fidelity Printers. Therefore, you can see that the major processes involved here are **Extraction, Crushing, Separation, Melting and Moulding**. The gold bars are then sent to the world London Bullion market for sale.



Activity 14.4 Processing of gold

1. explain the processes involved in processing of gold

Let us move on to the processing of Diamonds

14.6.2. Processing of Diamond

Let us study the figure 14.4 on diamond processing and attempt the activities that follow.

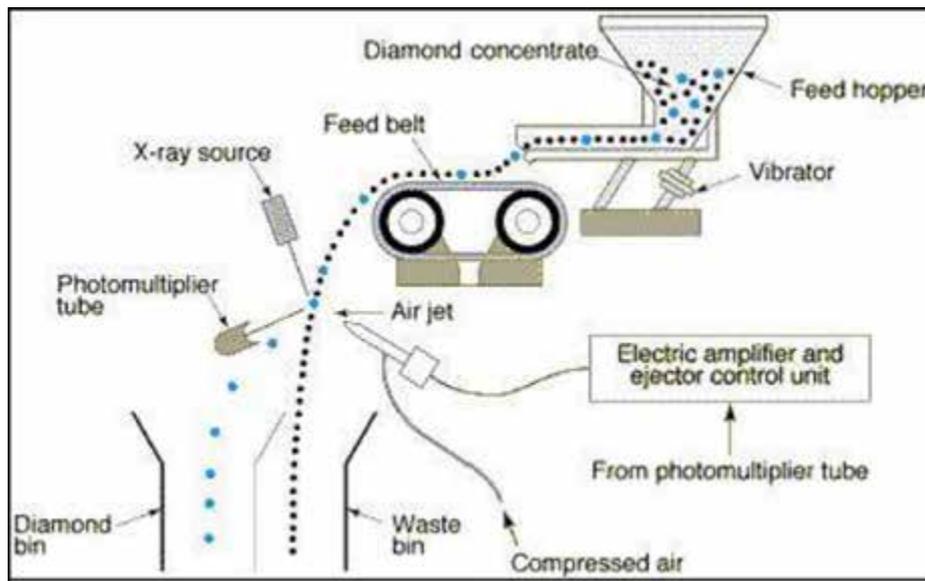


Figure 14. 4 Diamond Processing stages

As you can see on figure 14.4 there is a diamond processing machine. The diamond passes through a feed hopper through a feed belt and there is compression of air. A photomultiplier increases size of light and compressed air from the air jet. Now attempt the activity 14.5.



Activity 14.5 Diamond processing

1. Study figure 14.4 and list processes involved in processing of diamond.

You can see that when processing diamonds they are first brought to the surface, and then they are crushed and washed. The crushed rocks are then passed through a conveyor table covered in grease with hot water flowing over it. The diamonds will stick to the grease whilst the wet particles will slide over the table. The table is regularly stopped and the grease with the diamonds is removed regularly.

The diamonds are then polished and sold. They can also be used as jewellery as they are shiny and reflect a lot of light. The diamonds are sold through the Minerals

and Marketing Corporation of Zimbabwe. So, you can see that diamond processing involves crushing, washing and separation and polishing before they are sold to potential buyers. The processing of minerals at the place where minerals are found increases value of a mineral and this can also be referred to as beneficiation. We want to move on and look at the beneficiation process.

14.7 The beneficiation of minerals in Zimbabwe

Go through the key words section again and look at the definition of the word beneficiation? You can see that it refers to a process that involves improvement in the economic value of an ore by removing the waste material (gangue). This process results in higher-grade products. It is a purification process. Revisit Figure 14.3 and 14.4 and attempt questions that follow.

From what has been shown on figure 14.3 and 14.4 you can see that; beneficiation is a purification process that involves improvement in economic value of an ore. The mineral is first extracted from the ground, the size of the mineral is reduced and then there is physical separation of the mineral through the use of high temperature refinery until a pure metal is produced. The process can also include physical separation, low temperature processing and low temperature refining until the final metal is produced. There are two main processes of beneficiation, which are:

- Froth flotation
- Gravity separation as shown by the Figure 14.5.

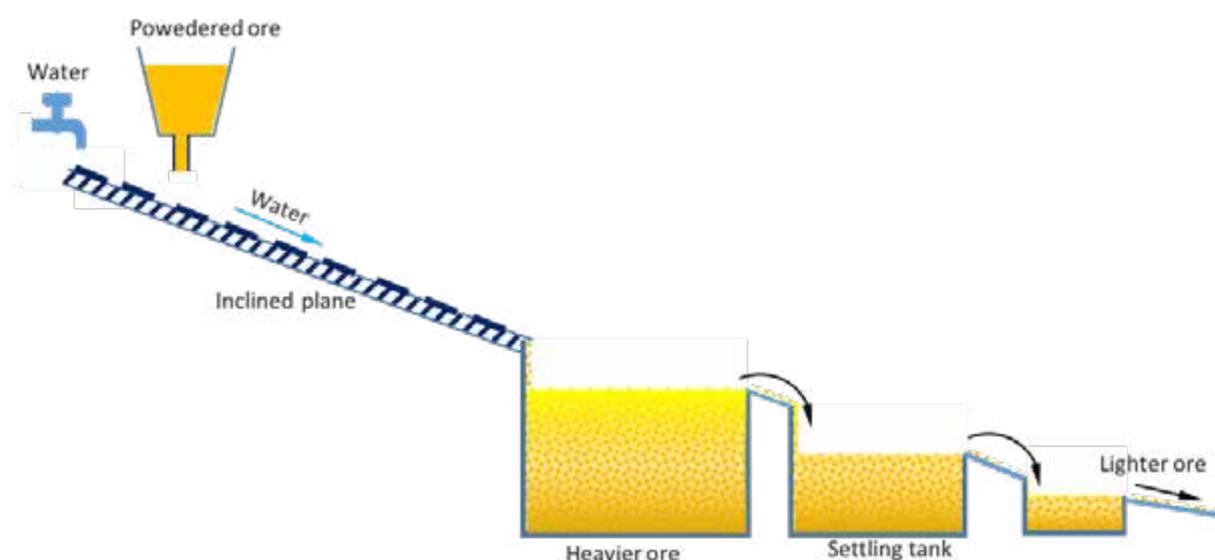


Figure 14. 5 Gravity separation (hydraulic washing)

Figure 14. 5 Gravity separation (hydraulic washing)

14.7.1 What is the importance of Beneficiation?

We have looked at the processes involved in the beneficiation of minerals, which are froth flotation, and gravity separation. We now want to look at the importance of beneficiation to a country. Beneficiation has brought about improvements in value of minerals and increased employment of local people. Attempt the activity 14.7.

Can you think any value brought by beneficiation? I hope you correctly noted that beneficiation leads to a number of advantages to the economy, which include the following:

- Employment creation as many people occupy the downstream industries,
- Infrastructural development,
- Increase in skills development,
- Government gains a lot through tax,
- Development of the water, power, transport, chemicals and telecommunications industry. Let us move on to focus on issues that deal with health and safety in mining.



Activity 14.6 Beneficiation of minerals in Zimbabwe

1. Define the term beneficiation
2. Name any stages of beneficiation shown in figure 14.3 and 14.4
3. What is the last stage shown on the diagram?
4. Suggest any advantages of beneficiation?

14.8 Issues of health and safety in mining

You might have heard of mining accidents elsewhere. Several people have their health and safety compromised in mining, especially when mining is not done properly. Some miners get sick, some die and some are injured. Miners may die or get sick because they lack protective clothing like goggles, gumboots and safety shoes.



Figure 14. 6 Health and safety

Study Figure 14.6 and attempt questions below



Activity 14.1 Small-scale miners

You can see that miners face a number of health risks underground. One of these risks includes decreased life expectancy, as there is increased frequency of cancer of bronchus, lung, stomach and liver. Miners also suffer from pulmonary tuberculosis and insect borne diseases like malaria. They are also liable to dangers associated with explosions and coal dust. Miners can also suffer from mine accidents. Let us look at some of the common causes of mine accidents.

Many miners die because of rock falls and lack of ventilation under the mines. There is also misuse of explosives due to lack of knowledge, this coupled with poorly maintained equipment causes loss of life in the mines. What measures do you think miners need to follow to reduce loss of life underground?

14.8.1 Precautionary measures

Using ICT resources go on internet search and find out what miners do before they get into mining operations. Do you realise that most of what they do is meant to

protect them from mining risks? We are sure you can relate the following with what you have observed from the internet search.

- Miners wear **helmets, safety boots, gloves and dust masks** to make sure that they have enough protective wear before they engage in mining.
- Miners make sure that they make safety as a top priority in any mining activity.
- They are trained in such a way that their goal is to eliminate repeat of accidents.
- They also receive training on safety measures and follow the rules as if their lives depend on it.
- They emphasize hazard detection and reporting.
- They investigate every accident that occurs in an area.

Well done you have come to the end of this unit. Before you close this module, take time to go through the summary below that will help you check what you were supposed to cover. Then after that also check your progress through the questions that follow.



Summary

Here is a reminder of what we have covered in this unit.

- You were able to see that small-scale mining involves the extraction of minerals with minimal use of machinery whilst artisanal mining was defined as the extraction of minerals on a very small scale.
- We were also able to come out with common characteristics of small-scale miners which included exploitation of limited reserves, lack of social security and low levels of capital.
- Need for increased support in order for one to acquire mining loans and need to provide incentives to miners in order to protect the environment from destruction was emphasised.

- We ended up by looking at the legislation governing mining. We identified laws like the environmental management act, mines and minerals act and the national social security authority act.
- Lastly, we looked at issues of safety and health, which include common diseases that affect the miners and common causes of accidents and precautionary measures to be taken. Hope this unit will help you understand more on small scale mining and its contributions to the economy

Now that you have finished this unit, check your understanding from the activities below.

End of Theme Assessment

Fill in questions

1. Small scale miners can also be referred to as
2. ASM in mining refers to.....
3. The common challenges faced by small scale miners are.
4. Main piece of legislation governing mining is
5. List down the protective clothing miners should have.....

Structured questions

1. Describe the common characteristics of small-scale miners
2. Describe the provisions of the social security authority to the mining sector.

Do you remember the objectives of this unit? Do not worry if you need reminding. I have listed them here below. Go through them and check how many of them you have achieved. Tick against those you are sure you have achieved. Put an X against those you feel you have not yet achieved. For any that you feel you have not yet achieved, find the section dealing with it in the unit and go over it again.

Objectives Can you now....	Check Box
• Describe the contribution of small-scale mining to the economy of Zimbabwe,	
• Outline the legislative framework on mining and mining rights,	
• Explain the challenges faced by small scale miners.	
• Explain the processing of selected minerals in Zimbabwe.	

Further reading

Chabikwa, B., Phiri, F., & Mapungwana, M. (2020). *Total Geography Book 3*. Harare: Priority Publishers.

Garirwe, S., Jerie, S., & Manyika, M. (2018). *Step Ahead Geography Form 3*. Harare: McMillan.

Gocha, N. M., Ncube, R., & Nembabware, L. (2007). *Dynamics of O'Level Human and Economic Geography*. Harare: College Press.

Unit 15 Sustainable use of Minerals, EIA and cost benefit analysis

- 15.1 Sustainable use of mineral resources such as reuse and recycling.
- 15.2 Environmental Impact Assessment in mining
- 15.3 The importance of environmental impact assessment in mining
- 15.4 Cost benefit analysis

Introduction

Do you still remember what you learnt in the previous unit? You have learnt about different minerals, small scale mining, processing beneficiation and health. However, in this unit you are going to learn about the sustainable use of minerals that you have learnt including the environmental impact assessment as well as cost benefit analysis.



Objectives

After going through this unit, you should be able to:

- Explain sustainable use of resources
- Describe environmental impact assessment
- Describe the importance of environmental impact assessment in mining
- Explain the cost-benefit analysis
- Describe the importance of the cost-benefit analysis in mining



Key Words

Sustainable use of resources

is meeting the needs of the present without over using so that the next generations would also benefit

Environmental Impact Assessment

it is the process of evaluating or taking into consideration environmental issues of a plan, policy, projects etc of the environment

Cost benefit analysis	is a process in business that is used to evaluate decision
Legislation	laws or a set of laws inserted by the government
Environmental management	these are organized attempts to control the human impact of the environment to preserve natural resources



Time

You are expected to take an average of **10** hours to go through this unit.



Study skills

You are required to have understood the previous unit so as to relate well with this unit. You should know different types of minerals and their importance.

15.1 Sustainable use of minerals

I guess you are wondering what sustainable use of minerals is. Have you ever been given something to eat by someone? Then you were told not to finish it? In this case it means sharing. You will be eating small part considering others to also have a small share or bite. Well in this case sustainable use of minerals means the use of minerals considering the other generations to come. This can also mean reusing and recycling of minerals. As you know minerals are can be used up (exhausted) so they need care when extracting as well as using them. Sustainability then comes into play when people carefully use the minerals. Have you heard of the **3 Rs**: re-use, reduce and recycle?

Re-use

You could have heard this term before, right? Probably in adverts on the radio or television or written on things that you would have bought. Re- use means re using things over again. Examples of things that can be re-used include plastic containers, shoe boxes, clothes, toys etc. For example, margarine containers can be used as lunchboxes or to store food stuffs such as sugar.

Recycle

Have you ever noticed that the things we use daily such as plastic bags, plastic containers and milk containers have a label underneath or beside that says “recycle”? It simply means these materials can be brought back to the factory and undergo a process of recycling or making other new products.

Reduce

This is to make sure that there is less use of materials which may harm or pollute the environment. How do you think people may reduce pollution? Well you are probably thinking of something already. Write your views and check with your facilitator. You may also include promotions done by companies. In this fact a company may ask its customers to bring back containers and the one who brings most will be rewarded. This is a way to reduce waste material on the environment.



Activity 15.1 Sustainable use of minerals

1. Explain ways in which mineral resources can be sustainably used.
2. Why are minerals important? (4)

15.2 Environmental Impact Assessment in mining

Have you ever heard of environmental impact assessment? Well, this is a policy which began here in Zimbabwe in 1994. It was a new policy which was started to help in the sustainable development of the country. Its main purpose is to make sure that resources are used wisely and some to remain for the future generations (sustainable use of resources). An environmental impact assessment is a planning instrument used for three things that is to identify, predict and assess the potential of human activities on the environment. The human activities can either be positive or negative. If the activities are negative, this policy is there to replace them with positive ones. It also evaluates any project to see if it worthy to be conducted or not. Mining requires this policy also. Mining of minerals is governed by acts which include the Environmental Management Act 13 of 2002 This act makes rules and regulations to protect the environment from the negative impacts of mining. The act governs on issues to do with water pollution, sewage discharge, noise pollution use of toxins and pesticides and also hazardous waste by mining companies

You should know that in Zimbabwe there has been established an act which governs the extraction and processing of minerals. This was established in 1961. The measure was put in place to address issues of registering miners and issuing of licences to miners. The act also states the rules and regulations to mine and payment of the local authorities. The act has been revised and amended since then to make sure the environment is fully protected.



Activity 15.2 Environmental Impact Assessment

1. Explain the meaning of environmental impact assessment (4)
2. Why are environmental polices important? (6)

15.2.1 The importance of environmental impact assessment in mining

Why do you think EIA is important in mining industry? We are sure you know that mining and quarrying are projects that can severely damage the environment if not well planned.

By now you should know that environmental assessment is taken up in mining as a rapid assessment technique for determining the current status of the environment and identifying impact of critical activities on environmental parameters. EIA is a relatively new planning and decision-making tool which helps in managing and monitoring mining activities. It is used to predict the environmental consequences of any mining development project. EIA thus ensures that the potential problems are foreseen and addressed at an early stage in project planning and design.

Creation of Environmental Impact Assessment (EIA) system is vital to conform socio-economic development projects to environmental safety and thereby ensure sustainable mining activities. In view of the fact that mining is an ever-growing industry, its impact on the environment is also ever increasing, leading to rapid deterioration in environmental conditions. As such environmental assessment provides a rational approach to sustainable development. It also enables us in carrying out environmental cost-benefit analysis of projects at an initial stage. It is thus a precursor to detailed analysis of environmental impacts, which are taken up only if a need for the same is established. Did you know that comprehensive EIA is usually conducted after

the rapid EIA and sometime after accruing a formal approval? It helps the planning and management to take long-term measures for effective management as well as environment conservation.

15.3 Sustainability and challenges

Minerals like any other resources can get exhausted if they are not wisely exploited. Sustainable use of resources is a concept that entails use or exploitation of minerals in a way which does not disadvantage the future generations from benefiting from the same minerals. That involves thinking of the future when using natural resources such as minerals. Do you consider the future generation when you use any resource? In most case people just think of themselves. As you shall see in this unit, environmental laws and community laws can also be used to sustainably manage natural resources such as mining.

Both the government and industry need to take a comprehensive view of sustainable development that should cover dimensions other than environment, such as stakeholder engagement and consultations, local area socio-economic development and transparency in communication and accountability. Preparation of a socio-economic assessment report for a mining project should be made a part of the permitting process for the grant and administration of mineral concession to a mining enterprise. Local socio-economic development works should preferably be executed by mining enterprises rather than government and semi-government agencies to avoid the problems of inadequate capacity, political manipulation and corruption.

In order to alleviate the limitations of small mines in carrying out sustainable development activities, consortia of small mining enterprises in a region should be promoted. Technical advisory services should be made available to them in the relevant areas. Mineral development in the country should be carried out within its available social and environmental "carrying capacity" and infrastructural facilities at a given point of time. There should also be a deliberate effort by government to eradicate corruption in mining permits and mining rights. In addition to all this, the mining industry should also consider recycling, re-use, substitution of minerals with other materials and continued research in mining and mineral use.

What do you think are the major challenges we face in sustainable mineral resource

use? Certainly, you could have heard about challenges government face in dealing with the small-scale miners. The main problem is on enforcement of the mining and natural resources related laws. The other challenge is lack of finance to sustainably support mining projects. The cost of recycling and finding substitutes for minerals is also high. Above all, lack of knowledge on sustainable exploitation and use of resources such as mineral is high. In countries like Zimbabwe, corruption has also become a major drawback in sustainably managing minerals resources.



Activity 15.3 The importance of environmental impact assessment in mining

As a mining commissioner, suggest measures that you would put in place for the sustainable management of minerals in your country (4)

What difficulties are you likely to face in implementing the measures stated above (3)

15.4 Cost benefit analysis

Have you ever thought of doing a small business to earn some money? It could have been selling some sweets or *freezits*. Probably you have thought of ways to get money (capital) to start your small business. Before doing all that you first seek for a good market. You also need to know if you will be able to earn some profit after selling. This means cost benefit analysis. In mining people do what is called cost benefit analysis. They look at the advantages and disadvantages of mining a mineral. If it brings profit, then people go ahead with it. But if the costs are more than the income gained, they do not go ahead with mining the mineral.

15.4.1 What Is a Cost-Benefit Analysis?

A cost-benefit analysis is a process in mining business used to analyse decisions. The business or analyst sums the benefits of a situation or action and then subtracts the costs associated with taking that action. You must realise that some consultants or analysts also build models to assign a dollar value on intangible items, such as the benefits and costs associated with extracting a certain mineral at a particular proposed mine site. The outcome of the analysis will determine whether the mining project is financially feasible or if the company should pursue another project.

You should know that in many models, a cost-benefit analysis will also factor the opportunity cost into the decision-making process. Do you know opportunity cost? Opportunity costs are alternative benefits that could have been realized when choosing one alternative over another. In other words, the opportunity cost is the forgone or missed opportunity as a result of a choice or decision. Factoring in opportunity costs allows project managers to weigh the benefits from alternative courses of action and not merely the current path or choice being considered in the cost-benefit analysis. By considering all options and the potential missed opportunities, the cost-benefit analysis is more thorough and allows for better decision-making.

- A cost-benefit analysis (CBA) is the process used to measure the benefits of a decision or taking action minus the costs associated with taking that action.
- A CBA involves measurable financial metrics such as revenue earned or costs saved as a result of the decision to pursue a project.
- A CBA can also include intangible benefits and costs or effects from a decision such as employee morale and customer satisfaction.

15.4.2 The Cost-Benefit Analysis Process

A cost-benefit analysis (CBA) should begin with compiling a comprehensive list of all the costs and benefits associated with the project or decision. The process in mining involve some of the following activities:

- Identifying the base case which is simply the projection of the current land use
- Defining the mining project and developing options
- Estimating the impact of the mining project
- Estimating the cost of the mining project impact
- Working out the net value of the mining venture
- Testing for uncertainty and risks
- Preparing report including CBA results and quantitative impacts

You should however know that the costs involved in a CBA might include the following:

- Direct costs would be direct labour involved in mining, inventory, mining equipment or machinery
- Indirect costs might include electricity, overhead costs from management, training of miners, utilities.
- Opportunity costs such as alternative investments, or buying a mine versus prospecting a new mine
- Cost of potential risks such as regulatory risks, mineral exhaustion, and environmental impacts
- Benefits might include the following:
 - Revenue and sales increases from increased production mineral.
 - Intangible benefits, such as improved employee safety and morale, as well as customer satisfaction due to enhanced product offerings or faster delivery.
 - Competitive advantage or market share gained as a result of the decision.



Activity 15.4 Cost-benefit analysis

Tabulate benefits and problems of CBA

Table 15.1 Benefit and problems of CBA

Benefits of CBA	Problems of CBA
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

1. What, in your opinion are the advantages of CBA in a mining project?
2. Design an imaginary mining project and come up with procedures you would follow to do a CBA. Try to attach cost to the process and determine if the project is worth or not.

Reflection

Have you understood the content in this unit? What did we say is meant by cost benefit analysis? If you need further clarification you can meet with your facilitator and or use a relevant website for further reading.



Summary

Well done, you have come to the end of the unit. Hopefully you will be able to attempt the end of unit assessment test. Below are some summary points for this section. You can add more in the spaces provided.

In this unit you have covered the following important concepts:

- Defined and explained sustainable use of resources
- Describe environmental impact assessment in mining
- Described the importance of environmental impact assessment in mining
- Explained the cost-benefit analysis, the process and advantages of it in mining

End of Theme Assessment

Section A multiple choice

Answer the following questions by choosing the correct answer from the options given

1. What is the importance of environmental impact assessment in mining?
 - A. To protect the environment
 - B. To stabilise the environment
 - C. To destroy the environment
 - D. To manage the environment

2. Sustainable use of minerals includes the following
 - A. Refuse, reduce, recycle
 - B. Re-use, reduce, recycle
 - C. Recycle only
 - D. Re-use

3. The environment can be protected through
 - A. Legislation
 - B. Stabilising
 - C. Sustainability
 - D. Managing

4. Challenges of the mines and minerals act include
 - A. Deforestation, siltation and mine dumps
 - B. Afforestation, land degradation and poaching
 - C. Mine dumps, siltation and afforestation
 - D. Poaching, and covered mine dumps

5. Land degradation is caused by
 - A. Mining
 - B. Afforestation
 - C. Sustainable use of the environment
 - D. Acts

Section B

Answer all questions

6. As a mining commissioner suggest ways you would put in place for the sustainable management of minerals in your country (4)
7. What difficulties are you likely to face in implementing the measures stated above (3)

Research Work

We would like you to do a research on any mineral being mined in your local community. Find out how the mineral is being mined. Find out the environment impact of the mining activity. Suggest solutions to the impact you have identified.



Check List

Do you remember the objectives of this unit? Do not worry if you need reminding, we have listed them here below. Go through them and check how many of them you achieved. Tick against those you are sure you have achieved. Put an X against those you feel you have not yet achieved. For any that you feel you have not yet achieved, find the section dealing with it in the unit and go over it again. Right, mark yourself.

Objectives Can you now...	Check Box
• Explain sustainable use of resources	
• Describe environmental impact assessment	
• Describe the importance of environmental impact assessment in mining	
• Explain the cost benefit analysis	
• Describe the importance of cost benefit analysis in mining	
• Assess the challenges and solutions of environmental management legislation	

Further reading

Chabikwa, B., Phiri, F., & Mapungwana, M. (2020). *Total Geography Book 3*. Harare: Priority Publishers.

Garirwe, S., Jerie, S., & Manyika, M. (2018). *Step Ahead Geography Form 3*. Harare: McMillan.

Gocha, N. M., Ncube, R., & Nembabware, L. (2007). *Dynamics of O'Level Human and Economic Geography*. Harare: College Press.

Unit 16 Environmental Management

- 16.1 What is landuse planning?
- 16.2 Types of landuse planning
- 16.3 Landuse planning as an environmental management tool (Risk informed land use management)
- 16.4 Challenges in land use planning
- 16.5 Solutions to challenges of landuse planning
- 16.6 What is environmental management legislation?
- 16.7 International environmental treaties and protocols
- 16.8 Domesticating international treaties and protocols
- 16.9 The effectiveness of legislation on environmental management
- 16.10 Solutions to challenges of implementing environmental management legislation

Introduction

From your studies in level one you covered the basics of environmental management. You probably covered environmental problems. Well, in this unit we are going to turn your attention to solutions to environmental problems. You will be taken through landuse planning in Zimbabwe as a way of fighting against environmental problems. You are going to learn about the urban landuse planning and rural landuse planning. We will explore the types national and international laws that have been put forward to deal with environmental problems.



Objectives

After going through this unit, you should be able to:

- describe land use planning
- explain land use planning as a strategy for sustainable environmental management
- identify challenges in land use planning suggest mitigation measures
- explain environmental management legislation.
- Identify international treaties and protocols relevant to environmental management.
- discuss pros and cons of domesticating international treaties and protocols.
- assess the effectiveness of requisite legislation on environmental management.
- discuss challenges and solutions of implementing environmental management legislation.



Key Words

Landuse	the way land is divided and given specific functions. For example, there can be land set aside for industrial sites or for grazing.
Legislation	the set of laws that are set to govern the nature or operations of a particular human activity. For example, laws govern the cutting down of trees.
Mitigation	the measures put in place to solve a particular problem. For example, contour ploughing to solve erosion on cultivated slopes.
Treaty	an agreement that is entered into by countries to solve a problem that is affecting the whole or a greater part of the world; Countries sign a treaty in order to work together for all their gain.



Time

You are expected to take an average of **10 hours** to go through this unit.



Study skills

- You are expected to have covered the basics of environmental management as you do this unit.
- You will also need to read widely from newspapers and other materials you can get to understand the issue of international treaties.

16.1 What is landuse planning?

You have already come across the meaning of the term landuse. We said that land use is the way land is divided and given specific functions. Land use planning is the process by which a community, using its different structures of leadership, decides where different social and economic activities such as farming, settlements, industry, commerce and recreation should take place within its area. In landuse planning there is the development of carefully worked out methods of dividing and allocating land to particular functions for the purpose of environmental protection and people's welfare.

Note that landuse planning involves knowledge of the land as well as the social and economic situation of the people who are meant to use it. There are many types

of land use you will observe in the country. I am sure even in your locality you have observed different land uses.

Note that in Zimbabwe, land use planning is governed by the Regional, Town and Country Planning Act.

Let us look at what this act is all about. You will notice that it is concerned with the planning of provinces, districts and local areas like wards and villages and townships. It has the objective of conserving and developing the physical environment and to ensure that there is health and safety standards. You must remember that it also seeks to ensure order, service provision and general welfare of the people in the communities.

Moreover, note that the act seeks to promote economic and infrastructural development. It aims to improve communication in rural and urban areas. It administers the making of regional plans and local plans in both urban and rural areas. You have to understand that it seeks to protect and preserve urban and rural infrastructure and the natural environment. It has authority over change in the appearance of rural and urban areas. Note again that the act governs the acquisition of land and controls development over that land. It also governs land use planning and issues related to the land use planning.

In the next section we will look at the types of land use that are there in the country.

16.2 Types of land use planning

The community you live in is either a rural area or an urban area. That community has had some planning for it to be as it is. If it is urban there was *urban land use planning* that took place. If it is rural it was *rural land use planning* that took place. Note that these are the two broad land use planning types. You have to understand that **urban land use planning** is the organisation and allocation of urban space to specialised functions. Meanwhile, **rural land use planning** is the organisation of rural space into areas that help the villagers to make good living. Let us move on to discuss these types of land use planning in detail.

16.2.1 Urban landuse planning

As we have already mentioned above, you could be in an urban area or you have visited one. You must have noticed that in urban areas, different areas have different purposes. Below, we discuss some of the major landuses of urban areas.

(a) The Commercial and administrative landuse

In your urban area or the one nearest to you, there is space that is mean for the commercial function. You may have noticed that on such space within the urban area you will find shops of different types selling different goods. You will also find banks, offices and food outlets of different types as well. This landuse is often in the city centre.

Most businesses that locate in the city centre are after the fact that it is easy to get to the city centre and many people get there. We have to explain that the allocation of land for commercial purposes in any city is necessary as it brings some order and protection of the environment. This landuse is recognisable by its high-rise buildings caused by high costs of the land there.

(b) The Industrial landuse

In any city you go to, the industrial sites are one of the most recognisable landuses you will see. The features of the industrial sites are very different from others. You will recognise it through its zig-zag roofs of factories, chimneys, storage tanks and railway networks. It is necessary to have the factories occupying their specific land within the city because of the pollution they cause. You will notice, further, that the storage tanks could be containing substances that are harmful to people. So, in this case landuse planning would be very important. Do you think it would be safe for the factory to be in the same street with an office and a suburban house? I am sure it is clear that there would be no safety there, hence the need for urban planning.

(c) The Residential landuse

Where you live is a residential area. If it is in the urban areas it must be in a suburb with houses meant for housing people. It is clear that these suburbs are planned by their appearance particularly from the air. You will also notice that within the urban

area there are shops that are placed at good places where people can access them. Suburbs also have playgrounds for children to play on. So, every time you see these remember that they are results of urban planning.

(d) The Recreational Landuse

If you take a walk in most urban centres you are also bound to see parks and picnic areas. These are recreational areas that occupy the recreational landuse. You will recognise the park by their lawns and trees. Very often you will also see benches and shades for people to relax during their leisure time.

(e) The green belts

As you travel out of an urban area towards the rural areas, there are vegetated areas that are protected by cities. In these areas, you will find that there are no construction projects allowed. Cultivation is also not allowed and well as the cutting down of trees. This area is called a *green belt*. Large cities often have green belts in order to protect the environment against uncontrolled or rapid spread of urban areas called *urban sprawl*.

So urban planning, as you have seen above involves the careful allocation of land for each of the above described processes. It also involves the careful control of these functions once they have been allocated identifiable areas. Moreover, as you might notice it involves the consideration of how the landuse affects people's day to day lives. Photographs 16.1.1 and 16.1.2 below show examples of carefully planned urban and rural areas.



Figure 16.1.1 Urban planned residential landuse



Figure 16.1.2 Rural planned residential landuse

16.2.2 Rural landuse planning

When you visit rural areas, you will see a different landscape. There are more open spaces and more natural features than in the urban areas. The landuses in rural areas are also different. This, then, implies that even our landuse planning will be different in the rural areas. Let us then take a look at the rural landuses.

(a) Arable land

Every rural area that you visit in Zimbabwe will have some cultivation on it. This is a common landuse in rural areas. I am sure that if you have a rural home there is a lot of land that is placed under cultivation. The land for cultivation is allocated by arrangement with the local authorities in the form of head men and chiefs. Note that when that happens that is rural landuse planning. This landuse consist of cultivated and uncultivated agricultural fields.

(b) Grazing land

You must be aware that rural people also keep different livestock. The livestock have places where they graze. As you might be aware, this grazing land for livestock is also given space within the rural landscape. The choosing or identification of areas where livestock like cattle, goats and donkeys graze is actually also landuse planning. If you were to go to large farms called ranches you would see that grazing land is divided into smaller grazing lands called paddocks. This is landuse planning as well.

(c) Private land

You have to note that the rural areas also have commercial farms. These farms are privately owned. You will realise that when the state plans development for rural areas they normally do not have these farms in mind. The reason is that if you were to go to these farms you would notice that they are well planned and developed to a modern level. Some planning goes into making them as organised as they are.

(d) Game parks and wildlife reserves

Some of the wildlife you will find in rural areas are actually living game reserves and parks. This shows you that one of the landuses in the rural is that of game reserves. In Matabeleland North, for example the Hwange National Park takes a very large piece of land. You will find that this is also true of Masvingo where the Gonarezhou National Park is found. Figure 13.1 below shows you provinces where National Parks are found in Zimbabwe.

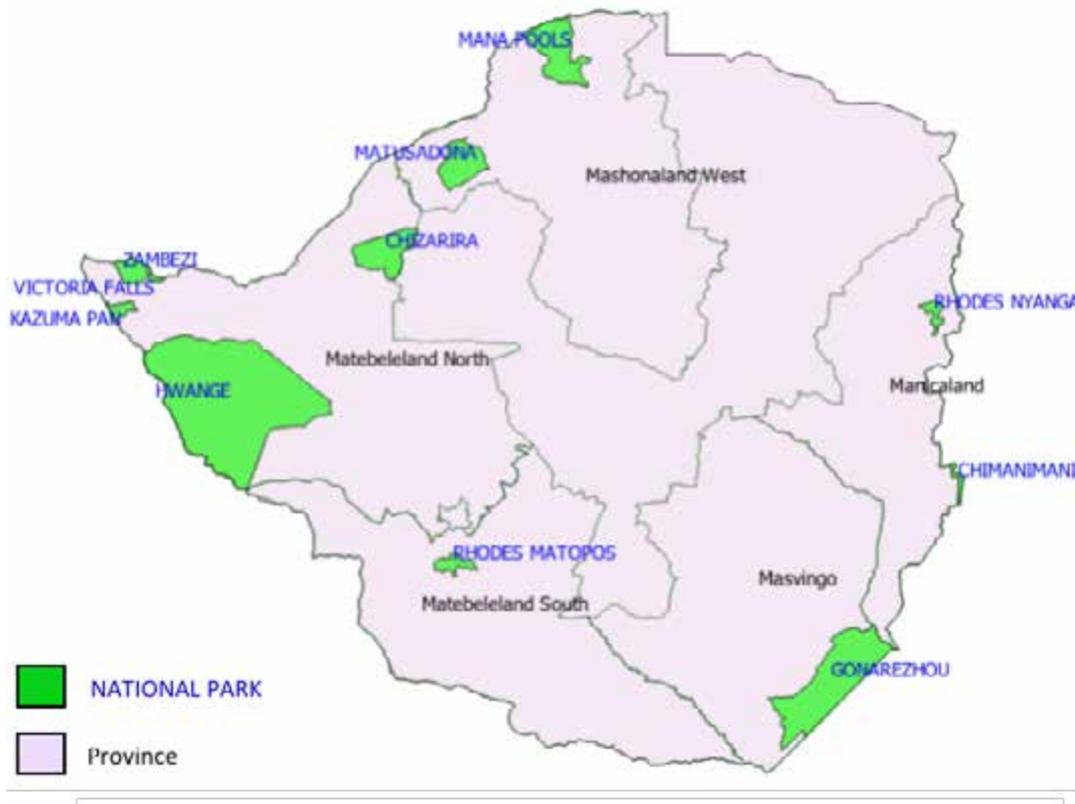


Figure 16.2 National Park and the provinces they are found in



Activity 16.1 Types of Land use planning

1. What are the differences between urban land use planning and rural land use planning?
2. In what ways are national park a good environmental conservation tool?

16.3 Landuse planning as an environmental management tool (Risk informed land use management)

Let us now look at how landuse planning is important for environmental management. You must take note of the fact social and economic activities all have an effect on different aspect of the environment. The most affected parts of the environment are discussed below. In all landuse planning that occurs there must be good *land use zoning* and the actions must be *risk informed*. **Land use zoning is the dividing of land and allocation of a special purpose for each of the divisions within an area.** You must note that to be **risk informed** is to plan with an awareness of the **environmental problem that could be caused by the results of the planning.**

(a) Planning for Water Resource protection

Let us start this section by this question. What is it that causes water pollution? You must have said human activities like manufacturing, domestic processes and farming. You were correct if you mentioned some of these. Human activities that pollute water also include mining. These human activities, as might be aware, release waste water and solid waste into the vital water ways.

You must note that this implies that when landuse planning is done, there must be planning of the water ways. There must be consideration of the location of the human activities and water ways. The siting of industries for example in a town must take into consideration the flow of the rivers of the town and the location of the dams or lakes that could be close by. While you can decide the location of a factory you cannot relocate a river! You have probably heard of the pollution of lake Chivero in Harare. It is a good example of failed urban planning as far as siting of industries and sewage systems is concerned. Figure 16.2 shows you the city of Harare, main rivers that feed into Lake Chivero and the lake itself.

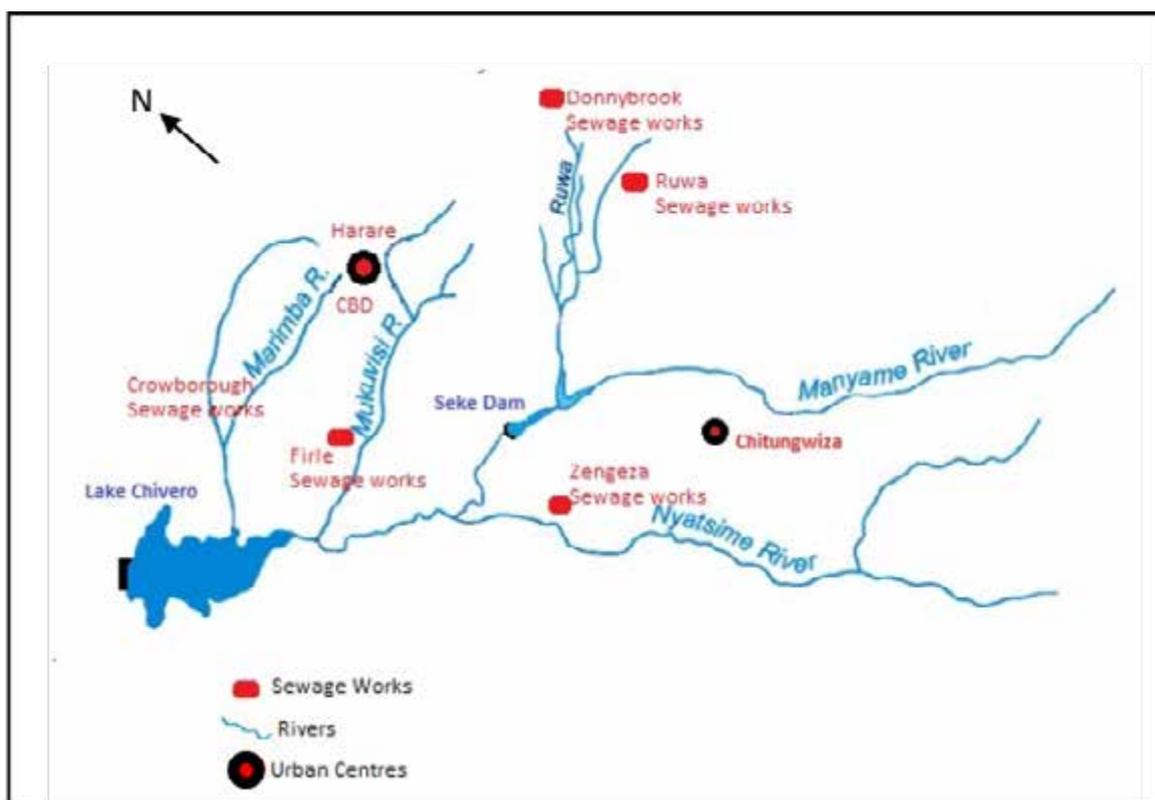


Figure 16.2 Rivers draining into Lake Chivero carry sewage and urban waste into the lake

We are sure you will appreciate the fact the Lake Chivero case is a lesson that town planning should also consider how where industry, agriculture and sewage plants should dispose of their waste. The water ways like rivers should be protected from liquid waste produced by human activities.

(b) Planning for the protection of the soil

You have to note that it is not only water ways that are affected, even soils are affected as well. The soils are affected mainly by agricultural processes. The cultivation of the soil destroys the soil by encouraging soil erosion. You have to realise that the loss of the top soil is a big problem especially in rural areas. As a result, soil should be planned for too.

You must understand that landuse planning for soil should considers how to deal with streambank cultivation. You will realise most city councils in Zimbabwean cities use a fire-fighting approach. This means that they deal with the problem when it has already occurred. Perhaps you have seen the crops that are near streams in urban areas being cut down by council workers. Note that cultivation on slopes in the areas where communal farming is practised is also another target area for landuse planning. As you might now realise landuse planning for the environment needs to also include some application of laws. In the cases we are discussing here laws against stream bank cultivation and slope cultivation need to be put forward an enforced as well.

Note again that soil can also be affected through soil pollution. The use of fertilizers, fungicides and pesticides pollutes the soil with chemical that remain in the soil for a long time. You will realise that soil pollution reduces soil fertility. This later affects the production in farms. As a result, the land use planning should also consider how to deal with pollution of the soil. How, do you think this is done? One way in which it can be done is through educating farmers on soil pollution. You also will notice that banning as certain harmful substances like DDT is also another way of land use planning that considers soils.

(c) Planning against deforestation

Another environmental problem that you will see occurring on the environment is deforestation. **Deforestation is cutting down of trees that is harmful to the**

environment. You must note that this is a typical problem for rural areas. In the rural areas, as you might have seen, people cut down trees for fuel wood and in order to get construction materials. As land use planning occurs therefore there must be consideration of putting forward laws that protect trees.

You must also note that in the urban areas the construction of houses and other structures causes deforestation. The authorities must therefore, plan with the loss of vegetation in mind. You have to further note that the loss of vegetation also leaves the place drier because of lack shade and openness to blowing winds that dry the place. You will realise that the meaning of all this is that there is need for consideration of vegetation in all construction and rural landuse planning.

(d) Planning against air pollution

Let us now consider air pollution. You should have noticed from you own environment that the burning of different fossil fuels pollutes the air. The smoke from cars, factories and even homes causes air pollution. It is important for our authorities to carry out land use planning with this type of pollution in mind as well. The unavailability of energy or the shortage of it will cause you to look for polluting alternatives.

You will realise further that the way to plan for energy supply is provide land and systems for alternative energy sources like solar energy plants for cities or sections of the city. Solar and wind farms need land for the equipment that is used to generate electricity for the city or part of the city. Study Figure 16.3 that illustrates for you a solar plant for electricity generation.



Figure 16.3 A solar plant – for generating electricity using mirrors and central boiler.



Activity 16.2 Landuse planning as an environmental management tool

1. What aspects of the environment should be considered in land use planning?
2. In what ways can land use planning be increasingly made to include issues of environmental management?

16.4 Challenges in land use planning

You are probably now wondering why land use planning been limited in success in Zimbabwe. The answer lies in the challenges that are there in the attempts to make it work. We are going to look at some of these challenges in this section.

(a) Lack of clear and integrated policies

As you have already seen above that land use planning needs to be integrated with development and environmental management. **To be integrated is to combine the two or more processes so that you have them being done together.** This integration has been difficult because we have environmental policies being independent and

city laws (called by-laws) also being independent. Energy regulation and laws are also independent. As a result, you have a lack of unity in our laws though they are all applied on the same environment.

(b) Lack of involvement of primary land users

You will find that much land use planning is done by the technical people in offices. Sometimes it is done by hired people who are from universities. Very often your simple villagers and simple community members are excluded. You will find that that is a mistake. The people on the ground must be included because they are the ones who use the land. Note, also, that the problems of shallow landuse planning affect these people. It is important to include the land users. Failure has resulted because they have often been left out.

If you were to go to areas where there is growth, there are often problems of exclusion of the general land users. In such places that are changing from rural to becoming more urban, there are fights between the rural councils and the villagers on issues like grazing land, cemeteries and traditionally important sites. The council pegs residential stands in those areas that the community considers important for other purposes. Such fights lead to the failure of landuse planning.

(b) Corruption

You have probably heard the word *corruption* being spoken in areas where development must take place. **Corruption is selfishness and seeking personal gain illegally.** You have most likely noted that in issues of land use planning, issues of bribery and *personal diversion* are the ones that affect programmes meant to develop communities. **Personal diversion is stealing company or government equipment and property for personal use.** You will find that in some cases rich people buy their way into areas that have been banned from use. Sometimes you may find officials using the land themselves. Such behaviour causes landuse planning to fail.

(d) Inadequate money

It must be clear to you that all programmes of land use management need money for them to succeed. It is often the case that you find that there is very little money

for land use planning. You can clearly see that without money the programme fails. Money is necessary for buying equipment and paying officials. In some cases, the money is needed for buying land from private ownership. Shortage of funds affects other factors like the one discussed for you below.

(e) Lack of equipment

As you have seen in the factor discussed above lack of money also causes lack of equipment for land use planning. Once the necessary equipment is not there, the officials find it very difficult to do their work. You must note that the equipment could include computers, surveying tools, machines and motor vehicles for transport. The land use planning programmes die before they are started because of the lack of equipment.

(f) Lack of knowledge and experience

You will notice that in some cases there is lack of knowledge among the people manning council offices. Where engineers have knowledge from books without the ability to apply the knowledge on real situations. If you were to have such engineers in land use planning and zoning there would be less progress. In most cases of failure of land use planning programmes in Zimbabwe, the failure has been caused by lack of knowledge on the part of the local authorities.



Activity 16.3 Challenges in land use planning

1. Describe some corrupt activities that affect land use planning negatively.
2. What do you understand by the term *integration* as used in land use management? How can it solve some challenges of land use planning?

16.5 Solutions to challenges of land use planning

Having looked at the reasons for the failure of land use planning, what do you think could be done to solve the problems? Well, this section will look at some of the solutions that have been attempted in solving problems of land use planning.

(a) Integrating policies.

In the sections above we discussed the lack of unity in the policies that are concerned with the environment, development and land use planning. Such policies have to be integrated so that the experts from all these areas work together. You may have noticed that there is no way development can exclude land use planning. There is no way that land use planning can exclude the environment. So, integration is the way to go.

(b) Involving the land users

We also discussed the lack of involvement of the land users in the land use planning process. This, as you will have noticed can only be solved by bringing in the land users. These are the simple people like villagers and town residents. Meetings to collect their views could be called. You must note that such meetings would give the ideas of the people on the ground to the whole process. You will realise that in some places they include only representatives of the residents and villagers on the ground. This is another way of getting the communities involved.

(c) Involving experts from different fields

You have to note that the processes involved in land use planning are technical. This means that they need specialists. You have to further note that the processes are many and different. This means that there will be many and different specialists needed for land use planning to be successful. It is not only a job for town planners or rural council engineers. As we have been discussing, even environmentalists, health personnel, people from schools and business people have to be involved as well.

(d) Rural electrification

You might be aware that in Zimbabwe the Rural Electrification Agency is involved in spreading electricity to rural areas. This has succeeded in areas where it has been done. There has been a diversification (involving many different ideas) of ways of making a living. It has also saved many forests that would have been cut. Electricity also ensures pumping of cleaner ground water. There is reduced pollution in the communities. In some cases that you may see there is use of biogas and solar energy sources as environmentally friendly solutions.

(e) Education of people on land use

You will notice that education of people on land use gives people an awareness of the authorities' plans. Education of people also gives knowledge on how they can use their land. You may be aware that in some places only environmental campaigns are done. These need to be integrated with other technical areas like agriculture, mining, business and development. Note that once people are educated on land use planning, they will work easily with council authorities. This reduces conflicts.

In the next section of this module we are going to look at environmental law. We will

look at both national and international environmental law. We are going to start by looking at environmental laws in Zimbabwe.



Activity 16.4 Solutions to challenges of land use planning

1. Explain the importance of the land users in land use planning.
2. Evaluate the role of rural electrification in land use planning.

16.6 What is environmental management legislation?

You have to understand the word **legislation**. It means laws, as has been outlined above. Environmental legislation is all the laws that govern environmental issues. You must also understand that there are two types of environmental law – national laws and international laws. In the next section we are going to look at international environmental law.

16.6.1 Environmental legislation in Zimbabwe

Have you heard of the Environmental Management Agency (EMA)? You must note that EMA was established after the passing of the Environmental Management Act (EMA as well). This act set up structures to govern environmental issues in Zimbabwe include the agency EMA. Yet you must note that the most important issue that EMA brought was to integrate the different laws that had pieces of environmental legislation in them. Table 16.1 below shows you the laws that were integrated and what EMA deals with.

Table 16.1 The Laws that were amended because of the EMA

Title of the Law	Year passed	Components of the law (What the law deals with)
Parks and Wild Life Act	1975	<ul style="list-style-type: none"> • Inland fisheries, fishing gear and methods • Hunting authorisation, equipment and hunting methods • Wildlife products (animals and plants) • International trade and protection of all species • Offences and penalties

Agricultural Land Settlement act	1970	<ul style="list-style-type: none"> • Land tenure (land ownership and distribution) • Farming (arable and livestock farming) • Agricultural development • Legal processes for farming cases
Rural Land Act	1963	<ul style="list-style-type: none"> • and tenure and subdivision of land • Farming
Communal Land Act	1983	<ul style="list-style-type: none"> • Communal ownership of land • Traditional rights • Land tenure
Forest Act	1949	<ul style="list-style-type: none"> • Structure governing forests • Classification of forests (public, and private forests) • Protection of forests • Forest fires • Timber extraction • Restoration of forests (afforestation and reforestation) • Authorisation on use of forests • Offences and penalties
Water Act	1998	<ul style="list-style-type: none"> • Structures in the governing of water • Authority over freshwater resources • Watershed and drainage basins • Ground water and water abstraction (sinking wells and boreholes) • Water works • Surface water and water supply • Water rights • Water pollution, drought and shortage

Meanwhile, you will note that there were laws that were totally incorporated into EMA. These are laws that dealt directly with environmental issues. These laws form the backbone for EMA today. Study Table 16.2 that shows you these laws.

Table 16.2 The Environmental Laws that were removed and turned into EMA

Environmental Law	Year passed	Components (What the law deals with)
Natural Resources Act	1968	<ul style="list-style-type: none"> • Fresh water resources, management and improvement • Water works • Water conservation zone • Protected areas • Offences and penalties • Soil conservation and soil improvement • Sustainable use of resources
Noxious Weeds Act	1926	<ul style="list-style-type: none"> • Weeds • Pesticides
Atmospheric Pollution Prevention Act	1971	<ul style="list-style-type: none"> • Structures governing protection of atmosphere • Air quality and air pollution, • Emissions into the atmosphere • Environmental standards

Hazardous substances and Articles Act	1971	<ul style="list-style-type: none"> • Structures governing the issues of food quality and safety • Food quality control and food safety • Plant protection • Pesticides, Fertilizers • Pollution control • Hazardous substances and hazardous waste • Packaging and labelling
---------------------------------------	------	---

You will appreciate the fact that the Environmental Management Act incorporates quite a lot of laws. These laws were not integrated before EMA but have since been integrated. This is what make up Zimbabwean environmental law.



Activity 16.5 What is Environmental legislation?

1. What do you understand by the term legislation?
2. Briefly explain what the Environmental Management Act is all about.

16.7 International environmental treaties and protocols

When you look at international environmental law, you are looking at over 80 major agreements. You will be talking about agreements that were all signed in order to look at specific issues of the environment. They date back to the 1940s up to present day. It is important for you to note that these agreements are international but countries sign into them as they please. There are some agreements that are not signed by all countries. You will find very few, in fact, that are signed by all countries. In some cases, some countries choose not to commit themselves into agreements.

Study Table 16.3 which shows the major international treaties and protocols. Remember, the word *treaty* simply means an agreement by governments. Meanwhile, the word *protocol* means an agreement that countries sign into as an indication of agreement on an issue. The full treaty itself might still have more work to be done.

Table 16.3 The Major International Convention and protocols

Treaty/ Protocol	Environmental Area of Focus	Year passed	Components (what the law deals with)	Acceptance by countries
Kyoto Protocol	Air pollution in form harmful gases.	December 1997	Control of air pollution in form of the following harmful gases. The gases focus on are: <ul style="list-style-type: none"> • Carbon dioxide • Methane • Nitrous oxide • Hydrofluorocarbons (HFCs) • Perfluorocarbons (PFCs) • Sulphur hexafluoride 	Not all countries signed (144 out of 192)
Paris Agreement	Global Warming	December 2015	<ul style="list-style-type: none"> • Focus is to control global warming through the control of greenhouse gases. • Countries have to set dates for action 	Partly signed. Some countries did not set dates or make any commitments.
Bamako Convention	Hazardous substances	January 1991	<ul style="list-style-type: none"> • Banning the entry of hazardous waste into Africa • Banning trade of hazardous waste in Africa • Hazardous waste includes nuclear waste 	Readily signed by 27 countries including Zimbabwe. Some countries attended as observers.

Convention on Biodiversity	Biodiversity (the richness and different types of plants and animals)	June 1992	<ul style="list-style-type: none"> • Conservation of biodiversity • Sustainable products of biodiversity; • Governing profits from biodiversity products. 	168 out of 196 signed.
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)	Trade in endangered species	1973	<ul style="list-style-type: none"> • Governing trade on endangered species of plants and animals • Protecting over 34 000 species of animals and plants • Putting species into three categories called appendices • Appendix I being the most severely endangered while Appendix III being the least endangered. 	183 countries signed.

The Zambezi River Basin Action Plan	The Zambezi river and its drainage basin	May 2007	<ul style="list-style-type: none"> • Freshwater resources management • Education on the fresh water resources • Data collection and reporting • Governs the laws concerned with the Zambezi river basin • EIA and resource damage evaluation • Monitoring drawing survey maps • Sustainable use of water. • International relations and cooperation • Governs over the drainage basin of the river • Water supply • Pollution control and sustainable development 	Angola, Botswana, Malawi, Mozambique, Namibia, Tanzania, Zambia and Zimbabwe are the parties to the treaty
-------------------------------------	--	----------	--	--

I am sure you are aware that the above tabled conventions are not the only ones that are there. This is only a sample of convention and protocols that Zimbabwe has signed. These conventions are only effective by the co-operation of the signing countries. In Table 16.3 we dealt with the term to *ratify*. This term means a country has agreed to a treaty that they had just only signed. Ratification is usually done after the country has considered the treaty against its own laws and interests. In the following section we will look at the application of international laws in countries.



Activity 16.6 International Environmental treaties

1. What is an environmental treaty?
2. What is the difference between signing and ratifying a treaty? How do these processes affect international environmental law?

16.8 Domesticating international treaties and protocols.

We have been discussing about international environmental law so far. Now let us look at how environmental law is domesticated. To *domesticate is to bring some something home that did not belong to the home*. In this case we are talking about making international environmental law work within the country. There are some who view international law as ineffective while others think that they are useless.

You must be aware of the fact that domestication of any international law is an issue still under discussion. Yet it is also important for you to note that the Zimbabwean constitution accepts that international law is supposed to be binding in Zimbabwe. This means that international law should be effectively followed in Zimbabwe.

Note however, that the same constitution says that people should have a say in the adoption of international law through their representatives in Parliament. International environmental law cannot become fully effective in Zimbabwe unless Parliament has made it into an act of parliament. This, you must understand, means that the parliament has to agree with what international law states and include it into acts of Zimbabwean law for it to be fully effective. So, what is signed by Zimbabwe's representative at any convention must be adopted and integrated by parliament for it to be fully effective in Zimbabwe.



Activity 16.7 Domesticating International environmental law

1. What is to domesticate an international treaty?
2. Describe the processes necessary for the domestication of environmental law in Zimbabwe.

16.8.1 Advantages of domesticating international treaties and protocols

From the discussion above you can see that international law has very few advantages. One of the clear advantages is that brings countries together and gives them a starting point for *co-operation*. Secondly, you will notice that environmental law *brings countries together* to share ideas about the international problems. A good example of this is the information that is shared by countries on climate change.

You must note that international conventions are good suggestions of what countries should have in their domestic law. They are a *standard* against which countries can measure themselves against. Note that domesticating international law also gives the country a chance to participate in important global issues. Some of these global issues *help our planet*. An example here is Zimbabwe participating in CITES protects the endangered species of plants and animals. This is not only good for Zimbabwe but is good for the world as well.

16.8.2 Disadvantages of domesticating international treaties and protocols

Perhaps having gone through the advantages of domesticating international treaties, you are aware what the disadvantages are. Let us now discuss the disadvantages of domesticating treaties. One disadvantage that stands out is the *lack of strength* of international law within individual countries. The law is without any one who real stands for it with power to enforce it.

You must have noticed, as we listed the treaties that Zimbabwe signed that *not all countries signed the treaties*. This is another disadvantage of treaties – that some countries may choose not to sign a treaty. Others may sign only and not ratify it. You must be aware that this part signing of treaties brings a weakness to the effectiveness of treaties.

Let us also make it clear that some treaties bring to the table *problems that are only being experienced by some countries*. This means that some countries will be having no problem about some of the issues brought to the international table. An example you must be aware of is the case of the Zimbabwean elephant that was placed in Appendix I of the CITES treaty in the 1990s. This case was based on elephants in

countries like Kenya which were getting fewer in numbers. At that same time the Zambesi valley was overpopulated with elephants and they were being destructive to the ecosystem. As you can see Zimbabwe had a different problem with the elephants. At that time Zimbabwe was forced not trade in any elephant products.

Note also that enforcing international law means use of *money*. Some countries like our own might not have the money necessary to put equipment, machines and structures and personnel in place to help implement the treaty. Moreover, notice that another shortfall is the lack of skilled people to help enforce the law. Another question that arises is how effective is domestic environmental law itself? In the section that follows we are going to look at this question. We will discuss how effective all environmental legislation is.



Activity 16.8 Importance of domesticating environmental treaties

1. In what ways did the CITES treaty disadvantage Zimbabwe in 1990s?
2. What are the effects of the withdrawal of some countries from environmental treaties?

16.9 The effectiveness of legislation on environmental management.

In section 16.8 above, we discussed the components of EMA. The question you should now ask yourself is, how effective EMA really is. Well, EMA covers all the important issues of the environment, as you have seen. Its effectiveness is limited by several factors.

You will appreciate the fact that Zimbabwe lacks a practical approach in the scientific community to study the environment deeply. Partly this weakness is due to lack of money for scientists to do their research. Without deep research our real environmental problems remain hidden until it is too late. You will also notice that the solution to our environmental problems will be drawn from the experiences of other countries rather than on our own research.

Another problem affecting the effectiveness of environmental law in Zimbabwe is corruption. Some officials can be bribed to overlook issues that should be taken into

account environmentally. EMA (the agency) is limited in being mobile enough to cover much of the country. In some cases, they are seemingly powerless to do anything. Examples of such cases are several cases of illegal gold panning in the country that damage the environment. You will also note that EMA seems to have no power in controlling deforestation especially in around urban areas where fuel wood and charcoal are a huge business with the power-cuts that Zimbabwe has experienced.

You must also understand that the effectiveness of EMA is reduced due to the small fines that are charged against environmental offenders. This especially applies to the large companies that find the fines for offending cheaper than costs for processing their waste to meet safety standards. This then defeats the whole purpose of environmental law.

16.10 Solutions to challenges of implementing environmental management legislation.

You are probably now thinking – What can be done to make environmental law more effective? One point which can be the starting point is the education of people in different issues of the environments. You will appreciate that we have to put effort in building an environmentally educated population.

You must note that EMA (the agency) should involve people on the ground more. They could do this through self-help project on the environment. The traditional leadership in the form of chiefs and headmen also must be involved deeply in dealing with environmental problems of their communities. As we mentioned in issued to do with land use planning above, the issues of the environment should be treated less technically and be brought down to the communities. Note that every environmental problem takes place in a community.

Moreover, you must realise that EMA needs to integrate its working with other experts like farmers, health workers and land use planners. You might be aware that EMA is working very closely with Ministry of Education and schools. That is good, I am sure you agree. Yet, you will realise that there could more that is done if EMA were to link with business people more. They should include people like kombi drivers who carry people who might litter, for example.

We ought to also have more effective environmental monitoring taking place. EMA targets institutions and companies because they are easy to approach. The real damage happens elsewhere with community traditions and ways of making a living. If you were an EMA official you would do well to come up with plans of monitoring even the village lifestyles in rural areas and township trends in urban areas. An example you might have noticed in the townships is that women sweep outside their yards every day and cause soil erosion. What should be done? You are correct if you said they should be educated on soil erosion.

Government should also equip EMA with the modern machines for environmental monitoring. At district level and below EMA officers should modern equipment to monitor the environment. You should note that the EMA officers are sometimes not well equipped to do their work.



Activity 16.9 Implementing environmental management laws

1. With reference to Zimbabwe, in what ways does EMA enforce environmental law?
2. What measures can be put forward to improve the implementation of environmental law in Zimbabwe?

Well done, you have completed this unit. Please go over the summary below to check on the points we covered in the unit.



Summary

- In this unit the first thing we looked at was the definition of land use planning. We further looked at the types of land use planning in form of urban and rural land use planning.
- We looked at the main land uses in urban and rural areas. We noted the differences between rural land use and urban land use.
- We saw how land use planning is done in the rural and urban areas in order to include environmental issues. We took you through planning for the soil, biodiversity, water resources and the air as land use planning is being done.
- The unit also took you through the problems of land use planning. We discussed the issue of involving the community in land use planning. We also discussed the issues of corruption, lack of funds, lack of modern knowledge as problems to land use planning.
- We examined the solutions to these problems which included involving land users, involving experts from other fields and rural electrification.
- Our attention also went to environmental legislation. We defined what environmental legislation is.
- We also looked at what EMA is all about. We looked at laws that are contained in EMA and those that make up the backbone of EMA.
- We further looked at environmental law. We defined what a treaty is. We further defined what a protocol is.
- Then we considered the signing and ratifying of treaties. We looked at examples of international environmental treaties to which Zimbabwe is signatory to.
- We further discussed the difficulties of domesticating international environmental treaties.
- We finally looked at environmental management legislation and how effective it is in Zimbabwe. We examined the challenges and possible solutions to the problems of environmental legislation.

End of Unit Assessment

1. Match the international laws given below to their environmental focus.

Treaty	Environmental focus
Bamako Convention	
Paris Agreement	
CITES	
Kyoto protocol	

2. (a) Distinguish between a signing and ratifying a treaty

(b) What are the problems encountered by countries in trying to domesticate international environmental treaties?

3. Discuss the view that environmental problems can be solved better by domestic law rather than international treaties.

Research Work

Find out from the local council office or EMA offices, what structures EMA has in terms of officers working in the communities.

Compile a register of at least three institutions or companies in your locality that are environmentally audited by EMA.

(a) What is it that EMA monitors in that institution or company?

(b) How much do they pay?

(c) How often do the officers visit?

(e) How effective is the environmental audit in your register?



Progress Check list

Do you remember the objectives of this unit? Do not worry if you need reminding. I have listed them here below. Go through them and check how many of them you have achieved. Tick against those you are sure you have achieved. Put an X against those you feel you have not yet to achieve. For any that you feel you have not yet achieved, find the section dealing with it in the unit and go over it again. Right mark yourself!

Objectives Can you now....	Check Box
• describe land use planning	
• explain land use planning as a strategy for sustainable environmental management	
• identify challenges in land use planning suggest mitigation measures	
• explain environmental management legislation	
• Identify international treaties and protocols relevant to environmental management.	
• Identify international treaties and protocols relevant to environmental management.	
• Identify international treaties and protocols relevant to environmental management.	
• discuss challenges and solutions of implementing environmental management legislation	

Further reading

Chabikwa, B., Mapungwana, M., & Phiri, F. (2020). *Total Geography Book 3*. Harare: Priority Publishers.

Bunnet, R. (1984). *Physical Geography in diagrams for Africa*. Harlow: Longman Group Limited.

Education, Ministry (1985). *School Atlas for Zimbabwe*. Stockholm: Esselte Map Service.

Waugh, D. (2014). *Geography: An integrated approach*. Oxford: Oxford University Press.

Unit 17 Agriculture and land reform: Land tenure, land reform and small-scale farmers

17.1 Land tenure systems

17.2 Land reform/Reorganisation of land

17.3 Land Resettlement in Zimbabwe

17.4 Challenges associated with Phase 2 land resettlement programme

17.5 Small- scale farming and food security

Introduction

We guess you could have heard about the land reform programme in Zimbabwe. Remember that the land reform in Zimbabwe has been a burning issue in the country's history. In this unit we shall start by discussing the concept of land tenure and show how it affects a farmer's decision making. We also identify the different forms of land tenure and the advantages and disadvantages of each system. This will be followed by a discussion on reasons for land resettlement in Zimbabwe and challenges associated with land reform. We end by suggesting mitigation measures to these challenges. We hope you will find this unit more interesting.



Objectives

After going through this unit, you should be able to:

- describe land tenure
- identify forms of land tenure in Zimbabwe
- explain characteristics of each land tenure system
- explain the advantages and disadvantages of each land tenure system
- describe land reform.
- explain forms of land reform
- identify reasons for land resettlement in Zimbabwe
- explain the land reform process in Zimbabwe
- discuss challenges associated with Phase 2 Land reform
- suggest solutions to the problems
- describe small- scale farming and food security in Zimbabwe



Key words

Land tenure:	the system of landholding or land ownership.
Land reform:	refers to the process of redistributing land to the landless
Land consolidation:	whereby small pieces of land are joined together to form one big plot which allows use of machinery
Land fragmentation:	whereby a big piece of land is divided into smaller landholdings for each household.
Land resettlement:	the relocation of families and individuals from overcrowded communal areas to planned farming areas provided by the government.



Time guide

You are expected to take an average of **10 hours** to go through this unit.



Study skills

- Before you proceed with this unit, we advise you to revisit your level 1 Unit on Agriculture and Land Reform so as to be able to link this unit to the previous concepts.
- Always take notes as you go through this unit.
- You are also being encouraged to read newspaper articles, listen to the radio and watch television programmes related to agriculture and land reform in Zimbabwe.

17.1 Land tenure

We hope you still remember how we have defined land tenure on key words. Can you write down the definition again in your own words. We defined **Land tenure** as a system of landholding or land ownership. You will realise that the system of landholding is very important because it affects a farmer's decision making. There are different forms of landholding in Zimbabwe. The following are types of land tenure in Zimbabwe.

17.1.1 Freehold tenure

In freehold tenure the farmer owns the land on which he or she farms. In Zimbabwe, before 2006 land changes, this system of land ownership was for commercial farming, both large and small- scale. The farmer has title deeds for the farm which gives him the right to own the land. Thus, the farmer is free to develop or to even sell the land.

What are the advantages of Freehold tenure?

- the farmer can make improvements on the land such as fencing, sinking a borehole, constructing a dam, gully filling and terracing that improve farming
- the title deeds can be used as collateral security when the farmer wants to get loans from banks for farming purposes
- the owner has the freedom to make renovations on any property on the land

What are the disadvantages of Freehold tenure?

- All costs related to land improvement are paid off by the owner alone
- The system does not allow equitable distribution of land
- Farmers may pursue personal profitability in ways that are socially or environmentally unsound.
- All administrative costs of owning a full title property are paid by the land owner

17.1.2 Leasehold tenure

Have you ever thought of the meaning of the word **lease**! This simply means to rent or to grant use or occupation of under a term of contract. Can you suggest other words that mean the same as lease? If you said to hire out, charter, to let you are in the track. Now leasehold tenure is a system where the land owner is given the right to use the land for a specified period of time on agreed terms. In some cases, if the farmer manages to develop the required farm infrastructure, the farmer will be granted freehold ownership. This was very common in Zimbabwe in the large- scale farming areas.

What are the advantages of freehold tenure?

- The farmer has a chance to eventually buy the land, thus converting from leasehold to freehold. This is cheaper.
- The farmer sometimes does not have to worry about land improvements because they are done by the landlord.
- The farmer may use the land as collateral security to borrow money from banks

What are the disadvantages of freehold tenure?

- The tenant or user of the land will not be able to fully utilise the property because of the restrictions put by the landlord.
- It is difficult for the farmer using the land to sell the land
- The landlord may decide to sell his or her land at any time which may leave the tenant landless
- The farmer has to pay a premium or rent for the time he or she is using the land.

17.1.3 Communal tenure

You have often heard of people talking of communal lands or communal resources. What could be these communal land or resources? Probably you are from a communal area or you once visited one. Have you ever thought of the reason why they call it a communal area? Communal tenure common in communal areas where the land is owned by the community members and there are no title deeds for the land. Just like any other resources in communal areas, land is owned by the whole community. The land belongs to the state. There is no individual ownership of land. The head of the state decides the basis for land sharing. This landholding system is customary whereby community members are given the right to use but not to own the land. However, you will realise that this system has its own advantages and disadvantages as we are going to discuss below.

What are the advantages of communal tenure?

- Every adult member of the community is a potential land owner
- Land ownership through this is usually at no cost
- Land can be inherited by family members
- Farmers can improve the land through, fencing, tree or hedge planting
- Farmers can work collectively on programmes like destocking, paddocking and conservation.
- Farmers have free access to other resources of the community such as wood fuel and water.

What are the disadvantages of communal tenure?

- Non-community members are usually excluded from acquiring land.
- Since every member is entitled to land, this leads to cultivation on grazing land, steep slopes and river banks which results in land degradation.
- Farmers have no title deeds for the land which they use which means lack of collateral security to borrow loans from banks for agricultural purposes.
- There are no incentives to improve the land or conserve other natural resources because they are communally owned.
- Inheritance of land cause land fragmentation which reduces the size of land as it is constantly divided among family members. This makes mechanisation difficult.
- Most communal lands are characterised by poor roads and shortage of markets for farm produce
- Unmarried women may not be allocated land.

17.1.4 State- owned tenure

This is a system of land ownership whereby the land is owned by the state. Good example is the A2 farms with a 99-year lease. This means that for the 99 years the farmer will be using the land, though the land will be owned by the state.

What are the advantages of State- owned tenure?

- It becomes possible for the state to reduce exploitation of the poor by the rich
- It increases agricultural production in the country



Activity 17.1 Land tenure

1. Define land tenure. (2)

2. State any 3 land tenure systems in Zimbabwe. (3)

3. Explain arguments for and against communal land tenure system. (7)

17.2 Land reform

We guess you have heard about land reform and that you could also be a beneficiary to this process! If you happen to live in resettlement areas, then you benefited. Generally, land reform refers to the process of redistributing land to the landless. In Zimbabwe land reform was an effort by the government to redistribute land in order to redress the unfair distribution of land which resulted from the colonial government before 1980. If you have done the history of Zimbabwe, you might have heard a lot about land redistribution. It is important for you to note that the other meaning of land reform is land reorganisation and it can be in the following forms:

17.2.1 Land consolidation.

Do you still remember how we defined land consolidation in the beginning of this unit? If you are forgetting, we urge you to refresh your memory here. Land consolidation is whereby small pieces of land are joined together to form one big plot which allows use of machinery. This form of land reform was done in other countries such as Tanzania other than Zimbabwe. However, in Zimbabwe land fragmentation was done. Let us see how these two are different.

17.2.2 Land fragmentation

This is whereby a big piece of land is divided into smaller landholdings for each household. Thus, farming households will possess several individual small plots. This is the type of land reform that occurred in Zimbabwe through the land resettlement programme undertaken by the government since 1980. In this case a large commercial

farm acquired by the government under willing seller, willing buyer approach, would be divided into smaller plots and each household would get a portion for homestead and cultivation area. You might be familiar with this programme or you might have relatives who obtained land through a similar system. However, for you to understand better we shall go through the details of land reform programme in Zimbabwe.

17.3 Land Resettlement in Zimbabwe

For you to have an appreciation of the land reform programme, let us look at a brief background to land reform in Zimbabwe. The 1969 Land Apportionment Act left 60 per cent of the total population occupying less than half of the land area in the country. Most of these people were allocated land which was unsuitable for agriculture, with low rainfall, relatively high temperatures and poor soils. On the other hand, the white commercial farmers who were the minority, occupied very large pieces of land most of them located in areas favourable for agriculture. The result of this was pressure on land, poor crop yields and rural-urban migration in communal areas. Upon independence in 1980, the new government had studied these imbalances and associated problems and resolved that there was need for an intensive resettlement programme in order to redress the land distribution imbalances. What then do you think is resettlement in Zimbabwean context? Take note of the word 'resettlement'. You will realise that is made up of two words, that is, 're' and 'settlement'. 're' simply means do something again and 'settlement' refers to where people resides. So, resettlement means giving places to settle to people who were once settled elsewhere. Now, it is easy for you to understand resettlement.

Resettlement was the relocation of families and individuals from overcrowded communal areas to planned farming areas provided by the government. This programme was meant to produce a more balanced share of land.

Now that you have an idea of what the land situation was like before independence and that the only solution by the government was resettlement, we now discuss the aims of this programme.

17.3.1 Aims of Land resettlement

May you brainstorm why the government of Zimbabwe had to resettle people? Compare what you have written with the following aims of the resettlement programme. The main aims of the programme were to:

- utilise land that was lying idle into full agricultural production
- have an equitable distribution of land to the people of Zimbabwe
- relieve population pressure on overcrowded communal lands
- improve living standards of rural people
- provide land to the people who were displaced during the war of liberation
- give land to the landless
- improve food security for the majority of population through increased agriculture production
- alleviate poverty as resettled farmers increase their incomes through farming
- create employment opportunities to the unemployed and the landless
- reduce conflicts over land in rural areas
- make use of abandoned and underutilised land

These were the aims of the government when they started the land resettlement scheme. Now we want to describe how this scheme was carried out in Zimbabwe. You will realise that the programme was done in phases since independence. In this section, let us discuss Phase 1 resettlement scheme.

17.3.2 Phase 1 Resettlement Programme

We hope you still remember that the land issue was one of the causes of the liberation struggle in Zimbabwe. So soon after independence, the government introduced the first phase of resettlement programme. It was done according to the Lancaster House Conference agreement of 1979 where the British government agreed to assist the Zimbabwean government financially to acquire land from white farmers. The aim was to resettle 161 000 families by 1995. Under this programme, the government would purchase land from white commercial farmers who were willing to sell part or all of their

land on a **willing seller, willing buyer** basis. This means that the government could only acquire land from those white farmers who were willing and prepared to release their land. However, not much land was willingly released by the white commercial farmers. As if that was not enough, much of the land released was located in regions of low rainfall, high temperatures, poor agricultural soils and disease infested. As a result, out of 161 000 target, only 50 000 families were resettled by 1997.

What were the main features of Phase 1 scheme?

In Phase 1 scheme four models were developed as Model A, B, C and D. These were organised as follows:

Model A

These are nucleated village settlements where each family would be allocated a residential stand and an arable plot of 5 ha just near the village. Each village accommodated 20 -50 families sharing grazing land and other resources. Each settlement would be allocated schools, clinics, boreholes, dip tanks and a service centre.

Model B

These are co-operative resettlements situated in already developed areas in terms of infrastructure such as roads, water and dip tanks. Do you still remember what a co-operative is? A co-operative is a farming business run by a group of people who jointly pull their resources and work together for a common purpose. Each co-operative supports 50-200 people. Each co-operative is run by a co-operative committee which is responsible for the distribution of co-op houses, livestock and machinery. They produce both food and cash crops.

Model C

These are mixture of central estate farms and individual settlements. The estate will be owned and managed by the government. You should note that here farming is specialised such as dairying, cattle ranching, tea or coffee growing. Workers at

the estate have their own plots at the outskirts of the estate. Good examples are Chisumbanje, Sanyati and Ngezi estates.

Model D

These are ranches mostly located in dry areas such as Tuli ranch in Gwanda District which are suitable for beef breeding. In this case, rotational grazing is practised whereby during the wet season, they leave some grazing areas alone to allow grass to grow.

It is important for you to note that most resettlement areas are located in remote areas and in Natural Regions 3, 4 and 5 with unfavourable climatic conditions. As a result, resettled farmers face many problems such as frequent droughts, pests and diseases and security problems which impact negatively on agricultural productivity in resettlement areas.

Let us now describe the Phase 2 of the resettlement programme. By the end of the next section you must be able to compare and contrast the features of the two phases.

17.3.3 What were the main features of Phase 2 scheme?

You might as well be disappointed to note that by the year 2000, only 50 000 families had been resettled instead of the planned 161 000. By 2000, the majority of people and war veterans who were in need of land and still awaiting for the government to continue with the land redistribution exercise, were now growing impatient.

In February 2000, the Svosve villagers near Marondera started to invade the surrounding white farms. This marked the beginning of the second phase of the resettlement programme. Government officials tried to stop the Svosve villagers from their invasion activities but war veterans joined in. The situation spread throughout the country like a veld fire. It was then that the government realised that the land issue was a serious one which could not be ignored. The government quickly intervened and restored order and regularised the land redistribution process.

You will realise that the manner in which land was redistributed in Phase 2 was so fast that the process was code-named "Fast Track" land resettlement programme

or “*Hondo yeminda*”. People were rushed to settle on white commercial farms. The newly resettled farmers were divided into two groups based on two resettlement models, that is, A1 and A2. Let us now examine the two models.

Model A1

This model followed the Model A of Phase 1, the intensive accelerated scheme. In this model each settler had 3-6ha of arable land away from residential stands. Residential stands are 0.4 ha in size. The other remaining land is reserved for infrastructure such as schools, clinics, boreholes, dip tanks and cemeteries.

Model A2

In this model, farmers were further divided into two groups. The first group was the peri-urban group. Each farmer was given 28ha of land near an urban centre. The second group consists of commercial farmers. Each farmer was given 250ha of land on former white commercial farms. They use existing roads and service centres. Farm workers’ compounds were left intact so that they offer labour to the resettled farmers.

17.4 What were the challenges associated with Phase 2 Land Reform Programme

Now that you have an appreciation of the land reform processes, it is important for you to note that in spite of the successes of the phase 2 land reform programme, it had numerous problems. These include the following:

- Multiple farm ownership. Despite government’s policy of **one- man, one-farm**, some selfish high-ranking people such as business people, senior government officials and politicians acquired more than one farm.
- Lack of adequate infrastructure in resettlement areas. Because of the speedy with which the process of resettlement was done, the government had no enough time to build the necessary infrastructure such as roads, schools, clinics, service centres and public transport.
- Lack of capital to buy farm equipment such as combined harvester, tractors and other inputs to begin farming on a strong foundation.
- Successive droughts have been affecting the newly resettled farmers leading to low yields.

- Lack of draught power. Most of the resettled farmers lack draught power such as cattle, donkeys or tractors
- Shortage of labour and the high cost of hiring labour
- Lack of sound knowledge about farming which results in poor farming methods and low yields.
- Problem of pilferage or theft of property and crops
- Inflation and shortage of foreign currency which makes it difficult for farmers to import inputs and fuel
- Deforestation. Cutting down of trees as farmers clear land for cultivation and for settlements which destroy forests.
- Under-utilisation of acquired farms
- Some soils have been exhausted and therefore resulting in low yields
- Shortage of social services such as schools and hospitals.
- Economic sanctions also closed foreign markets for agricultural produce.

17.5 Solutions to Phase 2 land reform problems

Imagine you have been tasked to come up with solutions to these problems. Do you think you can come out with some solutions? Just brainstorm and list some of the solutions you think would help. Look at some of the solutions suggested:

- The government can carry out land audits to eliminate multiple farm ownership.
- Random checks must be done to assess if newly resettled farmers are utilising land to the fullest.
- Government should eradicate corruption in land distribution.
- Loans must be made available for the resettled farmers to enable farmers to buy inputs, machinery, pay labourers and improve their plots.
- Conservation committees should be established through the Environmental Management Agency (EMA) to monitor the use of natural resources in resettlement areas.
- AREX officials can educate farmers on modern farming methods and sustainable use of resources so as to increase crop yields.



Activity 17.2: Resettlement

1. Define the following terms as they are used in land reform programmes
 - a) land consolidation (2)
 - b) land fragmentation (2)
 - c) land resettlement (2)
2.
 - a) Outline challenges faced by the newly resettled farmers in Zimbabwe. (4)
 - b) As a government official involved in land reform process, suggest solutions to each of the problems stated above. (3)

Copy and complete the table below to answer Question 2

2. Challenges	Solutions
-	-
-	-
-	-
-	-

17.6 Small-scale farming and food security

In this section we will take you through small-scale farming and food security. We are sure that you will agree that small-scale agriculture contributes significantly to food security in our country. Small-scale farming is practised by subsistence farmers in both rural and urban areas. It is done on a small scale. This means that the farmers use very small plots to grow crops such as maize and vegetables where labour is provided by family members. Small scale agriculture is a means of livelihood for some households. Livelihoods are the activities which households rely on to earn a living such as market gardening, communal farming and formal employment.

Imagine yourself without enough food to meet your daily meals! Do you think you would be able to concentrate on your work? Obviously not. This explains why food must be adequate for both households and individuals. **Food security** is the availability of adequate food to a household obtained through its own farming activities and sometimes food purchases. On the other hand, **food insecurity** refers to a situation when households are not able to raise enough food to meet their daily energy requirements. Thus, through small-scale agriculture farmers reduce food insecurity

significantly. Food insecurity is common in households which are child-headed or those headed by the elderly or single parents such as widows as well as people with health problems. All these situations prevent households or individuals to produce enough for their daily upkeep.

17.6.1 How can we prevent food insecurity?

You have probably seen people in your community being given food humpers or grain. We guess you know why they were given. If you say, it is because they were vulnerable due to food shortages, you are right. Food insecurity can be prevented by doing the following:

- Provision of food aid. Government and non-governmental organisations (NGOs) can give food assistance to vulnerable groups such as orphans, the elderly, widows and the sick.
- Storing grain after harvest. Small-scale farmers must store their grain after harvest for future consumption instead of selling it.
- Use of proper storage facilities. After harvesting, farmers are expected to store their grain in a way that it lasts for a long time such as use of pesticides.
- Practising community-based activities such as *Zunde raMambo/Isiphala seNkosi*. This allows some grain to be kept by the chief on behalf of the whole community to be shared to those in need in future.
- Drought mitigation measures can be implemented. For example, farmers can grow drought-resistant crops, use irrigation or growing varieties that mature quickly.
- Farmers should grow vegetables throughout the year to supplement their grain crops.



Summary

Well done, you have come to the end of this unit. It is my hope that you have understood all the concepts in this unit. It is now time to remind you of all that we covered in this module. Go over the points in the summary below and check if you have understood the concepts listed. Here are the main points of what you learnt in this unit:

- There are 4 land tenure systems in Zimbabwe namely freehold, leasehold, communal and state-owned land tenure systems
- Land reform refers to any form of land reorganisation and it includes land consolidation and land fragmentation.
- Land resettlement in Zimbabwe occurred in two phases namely Phase 1 and Phase 2. Phase 1 started soon after independence and it was organised according to the Lancaster House Agreement of willing seller, willing buyer
- Phase 2 was done hurriedly and hence it is called Fast Track Land Reform Programme
- Phase 2 scheme is associated with many problems because of lack of planned resettlements
- Small –scale farming contributes greatly to food security in the country.

Now attempt to answer questions on Activity 17.3 below.

End of Unit Assessment

Section A Multiple choice

1. Land tenure refer to
 - A a system of land ownership
 - B the way land is shared
 - C movement of people from one piece of land to the next
 - D the way crops are cultivated

2. When small pieces of land are joined together to form one large farm, this process is called
 - A land resettlement
 - B land fragmentation
 - C land consolidation
 - D land apportionment

3. The following are reasons for land resettlement in Zimbabwe except
 - A to improve people's living standards
 - B to increase food security
 - C to assist white farmers who wanted to dispose their land
 - D to redress the imbalances in land distribution

4. Farmers were put in village settlement where each household owned 5 hectares of land. This description matches_____ of Phase 1 of the resettlement scheme.
 - A Model A
 - B Model B
 - C Model C
 - D Model D

5. The major environmental problems caused by land resettlement is
 - A deforestation
 - B air pollution
 - C improper waste disposal
 - D littering

Section B

1. Table 17.1 below shows statistics for land redistribution between 1983 and 1987

Table 17.1

Year	Estimated number of households resettled
1983	20000
1984	10000
1985	5000
1986	2000
1987	2000

- (a) Describe the trends shown. (4)
- (b) Suggest reasons for the trends described above. (3)
- (c) Draw a bar graph to illustrate information given in Table 17.1 above. (5)

2. (a) What problems are likely to be faced by farmers resettled in Phase 2, Fast Track resettlement programme in Zimbabwe? (4)
- (b) Suggest measures that could be taken to reduce the problems you have stated in 2 (a) (i) above. (3)
3. Outline ways of reducing food insecurity in Zimbabwe. (7)

Research Work

Visit a nearby resettlement area and find out information about

- a) model of resettlement scheme
- b) benefits enjoyed by farmers
- c) problems faced by farmers in that area



Progress Check list

It is now time to go through the objective we listed at the beginning of the unit and check how many of them you have achieved. Tick against those you are sure you have achieved. Put an X against those you feel you have not yet to achieved. Then for any that you put an X against, find the section dealing with it in the unit and go over it again.

Objective	Check Box
Are you now able to...	
• describe land tenure	
• identify forms of land tenure in Zimbabwe	
• explain characteristics of each land tenure system	
• explain the advantages and disadvantages of each land tenure system	
• describe land reform.	
• explain forms of land reform	
• identify reasons for land resettlement in Zimbabwe	
• explain the land reform process in Zimbabwe	
• discuss challenges associated with Phase 2 Land reform	
• suggest solutions to the problems	

Further reading

Chabikwa, B., Mapungwana, M., & Phiri, F. (2020). *Total Geography Book 3*. Harare: Priority Publishers.

Garirwe, S., Jerie, S., & Manyika, M. (2018). *Step Ahead Geography Form 3*. Harare: McMillan.

Gocha, N. M., Ncube, R., & Nembabware, L. (2007). *Dynamics of O'Level Human and Economic Geography*. Harare: College Press.

Unit 18 Climate Change and Agriculture, diseases, pests and solutions, Urban Agriculture and Agribusiness

- 18.1 The effects of climate change on agriculture
- 18.2 Mitigation in Agriculture
- 18.3 Adaptation
- 18.4 Agricultural pests
- 18.5 Common diseases affecting agriculture
- 18.6 Effects of pests and diseases on agriculture
- 18.7 Biological, Chemical and Physical control of
- 18.8 Urban Agriculture
- 18.9 Agri-business

Introduction

We hope you still remember the definition of climate from the previous units. However, in this Unit, we would want to discuss about climate change. We are sure you have heard some discussions on climate change, in radios, televisions and newspapers. Even some people talking about it. And you may be wondering what is climate change? Let us explore this together.

Climate change is a global problem that affects us in different ways. We defined the word climate in the previous units and it should be easy for you to understand climate change. Simply, it suggests that there is a change in climatic conditions. Do you still remember climatic elements or conditions? These are closely related to weather conditions we discussed in the previous units. They include rainfall and temperature. So, climate change is the shift in average weather conditions of an area. This is not short term or measured on a small area like weather. Climate changes can take place over a longer period of time of around 35 to 40 years and is measure over extensive area. Do you think the climate in your area is still the same as it was 50 years ago? You may do a research and ask from elders in your community to find out if there are changes in rainfall and temperature patterns from the past.

You already have knowledge on climate change, adaptation and mitigation measures from Unit 4. If you are in doubt, go back to Unit 4 and have a relook at the definitions of the keywords. We also looked at adaptation and mitigation measures, which included

educating and training farmers to adapt to the new environmental conditions. In this unit, we are going to look at climate change and Agriculture, diseases and pests, urban agriculture and urban business.

Objectives

After going through this unit, you should be able to:

- deduce the effects of climate change on agriculture
- suggest mitigation measures
- assess possible adaptation measures
- identify agricultural diseases and pests
- describe effects of diseases and pests
- suggest biological chemical and physical control measures
- evaluate advantages and disadvantages of urban agriculture
- suggest solutions to the problems above
- list types of agribusiness in Zimbabwe
- identify sources of funding for small scale agribusiness
- evaluate importance of agribusiness to the individual and community

Key Words

Climate change	The shift in average weather conditions of an area. The changes can take place over a longer or shorter period of time
Mitigation	These are activities done by human beings to reduce the bad effects of natural hazards like floods, tropical cyclones, drought and heat wave.
Adaptation	These are activities done by human beings to reduce bad effects of climate change. These are ways of adjusting to the changes
Urban Agriculture	The growing of crops and raising of animals within and around cities and towns
Agribusiness	The sum total of all operations involved in the production and distribution of food and fibre.



Time guide

You are expected to take an average of **10** hours on this unit.



Study skills

- You have to note that this unit is about climate change and agriculture, therefore in your studies, always try to establish how climate change affect agriculture activities.
- You will need to have a very good understanding of the concepts of climate change.
- You will also need to have a deep understanding of the agricultural activities carried out in urban areas and importance of these activities to the people

18.1 What are the effects of climate change on agriculture?

From what you have learnt in the previous units, you have seen that natural processes that can destroy farms and reduce yields can also affect people. These natural processes are referred to as natural hazards. Can you think of any? Yes, these include tropical cyclones, floods, drought, pest, diseases and heat waves. Impacts of these hazards vary from place to place due to the difference in location in the world and variation in population size. Climate change has exposed many people to climate change related hazards. We guess you have heard about some of these hazards. Attempt the following questions. These will help you to assess your already existing knowledge of weather hazards you have covered in the previous unit.



Activity 18.1 Natural hazards

1. List down at least 3 weather hazards that you know or have experienced?
2. Describe how one of these hazards has affected the environment and the community you live in?
3. What do you think had caused these hazards to have different impacts on the environment?

From what you have identified above you can see that the hazards like heat waves, tropical cyclones, droughts and floods could be an indication of climate change. The effects include changes in precipitation, which means there could be more,

or less rainfall in an area. Extreme lack of precipitation results in droughts, while extreme amounts of precipitation may result in floods and related problems such as massive erosion and mass wasting. Extreme changes in temperatures meaning that the temperatures could be either too high or too low and this will lead to shift in the length of the growing season of crops. Extreme temperatures also result in related diseases and pest. For instance, too cold temperatures may result in frost bites which affect animals and plants while too high temperatures are related to fungal diseases and pests such as tsetse fly and mosquito. The hazards can also lead to loss of animal life and reduced plant species. For example, after a drought a lot of cattle die, rivers run dry and vegetation is reduced. We are going to discuss on these diseases and pests later in this unit.

18.1.1. Changes in precipitation

Do you still remember that when we introduced this unit, we asked you to research and ask from elders in your community to find out if there are changes in rainfall and temperature patterns from the past? We are sure they told you something. If they told you that, they are season changes in both rainfall distribution patterns and temperature, they were correct. In Zimbabwe, climate change has led to a shift in precipitation patterns. Rainfall is now more unreliable than in the past. Farmers are experiencing lower rainfall totals than in the past and dry periods during the dry season are now very common. For the farmer the effects have meant a lot in terms of agricultural production as farmers now experience of a lot of losses. The changes have also led to shortage of pastures and reduction in farm produce. Ultimately, this has resulted in low agriculture production. We are sure you once heard that Zimbabwe was a bread basket, but now we are importing agriculture produce such as grains. This is partly due to effects of climate change.

18.1.2. Changes in Temperatures

Climate change have also brought a lot of changes in temperatures. Extreme temperature changes have been recorded in most parts of the country. There have been very high temperatures during the day leading to high rates of evaporation and wilting of crops. During the winter season farmers have also experienced very low temperatures leading to frost problems, this has impacted negatively on the farmer. Some of the effects of high temperatures can be seen on Figure 18.1. Study the Figure closely and attempt the questions that follow.



Figure 18.1 Effects of high temperatures



Activity 18.2 Effects of climate change

Study the picture and attempt the questions below

1. Describe the scene in Figure 18.1
2. What do you think can be done to improve the situation?

From 18.1 we can see dead animals, bare ground, short bushes and scanted vegetation. The situation shown in figure 18.1 could be a result of an increase in temperatures because of climate change. The situation can be improved through growing drought resistant crops and irrigation farming. However, extreme cold conditions are sometimes experienced in Zimbabwe. We hope you still remember what we said are the effects of extreme low temperatures in section 18.1 of this unit. We would want you to write down these effects to both plants and animals and discuss with your study partner. You can revisit section 18.1 of this unit to refresh your memory.

18.1.3. Changes to growing season

Did you know that every crop has a number of days and conditions that are required for it to successfully to maturity? That is true! The changes in temperatures also affect the growing season of crops has also changed or shifted. If crops are exposed to more frost or hot days than required, their growth will be affected. This is the reason why, when you read on seed packs, they indicated number of days to maturity. You can visit a seed shop and look at these days for different crops. Certain crops have specific climatic requirements for instance maize as it needs daytime temperatures, which range from 14 degrees to 27 degrees and can be grown in areas having a total rainfall of 400mm. So, when temperatures change, then crops may fail to reach maturity or may be affected by frost. How can we minimize losses caused by climate change in agriculture? Let us look at the following suggested ways:

18.2 Mitigation in Agriculture

In the keywords section we defined the term mitigation. Do you still remember the meaning? If you have any doubts revisit the area. Mitigation refers to ways of reducing or lessening effects that come with climate changes in an area. There are a number of measures that a farmer can adopt to reduce the effects.

Before we discuss mitigation, let us briefly discuss causes of climate change because solutions to the effects of climate change should come from our understanding of the causes.

We have already said, climate change is the long-term change in the Earth's climate. This is caused by the release of greenhouse gases such as carbon dioxide [CO₂] and methane [CH₄] which trap heat in the atmosphere, causing the planet to become hotter (global warming). Greenhouse gases are released by human activities which use of fossil fuels (coal, oil and natural gas) as well as by large-scale commercial agriculture and deforestation. Methane (CH₄) mainly comes from livestock farming and waste management. Nitrous oxide comes from agricultural activities mainly related to fertilizer use. Fluorinated gases come from industrial processes, refrigeration and some consumer products. Now that we have identified causes of climate change and who is responsible to it, it is now easy for us to discuss mitigation and adaptation.

Mitigation means to lessen or reduce effects that come with changes in climate. If you are a farmer, you should have a number of ways you can use to reduce the impact of climate change on your crops and animals. This is easy for you by simply answering questions such as:

- (i) What should I do when there is extreme lack of water to support crop or animal production?
- (ii) What should I do if the temperatures are too low to support crop and animal production?
- (iii) What should I do if there is an outbreak of disease that threatens crops and animals?

These questions will lead you to solutions which you can use to mitigate problems caused by changes in climate. Some of the mitigatory measures include the following:

- You need to be educated on issues related to climate change so that you will be able to manage the effects this can be done through attending agricultural workshops or climate change awareness programs.
- Irrigation farming is also necessary to supplement and regulate water distribution in dry areas. Irrigation adds moisture to soil where the rainfall is not enough.
- Intercropping can also assist to reduce effects of climate change. This increases soil cover and thereby reduce loss of soil water.
- Farmers can also plant drought tolerant breeds, early maturing crops, and selective livestock. This include crops such as rapoko, millet and sorghum and animals such as goats and donkeys. Weather forecasting, zero tillage and organic farming will also help the farmer to increase the outputs.
- Water harvesting is also important to reduce effects of climate change. They are several ways of harvesting water. Some trap water from rooftops, some by damming and some by re-directing run off water to crops or ponds.

We have looked at mitigatory measures, which include use of short season varieties, and irrigation farming. These are not exhaustive; can you think of other ways of mitigating effects of climate change! Share with your friend other mitigatory measures you have identified. Let us now look at how we can adapt to climate change.



Activity 18.3 Mitigation measures on climate change

Attempt the activity below as this will help you to have a better understanding of the concepts.

1. What is climate change mitigation?
2. Imagine you are a maize farmer what measures would you take to reduce the effects that come with changes in the growing season?
3. What challenges you may face in implementing your measures?

18.3 Adaptation

We have seen that adaptation is simply adjusting to a prevailing climate situation. You can see that adaptation measures are based on reducing vulnerability to the effects of climate change. While mitigation attends to the causes of climate change, adaptation addresses impacts of climate change. A number of measures can be taken to adapt to climate change. Study Figure 18.2 and attempt activity 4

Figure 18.2 shows one type of a drought resistant crop called sorghum/*mapfunde/ amabele*. This type of crop can survive in very dry conditions.



Figure 18.2 Drought resistance crops

Figure 18.2 Sorghum is one of the drought-resistant crops

Farmers can adapt to climate change through three main ways, which are:

- The use of drought tolerant crops and animals - Farmers produce 80 percent of all plant-based foods from grass crops. This success is due in part to the plants' ability to adjust more quickly to dry conditions and sustain lack of water better than other plants.
- Crop diversification - Is a strategy to deal with climate variability. It refers to the addition of new crops or cropping systems to agricultural production on a farm. By diversifying, farmers increase the range of potential food and income sources available to them.
- Changes in cropping patterns and calendar of planting - The Crop Calendar is a tool that provides timely information about seeds in order to promote local crop production. It contains information on planting, sowing and harvesting periods of locally adapted crops in specific agro-ecological zones.
- Increase of conserving moisture through
- The appropriate tillage methods - These include spreading compost or animal manure, reducing tillage, green manuring and practicing good crop rotations. Crop residues left on the soil surface can conserve moisture by reducing evaporation.
- Improving irrigation efficiency - Use of a consistent method of irrigation scheduling can often reduce energy use by 7 to 30%. Using an efficient irrigation scheduling system can ensure you are not under or overwatering the crop.
- Afforestation - Is highly important to maintain biodiversity and ecological balances. It is also important to prevent global warming, soil erosion and pollution. Afforestation purifies the environment and helps in reducing the carbon dioxide level

We hope you are now equipped with knowledge on mitigation and adaptation of effects of climate change. With climate change, pests and diseases have also emerged now we need to explore common agriculture diseases and pests.



Activity 18.4 Climate change adaption

1. Identify the activities that can be done to adapt to climate change as shown by the Figure 18.2?
2. Of the activities you have identified, which ones are used in your community?
3. What are the advantages of growing crops such as millet and sorghum in light of effects of climate change?

18.4. Agricultural pests

Climate change has also caused outbreaks of pest. Some of these pests have adopted to new climatic conditions and are difficult to control. I hope you know that a pest is any animal or plant detrimental to humans or human concerns, including crops, livestock and forestry, among others. The term is also used for organisms that cause a nuisance, such as monkeys and baboons. In this section we are going to discuss pests which became more common due to changes in climate. Pests are a problem to agricultural activities because they:

- carry disease-causing micro-organisms and parasites, for example, ticks
- attack and eat plants such as vegetable, crops and plantations. For example, caterpillars and grasshoppers.
- damage stored food. For example, rats, weevils and mice may eat grain in silos, rice or biscuits in shops and homes and contaminate this food with their droppings and urine
- attack and eat farm animals. For example, elephants, jackals and wild dogs kill or maim many sheep and goats each year. Foxes will kill poultry, lambs and many species of native wildlife; and wild cats prey on domesticated animals as well.
- damage buildings and farm equipment. For example, termites can cause considerable damage to timber in buildings.

- bite farm animals and people. For example, bed bugs (so called because they often bite people in their beds) are very difficult and expensive to control. Their bites can cause great irritation to those bitten and like mosquito bites. The worst effect of these biting pest is that they cause diseases. Think of mosquito and tsetse fly. We are sure you have heard about these two pest and diseases they cause. If you have not, don't worry, we are going to discuss this in the coming sections of this unit.

There are thousands of different kinds of pests, which are harmful to humans. The great majority of these are types of insect. Can you give more examples of pest that you know and has affected farming activities? Now attempt the activities to assess yourself on how much you know about pest. It is a simple activity which you can answer using your experiences with pest or what you once learnt on pest and diseases from lower grades.



Activity 18.5 Agricultural pests

Attempt the activity 18.5 and answer the following questions on pests

1. List down any common pests you have seen in your local area that affects crops and animals?
2. What are the effects of these pests on agricultural production to the farmer?
3. Suggest measures that can be taken to reduce the effects of these pests on the environment?

From activity 18.5 you can see that common pests in Zimbabwe include pest such as:

- army worm
- red locusts
- qualia birds
- tsetse fly

Now, go on to look at common pests like armyworm, qualia birds and the tsetse fly and their effects on agriculture production. For you to have a better understanding of the pests study the picture in Figure 18.3 and attempt the questions below activity 18.6.

18.4.1 Armyworms

These pests destroy crops through chewing of plant tissues. There has been an increase of these pest in recent years due to climate change. Pesticides only work when the larvae are very small and before they have begun to cause visible damage to the crop. After that, there are no quick fixes.



Figure 18.3 *The armyworm*

Look at the picture of the army worm in figure 18.3 and try to answer the questions that follow. This will assist you in getting to know the pest more.

1. Describe the pest in figure 18.3 and outline its effects on crops?
2. Identify areas in Zimbabwe where they are common?

These pests cause extensive damage to crops and pasture. The pest can cause crop losses of more than 70 percent. Communal farmers feel the greatest damage because they lack enough resources and knowledge to combat these outbreaks.

The solution to the outbreak of armyworm is the use of chemicals such as carbaryl, malathion and trichloforton. Let us now look at another pest that seem to have increased due changes in climate; the locust.

18.4.2 Red locusts

These locusts feed on grain crops and cause extensive damage in areas where they pass through. The red locusts feed on flowers, leaves of plants and on the fruits. They

can cause extensive damage when they attack an area in large numbers. You should know that locusts are not only red, they are many types of locust but the red are the most common ones that attacks crops through chewing of the plant tissues. Study the Figure 18.4 of a red locust and attempt activity 18.6. Look at the photography closely so that you may be able to answer questions that have been given for you below.



Figure 18.4 Red locusts



Activity 18.6 Red locusts

You can see that figure 18.4 shows locusts that are red in colour and move in large numbers now do the task below.

1. What do locusts feed on?
2. What is the best way of controlling locusts?

The best way of reducing the effects of locusts is spraying chemicals, they can also be controlled using physical means by hand picking but this is less effective as it takes time to complete the task. Chemical control can also be used to control locust. They are many types of locust that destroy crops. We hope you know some of them. You can share names of these locusts with your study friend. You should also visit your

garden or crop field and identify some of these locusts. Now, you can go back and attempt the questions again to see if you initially answered them correctly.

18.4.3 Quelea birds

The quelea bird is also another pest that causes great damage to plants and pastures. These birds move in large numbers destroying plants and pastures. Quelea birds are shown in figure 18.5 look at the photography closely so that you may be able to answer the questions below.



Figure 18. 5 Quelea birds



Activity 18.7 Quelea birds

Answer the questions below using figure 18.5 showing quelea birds.

1. How best can we control quelea birds?
2. Which types of crops do you think these birds usually affect?

The Quelea birds usually destroy wheat fields and are usually scared away using drums. The best way to control these menacing pests is to spray using chemicals although they can be trapped and eaten by farmers. We are sure that you have heard about these birds and you can identify them. You should also know that, quelea birds are not the only birds that destroy crops, they are several, birds that are destructive to crops. Can you name some of these, which are common in your area and how you have managed to control them?

18.4.4. Tsetse fly

Tsetse fly are disease-carrying pests. They pierce animals and suck blood. In the process, they spread diseases such as sleeping sickness.

Study figure 18.6 and the map 18.1 that shows areas infested by tsetse fly; attempt all questions that follow:



Figure 18.6 Tsetse fly

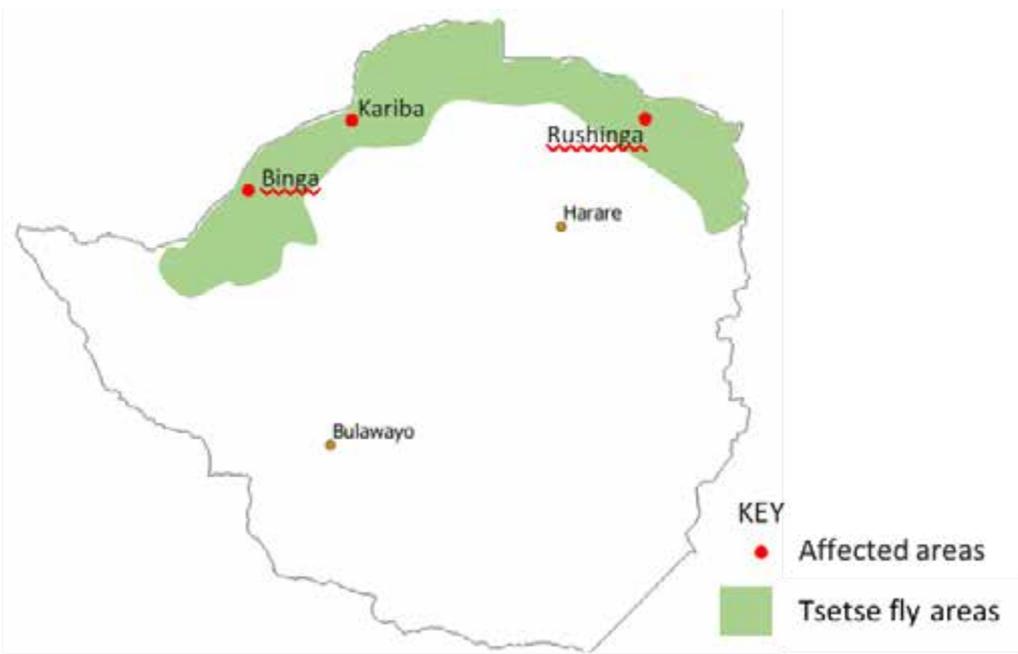


Figure 22.1 Tsetse fly affected areas in Zimbabwe with a low population density



Activity 18.8 Tsetse flies

From your knowledge of pests and diseases and from study of the map 18.1 attempt the activities below:

1. Which areas are tsetse fly infested?
2. Name the diseases carried by the tsetse fly?

The tsetse fly had almost been eliminated in Zimbabwe but it has since resurfaced in areas like Mbire and the Zambezi valley because of the dominance of wild animals such as buffaloes from neighbouring countries; like Mozambique and Zambia. Tsetse fly are also common in these areas because of high temperatures that prevail. The pest causes diseases like nagana or sleeping sickness.

18.5 Common diseases affecting Agriculture

A disease is defined as any condition that causes the systems of animals not to function properly, and also include bacterial and viral diseases. There has been an outbreak of these diseases due climate change. The increase in temperature has also resulted in an increase in bacterial diseases. Bacterial diseases include abortion, anthrax, (calf) scours, mastitis and tuberculosis. Abortion, the expulsion of a premature foetus in

fifth-to-seventh month of pregnancy, is a zoonotic disease spread through contact. Anthrax, another zoonotic disease, has a high mortality rate, which is caused by bacterium called bacillus anthracis that produce relatively large spores on contact with oxygen. A highly infectious and fatal disease of cattle, anthrax causes acute mortality in ruminants.

Signs of the illness usually appear within three-to-seven days after the spores are swallowed or inhaled. Anthrax typically causes an unusual rise in body temperature followed by depression, cardiac distress, staggering and death. Affected animals sometimes die of suffocation, usually within two days, once signs manifest in the animals. Hoofed animals, such as cattle, deer, goats and sheep, are the main animals affected by this disease. They usually acquire the disease by swallowing anthrax spores while grazing on pasture contaminated with bacillus anthracis spores.

Black quarter or blackleg, is a soil-borne infection which generally occurs during the rainy season.

Foot and Mouth disease is also a contagious disease caused by a virus that affects animals with cloven hooves like cattle goats, pigs and sheep. It should be reported after notification to the veterinary department. The common signs of the disease include poor animal health, blisters on the gums and hooves. The animal may also have problems in movement and producing saliva. The disease can be controlled through zoning and creation of surveillance areas or buffer zones and foot and mouth free zones. Infected animals must be culled and for bacterial diseases, they are given antibiotics.

18.6. What are effects of pests and diseases on productivity?

Pests and diseases affect food crops, causing significant losses to farmers and threatening food security. Outbreaks and upsurges can cause huge losses to crops and pastures, threatening the livelihoods of vulnerable farmers and the food and nutrition security of millions at a time.

So far, we have looked at a number of pests and diseases we now want to look at how this affect agriculture. Pests and diseases cause a lot of damage to plants and animals Attempt the activity given below.



Activity 18.9 Effects of pest and diseases

1. List and discuss the effects of pests and diseases on productivity you know?

We are sure from your discussion you have realised that pests and diseases cause a lot of harm. How can they be controlled? Do you remember seeing any farmer destroying pest or treating animal or crop diseases? Probably, you have done so before. They are different ways through pest and diseases can be treated. However, these can be grouped into chemical, biological or physical methods. They are also cultural methods, which are basically based on good farming practices.

18.7. Biological, Chemical and Physical control of pests

Pests can be controlled using many ways. The pest control methods could be physical, chemical or biological. We shall explore these methods together.

18.7.1 Biological control methods

The word "bio" means living. So, when living organisms are used to control pests, we call that biological pest control. One of them is the use of animals to control another animal, for example we want to kill rats we put a cat. Can you think of other examples where plants or animals are used to control pests?



Activity 18.10 Biological control of pests

1. Can you describe any other biological control method and explain how it works?

These methods involve the use of predators for example the lay bird and praying mantis feed on aphids. The effect is that a lot of aphids will be eaten. The natural enemies introduced are the biological control agents or bio agents

Advantages of this method include the following

- It is a very cheap method of controlling pests
- The system operates on its own after application of the biological agent
- Environmentally friendly method of controlling pests since it is non-polluting

Disadvantages of this method of control are as follows:

- It is a very slow method of controlling pests so it requires a lot of time to wipe away the pests
- It requires proper planning to develop a successful control method otherwise it can cause other problems
- Introducing a new organism into the environment may disturb the ecosystem.

18.7.2. Chemical control methods

This method is different from the biological method as it involves the use of chemicals in reducing pests. The chemicals are collectively called pesticides

The chemicals operate differently in the control of pests. Some of the chemicals are systematic whilst others kill when there is contact.

The chemicals can cause death to pests through suffocation of the pests. As in biological method, there are also advantages of this method, which are:

- It produces rapid response results in pest controlling
- It is possible to use them on a large scale
- Chemical control can be accessed in various forms such as dusts and fumigants and sprays

Disadvantages of this method include the following

- Pesticides are very expensive to buy
- Have a tendency of killing non-targeted organisms
- Use of these chemicals requires expertise and precision otherwise it can cause unwanted damage
- Caution should be practiced during application
- They pollute the air so they are not environmentally friendly
- Systematic chemicals may remain in the crops and be ingested by humans, causing some health problems.

We have looked at methods of controlling pests both biological and chemical now let us turn our focus on another interesting aspect, which is urban agriculture

Physical methods of pest control

This involves control of pest by getting rid of insects and small animals. We are sure you were at some time bothered by a mosquito. What did you do to get rid of it? You certainly did not spray it but attempted to slap it and squeeze it on your hands. That was physical. So physical means include:

- Killing of insects using bare hands.
- Trapping.
- Hunting and shooting.
- Fencing / netting.

The advantages and disadvantages can be presented in the form of a table as shown below:

Advantages Physical Methods	Disadvantages Physical Methods
Reduces soil disturbances.	Slow process e.g. trapping.
Environmentally friendly, does not pollute the air or environment.	Very expensive especially resources.
	Requires skills e.g. making the traps or setting it.

18.8. Urban Agriculture

In the keywords section we defined urban agriculture. Do you still remember the definition? Write down the definition again, just to remind yourself about urban agriculture? Remember we said it is the growing of plants and keeping of animals within and around cities and towns. Let's look at the nature of urban agriculture.

18.8.1 What is the nature of urban agriculture?



Figure 18.7 Nature of urban agriculture

From the picture in 18.7 we can see that farming is being done in urban area, greenhouses are used. Intensive agriculture is done. Vegetables are grown in large quantities and a lot of water and chemicals are used.



Activity 18.11 Urban agriculture

Study Figure 18.7 which show some aspects of urban agriculture and answer the questions below.

1. Describe the scene in the photograph?
2. Name the types of crops shown in the pictures?
3. What other crops do you think are grown in urban areas?
4. What arguments can you put forward to support this activity?
5. What challenges does this type of activity face?

From Activity 18.12 you can see that urban agriculture involves the following.

- It is done on open spaces in towns and cities and also on their periphery to supplement family income for example in Harare and Bulawayo. It is also done along streets, rooftops and greenhouses.
- It is usually done by poor households, and mostly done by women and children.
- Common crops grown are maize, sweet potatoes, beans and vegetables and even sugar cane along valleys and wetlands.
- It utilizes urban waste from the homes
- This type of activity has provided people who live in urban areas with the following advantages:
 - It is a source of livelihood for a number of households
 - Urban agriculture helps in reducing open and undeveloped land which could have been used as dumping sites.
 - Agriculture in urban areas create a market for agro-based industries for example those which produce fertilizers like ZIMPHOS and those that produce **agro-chemicals such as Agricura.**
- Provision of food security to the poor.
- It makes use of vacant urban space.
- It is a source of varied food products and animals such as chickens and rabbits.

However, this type of activity has its own disadvantages. If you have visited town, you could have realised that urban agriculture is done at some places that are not good for farming. Some farmers grow crops too close to river banks, on wetlands and along road sides. Surely this cannot be a good thing. Urban agriculture is associated with the following disadvantages:

- Environmental degradation as there will be increased erosion and siltation of streams.
- It destroys fragile habitats for endangered species.
- Can provide breeding grounds for mosquitoes.

- Maize fields can harbour criminal activities like robbery and rape.
- Access to fields is difficult for the poor so it actually increases the gap between the rich and the poor.
- Some grow crops along rivers or on wetlands which eventually cause siltation or destroys the wetlands.

You can think of more problems caused by urban agriculture and add to this list. So how can we solve the problems faced in urban agriculture, let us look at some of the measures below:

18.8.9 What are the solutions to urban agriculture?

A number of solutions can be put in place to reduce problems caused by urban agriculture. The following are some of the solutions to urban farming problems:

- There should be strict enforcement of the law against any form of farming along valleys and wetlands. We hope you have heard about the Environmental Management Act (EMA). EMA and the law enforcement urgency should assist in enforcing environmental laws.
- Urban farmers should be encouraged to use organic fertilizers which have less damage on the environment.
- Farmers are supposed to be encouraged to use physical methods of pest and weed control rather than use of chemicals which can destroy the environment.
- Farming should be practiced about 30metres away from the streams to reduce soil erosion and siltation



Activity 18.12 Solutions to urban agriculture

1. If you were a city councillor or mayor, how were you going to deal with problems of urban farming?
2. What challenges do you think you were going to encounter in implementing your solutions to urban farming agriculture?

18.9. What is Agri-business?

Have a closer look at the picture below and attempt questions that follow.



Figure 18.8 Agri-business

The figure 18.8 shows people selling a variety of vegetables these include cucumbers, pears, tomatoes and carrots. From study of Figure 18.8 what is Agri-business? If you are in doubt go back to the section on keywords and read again. We are sure you still remember that, agri-business is the sum total of all operations involved in the production and distribution of food and fibre. It also involves production of farm machinery agro-chemicals crop production, breeding, distribution of farm products and marketing of agricultural related products. What do you imagine when you hear the word 'agriculture'? Farmers who produce animals and crops or seed, weed, and feed or cows, sows, and ploughs. Agriculture is changing from mere farming to a technology-oriented industry comprising of production, Agricultural science, and agribusiness.



Activity 18.13 Agri-business

Study Figure 18.8 and answer questions that follow

1. Describe the scene in Figure 18.8?
2. Name the types of businesses you can see

Did you know that, the term 'agribusinesses were coined by two Harvard Economists, Johan Davis and Ray Goldberg in 1957. They defined agribusiness as "the sum total of all operations involved in the manufacture and distribution of farm supplies; production operations on the farm; and the storage, processing and distribution of farm commodities and items made from them. "Agribusiness actually includes all enterprises derived 'from' and 'around' agricultural production Imagine you would like to start a business. Where do you get the funding comes from?

18.9.1. What is the source of funding for Agri-business?

They are numerous sources to fund for agriculture activities. The source is determined by the size of agriculture activity and the reason for doing it. The following are suggested sources. However, you are not limited to these, you can think of other sources and discuss them with your study partner.

- Funding can also come from *ukutshayelana/ mukando*. This is when small groups of farmers decide to have some financial contributions to their members. They set their rules and at a specified time, usually end of month, all members give the stipulated amount to one member. This will continue until all the members have received the equal amount.
- Local banks for example Agri-bank offer loans to finance agribusiness. Local banks have schemes to assist small scale to large scale farmers. This is usually done to only those farmers who have proved means to pay back or those with collateral security.
- Informal credit facilities are also another source such as cooperatives. Farmers can also take informal loans. However, these usually have high interest rates. These loans are used to provide for capital to start Agri-enterprise.
- It is also financed by non-governmental organizations such as Youth Dialogue Zimbabwe and the Small and Medium Enterprise Development Cooperation (SEDCO) have also provided finances to support certain groups of farmers.
- Farming contracts are also common in Zimbabwe. Some farmers enter into contracts to produce particular crops. The usually agreements have been that, when the farmer harvested, he has to sell a certain percentage of the harvest to the contractor or the contractor will provide market for the farm produce.

18.9.2 What is the importance of Agri-business

If you visit your local market centre, you will be realized that, there are many agriculture products on sell. Some are markets for direct agriculture produce such as eggs, vegetables, meat or flowers. Some sell agriculture equipment and tools. Some provide agriculture services and some are consultancy on agriculture activities. All these form part of agri-business. We hope this gives an insight to the value of agri-business and the following are some of the importance of agribusiness:

- It ensures food security and reduces costs of importing food for the nation.
- It increases the gross domestic product as production is increased.
- Agri-business benefits the economy of the country because it provides raw materials for the manufacturing sector.
- To families, agri-business is a source of livelihood, families earn a living from selling agricultural products.
- There is also a general improvement in people material well-being and standard of living.
- It ensures a health life through increased access to a balanced diet.
- It offers hands on training to farmers.
- So many people are employed through agriculture business
- Agri-business create market for agriculture produce



Activity 18.14 Importance of Agribusiness

Activity 18.14 Importance of Agribusiness

Well done, you have come to the end of this unit. It is my hope that you have understood all the concepts in this unit. It is now time to remind you of all that we covered in this unit. Go over the points in the summary section below and check if you have understood the concepts listed there.



Summary

In this unit, we managed to look at climate change and agriculture. Climate change was defined as the shift in average weather conditions of an area. The following points were also noted in this unit:

- Climate change leads to changes in precipitation, changes in temperature and changes in the growing season of crops.
- Common pests that affect agriculture include armyworm, red locust, quelea bird and tsetse fly. These can be controlled through biological and chemical means.
- Urban agriculture has advantages and disadvantages which include provision of food to the family, utilization of vacant spaces although it can also be a habitat for criminal activities. It also leads to siltation of rivers.
- Agribusiness increases gross domestic product and supplies raw materials to the manufacturing sector.

Hope this unit has helped you to have a better understanding of climate change and its effects and also the role of urban agriculture

End of Unit Assessment

1. Climate change entails
 - A. local temperature changes falling
 - B. global temperature rising
 - C. snow over Zimbabwe
 - D. the drying of Zambezi
2. Which of the following is not an effect of climate change?
 - A. failure of certain crops
 - B. reduced yields
 - C. shorter growing season
 - D. increased concentration of cash crops
3. Urban agriculture in Zimbabwe is
 - A. done in rural areas
 - B. done in forested areas
 - C. needs very big trees
 - D. open spaces in towns and cities

4. Biological control involves use of
- A. burning weeds
 - B. planting more crops
 - C. use animals to control weeds
 - D. chemicals
5. Which of the following can be controlled by using carbaryl?
- A. army worm
 - B. aphids
 - C. weevil
 - D. maize stalk borer

Structured questions

1. (a) Describe the main characteristics of urban agriculture in Zimbabwe? (2)
- (b) State solutions to problems caused by urban agriculture (6)
2. Describe the importance of agri-business to the economy of Zimbabwe?



Progress Check list

Do you remember the objectives of this unit? Do not worry if you need reminding. I have listed them here below. Go through them and check how many of them you have achieved. Tick against those you are sure you have achieved. Put an X against those you feel you have not yet achieved. For any that you feel you have not yet achieved, find the section dealing with it in the unit and go over it again or discuss them with your teacher or study partner. Right mark yourself!

Objectives: Can you now:	Check Box
• deduce the effects of climate change on agriculture	
• suggest mitigation measures	
• assess possible adaptation measures	
• identify agricultural diseases and pests	
• describe effects of diseases and pests	
• suggest biological chemical and physical control measures	
• evaluate advantages and disadvantages of urban agriculture	
• suggest solutions to the problems above	
• list types of agribusiness in Zimbabwe	
• identify sources of funding for small scale agribusiness	
• evaluate importance of agribusiness to the individual and community	

Further reading

Chabikwa, B., Phiri, F., & Mapungwana, M. (2020). *Total Geography Book 3*. Harare: Priority Publishers.

Mbizi, N. and Mamhosva O.T. (2019). *New Trends in Geography Form 4*. Harare: Edu light books.

Unit 19 Industry: small to medium enterprises and the role of informal industries

19.1 Small to Medium enterprises (SMEs)

19.2 The role of informal industries in Zimbabwe

19.3 Occupational safety and health

19.4 Challenges facing manufacturing and processing industries in Zimbabwe.

Introduction

Have you ever been involved in any industry? We guess you might have experienced some form of industry at home or in your local area. Can you just brainstorm examples of industries that are found in your area? Remember, in Level 1 we defined industry as all forms of economic activity carried out by an individual or a group of individuals in order to earn a living such as farming, mining, bakery, iron and steel manufacturing and retailing. We also learnt that these activities can be formal or informal and can be small- scale or large-scale. In this unit we look at small-scale industries which are referred to as Small to Medium Enterprises (SMEs). You will realise that most of these SMEs are informal and they play a significant role in our economy. We hope you will enjoy your studies through this unit.



Objectives

After going through this unit you should be able to:

- describe the characteristics of Small to Medium Enterprises (SMEs)
- describe the location of these SMEs
- assess the role of informal industries in Zimbabwe
- explain the occupational safety and health issues in industries
- outline challenges facing manufacturing industries in Zimbabwe

Informal industries	enterprises that operate without being registered as required by law.
Occupational safety and health	deals with all issues to do with health and safety in the workplace with the aim of preventing or reducing hazards.
Economies of scale	the reduction of production costs that is a result of making and selling goods in large quantities, for example, the ability to buy large amounts of materials at reduced prices.

 **Time guide**

You are expected to take an average of **10 hours** to go through this unit.

 **Study skills**

This unit is about small enterprises. We are sure you have seen some in your area. For you to have a better understanding of this unit, you need to relate concepts learnt to real life examples within your locality. As you go through this unit you are also advised to take notes and attempt all the activities.

19.1 Small to Medium enterprises (SMEs)

Small to Medium enterprises (SMEs) have been a topical issue on radio, television and even in community programmes and as such we expect you to have an idea of what are SMEs? Have you ever had a chance to listen to such programmes? If so, what is your general understanding of Small to Medium Enterprises (SMEs)?. We guess what comes into your mind are the small businesses! It is important for you to note that there is no universal definition of a small, medium or large enterprise. However, enterprises are still classified as small, medium or large basing on certain common characteristics of each. We now, discuss some of the characteristics of SMEs in the next section. These should help you to understand the nature of SMEs.

19.0.1 Characteristics of SMEs

Before we proceed with this topic let us check how much you know about SMEs. Quickly state the features of SMEs that you know. Are you done? Now compare what you have with the characteristics that come up as you go through this discussion. One of the characteristics of SMEs is the small number of employees. Most small enterprises employ just a few people, less than 50 people. This may be because owners of small enterprises are unable to pay a large number of workers, or their scale of operation does not require many workers. Another common feature of SMEs is that they need less capital for investment as compared to large firms. You might have witnessed some people in your area that started their small businesses with very little capital and are doing well today. SMEs are also known for their low sales turnover in relation to large firms. Sales turnover is the total revenue obtained by an enterprise from goods or services sold. Since they operate on a small-scale, SMEs produce and sell fewer goods and services and in turn they get low sales revenue as compared to large firms. Low market share is another feature of SMEs. Do you have an idea of what market share is? Market share refers to the percentage of a firm's sales as a proportion of the total industry's sales. For example, if a small enterprise is in the bakery industry where giant firms such as Bakers Inn, Proton and Lobels bakeries dominate the market, it will only sell a few loaves of bread as compared to the other three bakeries.

Small enterprises are also characterised by small total floor space occupied by the firm. Usually the business covers a small area because it is difficult for the enterprisers to purchase large business stands or they may not afford rentals for large premises. Most of the enterprises are operated from home and they are referred to as home or cottage industries. I guess you have such enterprises in your area or you once came across such businesses elsewhere. Can you quickly name some of these businesses and state examples of activities undertaken? Check your list! If you mentioned such activities as sewing, motor car repairs, vending and welding you are in the right track.

19.1.2 Location of SMEs

Have you ever seen any SMEs in your area? You might have realised that most SMEs are located at backyards or in the neighbourhoods close to home. Look around within your home area and quickly find out if there are any such businesses. Just shortlist them!

In Harare, SMEs are concentrated around or close to high density suburbs such as Gazaland in Highfield, Chikwanha in Chitungwiza, Siyaso and Magaba area in Mbare as well as Glenview Area 8. Some are located in industrial sites such as the Willovale industrial area. Some SMEs are located in the Central Business District (CBD). A wide range of activities are carried out in these areas such as welding, carpentry, motor mechanics, panel beating, tin-smithing, basketry, mending tyres, poultry and selling of second hand clothes (mabhero).

It is important for you to note that most of the SMEs are informal. Informal industries are those enterprises that operate without being registered as required by law. State examples of such industries that you know. You would realise that most of these industries operate on a small scale and are involved in the activities of SMEs we mentioned earlier.



Figure 19.1 An example of an SME

Now you have an idea of what SMEs and informal industries are and their location. Try to make a summary of what you have learnt so far. Pay particular attention to characteristics of SMEs, examples of SMEs in Zimbabwe and in your area as well as their location. Are you done with your summary? If so, we now assess the role played by the informal industries in Zimbabwe.

19.2 The role of informal industries in Zimbabwe

What do you think is the role of the informal industry in Zimbabwe? We are sure there are many such industries in your area. If you are closer to or you are involved in such industry, identify the various activities undertaken. If you mentioned activities such as

small-scale farming, welding, vending and tin-smithing you are correct. How do you think these activities are benefiting the economy of our country? Quickly brainstorm some of the benefits of informal industries. If you found some or all of the benefits discussed below, well done! Now let us go through the discussion together.

Informal industries create employment. Thousands of people who could not be absorbed in the formal sector are earning a livelihood through working in informal industries. They often produce a wide range of goods which increase consumer choice. For example, informal industries such as furniture manufacturers in Glen View produce a variety of furniture products from which customers can choose from. Another advantage is that small enterprises are often run by dynamic entrepreneurs with new ideas and are highly innovative and responsive to better and safer technology which improves business in Zimbabwe. Nowadays most informal enterprisers are those skilled university and college graduates who could not find their way into formal employment and as such they have modern business ideas.

The existence of the informal sector businesses is of benefit to our economy because they create competition for large firms which improves quality of goods and services and lower prices. SMEs increase revenue for the government through paying of tax. Some informal industries pay taxes to the government and this helps the government to fund public projects. They contribute to the national output or Gross Domestic Product (GDP). Do you know what GDP means? This refers to the value of all the goods and services produced and sold by a country annually. Informal industries contribute to exports which bring in foreign currency to the country. Why does a country need foreign currency? Remember a country does not produce everything it wants! As such we need foreign currency to import goods and services from other countries.

Informal industries often produce affordable goods and services for the majority of the people. Thus, since informal industries face competition from large and established businesses, they often charge lower prices in order to survive in business. Informal industry promotes development of artistic skills such as basketry, carving and pottery. They also recycle materials that would have been wasted. Thus, some informal industries use scrap or by-products from other industries or disposed materials as raw materials in the production of their goods and services which reduce wastage of resources.

Now quickly brainstorm examples of such raw materials and what they are used for by SMEs that you know. Compare your list with mine below. If your examples are similar with mine below, congratulations, you got it right!

Table 19.1 Examples of materials being recycled by informal industries

Material	Use
Disused vehicles	making steel products e.g. scotch cuts, metal buckets, car repairs
Used scrap metal	making metal pots, dishes, hoes
Timber cut-offs	Furniture

19.2.1 Advantages of operating small enterprises

From what you have learnt so far on SMEs and informal industries, would you choose to operate a small enterprise? If so, why? We guess you might prefer to run a small firm. Did you know that the owners of informal industries often enjoy certain advantages by operating small enterprises? Can you just state some of the advantages being enjoyed by SMEs in your area? Compare your answers with points that you can pick from the discussion below. Let us go through this discussion together and find out some of the advantages enjoyed by informal enterprisers

The owner of the business is his own boss and enjoys full control of the business. He/she is also the manager and can create a personal relationship with workers and customers. Have you ever noticed that a small enterpriser such as owner of a general dealer shop sometimes knows his customers by name? What do you think is the advantage of that? Probably this creates customer loyalty and helps him to retain customers over a long period of time. Small enterprisers also work closely with their workers. This creates closer cooperation in business. There is quick decision-making because the owner does not have to consult anyone. For example, if he/she decides to hire or fire a worker or to change prices. There is also flexibility of operations. This means that they can quickly adapt to changes in technology and market conditions. Thus, they can easily switch from one business to the other depending on market conditions. They enjoy flexible working hours which allows the owner to increase sales. Many SMEs open for very long hours which allow them to generate more revenue. Small enterprises need low capital investment which the enterpriser can

easily raise to start the business. People get opportunity to be trained on the job as they work. This increases skills level and improves quality of goods produced which benefits the enterpriser.

Operating a small enterprise is a wonderful thing to do! Do you agree and why? Yes, it is, considering the advantages discussed in this section. Surely one would prefer to run a small enterprise. Can you quickly outline some of the advantages that makes you feel like you want to start your own small business!



Activity 19.1 Advantages of SMEs

Visit some SMEs around your home area and ask the owners the advantages they are enjoying by operating small enterprises. Make a list of their responses and compare them with what we discussed in this section.

19.2.2 Problems associated with informal industries

We guess you noticed that although informal industries contribute significantly to the economy of the country, most of these businesses operate outside the law? Local authorities as well as the government find a difficult time in dealing with problems caused by informal industries. Before we proceed with this section, quickly brainstorm some of the problems that are caused by informal industries in your area. If you came up with such problems as environmental pollution, poor health and safety measures, poor quality goods and poor sanitation you got it right. Well done!

Some informal industries locate in undesignated areas with poorly built structures, thereby causing sight pollution. They do not observe health and safety measures. For example, workers work without protective clothing, and therefore, they are vulnerable to accidents at the work place. Remember we expect workers to have safety clothes such as safety shoes and helmets but the majority of small enterprisers cannot afford them. Most of the informal enterprisers lack firefighting skills. They also lack equipment such as fire extinguishers. Therefore, they are exposed to high risk of fire, for example, fire outbreaks at Glenview Area 8 and Siyaso in 2018 and 2019 which destroyed a lot of property. There is often poor ventilation and lighting in the premises. As a result, occupational accidents often occur. Unfortunately, most of these accidents are not reported. To make matters worse, workers are not covered

by National Social Security (NSSA) and health insurance as encouraged by law. This means that occupational accidents may never be compensated.

Informal industries often use low quality raw materials and as a result they produce goods of low quality. Remember in the previous section we noted that some small enterprisers collect disused materials and recycle or use them as raw materials. Low quality raw materials might result in low quality goods. The government is also concerned about the level of pollution caused by informal industries. They cause high noise, land and air pollution. This results from the fact that they lack proper places for waste disposal and use poor methods of production. The work places also lack safe water and proper sanitary facilities which become a health hazard for the workers.

SMEs face problems of raising capital. What do you think could be the reason for this? If you said it is because they lack collateral security, you are in the right track. Most small businesses have nothing to show as guarantee when seeking finance from banks. They also face difficulties in finding suitable and reasonably priced premises. SMEs do not enjoy economies of scale. Economies of scale refers to the reduction of production costs that is a result of making and selling goods in large quantities, for example discounts offered when goods are bought in bulk. Thus, SMEs often buy goods or raw materials in small quantities which becomes more expensive. Informal enterprisers also lack management expertise since the owner performs all functions such as accounting, marketing and human resource management.



Activity 9.2: Problems faced by Informal industries

From the problems of informal industries, we have discussed, state only those that you have witnessed in your area. What efforts are being made by the community, traditional leaders or local authorities to mitigate these problems?

19.2.3 How does the government assist SMEs?

Now, we look at assistance given to SMEs by the government. Remember the government is aware of the challenges facing SMEs and the informal sector. It therefore offers assistance to keep these enterprises going and growing. Here are some of the ways by which the government assists SMEs.

The government offers training programmes through local colleges and sometimes provides funding for workshops to train new business start-ups. This equips them with skills and ideas to run their own enterprises. The government provides advice to SMEs through the Small Enterprises Development Corporation (SEDCO) under the Ministry of Small to Medium Enterprises.

The government also provides assistance to enterprises that agree to locate in economically deprived areas such as growth-points or rural service centres. Can you think of examples of such areas? If you thought of Murewa Centre, Mutoko Centre and Mhondoro Mubayira you are correct. For example, if a firm agrees to locate in economically disadvantaged areas they might be exempted from paying tax for a certain period of time. SMEs are encouraged to participate and showcase their products at the Zimbabwe International Trade Fair (ZITF) and Agricultural Shows to promote exports and sales of upcoming businesses.

To reduce the problem of shortage of capital, the government encourages some commercial banks such as Agribank to provide loans at low interest to SMEs. This enables SMEs to obtain capital to purchase premises, raw materials and for expanding their businesses. SMEs are often charged lower taxes by the government as compared to large firms. This helps them to retain more profits for business growth and expansion. The indigenisation policy introduced by the government empowers the locals to start their own enterprises. I guess you know examples of people who benefited from this policy in your area.

You must have learnt a lot about SMEs and the informal enterprises in this section, especially their contribution to the economy, problems they are associated with, as well as the ways the government assists these businesses. Now find out how much you have understood in this section by attempting Activity 19.3 below.



Activity 19.3 SMEs

1. Define term industry (2)
2. Outline any two characteristics of SMEs (2)
3. Explain three benefits of the informal industry in Zimbabwe. (6)
4. (a) What problems are faced by the informal sector enterprises? (4)
(b) Suggest measures that can be taken to mitigate the problems of SMEs and the informal sector. (3)

19.3 Occupational safety and health

What do you understand about health and safety issues? Have you ever heard of or seen people who were involved in accidents while at work? If so, just explain the nature and causes of that incident! It is so sad that one gets involved in an accident while at work, is it not so? In this section, we explain occupational safety and health in industry. Occupational safety and health-deals with all issues to do with health and safety in the workplace with the aim of preventing or reducing hazards. It is important for management to observe health and safety issues in order to protect their workers at work places. The government is responsible for health and safety issues through NSSA and the Ministry of Labour. NSSA's role is to create awareness and promote health and safety issues. At work places, managers are also responsible for ensuring that working environment is safe and that workers are well trained to reduce accidents at work.



Figure 19.2 Safety equipment and clothing

What do you think managers should do in order to ensure health and safety of their workers? Quickly brainstorm some of the measures that you can think of. We guess you mentioned that they must ensure that there is enough lighting, enough ventilation, safety clothes such as gloves, helmets and safety shoes as well as firefighting equipment and first aid kit. Managers should also educate employees on safe conduct at work. This includes avoiding using machines or driving under the influence of alcohol or when stressed. Workers should also read instructions and sign posts carefully. Regular medical check-ups are also essential. If you got them right, congratulations! You can still add to this list.

19.4 Problems of manufacturing industries in Zimbabwe

Now let us discuss the problems associated with small firms together. You might have noticed that many manufacturing firms are closing down. This is probably because of various challenges being faced by the manufacturing sector. We now look at the problems facing manufacturing industries in Zimbabwe. Manufacturing industries are facing the problem of old equipment which results in frequent break-downs. They are also facing high maintenance costs of machinery. This is because of high cost of spare parts to repair machines. This problem is worsened by the fact that some spare parts need to be imported yet this needs foreign currency which the country is running short of. As technology changes, they also face high costs of upgrading technology. Industries are faced with an energy crisis due to frequent power cuts as well as shortage and rising costs of fuel. Industries face high cost of electricity and water which increases costs of production and reduce profits. They face stiff competition from foreign products. The volume of foreign products such as vehicles, cooking oil and other grocery products is increasing and this has a negative impact on local companies.

Some essential industries lack necessary raw materials some of which have to be imported such as glass, rubber, chemicals, fuel, flour and some lubricating oils. Manufacturing industries also lack skilled workers due to brain drain. Brain drain refers to the migration of skilled human resources to other countries for greener pastures. This leaves local industries with a shortage of professionals. Another challenge facing manufacturing firms is lack of capital to buy equipment and to pay workers. As a result, some firms rely on obsolete or out-dated equipment which is less efficient.

Zimbabwe's manufacturing industries face problems of mismanagement, nepotism and corruption. The problem of fraud and mismanagement of funds is a major problem

which caused closure of some industries such as ZISCO. Foreign investors are not forthcoming to form joint ventures or mergers with local firms leading to some firms closing down or down-sizing which causes unemployment. Most major roads in the country are in a bad state and this impacts negatively on our local industries as it hinders movement of goods and services. The situation is made worse by the fact that Zimbabwe is landlocked. This means that it has no direct access to the sea. As a result, Zimbabwe has to pass through other countries such as Mozambique to Port Beira or South Africa to Ports Durban and Elizabeth which increases transport costs. Now just pick from the discussion, the major problems faced by manufacturing industries that you have learnt from this discussion. If you came up with at least five problems, it shows we are moving well together. Keep it up!

19.4.1 Solutions to problems

We guess you agree with me that Zimbabwean manufacturing industries have real problems which affect the economy at large. What do you think should be done to reduce these problems? Quickly, brainstorm your suggestions on how to reduce the impact of such problems. What solutions did you come up with? We hope you came up with something. Now compare your responses with what we are going to discuss in this section.

In its effort to rescue manufacturing firms from total collapse, the government makes cheaper loans available to local industries. These will go a long way in sustaining their operations. The government is constantly reviewing import tariffs for the motor industry, beverages, and agricultural commodities so as to reduce costs. These industries import most of their raw materials and high tariff charges tend to raise costs. If tariffs are reviewed downwards this reduces cost of importing raw materials and hence reduced cost of production.

Remember we mentioned stiff competition from foreign goods as one of the greatest threat to local firms. The government attempts to solve this problem by increasing tariffs on imported goods such as vehicles and other finished products or even banning import of certain products. This reduces quantities of imported goods and promotes purchasing of locally produced goods and services. The government is working on provision of cheaper and reliable sources of energy such as solar energy. They also control the pricing of utilities such as water, electricity and communication which helps firms to reduce costs. There is development of infrastructure such as roads,

rail, airports, dams and communication to facilitate easy movement of goods and services. The government has so far upgraded highways such as Harare-Bulawayo road as well as Harare-Mutare highways. The upgrading of the Harare- Beitbridge highway is underway. The government must fight corruption in both public and private sector industries.

Now, make a summary of solutions that you picked from the discussion. When you are through, compare your list with my own below.



Summary

In this unit you learnt about Small to Medium Enterprises (SMEs) and the role of the informal industries in Zimbabwe. You also learnt about the problems faced by the informal industries and how the government is assisting them. We also discussed the challenges faced by manufacturing industries and suggested possible solutions to these problems. You will conclude this unit by attempting the end of unit Assessment. We are sure you benefited a lot from this unit and you are now ready to move to the next unit. However, before you proceed to the next unit, attempt questions in the assessment below.

End of Unit Assessment

Section A: Multiple Choice

1. The following are characteristics of Small to Medium Enterprises (SMEs) except
 - A. high capital investment.
 - B. few employees.
 - C. low sales turnover.
 - D. low market share.
2. Which of the following is a benefit of informal industries?
 - A. They reduce the country's level of investment.
 - B. They reduce rate of unemployment.
 - C. They increase pollution.
 - D. They are prone to natural disasters.

3. Which of the following is not a solution to challenges facing informal industries?
 - A. giving them grants and subsidies.
 - B. assisting them with low interest loans.
 - C. offering advice to enterprisers.
 - D. inviting foreign investors.

4. Which of the following is not NSSA's role?
 - A. to give loans to SMEs.
 - B. to create awareness on health and safety issues.
 - C. to ensure that workers are trained on safety issues.
 - D. to ensure that there is enough lighting and firefighting equipment at the work place.

5. Zimbabwean industries are facing the problem of power mainly because of all of the following except
 - A. shortage of fuel.
 - B. there are frequent power cuts.
 - C. industries are not electrified.
 - D. high cost of fuel.

Section B: Structured Questions

- 1
 - (a) Outline five features of Small to Medium Enterprises (SMEs). (5)
 - (b) Explain the role played by SMEs in the economy of Zimbabwe. (7)
 - (c) What advantages are enjoyed by owners of small enterprises? (3)

- 2
 - (a) What problems are faced by manufacturing industries in Zimbabwe? (7)
 - (b) Suggest solutions to problems you have outlined above. (5)

Research Work

1. Visit the local manufacturing industry in your area and find out on:
 - (a) the activities done at the industry
 - (b) products produced
 - (c) problems being faced by the industry
 - (d) possible solutions to problems being faced



Progress Check list

It is now time to go through the objectives we listed at the beginning of the unit and check how many of them you have achieved. Tick against those you are sure you have achieved. Put an X against those you feel you have not yet achieved. Then for any that you put an X against, find the section dealing with it in the unit and go over it again.

Objective	Check Box
Are you now able to...	
• describe the characteristics of Small to Medium Enterprises (SMEs)	
• describe the location of these SMEs	
• assess the role of informal industries in Zimbabwe	
• explain the occupational safety and health issues in industries	
• outline challenges facing manufacturing industries in Zimbabwe	

Further reading

Chabikwa, B., Phiri, F., & Mapungwana, M. (2020). *Total Geography Book 3*. Harare: Priority Publishers.

Gocha, N. M., Ncube, R., & Nembabware, L. (2007). *Dynamics of O'Level Human and Economic Geography*. Harare: College Press.

Munowenyu, E. M. (2008). *Step Ahead:O'Level Human and Economic Geograghy*. Harare: Longman Zimbabwe (Pvt) Ltd.

Unit 20 Tourism and its importance in Zimbabwe

20.1 What are service industries?

20.2 Tourism in Zimbabwe

20.3 The importance of tourism

20.4 Problems associated with tourism in Zimbabwe

20.5 Solutions to problems associated with tourism in Zimbabwe

20.6 Problems associated with service and quaternary industries in Zimbabwe

Introduction

What activities do you like doing during your free time? Maybe you like travelling to places of interest. Many people like touring places of interest to see animals and beautiful landscapes. When people travel to different places for enjoyment, they are involved in tourism. In this unit we are going to cover tourism. We will look at the nature of tourist attractions in Zimbabwe. We will further look at benefits and problems of tourism. Our journey in this unit will also take us to the service and quaternary industry in Zimbabwe.



Objectives

- describe service industry
- define tourism
- describe tourism in Zimbabwe
- describe problems associated with tourism in Zimbabwe
- suggest solutions to problems faced by tourism in Zimbabwe
- explain problems associated with service and quaternary industries in Zimbabwe



Key Words

Reputation	the way a country or an individual is viewed by others. It can either be good or bad.
Arrivals	arrivals are the count of people who enter Zimbabwe.
Tourist attraction	an area or a feature that is interesting for people to visit for leisure.
Back packers	tourists that camp for accommodation. They carry all their necessities on their back in back packs.



Time

You are expected to take an average of **10 hours** to go through this unit.

20.1 What are service industries?

We are going to begin this module by looking at service industries. You must be aware from your level 1 work that there are three types of human activities. These are primary, secondary and tertiary industry. Note that tertiary industry is also known as service industry. Service industries are human activities that are concerned with delivering intangible items like education, car repair, security and health to people. Do you know any examples of tertiary industry? Some of the examples you could have included in your list of examples are teaching, plumbing, electricity supply, catering and food industry. You must understand that tertiary industries also include a type of industry known as *quaternary industry*. Note that quaternary industry is the use of ICT and other types of modern technology in research and development to give value and train other industries. It also provides information from the research to other industries. This is called *consultancy*.

You will note that the growth in the tertiary industry sector is a sign that the economy is growing. As the primary and secondary industry sectors decline, the tertiary and quaternary industry increase. The primary sector declines rapidly while the secondary sector rises first and then decline later. You will therefore appreciate that tertiary industries and quaternary sectors are typical in More Economically Developed Countries (MEDCs). Meanwhile, note that the primary sector is dominant in Less Economically Developed Countries (LEDCs). Figure 20.1 illustrates the development of these sectors in the course of time.

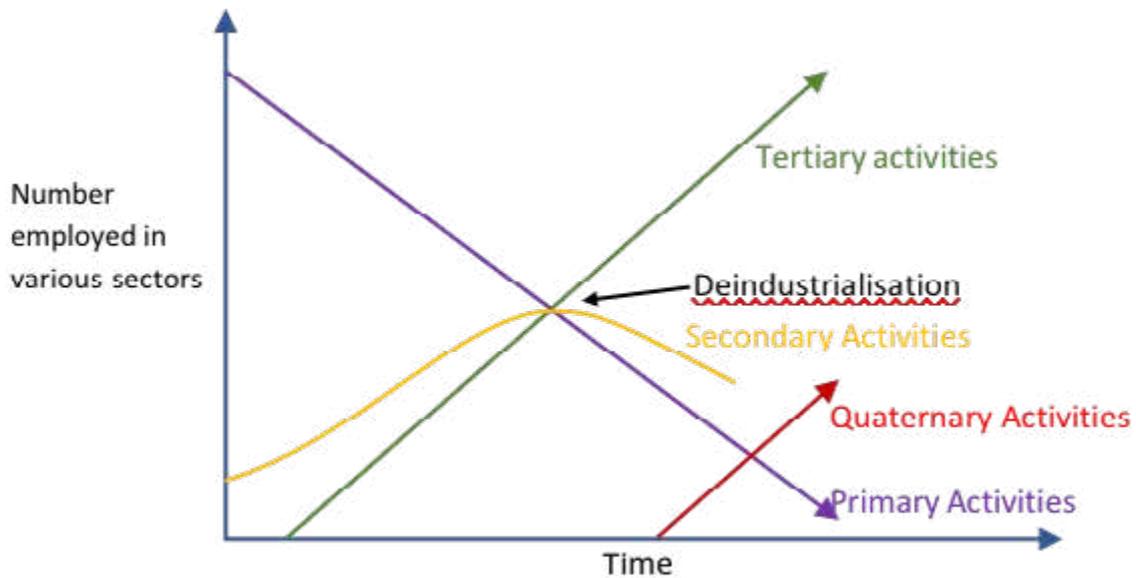


Figure 20.1 The Tertiary sector in relation to other sectors according to Colin G. Clark



Activity 20.1 Service industries

1. With reference to examples, define the term service industries?
2. Refer to Figure 20.1 to answer the questions that follow.
 - (a) Compare the changes in the primary and quaternary sectors.
 - (b) Explain the importance of quaternary sector to Zimbabwean industries.

20.2 Tourism in Zimbabwe

I am sure you have travelled before to some place for leisure. When you travel for leisure you are involved in tourism. *Leisure* is time that is spent in enjoyment of hobbies and free time away from daily duties and work. You have to understand that *tourism* itself is a tertiary industry that serves people to places of interest for leisure.

20.2.1 Tourist attractions in Zimbabwe

The Victoria Falls is one place that I am sure you have heard of before. It is one of the tourist attractions in Zimbabwe. You have to understand that a tourist attraction is an area or feature of interest that people visit for leisure. There are several types of tourist attractions that you will find in Zimbabwe. These are discussed below.

(a) Historical monuments

You will notice that there are areas of historical significance in a community or country. So, tourists visit these historic monuments. I guess you have such places in your local area. Under this category, in Zimbabwe we have monuments such as the Great Zimbabwe, Khami Ruins, Old Bulawayo and Danan'ombe Ruins (formerly known as Dhlodhlo ruins). Note that these historic monuments are remains of old settlements of people who lived in Zimbabwe in the past. Your interest in these if you went there would be the way people used to build in the past. You would also get a hint of how these people also used to live. There are several ruins and historical sites in Zimbabwe. Photographs 20.1.1 and 20.1.2 show some major tourist historical monuments in Zimbabwe.



Figure 20.1.1 The Great Zimbabwe Ruins



Figure 20.1.2 Khami Ruins

(b) Physical features (Scenery Attractions)

You should also know that Zimbabwe has tourist features that are physical features. These are attractions that are a result of physical processes such as weathering, erosion or tectonic processes. I hope you still remember these processes from Unit 5, 6 and 7. You can always refer back to these units to refresh your memory on how these physical features were formed. Among these, the most well-known is the Victoria Falls. As you might be aware, Victoria Falls is a waterfall – a river landform. Other physical tourist attractions include the Eastern highlands like Chimanimani and Inyanga. There are also rock formations like Matopo hills, the Balancing rocks of Epworth, Chinhoyi caves, Mana pools and Chilojo Cliffs in the south-east of Zimbabwe. Physical tourist attractions also include rivers and natural lakes. Note that when people visit these attractions, they enjoy the scenery and activities associated with them such as mountain climbing, photographing and fishing. Photographs 20.2.1 and 20.2.2 show you some physical features (Scenery attraction)



Figure 20.2.1 Cliffs at Gonarezhou National Park



Figure 20.2.2 The Victoria Falls

(c) Parks and wildlife

Under parks and wildlife, you have national parks, botanical gardens and wildlife sanctuaries and conservancies. Note that these are plant and animal areas where people enjoy nature in form of animals and plants. In Zimbabwe we have parks and botanical gardens such as Hwange National park, Gonarezhou National park, Chizarira National Park, Nyanga National park, Matopo National Park and Ewanrigg botanical gardens.



Figure 20.3.1 Chizarira National Park



Figure 20.3.1 Hwange National Park

(d) Modern man made Attractions

You will not fail to enjoy visiting a place like Harare when seeing its buildings. The urban buildings especially high-rise buildings are tourist attractions on their own. Cities

like Harare and Bulawayo are tourist attractions because of the buildings they have. These cities also have other attractions inside them. Bulawayo has, for example the Natural History Museum while Harare has the National Museum of Human Sciences and Gweru has the Military museum. Manmade features also include Birchnough bridge and dam walls such as the Kariba. In most cases these cities and towns are endowed with luxury hotels and other facilities that attract tourists.

(e) Water attractions

Zimbabwe, as you might be aware, has a lot of water attractions. These are rivers, dams and lakes. Major dams are also a major tourist attraction because of the large expanses of water and activities such as boat cruising fishing, sight-seeing and water sports associated with them. Kariba is famous with the Tiger Fish tournament where tourist gather to compete on tiger fishing. The other water attractions include the Zambezi river, the Save river and Lake Mutirikwi. Note that there are so many other tourist attractions in Zimbabwe that I did not include here. You can discuss these with your study partner.

(f) Cultural attractions

Some tourists are attracted by culture. There are many tourists who travel to Zimbabwe just to experience how we live and what we believe in. Some like our traditional dances across our nation. The popular Jerusalem dance has attracted many tourists. Most of the historic tourist attractions such as Great Zimbabwe and Khami ruins, have a cultural aspect. If you visit Great Zimbabwe, you will realise that the stories attached to the monument explain the culture of the people who lived there. There is a village, which also provides information on family structures, social and economic activities.

20.2.2 Factors that affect tourism in Zimbabwe

When you travel to a place for leisure, you go there because you are attracted and because you feel safe. Attraction and safety are some of the factors that influence tourism. In this section we are going to look at factors that affect tourism. These are actually reasons that encourage or discourage tourists from visiting.

1. Tourist attractions

If you were to save money in order to visit a particular country, you would want to go and see more than one attraction. Would you not? Well, it is important for a country to have several interesting sites for tourists to visit so that it is attractive. Zimbabwe is attractive in terms of tourist attractions because, as we discussed in the previous sections, the attractions are very different and interesting. Note that when a country has a wide variety of attractions it develops a successful tourism industry. Meanwhile, if it has a few attractions its tourism becomes poorer.

2. Good climate

When you plan your visits to the forest or to a major tourist attraction, you want to visit on a sunny day or conducive weather conditions. You are not any different from other tourists. Tourists like warm sunny weather. So, countries with warm sunny weather will attract more tourists. No one, as you might admit, wants to have an outing on a rainy or very cold day. Tourists who come to Zimbabwe from Europe are also attracted by the sunny climate we have.

3. Reputation of the country

You have to understand that every country has a reputation to people who want to visit it. **A reputation is the way a country is viewed by the potential tourists.** If tourists see the country as politically unstable or unsafe, they stay away from that country, even if it has attractive tourist sites and activities. On the other hand, if you were a tourist you would want to visit a country you felt safe to visit. Zimbabwe's reputation has gone through ups and downs because of political factors. Generally, tourists still frequent Zimbabwe.

4. Transport network

You will agree with me that tourism is travelling. This then means that when you travel you have to have good transport facilities which include roads, railway and air. Without good transport facilities that enable tourists to move from one attraction to another, tourists will not come to a country. Remember that many tourists have personal timetables of what they will visit at specific times. This means that the

transport needs to be available and also reliable. Well timetabled buses, trains and aeroplanes attract more tourists.

5. Accommodation

Travelling to another place means that you need somewhere to sleep. Since tourism is leisure or enjoyment, the accommodation that is available for tourists is important in attracting tourists or keeping them away. Accommodation in the form of hotels and lodges is what you will find as attractions to tourists. The better the quality of the accommodation the more attractive to tourists it is. You have to understand that, in some cases the accommodation is self-provided by the tourists and the host country provides camping sites. There are tourists who are called *back packers* who enjoy camping outdoors and sleep in tents with sleeping bags.

6. Political stability

You must also note that unstable countries where there are wars or political problems keep tourists away. Tourists in such a situation would fear for their safety. You must note that in some countries, tourists have been kidnapped for money. While in others tourists have been used for political negotiations. So, in such situations if you were a tourist you would keep away from where you risk being kidnapped.

7. Religious factors

Note that religious factors affect tourist in two ways. You can have what is known as *pilgrimage*. Pilgrimage is the visit by people to a holy place for a particular religion. These believers are called *pilgrims*. Maybe you have heard of visits by Muslims to Mecca in Saudi Arabia. We also have major tourist visit to Israel and place where Jesus was born, the Holy land. Some religious tourist is also common in the Vatican City, the capital of the Catholic church. Such a visit is actually religious tourism. You must further understand that, that religion affects tourism in that some religious extremists keep tourists away from the countries they are found. For example, religious fanatic groups scare tourists away in some Middle Eastern countries.

8. Organisation of tourism

Remember that we said tourists like good accommodation and transport. There are tourism companies that prepare tourist packages. Tourist packages are collective accommodation and transport services organised and offered to tourists. The companies organise transport and accommodation at one go. You will realise that such packages attract tourists as they can also offer visits to several tourist attractions in under one payment.

9. Tourism Marketing

Have you ever met the word marketing in your reading? What is marketing? We define marketing as the promotion of a product or service through letting people know about it and making it attractive and satisfying to people. In tourism we also have marketing, especially in form of publicising tourist attractions and tourist packages to potential tourists. Where tourism marketing is done, there tends to be success in the tourism business. Potential tourists get to know about places they were not aware of.



Activity 20.2 Factors influencing tourism in Zimbabwe

Explain the importance of good organisation in tourism in Zimbabwe.

Discuss the view that tourism is affected more by reputation than any other factor.

20.3 The importance of tourism

You must be aware of the fact tourism does not only benefit the tourist but has economic contributions it makes to the host country. In this section we will look at the benefits from tourism.

20.3.1 Creation of employment

You should understand that the tourism sector employs thousands of people. There are people who are employed in hotels where tourists are catered for in terms of accommodation and food. You might have already seen that more people are employed in the transport industry. Even more people are self-employed in the

informal sector which also services and sells carvings and other curios to tourists. See Figure 20.2 that shows you the numbers of people employed in the tourism industry from 1995 to 2018.

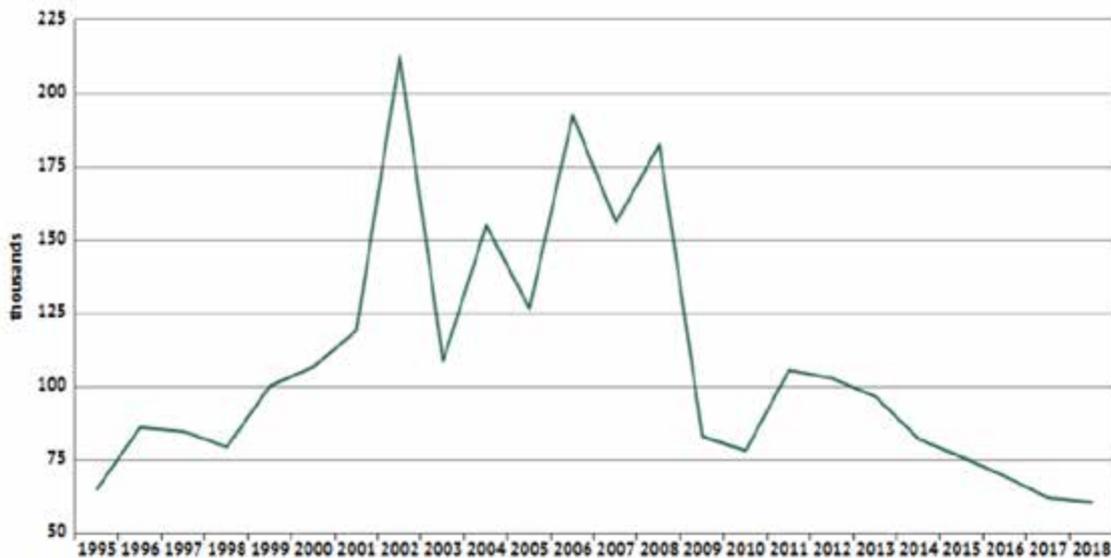


Figure 20.2 Numbers employed in tourism in Zimbabwe

20.3.2 Development of infrastructure

Further note that tourism leads to infrastructural development. This is the construction of roads, bridges and buildings. All these help the country to host tourist well. The infrastructure also benefits the local people. You will note that the local people also use the infrastructure in their day to day lives; especially roads and railway lines.

20.3.3 Earning income

Remember that all businesses involved in tourism make money. In most cases this money is foreign currency since most of the clients of the tourist sector are from outside the country. Note that it is good for the country's businesses to earn foreign currency as it strengthens their position in international trade. You also have to note that the tourism business also earns local currency income. Figure 20.3 shows you the expenditure in tourism business in Zimbabwe over the recent years.

20.3.4 Promotion of culture

There is yet another benefit from tourism. As a way of showing tourists the Zimbabwean culture, dance groups and carvers present Zimbabwean culture in dance, paintings and carvings that are sold to tourists. You must understand that as these groups do this, they preserve Zimbabwean culture. They also spread it to the rest of the world

as it is viewed by tourists. Note further that tourist also buy Zimbabwean clothing. Moreover, they also hear the Zimbabwean language and this also promotes the culture of Zimbabwe. On the other hand, host countries will also have an opportunity to learn foreign cultures as they interact with tourists.

20.3.5 Protection of monuments

It is through tourism that you have monuments like the Great Zimbabwe being protected. The government through its the National Museums and Monuments protects these monuments. You will find that the government protects and oversees the repair and restoration of these monuments. This then keeps them in good condition telling the Zimbabwean story and also earning income through tourism.

20.3.6 Promotion of international interaction

If you lived in a popular tourist destination like Victoria Falls you would be used to seeing tourists from all over the world. I am sure you would also, from time to time talk to some of them. You would quickly have an idea of global issues through the people you would meet in your town. This is an example of how people get to interact with the world as they meet different tourist from different countries.

Think of Zimbabweans who work in hotels. They definitely get to learn of other cultures as they serve and interact with tourists from different places of the world. They even get to speak several languages as they seek to be able to serve the different tourists. These benefits are why tourism is important. Figure 20.4 summarises for you the importance of tourism.

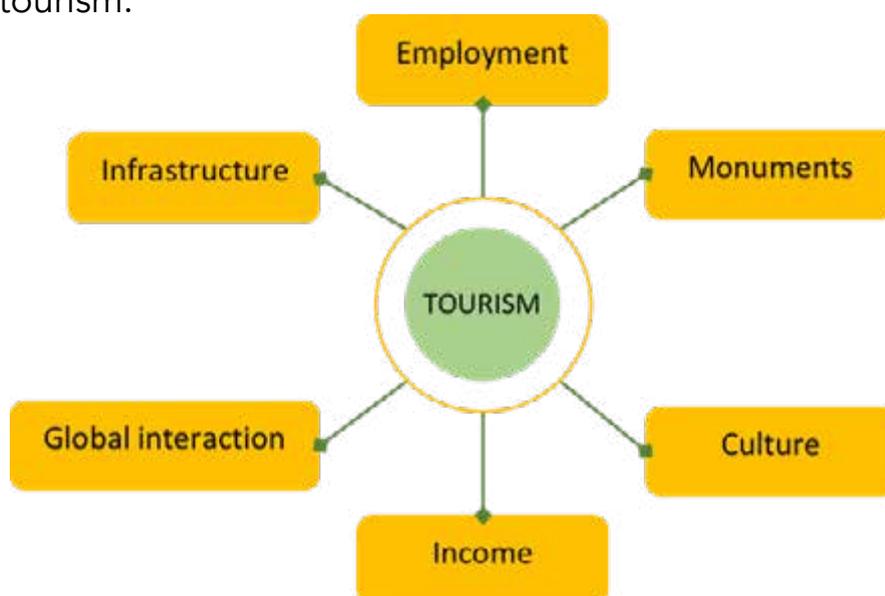


Figure 20.4 Benefits of tourism



Activity 20.3 The importance of tourism in Zimbabwe

1. Refer Table 20.1 which shows number of employees in the tourism sector in Zimbabwe.
 - (a) Which category had the highest number of employees?
 - (b) Describe and explain the trends shown in Table 20.1.

20.4 Problems associated with tourism in Zimbabwe

Your own experiences in life must have taught you that there is nothing that is 100% perfect. Tourism is not an exception. Tourism has its own shortcomings. We are going to look at these problems in this section. These problems range from social to environmental.

20.4.1 Cultural pollution

You may have heard about the term pollution and we guess you still remember that that it has to do with contamination of clean environments by unwanted substances. Culture can also be contaminated. We have been discussing the goodness of getting to know other cultures brought by tourism. This is viewed differently if it happens at the expense of the local cultures. In some cases, you will notice that the local cultures end up being looked down-upon. People end up thinking that the foreign cultures are far better than our own. You will find that the local culture ends up being diluted and changed. Do you think this is right? How far should we go in accepting and integrating other cultures into our own? We will not answer these questions. They are for you to think on.

20.4.2 Spread of diseases

Another issue you should consider is the fact that as we open our borders for tourists, they may bring diseases into our country. The spread of diseases like HIV/AIDS across international borders is highly through tourism. There are other diseases that are far more deadly which also spread through tourism. An example of such a disease is Ebola. So, you will realise that in most cases there is very little screening of tourists for diseases like the ones we have mentioned above. The equipment for such screening could be unavailable. Moreover, you will notice that the screening process could be left out altogether for fear of offending and chasing the tourists away from the country.

20.4.3 Drug trafficking

Note also that in the process of accepting tourists the country may also let in drug traffickers with their drugs. Airports and road border posts all have shortages of equipment to catch global drug traffickers. As you may be already seeing, harmful drugs like cocaine and heroin find their way into the country because of tourism. The police and the border people are not well equipped to deal with all this.

20.4.4 Unfair exploitation of resources

Have you ever heard of the story of Cecil the lion? This was a large male lion that was a major attraction in Hwange National Park. In 2015 Cecil was shot by a game hunter and was killed. The issue raised quite a lot of discussion and anger from Zimbabweans. Note that this is an example of unfair exploitation of resources. The tourist paid a lot of money to come and shoot a Zimbabwean lion. You must note that this game hunting is allowed by some countries. It is called *trophy hunting*. As you might have seen already, this trophy hunting is a tourist attraction and is legal. Again, do you think it is alright for people to hunt down animals and shoot them for fun?

20.4.5 Environmental degradation

Let us now look at the way tourism causes environmental degradation. There are beautiful places that are far away from people. To reach them roads have had to be constructed. You will notice that the construction of roads means that trees are cut down. When buildings for accommodation are built, there is disturbance to the ecosystem. You will note that animals lose their homes. You will also note that noise of tourists also disturbs animals in their dens and nests. Such disturbances also cause some animals to fail to mate. You have to note that when this happens the animal species are threatened.

20.4.6 Places of interest expensive for local tourism

You must note that tourism also makes place of interest expensive for locals. In most tourist attractions they charge for entrance. You will find that even though they charge locals lower fees, in some cases the fees are still too high for locals. You will discover that the locals who visit these places of interest end up being fewer. You must also note that the hotels, shops and transport in tourist resorts are expensive for the locals. You must note that it is mass tourism that causes the most damage. Mass tourism is tourism by large number of tourists in a resort. Mass tourism causes littering as

well. You will also notice that some monuments are damaged by mass tourism. Mass tourism damages the environment through *overtourism*. Over tourism is where a tourist attraction is visited by far more people than it can handle at the one time.

20.4.7 Low number of arrivals

You could have heard that Zimbabwe had a problem of low numbers of tourists in recent years. Neighbouring countries of Zambia, South Africa and Botswana have capitalised on the reputation that slumped. Did you know that in countries like South Africa there are travel agencies that advertise the Victoria Falls as a part of a South African tourist package? This has affected the numbers of arrivals in the country as some tourists fly into Zimbabwe and enjoy the attraction and then fly back to South Africa.

Note that some choose to view the Victoria Falls from the Zambian side. Meanwhile, those from Botswana fly into Zimbabwe and also fly back to Botswana without booking into Zimbabwean hotels. An example of the Botswana case is when tourist visit the Okavango delta in Botswana, they fly into Zimbabwe and visit the Victoria Falls. Note that after that they fly back to the hotels and lodges around the Okavango delta. You should understand that all this is loss of revenue to the tourist industry in Zimbabwe. Of late, however, the numbers have been improving. Figure 20.5 shows you the figures for tourist arrivals.

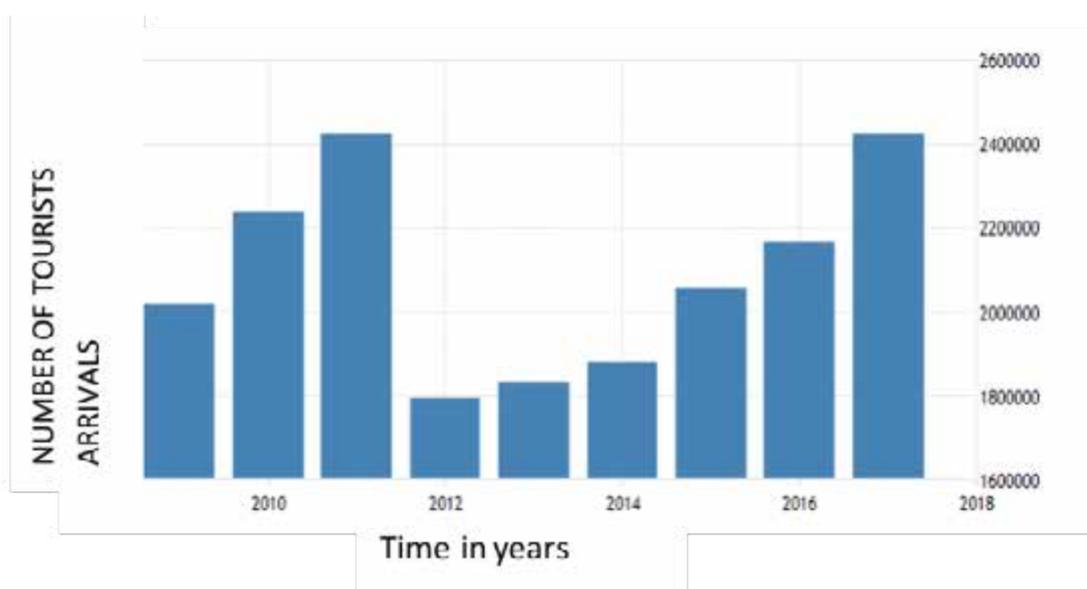


Figure 20.5 Tourist arrival in Zimbabwe from 2009 to 2018



Activity 20.4 Problems associated with tourism in Zimbabwe

1. State three problems caused by tourism.
2. With reference to Figure 20.2, suggest possible reasons for the low arrivals between 2012 and 2015.

20.5 Solutions to problems associated with tourism in Zimbabwe

In this section we are going to look at the solution that have been put down to solve the problems associated with tourism. We will examine what other countries have done in problems that are similar to those that Zimbabwe is facing in its tourism industry.

20.5.1 Control of the number of tourists

Let us start by looking at the way tourist attractions like Victoria Falls are sometimes affected by over tourism. In the case of over tourism, the number of tourists entering into the falls must be controlled. Note that the tourists are controlled through keeping a clear count of people coming into the attraction on a daily basis. This number must be kept against a known carrying capacity of the tourist attraction. The *carrying capacity* is the maximum number of people that can enter into a tourist attraction area without causing any damage to the area. You must note that the authorities of the tourist attraction should know the carrying capacity of their place. This would enable them to limit the numbers of tourists getting into the place at any given time.

20.5.2 The use of sustainable development techniques

Let us now discuss the sustainable development solution. Let us start by defining the term sustainable development. *Sustainable development* is the current generation's ability to use the resources we have without damaging or depleting them for the future generations. Sustainable development involves the careful use of the resources through conservation. You will notice that once the tourist attractions are viewed as resources that must be used by the future generations, their conservation becomes easy.

One example that you will find has worked well is the conservation of the pyramids in Egypt. The area where the pyramid of Giza and the Sphinx are, has a known carrying capacity. It is because of this knowledge that has led to the control of people that can enter into a pyramid or be around the pyramids. Another way of conserving man-made attractions is to have them repaired by an expert when they are damaged or worn out.

In our country places like the Victoria Falls and the Great Zimbabwe ought to be protected through the limiting of numbers entering to tour. You will notice that large numbers of tourists at the Great Zimbabwe may lead to the damage of the old monument. Meanwhile, Victoria Falls could have accidents and destruction of the natural rainforest vegetation.

20.5.3 The Increased screening at international entry points

Let us move and turn our attention to the entry points into Zimbabwe. In the previous section we saw how the border post and airports have very inadequate equipment for screening all people who enter the country. Advanced scanning equipment as well as trained personnel should be there at the border posts.

You have to understand that Zimbabwe should adopt even the use of trained dogs to screen travellers. This would find a lot of illegal equipment, drugs and even weapons. The Middle Eastern city of Dubai is an example of a place with an effective screening system as tourists enter into their country. They have trained police dogs so that they pick up the scent of hidden substances like cocaine. You would agree with me that Zimbabwe should have such tight security at the border posts.

20.5.4 Promotion of local tourism

Lower charges to places of interest encourage locals to visit places of interest. You must be aware of the fact that local tourism in Zimbabwe is much lower than foreign tourism. Yet you will notice that because there are more locals, tourism could benefit more from local tourism. So, note that the promotion of local tourism is one way of solving even the slump that tourism can sometimes experience. You will further notice that tourist attraction authorities like the Department of Parks and Wildlife should advertise their tourist attraction more to the locals. The current charges in most tourist resorts in Zimbabwe are lower than those for foreign tourists but they are still expensive for the majority of the local people.

20.5.5 Developing competitive tourist packages

Remember that in the previous section we mentioned that South Africa and Botswana develop tourist packages that even include Zimbabwean tourist attractions. In this section we are looking at how Zimbabwe should develop competitive packages for tourists. You must be aware of the fact that the Victoria Falls is well known throughout the world. So, in making tourist packages tourism agencies should include the Victoria Falls.

You will also notice that packages that are attractive to tourist are not only about tourist attractions. They also depend on hotels and transport. Hotels offer accommodation and food which must be standard. As you are now aware, the hotels and the food must match or be better than those of the competitors. This means that having the attractions package the right way and the infrastructure improved, there must still be good advertising to attract tourists, because they are some attractions which are not known by tourists. For example, they are very few people who know the Mutoko ruins in Zimbabwe. Only through strong marketing strategies can they be known.



Activity 20.5 Solutions to problems associated with tourism in Zimbabwe

Match the solutions to problems of tourism given in list A to the problems in list B.

List A

- Developing competitive tourist packages
- Promotion of low tourism
- Screening at border posts

List B

- Drug trafficking
- South Africa advertising Zimbabwean tourist attractions
- Low tourist arrivals

1. To what extent are the following solutions effective in Zimbabwean tourism?

(a) Sustainable development

(b) Controlling the number of tourist per given time in tourist attractions.

20.6 Problems associated with service and quaternary industries in Zimbabwe

As you have seen in the discussion above, the service and quaternary sectors are very important in an economy. We are now going to look at the problems associated with these sectors in Zimbabwe. We will start by looking at the problems associated with the service sector.

20.6.1 Problems associated with the service sector

1 Lack of modern equipment

You must understand that the service sector in Zimbabwe is mostly in the hands of the government. There are many services that the government offers to the people. These include, as we have seen above, education, health, security, registry and agricultural services. In most of these areas the equipment that the workers use is old. In some of the cases the equipment is not enough.

You will find examples of the lack of modern equipment in the hospitals, police stations and registry offices. Let us focus on the police service, as an example. The police officers have to write dockets by hand when they could computerise the filling in of all their forms. They even lack transport to travel during their investigations. They hike for lifts from civilians. This reduces the effectiveness of that field of service delivery.

2 Low salaries for civil servants

Another problem you will find associated with the service sector is low salaries for the civil servants. As I explained above, the service sector is mainly in the hands of the civil servants. Now and again this problem causes strikes that disturb service delivery. These low salaries also make the workers unhappy as they work and this result in inefficiency.

3 Poor working conditions

You will also find that the conditions under which the service sector people work are poor. Let us look at the teachers as an example. The schools that some of them work

in are very poor. They have no running water, electricity nor transport. Moreover, the houses they live in are of low quality. This shows that the conditions in some areas of service delivery are poor.

We guess you have heard or experienced services in our health delivery system. There is limited supply of medical resources and patients die regularly. The agriculture sector has also its challenges as well. Agricultural extension offices conditions are also poor. They travel on poor roads and live in poor housing. You will further notice that these people have no shops close by to do their shopping. All these conditions can affect the service delivery.

4 Loss of personnel through brain drain

You will notice that the effect of the low salaries and the poor working conditions is that, skilled workers leave the country. Most of those who leave Zimbabwe go to neighbouring countries, especially South Africa. We are sure you are aware that the final effect is, there is shortage of personnel in service delivery. This loss of skilled people to other countries is called *brain drain*.

You will find that South Africa and Botswana are the major areas of destination for the civil servants who leave the country. There is a large number of teachers, doctors, and nurses that have left Zimbabwe to work in South Africa. This is a loss also in the sense that these skilled people are trained by the government at cheaper costs yet they end up benefitting the other countries.

5 Over-training of personnel

Let us now focus on the training of the service sector workers. You will notice that the education and health areas have more trained people than they currently need. The current situation in Zimbabwe is that teachers are trained but have no schools to go to. This also applies to nurses. You will find that there are nurses who finish their training but cannot be absorbed into the clinics and hospitals of the country.



Activity 20.6 Problems associated with the service sector

1. Explain two economic problems associated with the service sector.
2. Explain the problem of brain drain from the service sector in Zimbabwe.

20.6.2 Problems associated with the Quaternary sector

When we started this unit, we defined the term quaternary sector. Do you remember what we said it is? In case you have forgotten you can revisit section 20.1. The growth of the quaternary sector, as we mentioned, is a sign that a country is developing well. For countries like ours, the development of the quaternary sector is limited by the factors that we will discuss in the following sections.

1. Lack of funding

Investment, as you might be aware is very important for the development of the quaternary sector. You must remember that this sector involves hi-tech equipment. This hi-tech equipment is expensive to buy. You will notice that such equipment is imported.

Note that the quaternary sector also requires knowledge of a high level. Experts with mostly technical skills are important for the quaternary industry. Have you ever heard of the Silicon Valley? The Silicon Valley is a specialised industrial area in California in the United States of America. This area manufactures specialised computer parts and software whose factories require millions of dollars to establish. You must understand that for such an industrial park to be developed there is need of large sums of money. Thus, one problem why the quaternary sector in Zimbabwe does not do well is because of lack of funding.

2 Low levels of technology

Another problem that limits the quaternary sector is the low levels of technology compared to global standards. A viable quaternary sector must also meet global standards. You must note that Zimbabwean universities are also limited in their production of highly skilled undergraduate and even post graduate skilled people.

3 Lack of research

Even when we focus on the research that is being done in the universities, we notice that most of it is just academic. Yet, as we have mentioned, the quaternary sector also succeeds because of research. In countries where they have rich quaternary sectors, they have private companies that fund research in engineering, medicine, information and communication technology (ICT). This means that the research done there feeds directly into industry and production.



Activity 20.7 Problems associated with service and quaternary industries

1. Explain the influence of lack of research in the quaternary sector in Zimbabwe.
2. Explain the influence of lack of money on all the other problems associated with the quaternary sector.

Well done, you have come to the end of the unit. It is my hope that you have understood the concepts we covered here. You have to go over the summary below to briefly revise the content we covered here.

Summary

- In this unit we covered the definition of the term service sector. We mentioned that the service sector is also called the tertiary sector. We further mentioned that it deals with intangible commodities like education, health, security and plumbing.
- We also discussed tourism in Zimbabwe in terms of the types of tourist attractions. Under types of tourist attractions, we considered historical monuments, physical factors, wildlife, water attractions and man-made attractions
- We also considered the factors influencing tourism in Zimbabwe. In this section we looked at the reputation of the country, the nature of tourist attractions, good climate, the infrastructure and the organisation of tourism. We looked at the social factor the religion and political stability.
- We considered the importance of tourism. We examined how much tourism contributes in the Zimbabwean economy.

- We further looked at the problems associated with tourism. We took you through content like the spread of diseases, costly tourist resorts for locals, low arrivals and unfair exploitation of resources.
- We ended the unit by looking at why the quaternary and tertiary sectors in Zimbabwe has lacked growth. We saw that it was due to lack of funding, low level of technology and lack of research.

End of Unit Assessment

1. With the aid of named examples, describe the nature of tourist attractions in Zimbabwe.
2. How does tourism benefit Zimbabwe?
3. Outline the problems that are associated with the service sector in Zimbabwe.
4. For each of the following tourist attraction in Zimbabwe, identify a problem and a benefit by filling in the gaps.

Tourist Attraction	Problem	Benefit
Victoria Falls	(a)	Earns income
(b)	Danger of feature collapsing	Creates employment
Lake Kariba	(a)	Has more than one purpose
Hwange National Park	(b)	Conservation of animals
Nyanga National Park	No international airport	(e)

Research Work

1. Visit the local council and find out if there are areas with tourism potential in your locality.

Compile a list of such areas in terms of

- (a) The type of tourist attraction it is.
- (b) The development needed to make it fully functional.
- (c) What benefits it will bring to the locality once fully functional.

2. Submit your findings to the local council.



Progress Check list

It is now time to go through the objective we listed at the beginning of the unit and check how many of them you have achieved. Tick against those you are sure you have achieved. Put an X against those you feel you have not yet to achieved. Then for any that you put an X against, find the section dealing with it in the unit and go over it again.

Objective	Check Box
Are you now able to...	
• define tourism	
• describe tourism in Zimbabwe	
• describe service industry	
• describe problems associated with tourism in Zimbabwe	
• suggest solutions to problems faced by tourism in Zimbabwe	
• explain problems associated with service and quaternary industries in Zimbabwe	

End of Theme Assessment

Now that you have gone through a series of related topics, attempt the following questions. They cover units 19 and 20. Give it a go!

Section A Multiple Choice

Answer the following questions by choosing the correct answer from the options given.

1. Which one of the following is a characteristic of service industry?

- A** The processing of raw materials
- B** The manufacture of cars
- C** Sale of tangible goods
- D** Sale of intangible commodities

2. Quaternary industry is _____.

- A** the industry of research, ICT and consultancy
- B** mining, farming and forestry
- C** car and radio assembly
- D** teaching, security and health delivery

3. Which one of the following is a role of the informal industries?

- A** Employing foreign highly skilled people.
- B** Supplying the local market with goods
- C** Improving the export market
- D** Developing infrastructure

4. They manufacture goods from rented premises and may operate from home.
Which type of industry is being described here?

- A Car assembly.
- B Large scale industries
- C Small to medium enterprises.
- D Smart phone manufacturing.

5. Which of following is a correct pair?

Tourist attraction

Type of attraction

- | | |
|--------------------------|---------------------------|
| A Great Zimbabwe | Scenery, physical feature |
| B Victoria Falls | Scenery, physical feature |
| C Natural History Museum | Water attraction |
| D Lake Kariba | Historic |

Section B

Answer the following questions in the spaces provided below.

1. Figure 20.4 shows the sources of tourists coming to Zimbabwe and Kenya.

Key

1 Europe

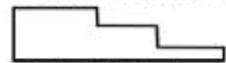
2 North Africa

3 Africa

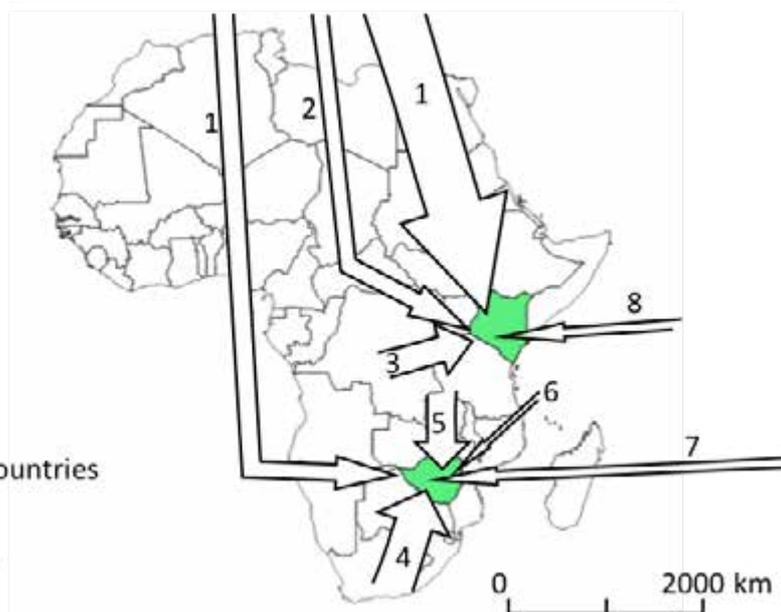
4 South Africa

5 Zambia

6 Other African Countries



Scale 5% to 1mm



(a) Name the technique used in Figure 20.4 to show the sources of tourists.
(b) Describe and explain the tourist movements shown.
(c) With reference to Zimbabwe, suggest with reasons what benefit and problems tourism has brought about.
2. As an industrialist, what arguments would you put forward for and against the relocation of industry.

Further reading

Chabikwa, B., Mapungwana, M., & Phiri, F. (2020). *Total Geography Book 3*. Harare: Priority Publishers.

Education, Ministry (1985). *School Atlas for Zimbabwe*. Stockholm: Esselte Map Service.

Waugh, D. (2014). *Geography: An integrated approach*. Oxford: Oxford University Press.

Unit 21 Population

- 21.1 Basic population terms (birth rate, death rate, infant mortality rate, fertility)
- 20.2 Collection, presentation and interpretation of population data
- 20.3 Population data, collection and analysis of techniques
- 20.4 Population data presentation techniques.

Introduction

Have you ever heard of the term population? Yes, you did in Level 1. You are living in a community with quite a number of people of different ages, gender and race. These people are what makes up a community and they are also a population. Population is the number of people living in a given area. In this unit, we would like you to learn more about population and the basic terms used. You will also learn about how population data is collected, presented, analysed and interpreted.



Objectives

After going through this unit, you should be able to

- explain population terms
- apply population terms at local and national levels
- collect population data within the school or local community
- analyse population data
- present population data
- interpret population data



Key Words

collect	to gather material together
analyse	to think deeply
present	to describe or show what you have
census	the counting of people in a country and presenting the results
vital registration	these are records of births, deaths, marriages, divorces and migration patterns in a country.



Time guide

You are expected to take an average of **10** hours to go through this unit.



Study skills

This unit requires you to do some research, so you need to refresh your statistical calculations.

21.1 Population terms

Did you know that every discipline has its own language? Just imagine that today you are considered as learner because you are going to school. If you get arrested, you will be called a suspect. If you get sick you will be called a patient. So, understanding language for each discipline will help you to understand the discipline. There are terms that are unique to the study of population. The following words are the basic terms used in the study of population. Make sure you understand them.

Birth rate

It is the number of live births per thousand people per year

$$\text{Crude birth rate} = \frac{\text{number of births per year}}{\text{Total population}} \times 1000$$

Death rate

This refers to the number of deaths per thousand people per year. It can also be called mortality rate.

$$\text{Crude death rate} = \frac{\text{number of deaths per year}}{\text{Total population}} \times 1000$$

Infant mortality rate

This is the number of deaths of children who die before reaching one year per thousand children per year.

Fertility

It is the biological capacity of adult females to bear children. This determines **fertility rate**. Fertility rate is the number of children born to women of the child bearing age expressed as a percentage. It is important for you to note that child bearing age is 15 to 49 years.

Life expectancy

These are the number of years that an average person is expected to live.

Natural population increase

Natural increase of population is obtained by subtracting death rate from birth rate. This means the increase of population without including migration into and out of an area.

Natural increase = birth rate – death rate

21.1.2 Factors affecting birth rate

Did you know that birth rates differ from country to country? This is due to different causal factors. Let us discuss these factors below.

- **Need for a male child**

In most African societies it is very important to have a male child as he will bear the family name. All the wealth is supposed to be left in his name upon the death of his father. Wealth and the family name are supposed to be passed down from generation to generation. So, there is need for a male child.

- **Children as a source of labour and security**

Having a child is more important in most societies as children are seen as a source of labour and security. When we say labour, we mean to say that children are there to help in the fields and do most of the house hold chores. So, if a family has quite a number of children then it means all the work will be easy to manage with no time. Security means that parents have children that will take care of them in their old ages and also provide for their needs.

- **Religious beliefs**

Did you know that some religions do not allow the use of contraceptives (family planning pills, condoms and other methods of birth control.) and abortion? They believe that children are a gift from God so people should not worry about having many children. Most white garment churches encourage their members to marry and have more children. Some even encourage their members not to worry if they happen to lose a child as they believe that God will give them another child.

- **Family planning**

There are various family planning programmes which are helping people to have a fewer number of children. Mainly these programmes educate women on the advantages of having fewer children. These programmes help to reduce birth rates. The most targeted areas in Zimbabwe are the communal areas where women have since been taught about the importance of family planning.

- **Symbol of greatness**

Some people believe that having children is a symbol of greatness. This means that having children is a great achievement and other people will respect and honour you. The patriarchal societies of Africa consider having more children as a symbol of greatness. Respect is earned with the number of children a man has. This therefore leads men to have more wives in order to have more children.

- **Early marriages**

People who get married early tend to have quite a number of children thereby increasing birth rates. Children get married at a tender age especially girls usually between the ages of 12 and 18 years. This usually happens when a girl gets impregnated by an older man who would have promised. With lack of education the young girls would have more children.

21.1.3 Factors affecting death rate.

Deaths are caused by a number of factors which we are going to discuss below. Most countries are trying their best to solve problems that are causing death rates to increase.

- **Food**

A good diet promotes good health. A good diet is the one that is balanced. A balanced diet helps to nourish the body and protects it from malnutrition diseases such as kwashiorkor, marasmus and scurvy. In Zimbabwe, for instance, the government has set up supplementary feeding programmes in schools, particularly in rural areas, to help the needy. Non-governmental organisations and religious groups such as Christians and Moslems also distribute food through their food aid programmes to communities with food insecurity. Such efforts have gone a long way in reducing death rate in the country.

- **Wars**

This is a major factor which increases death rates. If a country is experiencing war, most of its inhabitants perish during that period. Wars if prolonged and not checked they cause high death rates leading to the decrease in population.

- **Decreasing infant mortality rate**

Do you remember what infant mortality rate is? Most countries including Zimbabwe conduct immunisation programmes to prevent child-killer diseases such as polio, tuberculosis, tetanus, diphtheria, whooping cough and measles. This helps to decrease infant mortality rate.

- **Water and sanitation**

Poor water sources and poor sanitation lead to water-borne diseases which increase death rate. On the other hand, improved water and sanitation reduces death rate. In Zimbabwe, the government has made efforts for people to have access to clean water by constructing boreholes and tap water in most rural and urban areas. This has helped to reduce water-borne diseases.

- **Diseases**

You have probably noticed that most people are dying due to different diseases. The most dangerous ones include cancer, ebola and HIV/AIDS. In most cases people get diagnosed with cancer or HIV when the disease would be in its advanced stages.

Thus, lack of adequate medical facilities, health personnel and knowledge about certain diseases in most developing countries increase death rates. The six killer-diseases are also a cause of high death rate in developing countries. Do you still remember examples of killer- diseases we mentioned earlier? If you have forgotten, revisit the previous section.

- **Abortion**

Did you know that abortion affects death rate? Well, some religious sects do not encourage abortion and others do. If the pregnancy is a danger to the mother, abortion is allowed. For example, if the unborn baby grows in the mother's fallopian tubes, the pregnancy is terminated to save the mother. In some countries like China, when the parents do not want the sex of the child, they are allowed to terminate the pregnancy after a scan has been taken to show the sex of the unborn baby. However, in other countries it is illegal to terminate pregnancy without a medical doctor's approval.



Activity 21.1 Population terms

1. Define the following terms.

- a) Birth rate
- b) Infant mortality rate
- c) Life expectancy

2. What is natural population increase? Give the formula in your answer (2)

3. State any three factors that affect death rate (3)

4. Describe any two factors that affect birth rate. (6)

21.2 Population data collection, presentation and interpretation

21.2.1 How do we collect population data?

We would like you to note that collection of information is very important in population science. There are various ways or methods of collecting population data. Every country carries out a population census after a particular period of time. Why do you think the government spends a lot of money counting people? It is important to know the number of people who reside in a country in order to:

- plan for the needs of the population in terms of accommodation, food security, health facilities, water, employment, schools, transport and other needs that people may want
- monitor the movements of people in and out of the country
- determine boundaries of election constituencies, districts and even provinces in a country.

Tip

Population information is collected through a census and or vital registration. Do you know that you were already counted either through a census or vital registration? Most people think we are only counted during census. Our population details have been recorded. Let us look at how population data is collected.

Censuses

We are sure you have once been counted for one reason or the other. This might be in the classroom, at church or during distribution of food or agriculture inputs. This is similar to what happens in a **census**. You have heard of the word census before, right? Maybe you have seen some people visiting your area and home asking questions and recording information. Before they leave, they would put up a sticker on your front door as evidence of data collection. Those people who are involved in the counting of people are called **enumerators**.

What is census then? Census is the counting of people by enumerators in a country. Census results are recorded and then presented. In Zimbabwe this is done after every ten years. This process requires a lot of money to be carried out. Money is important for the buying of stationery, travelling expenses to various places in the country and also to train and pay the enumerators collecting data. During the census period a person is only counted once where ever he/she is.

Information collected during census include

- the name of the person being counted
- his/her age
- gender/ sex of the person
- marital status (single, married or divorced)
- number of children one has

- citizenship
- place of birth
- religion of the person
- level of education that he / she has attained
- if the person is employed or not
- relationship with the head of the house
- availability of water
- if they own the house or they are renting

Advantages of census

- It enables the government to plan for the needs of the people in terms of accommodation, food security, health facilities, water supply, employment, schools, transport and other socio-economic factors.
- A census allows the authorities to monitor the movements of people in and out of the country
- It helps in demarcating political boundaries
- It is a more accurate method of collecting population information
- Apart from the number of people, a census covers other aspects about population such as housing, education, health issues as well as water and sanitation services in the country.

Disadvantages of a census

- some records might be lost or destroyed
- some areas could be out of reach (accessibility)
- high costs of transport and stationery that will be used during the data collection
- enumerators need to be paid for the data collection process
- coverage of some areas will not be done adequately
- some people will not be home during the data collection
- falsehood from participants who would not want to be counted.

Vital registration

We hope you have a birth registration card, a birth certificate or a national identity card? The birth certificate document shows your date of birth, sex, place of birth, parents, citizenship and nationality. These important documents that are given at the Registrar's office once a person is born as a form of identification. Such information is important as the office of the registrar would like to keep records of the actual number of people who are born and who die in a country. Marriage and divorce records are also captured. Migration patterns are also recorded, those who travel outside the country and within. Even when a person dies, a death certificate is issued. Why do you think a death certificate is issued if someone dies? Brainstorm and write down your suggested reasons.

Sample surveys

Sampling is also another method used in data collection. A sample is a small group of people or small part of the population studied to represent the larger population. Information obtained from a sample population will be used to describe characteristics of the whole population. For instance, if the government wants information about health in rural areas, a study will be carried out in one or two rural areas. The results obtained will be used as a representative of all the other rural areas in Zimbabwe.



Activity 21.2 Population data collection

1. What is vital registration? (2)
2. How long does it take for a census to be held in Zimbabwe? (1)
3. Explain why it is important for a government to hold a census. (3)

21.2.2 Presentation, interpretation and analysis of population data

How do we present, interpret and analyse population data? You should know that data can be presented in various ways. We will look at some of the ways in this unit. You should always remember that population structure comprises of age and sex of the population. This should be reflected when you are presenting population data.

Population pyramids

These bar graphs that show the age and sex structure of a country. It consists of horizontal bars for both males and females representing the age groups and total number of people in each age group separately. Males would be on the left while women would be on the right side and each group is given as a total percentage of the population. The pyramid shows if population would be increasing or decreasing with age. Pyramids also show changes in population and can predict the future changes. The pyramid shows the different age- structures of those who are young (0-14), economically active (15-64) and old age (65+). This information helps to work out the dependency ratio. Dependency ratio refers to the number of the non-economically active (young and old) people as a proportion of the total working population.

Dependency ratio is expressed as

$$\text{Dependency Ratio} = \frac{\text{dependents (0 - 14) + (65 +)}}{\text{Economically active population (15 - 64)}} \times 100$$

A population pyramid of a country can shows the following

- migration, ages and the gender of those migrating
- effects of lack of population planning and policies
- predictions of the future population

Expanding population pyramids

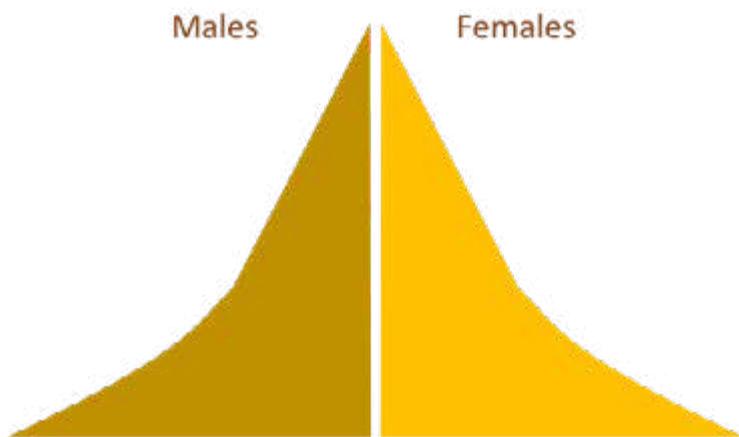


Figure 21. 1 Expanding population

You have seen pyramids before, maybe in pictures or on television. This is an example of a population pyramid which shows males and females by age. Note that the pyramid has a broad base meaning there is high birth rate. A narrow top shows high death rate and low life expectancy. High death rate is a result of high infant mortality rate, poor health services, poor diet and diseases such as HIV/AIDS. The above pyramid is a resemblance of most developing countries. The base shows that a large number of children are born but they are unfortunate enough to reach the later stages of life. Infants could be affected by the six killer diseases which include kwashiorkor, marasmus, whooping cough and measles. A narrow top shows low life expectancy as most people die before reaching the age of 80+ years. This is due to lack of improved health facilities which include hospitals and medical equipment, shortage of medical doctors and trained nurses as well as diseases such as HIV/AIDS.

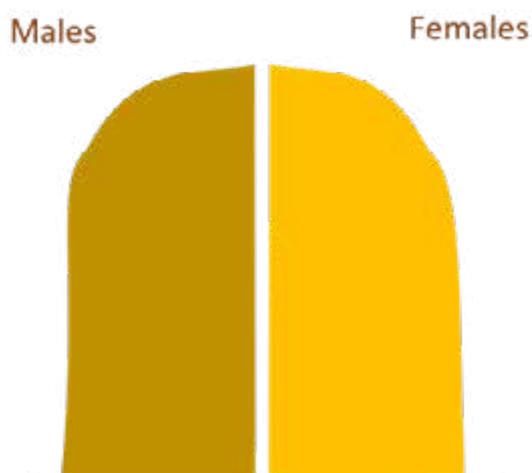


Figure 21.2 Stationary population pyramid

As you can see this pyramid is a bit different from the first one in figure 21.1. Do you see any differences? The base as well as the top are now different. Stationary means there is low death rates and low death rates. Life expectancy is high as the top shows high number in old age people. This pyramid is a characteristic of most developed countries.

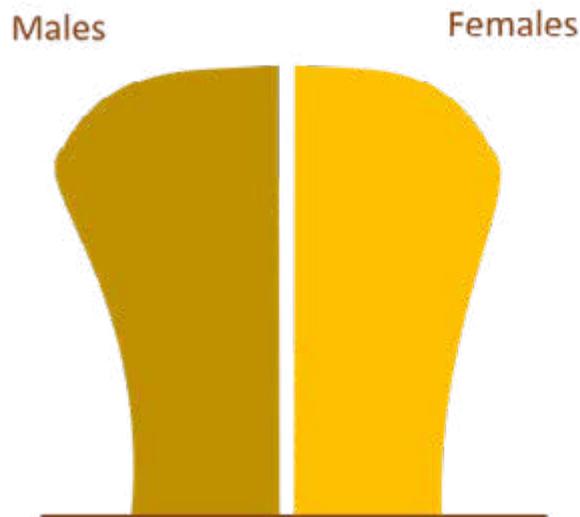


Figure 21.3 Contracting population pyramid

This pyramid is contracting. What do you think it means? This simply means there is low birth rate, low death rate and high life expectancy. The top is broad and the base is narrow. Countries who have such a population pyramid are economically developed and have high living standards, good education, good food and good health facilities. Children will be born but in low or declining numbers.



Activity 21.3 Population presentation, interpretation and analysis

1. Construct an expanding population pyramid (2)
2. Describe the expanding population pyramid (4)

Reflection

In this unit we have been discussing population terms such as data collection, presentation, interpretation and analysis. We hope that you have understood this

unit and if you have any areas that you need further explanation please consult your tutor or go through the unit again.



Summary

We have come to the end of this unit. We hope you enjoyed going through the topics. In this unit we covered population studies and the following are the main points to note.

- Birth rate is the number of births per thousand people per year
- Death rate is also called mortality rate
- A census is the counting of a population in a country. In Zimbabwe it is usually held after every ten years
- A census is carried out for the government to know the number of people in its country
- Population information can be presented on a population pyramid which shows the age and sex structure of a country
- Factors that influence birth rate include religious beliefs, need for a male child and early marriages
- Death rates are influenced by war, diseases, poor living conditions, family planning and abortion

End of Unit Assessment

Section A Multiple choice

Answer the following questions by choosing the correct answer from the options given.

1. The following are importance of population information except that
 - A it can be used for economic planning
 - B it shows the level of unemployment in the country
 - C it shows one's political affiliation
 - D it indicates the level of economic development of a country

2. Vital registration records information about
 - A. births and deaths
 - B. population
 - C. a person's religion
 - D. enumerators

3. Population information can be presented using
 - A. bar graphs
 - B. pie charts
 - C. pyramids
 - D. graphs

4. Death rates are influenced by the following except
 - A. religion
 - B. need for a male child
 - C. diseases
 - D. war

5. Stationary population pyramids are characterised by
 - A. high birth rates
 - B. low death rates
 - C. low life expectancy
 - D. high dependency ratio

6. Define the following terms
 - (a) fertility rate (1)
 - (b) population census (1)
 - (c) life expectancy (1)
7. State reasons for the increase of life expectancy in some developing countries in recent years. (3)
8. Explain two advantages and two disadvantages of a higher life expectancy in developing countries (4)
9. Describe population problems that are likely to be faced by a country. (6)

Research Work

Collect age and sex data about your local population. (You should be able to collect population information through the techniques we discussed above)

Draw a population pyramid of your area from the data.



Progress Check list

Do you remember the objectives of this unit? Do not worry if you need reminding, we have listed them here. Go through them and check how many of them you achieved. Tick against those you are sure you have achieved. Put an X against those you feel you have not yet achieved. For any that you feel you have not yet achieved, find the section dealing with it again. Right, mark in the unit and go over it yourself.

Objectives	Check box
Can you now...	
• explain population terms	
• apply population terms at local and national levels	
• collect population data within the school or local community	
• analyse population data	
• present population data	
• interpret population data	

Further reading

Chabikwa, B., Phiri, F., & Mapungwana, M. (2020). *Total Geography Book 3*. Harare: Priority Publishers.

Waugh, D. (2014). *Geography: An integrated approach*. Oxford: Oxford University Press.

Unit 22 Population distribution and density in Zimbabwe, Africa and the world

21.1 Population distribution in Zimbabwe, Africa and the world

21.2 Population distribution in Zimbabwe

21.3 Variations in population density in Africa

21.4 Factors affecting population density

Introduction

Did you know that there are billions of people spread across the world? Well people have different likes so they tend to live in different areas. This is called population distribution. Most of our relatives stay in different towns or cities because of various reasons. Do you still remember what you learnt in the previous unit? Well, in this unit we would like you to learn about the distribution of population in Zimbabwe, Africa and the world. You will also learn about the variations in population density and the factors that affect population distribution and density.



Objectives

After going through this unit you should be able to:

- describe population distribution in Zimbabwe, Africa and the world
- explain differences in population density in Zimbabwe, Africa and the world.
- identify factors affecting population density
- interpret population data



Key Words

Population	total number of people living in an area
Dependency ratio	the ratio obtained by comparing the working population to the non-working population (economically active and non-economically active)
Mortality	means death
Population density	refers to the number of people per unit area. It is calculated by the formula:



Time guide

You are expected to take an average of **10** hours to go through this unit.



Study skills

This unit requires you to use your imagination and study various maps provided.

22.1 Population distribution in Zimbabwe, Africa and the world

Have you ever asked your parents or relatives why they chose the area where you live? Well, if you did, they might have told you a couple of reasons why they chose to live in that area. In this unit, we will discuss the physical and human factors that influence people when choosing a place to settle. People are spread all over the world due to historical events, necessity and choice. The land across the world is not uniform. This causes the population to be unevenly distributed, meaning some places have fewer people while others have quite a large number of people. People choose to live in areas with adequate water supply, good climate and good farming land. The world's largest population is in the northern hemisphere than in the southern hemisphere. You are probably wondering why this is so! Well, this is because there is more land in the northern hemisphere than in the southern hemisphere. The distribution of population is shown by the use of dots, shading or proportional circles methods. Have you seen dot maps before? A dot represents a given number of people. Thus, on a map, areas with a higher concentration of dots indicate a larger population compared to areas with fewer dots.

Population density can also be presented by way of shading. Where it is shaded darker it means there are many people in that area and a lighter shade indicates an area with fewer people. These shaded maps are called choropleth maps. Some areas are densely populated for example the Netherlands and Bangladesh. This is because there are flat lowland plains which attract settlement. This is different from the Sahel countries which receive irregular rainfall and are characterised by low population densities. Study the world map in Figure 22.1 and see how the world's population is distributed.

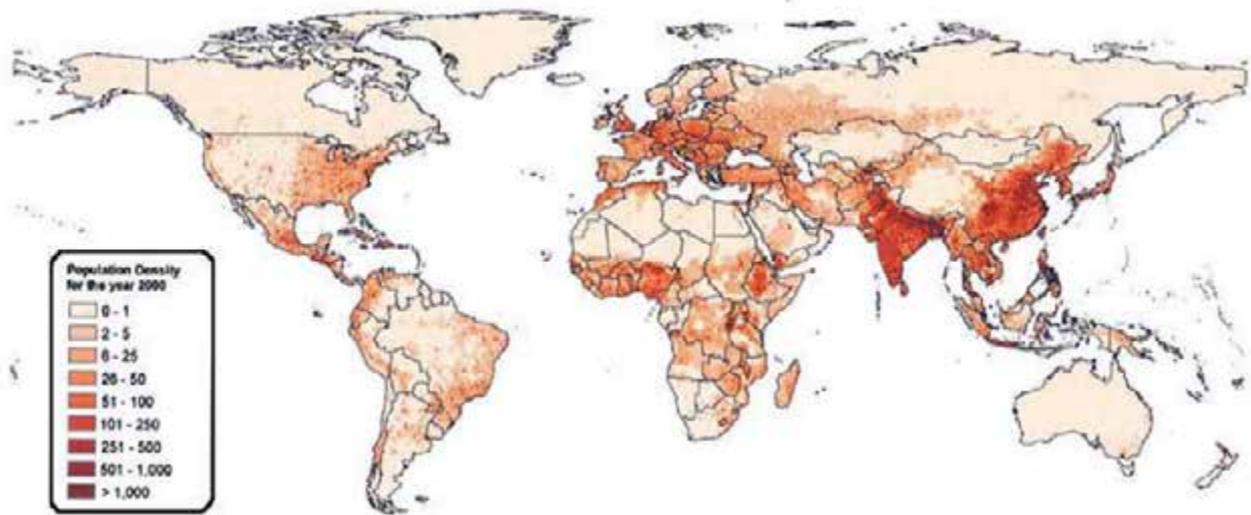


Figure 22.1 Global population distribution

22.2 Population distribution in Zimbabwe

You should note that Zimbabwe's population is unevenly distributed. This is because at least seventy percent of people are settled in communal areas and thirty percent in urban areas. Figure 22.2 shows a dot map showing the distribution of population in Zimbabwe. The map shows that the north eastern part of the country is densely populated in the high veld and in the eastern highlands near Bindura and Trojan mine. Redcliff, Bulawayo, Masvingo and the eastern parts of the country are also densely populated. This is due to favourable weather conditions in these areas and availability of arable land. Areas with low population densities include the Zambezi valley, Hwange national park and Gonarezhou national park. This is because these areas have extreme harsh weather conditions. Temperatures are high and rainfall is low throughout the year. The soils are too poor to support agricultural activities. These areas are also prone to tsetse flies. High population densities are in some the communal areas and moderate population densities are in the northern and southern parts of the country.

The urban areas of Zimbabwe have high population densities and are found in the high veld. The main reason behind the location of Mutare and Bulawayo urban centres is the presence of a railway line which was built as a communication line. These areas have cool temperatures and good fertile soils suitable for agriculture. The historical factor of colonisation also plays an important role in the location of these urban centres. These urban centres developed through industrialisation and grew large

with high population densities. The industries attracted quite a number of people through job creation.

Areas with moderate population densities include the southern, the south western and the north eastern parts of Zimbabwe. The areas include Midlands, Masvingo and Matabeleland.

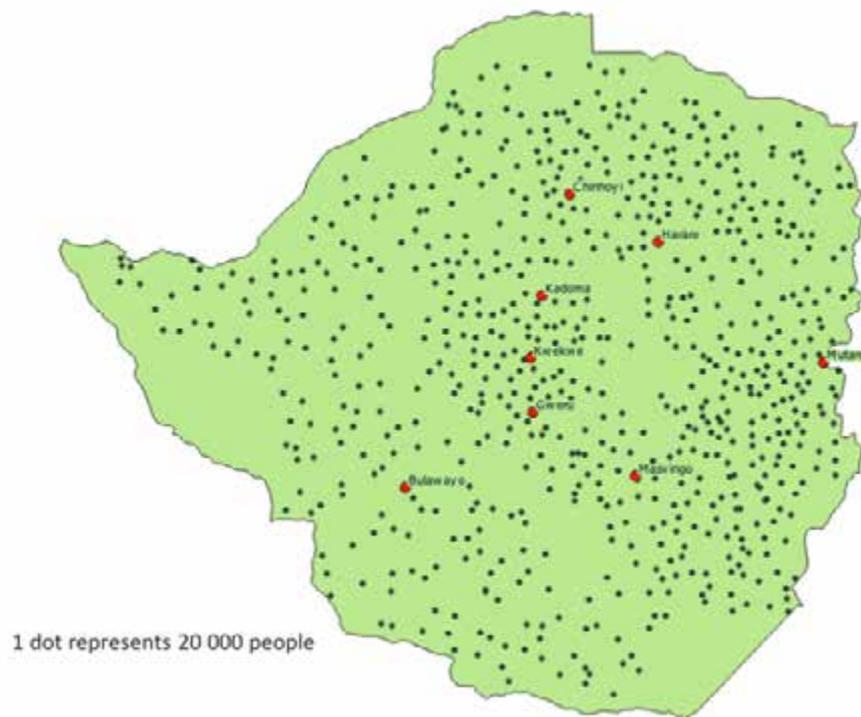


Figure 22.2 A map showing population distribution and density in Zimbabwe
(Source: Chabikwa et al, 2019)



Activity 22.1 Population distribution in Zimbabwe, Africa and the world

1. State the differences between population density and distribution (2)
2. Describe and explain the distribution of population in Zimbabwe (5)
3. Give reasons for high population densities in communal areas in Zimbabwe. (3)

22.3 Variations in population density in Africa

On the key words we have already defined the term population density. Figure 22.3 shows a map showing population distributed Africa. You will see that population

distribution is not even and there are some places with high concentration of people in a unit area.

In Africa, there are three distinct population densities namely low, medium and high population density areas. Low population density areas are those with less than 10 people per square kilometre and they mostly cover desert and semi desert areas of the Sahara, Namib and Kalahari deserts. Low population densities are mainly due to low rainfall, little or no vegetation, extremely high temperatures and absence of surface water which repel settlement.

Medium population density areas are those with between 10 and 50 people per square kilometre and these stretch across the central plateau of Africa, East and West Africa. These areas are characterised by high rainfall and rich soils, hence the main activity is agriculture and commercial exploitation of forests.

Those regions with more than 50 people per square kilometre are the high-density areas. They cover Africa's mining regions such as the Zambian copper belt, Zimbabwe's high veld as well as the Nile valley. Coastal areas of West, Eastern and Southern Africa are also densely populated. Major towns and cities of Africa have attracted high population densities because of industrialisation which created opportunities for employment in mining and industrial centres.

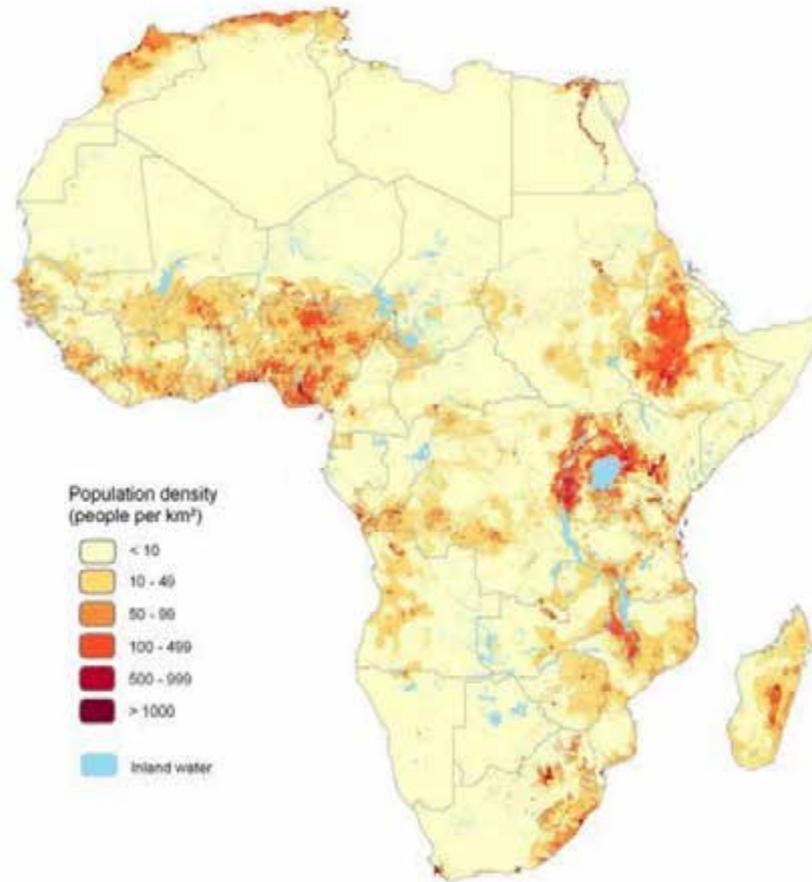


Figure 22.3 A map showing population distribution Africa



Activity 22.2 Variation in population distribution and density

1. Define the following terms.
 - (a) Population distribution
 - (b) Population density (4)
2. What causes population to be unevenly distributed? Give two reasons. (2)
3. What do you think influence high population densities along the coastal areas? (3)

22.4 Factors affecting population distribution and density

As we highlighted before, there are various factors which influence the distribution of population. These can be divided into physical, economic and human factors. These will be discussed below.

22.4.1 Physical factors

- **Water supply**

Water is an important aspect that is considered by many people before settling in an area. People favour to settle where there is adequate water supply or near water sources such as rivers, springs or dams to access water for various purposes. For example, people have settled along the Nile river to draw water for farming purposes. Areas with adequate water supply are associated with high population densities.

- **Climate**

Climate includes rainfall and temperature. In most cases people avoid areas with extreme harsh weather or climatic conditions. Extreme means either too hot or too cold. Population density is low in areas near the poles because it is too cold, and in deserts because they are hot and dry. People prefer to settle where there are favourable climatic conditions. Areas that receive low annual and unreliable rainfall have fewer or no inhabitants. Areas like the Sahara Desert and Sahel countries are good examples with sparse population. On the other hand, the Alps and South-East Asia are densely populated because they have a monsoon type of climate.

- **Pests and diseases**

Areas which are swampy or low lying are unfavourable for human settlement. These areas are prone to parasites such as mosquitoes and tsetse fly which cause malaria, sleeping sickness and river blindness. Such areas limit the number of inhabitants and hence they have low population densities. These include the central parts of Africa which are prone to malaria. In Zimbabwe areas along the Zambezi and Limpopo low veld attract low population densities for the same reason. Other areas are relatively pest and disease free, while others have adequate and high technology to eradicate such problems. Such areas have high population densities.

- **Soils**

Have you ever noticed that most people practise agriculture? People tend to settle in areas with fertile soils like clay, alluvial and loamy soils. There are high densities of population in areas with fertile soils such as along the Nile river with rich alluvial soil deposits.

- **Relief**

This means the steepness or flatness of an area. People prefer to settle in areas where it is fairly level and avoid mountainous, hilly or rocky places. This is because people would want to cultivate on flatlands. Buildings and communication lines are also easy to construct on flatlands. Therefore, areas with a flat or undulating terrain attract high population densities whereas rough and mountainous areas have low population densities.

- **Vegetation**

Densely forested areas like the Congo Basin and other parts of the tropical rainforest are lowly populated. These areas harbour different kinds of animals and pests which scare away settlers. Thick vegetation is also difficult to clear which repel settlement. Hence such areas have low population densities. On the other hand, Savannah grasslands have more inhabitants and high population densities.

- **Altitude**

Have you ever heard of the saying that goes, "The higher you go the cooler it becomes"? High altitude areas experience low temperatures and low pressure which makes it so difficult for settling and breathing. A few people choose such areas thus making the areas sparsely populated. Most people prefer to settle in low lying areas which are warm, wet and easy to cultivate.

22.4.2 Economic Factors

- **Natural resources**

Areas which are densely populated are areas which have minerals. People would want to exploit mineral resources therefore settling in such areas making them densely populated. In Zimbabwe there are areas which have developed due to mining which include Zvishavane, Kwekwe, Kadoma, Shurugwi, Mhangura, Bindura, Shamwa, Hwange and Mashava. Minerals in these areas have attracted high population densities. Try to name the minerals mined in each of those towns that we mentioned above.

- **Urbanisation**

The development of industries has led to the increase in population that settle in

urban areas, Urban areas are densely populated as people are drawn to work and settle near the industrial areas. Such areas have the fastest growing population.

- **Communication**

People tend to favour settling in areas which have good communication lines. Some have settled near rivers, railway lines or roads for easy communication. Areas where it is difficult to construct lines of communication are sparsely populated. For example, the mountains in Bolivia and the Sahara Desert are sparsely populated. Where it is easier to construct railways, ports, roads and canals population densities are high.

22.4.3 Human factors

- **Historical**

Historical factors such as trade have led to the development of some towns as they were used as trading posts in the past. Such areas include the east and west African coasts. Trading that took place since long ago has made these areas to be densely populated.

- **Political**

The government may decide on where to settle their people. It can be due to excessive growth of population. Zimbabwe introduced land resettlement programmes after the colonial era to redress disparities in land distribution. This influenced population densities.

- **Land resettlement**

Have you ever heard of the land reform programme? In Zimbabwe it was a government initiative which involved relocation of people from overcrowded communal areas to newly allocated pieces of land for farming. This helped to address the issue of high population densities in the communal areas.

- **Defence**

In the past people settled on high ground for defence. When people settled on high ground, they could easily identify an enemy approaching. Nowadays this is no longer an important factor as people have now developed modern technology and advanced methods of fighting.



Activity 22.3 Factors affecting population distribution and density

1. Identify three physical factors that have influenced population distribution and density in your community (3)
2. Explain how the factors mentioned above have influenced population distribution and density in your community. (6)

Reflection

In this unit you have been learning about population distribution and density in Zimbabwe, Africa and the world. We hope you have noted that population is not evenly distributed across the world and there are various factors which cause these variations.



Summary

By now we are sure you have understood most of the concepts in this unit. If you have not done quite well in your activities go back and go through the sections again. Remember the definitions of key words and also the factors that influence population distribution. Below are the key points covered in this unit.

- Population distribution is the spread of people in a given area or country.
- Population is densely populated in areas with minerals, fertile soils and adequate water supply.
- Physical factors include soils, water supply, climate and pests and diseases.
- Distribution of population on maps is shown by dots or shading.
- Population change and distribution is affected by physical, economic, human and political factors.
- People are highly concentrated in the northern hemisphere of the world than in the southern because there is more land surface in the north than in the south.

End of Unit Assessment

Section A Multiple choice

Answer the following questions by choosing the correct answer from the options given.

1. The birth rate of a country can be minimized through
 - A. early marriages
 - B. birth control measures
 - C. life expectancy
 - D. encouraging men to have more wives

2. High population densities in Zimbabwe are found in
 - A. urban areas
 - B. communal areas
 - C. coastal areas
 - D. desert areas

3. Why did people long ago settle on high ground areas?
 - A. To see the view
 - B. For defence
 - C. For trade
 - D. For assistance

4. Physical factors that affect the distribution and density of population include
 - A. Defence and political
 - B. Climate and water supply
 - C. Communication and historical
 - D. Urbanisation and natural resources

5. Low population densities are caused by

- A. Lack of minerals
- B. Low lying relief
- C. Hot and dry climate
- D. Warm and humid

Section B: Answer all questions

- 6. State the difference between population distribution and population density. (4)
- 7. Study Figure 22.2 which shows population distribution in Zimbabwe. Describe and explain population distribution in Zimbabwe (7)

Research Work

You are required to carry out a survey in your area on how people have come to settle there. You are to draft questions which will help you to gather information on how people in your area have chosen to settle in that place.

- (a) Draft questions you would use to collect the data.
- (b) Present the data using the suitable data presentation technique.
- (c) Explain the data.



Progress Check

Do you remember the objectives of this unit? Do not worry if you need reminding, we have listed them here. Go through them and check how many of them you achieved. Tick against those you are sure you have achieved. Put an X against those you feel you have not yet achieved. For any that you feel you have not yet achieved, find the section dealing with it in the unit and go over it again. Right, mark yourself.

Objectives	Check box
Can you now:	
• describe population distribution in Zimbabwe, Africa and the world	
• explain differences in population density in Zimbabwe, Africa and the world.	
• identify factors affecting population density	
• interpret population data	

Further reading

Chabikwa, B., Phiri, F., & Mapungwana, M. (2020). *Total Geography Book 3*. Harare: Priority Publishers.

Garirwe, S., Jerie, S., & Manyika, M. (2018). *Step Ahead Geography Form 3*. Harare: McMillan.

Waugh, D. (2014). *Geography: An integrated approach*. Oxford: Oxford University Press.

Unit 23: Population growth and change

- 23.1 Population growth/ decline
- 23.2 Factors influencing population growth
- 23.3 Effects of population growth
- 23.4 The Demographic Transition Model
- 23.5 Critiques of the Demographic Transition Model

Introduction

You live in a society or community that has a number of people of different ages, race, gender and religion. In unit 21 and 22 you learnt about population and the terms used in population. In this unit I would like you to visualise the community you live in and the different people you are surrounded by. You might have noticed that the number of people in your community is either growing or decreasing. This is caused by a number of factors. In this unit we are going to look at these factors. In the course of the unit we will also look at the effects of declining population of the demographic transition model, strengths and weaknesses of the demographic transition model and examples of countries with high population growth and declining population.



Objectives

After going through this unit, you should be able to:

- explain factors which influence population growth
- explain the effects of population growth (negative or positive)
- describe the features of the various stages of the Demographic Transition Model
- identify countries with high or low population growth rate.



Key words

Birth rate	the number of live births per thousand people in a given population per year
Death rate	the number of recorded deaths in a given area per thousand people per year
Immigration	the movement of people into an area or country. The people involved are called immigrants .
Emigration	the movement of people out of an area or country. The people are called emigrants .



Time guide

You are expected to take an average of **10** hours to go through this unit.



Study skills

This unit requires you to have mastered unit 21 and 22 in order to fully understand this unit. You therefore need to revise your notes on unit 21 and 22 before you start this unit. You are also going to do some research in this unit.

23.1 Population growth and decline

We hope that you still remember that population growth is simply the increase of population and population decline is when population numbers are falling. Many countries are caught between the line on whether they want population to increase or decrease.

Population growth is the increase in population as a result of birth rate and death rate as well as immigration and emigration. Population growth rate is therefore expressed as follows:

$$\text{Population growth rate} = \frac{\text{Natural increase} + \text{net migration}}{\text{total population}} \times 100$$

NB Natural increase = births – deaths;

Net migration = immigration – emigration

The formula shows that births and immigrants increase population whereas deaths and emigrants reduce population. It also shows that **population growth rate** is expressed as a percentage of the total population.

Let us now go through factors that influence population growth.

23.2 Factors influencing population growth

In your community you have probably noticed population growing or decreasing. What do you think is causing that? Population growth is affected by a number of factors which include birth rate, death rate, immigration, emigration.

Birth rate

In the previous units we defined birth rate as the number of live births per thousand people per year. Remember, birth rate is determined by fertility rate. Fertility rate is measured by the number of children born to a woman of child bearing age. A high rate of fertility results in high birth rates. Remember in Unit 21 we discussed factors that cause a high birth rate. High birth rates lead to high population growth rates. Some of the causes of high birth rate include the following.

- Improvements in basic health care which has lowered maternal mortality. Maternal mortality refers to the death of expecting mothers before or during giving birth.
- Need for labour in the family has contributed to high birth rate.
- Cultural factors such as the desire to have a male child in the family have also led to high birth rates.
- Prestige of large families results in high birth rate.
- Low levels of education among women.
- Ignorance on the use of or unavailability of contraceptives.

Death rate

Have you ever been at a funeral before? Death is something which is sorrowful and it has a negative effect on population. If a person dies it means population has decreased. Death rates can increase due to a number of reasons. These include:

- lack of affordable health care. If a person cannot afford to pay for medication or hospital bills this might result in death
- poor maternal care which results in high maternal mortality
- high infant mortality due to malnutrition and poor health care
- poor water and sanitation which result in water-borne diseases that increase death rate. Name any two water-borne diseases.
- poor diet and shortage of food leads to malnourished people resulting in high death rate
- wars and other political instability result in high death rate.
- the pandemic of HIV/AIDS and cancer also contributes to the increase in death rates.

An increase in death rate has an overall effect of reducing population or negative population growth.

Immigration

We guess you might have seen people who come to Zimbabwe from other countries. These people are known as immigrants. Immigration is when people move into an area or country. It affects population growth in the receiving and host country as it will have a high population growth rate.

Emigration

Have you ever travelled out of the country? If you did what was the reason? Probably you were visiting a relative. People travel to settle in other countries for various reasons. Some could travel to further their education or they will be running away from war. This is called emigration. When people emigrate, population decreases.

Activity 1 Population growth

1. State any five reasons why people migrate to other countries.
2. What causes population to grow? Give two reasons.

23.3 Effects of population growth

You should note that population growth has positive as well as negative effects. Let us discuss these factors.

23.3.1 Positive effects

- **More human labour**

If population growth is high, there is availability of human labour which is readily available and cheap. Immigrants sometimes bring skills which contribute to economic development.

- **Tax base expansion.**

A large population raises the tax base which raises government revenue. You are probably wondering what tax is. It is the money that every individual or company contributes to the government. For example, if you buy something in a shop you get a receipt, check where it is written VAT. VAT means Value Added Tax. This is the tax that you would have contributed to the government.

- **Increased demand for goods and services (large market)**

A large population provides a larger market for goods and services from suppliers. Thus, a large population increases demand for various goods and services offered on the market and this benefits suppliers through increased sales and profits.

23.3.2 Negative effects

Let us discuss the negative effects of population growth.

- **Population pressure**

If population growth rate is high people tend to use more resources. This therefore put strains on the government as well as the environment at large. Do you know that there are things that people need to survive? Not only food but water, land and wood for fuel. If the population over-uses the available resources it then causes their decrease. So, population growth needs to be checked.

- **Poverty**

This is one of the most dreadful problems in most countries with a rapid population growth. Poverty has to do with people not affording a decent living, that is, getting a meal, clothing or even money. Most people would live in shanty houses with no water supply or electricity as they cannot afford to pay bills or own a home. If population growth is high the likelihood of poverty is high. You will find out that most people with more children cannot afford to provide them with their basic needs which include food. This therefore shows poverty.

- **Poor living standards**

Have you ever seen people who live in areas where it will be dirty, no water, no sewer systems, no power and no proper housing? This is an indication of poor living conditions. When population grows people end up living in poor conditions due to shortage of accommodation especially in urban areas. This leads to poor living conditions.

- **High unemployment**

This is the shortage or unavailability of jobs. In most cases it is difficult to have everyone getting a job in countries with high population growth rate. The jobs will be few and unavailable as compared to the number of people looking for jobs in the country.

- **High crime rates**

This is a major problem in areas with high population growth. Theft, robbery, murder and corruption are some of the crimes that people commit in areas with high population. People would have nothing to do therefore they tend to crime in order to survive. This is also caused by high unemployment as the population will be too high.

- **Overcrowded conditions**

Have you ever been in a room with a lot of people with nowhere to sit and breathing fresh air is even difficult? These are indications of over crowdedness. There are some places which are overcrowded because a lot of people have occupied a small space or area therefore making it very difficult to survive in those areas. Mostly this takes place in urban areas where people would have no choice but to stay together with an average of six or more people per room.



Activity 2 Effects of population growth

Over crowdedness is an effect of population growth. Can you identify places in your area that have this characteristic?

Outline other effects of population growth.

NB: Remember that population growth has both negative and positive effects

23.4 The Demographic Transition model

This is a model that describes population change over time. It was developed in the mid-20th century to address changes in population. The diagram below illustrates for you the stages of the theory. The theory of Demographic Transition explains the effects of changes in birth rate and death rate on the growth rate of population. It refers to a population cycle that begins with a fall in the death rate, continues with a phase of rapid population growth and concludes with a decline in the birth rate. Did you know that the theory of demographic transition is based on the actual population trends of advanced countries of the world? This theory states that every country passes through different stages of population development. Figure 23.1 illustrate the proposed population changes according to the model.

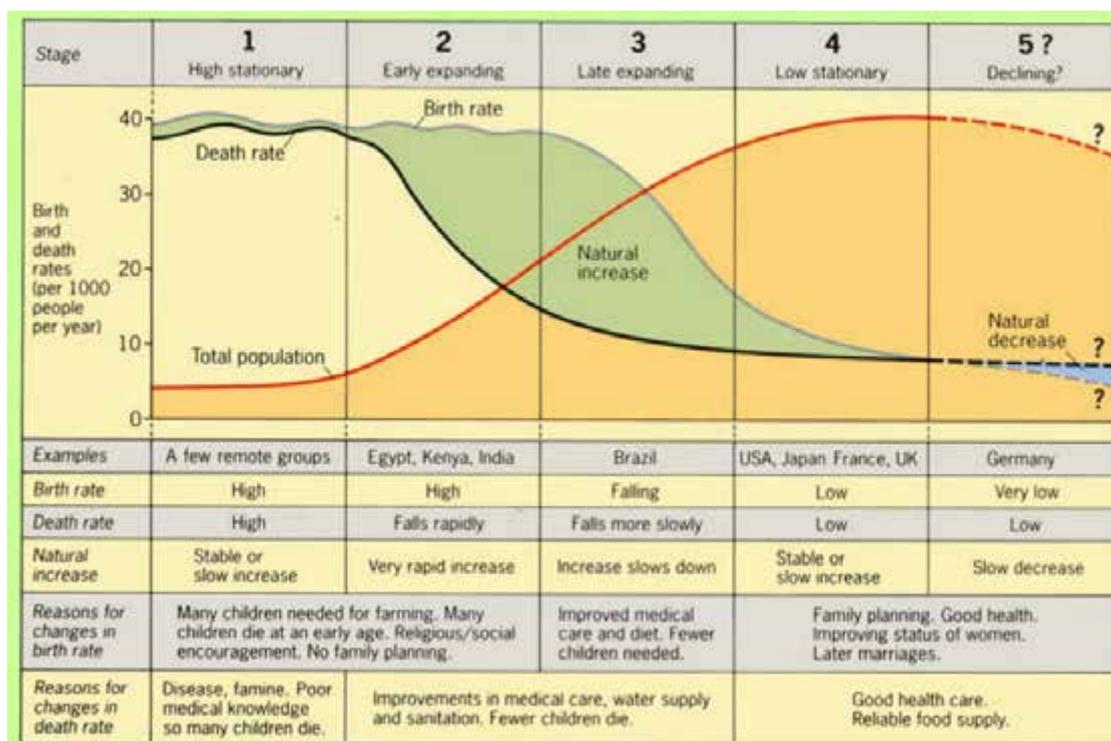


Figure 23.1 The Demographic Transition Model

NB Figure 23.1 also gives examples of countries in each stage of the demographic transition model. These examples show the model applies to real situations in the world.

Stage 1 High stationary

The first stage shows high birth and high death rates. Birth rate is high as children are seen as economic assets or as a form of labour. Do you still remember the causes of high birth rate that we discussed earlier in this unit? Quickly brainstorm them to refresh your memory.

In some societies, fathers with more children will be respected and they acquire a higher status. Also lack of use of contraceptives and some religious beliefs encourage the bearing of more children. Some religions believe that children are a gift from God therefore they tend to have as many children as possible. Other religions also discourage the use of contraceptives to allow birth of many children. We are sure you have also noted on Stage 1 that there is high birth rate and high death rate. What do you think are the causes of high death rate? Many children are dying before reaching the age of one year which means infant mortality rate is high. This can be caused by poor diet, poor sanitation, lack of medical care and inadequate hygiene. Have

you ever seen a child suffering from kwashiorkor? This is due to poor diet. The total population in this stage remains low as births and deaths are balanced.

Stage 2 Early expanding

Take a closer look at stage 2. Do you see any differences from stage 1? Yes, the death rates are falling. What do you think are the causes for the decline of death rates in stage 2? This is as a result of improved diet. People are now eating healthy and having well balanced diet, and children are well fed. Good hygiene is now practised as people no longer throw litter everywhere. There is also improved medical facilities and affordable health care for all. Have you noticed that birth rates have also remained high? List the reasons behind the high birth rates.

Stage 3 Late expanding

What do you see in stage 3? Death rates continue to fall. Birth rates also begin to fall. A fall in birth rate might be due to use of contraceptives. Women now also have a say in the number of children they would like to bear. They are now empowered in making decisions about size of their families. This stage also means that women are now educated enough to raise their status in the society meaning they will be respected like men. In some cases, the high cost of educating and taking care of children has led people to have fewer children.

Stage 4 Low stationary

Carefully look at this stage on the diagram. What changes do you see? The population is **stationary**. This means that it is neither growing nor declining. Birth rates continue to fall. This might be because women are now highly educated and have choices to make concerning the number of children they want. Children are now seen as expensive resulting in low birth rate. This stage also indicates late marriages and use of contraceptives.

Stage 5 Declining

Do you think this stage is possible? Having low birth rates and low death rates? Some countries like Germany have entered this stage where population is now shrinking. The population is ageing. An ageing population is one where the greater percentage of the population consists of the elderly, above 65 years. There are more elderly people than youths or infants due to high life expectancy and low birth rates.

23.4.1 Population pyramids with reference to the demographic transition model

We guess you still remember the population pyramids we discussed in the previous units. Population pyramids are used to represent population patterns of countries. The pyramids below are a representation of the stages found in the demographic transition model in Figure 23.1 above. Carefully go through them and describe the characteristics of each.

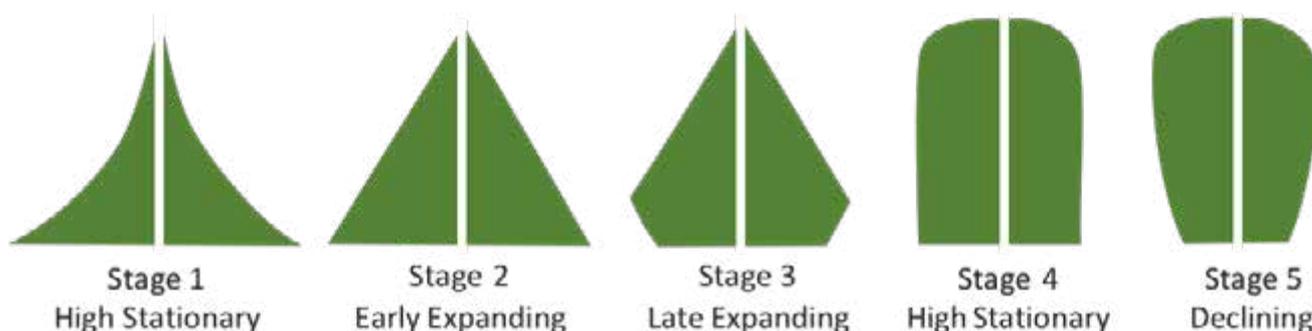


Figure 23.2 Population pyramids in relation to the demographic transition model

Tip

You should keep in mind that the descriptions of the population such as early expanding tell you the size of the population and the growth rate. For example, low stationary means that the population is low and is not changing much – it is stationary. Meanwhile, late expanding simply means the population is in its first stages of growing.

23.5 Critiques of the Demographic Transition Model

We should start by defining the term **critique**. It means to analyse or assess.

Notice, therefore, that this means that despite its usefulness as a theory describing demographic transition in Western Countries, the demographic model has been criticised because of the following reasons:

- Population scenarios cannot be predictive
- This literally means that populations have variations and similarities. Therefore, population cannot be predictive that is whether it is going to increase or decrease
- Each country has different and unique features that may vary with other countries.
- This explains that countries have different features and are not uniform.
- In other countries like Russia most men do not survive beyond their mid-50s due to lifestyle choices. This includes the fact that they suffer from high stress levels, smoking and alcohol abuse.
- Economic development does not mean social development. This means that if a country is economically stable (availability of jobs, industries etc) it does not mean socially it is stable. Social ills may still occur like theft, robbery, murder
- Death rates in sub-Sahara Africa due to HIV/AIDS
- HIV/AIDS is causing most deaths in the sub Saharan Africa.
- Migration can also affect the Demographic transition model
- The model assumed that over time all countries would pass through the same four stages. This therefore seems unlikely because many less economically active countries in Africa will ever become industrialised.
- This model somehow assumed that the fall in death rates in stage 2 is due to industrialisation. This is not the case in most countries because in Britain it was due to urban growth and later advanced medical facilities.
- Stage 3 birth rates have been less than what the model predicts. This is due to religious beliefs and political opposition to birth control. Even China had to introduce a one child policy as a government measure to reduce population growth.
- This model is Eurocentric which means it was designed for European countries.

- However, this model can be used to show population growth changes of a country over a period of time and also to compare the growth rates between different countries at a given point in time.

Let us check how much you understood in the following questions. Attempt Activity 3 and assess how much you have understood on the concepts we have covered so far.



Activity 23.3 The stages of the demographic transition model

1. Can you try to apply the Demographic transition model in your society Explain your findings.
2. Why is it difficult to apply the demographic transition model? Give four points. (4)
3. Complete Table 23.2 by showing countries with low or high population growth rates. Choose from the list below.

Table 23.2 Countries with low and high population growth rate

LOW GROWTH RATE	HIGH GROWTH RATE

South Sudan; Oman; Lebanon; Malawi; Angola; Qatar; Kuwait; Burundi



Summary

Well done, you have completed this unit. It is our hope that you are now able to describe and explain key concepts that we covered in this unit. If there are some concepts which you have not yet understood, revisit those topics and read them again. Use the recommended books for further reading. However, you can search from relevant websites for more information on the concepts covered. Now let us check our progress by reminding you what you have covered.

- Emigration is when a person leaves his/her country permanently to settle in a foreign country
- Birth rate is the number of live births per thousand people in a given population
- A demographic transition model is a model that describes population change over time.
- Causes of high growth rate include unavailability of contraceptives, different religious beliefs, etc
- People migrate for various reasons which include availability of jobs and good health facilities.
- There are various critiques with the applicability of the demographic transition model
- Causes of low growth rate includes poor hygiene, poor sanitation, HIV/AIDS
- Population structures can be shown through pyramids that show the age and sex structures.
- The economic development of a country does not mean it is socially developed.
- HIV/AIDS and cancer are the major causes of deaths in most countries.

End of unit assessment

Section A multiple choice

Answer the following questions by choosing the correct answer from the options given.

1. Death rate is influenced by
 - A. infant mortality rate
 - B. birth rate
 - C. social constraints
 - D. age

2. Reducing infant mortality rate is done through
 - A. giving good food to babies
 - B. vaccinating against the child killer diseases
 - C. improve water sanitation
 - D. family planning

3. Natural increase is obtained by
 - A. subtracting birth rate from death rate
 - B. subtracting infant mortality rate from birth rate
 - C. subtracting death rate from birth rate
 - D. subtracting death rate from infant mortality rate

4. Information collected during a census include
 - A. a person's place of birth
 - B. a person's income
 - C. life expectancy
 - D. number of cars a person owns

5. What is the major cause of death in most countries these days besides HIV/AIDS?
 - A. six killer diseases
 - B. HIV
 - C. cholera
 - D. cancer

Section B

Answer the following questions

6. Define the following terms
 - (a) declining population (1)
 - (b) growing population (1)

7. High unemployment means.....
8. Give any reasons explain why a country should reduce population growth (4).
9. As a planning officer propose programmes that can be used to reduce high rates of natural population growth. (3)
10. Draw a labelled diagram of a population pyramid of a country in stage 2 of the demographic transition model. (4)

Research Work

You should carry out a population survey in your area or community. You can either visit a nearby health centre (clinic/ hospital) and record the number of females and males. Present your data using a population pyramid. Females on the right and males on the left side. Note the age differences in order for you to come up with a good diagram.



Progress Check

Do you remember the objectives of this unit? Do not worry if you need reminding, we have listed them here below. Go through them and check how many of them you achieved. Tick against those you are sure you have achieved. Put an X against those you feel you have not yet achieved. For any that you feel you have not yet achieved, find the section dealing with it in the unit and go over it again. Right, mark yourself.

Objectives	Check box
Can you now:	
• explain factors which influence population growth	<input type="checkbox"/>
• explain the effects of population growth (negative and positive)	<input type="checkbox"/>
• describe the features of the various stages of the demographic transition model	<input type="checkbox"/>
• identify countries with high or low population growth rate?	<input type="checkbox"/>

Further reading

Chabikwa, B., Phiri, F., & Mapungwana, M. (2019). *Total Geography Book 3*. Harare: Priority Publishers.

Munowenyu, E. M. (2008). *Step Ahead:O'Level Human and Economic Geograghy*. Harare: Longman Zimbabwe (Pvt) Ltd.

Unit 24 Migration, Population policies and Diseases

- 24.1 Migration and its Causes
- 24.2 Types of migration
- 24.3 Effects of migration
- 24.4 What is a Population Policy?
- 24.5 Population and diseases

In this unit we are going to look at the movement of people. We will study the movement of people from one place to another and the results of this movement. Have you ever changed your place of residence? If so, you were involved in the types of movement that we are going to study in this unit. We are further going to look at the population laws that are used by different countries to control population changes. After that we will look at diseases affecting populations in developing and developed countries.



Objectives

After going through this unit, you should be able to:

- describe causes of migration
- explain effects of migration
- outline different categories of migration
- describe the rationale of having population policies
- explain the effects of population policies for named developed and developing countries
- describe diseases associated with developing countries
- describe diseases associated with developed countries
- explain the differences in diseases between developed and developing countries
- explain social and economic effects of diseases



Key Words

Population Policy	A set of measures put in place with the intention of causing change to population.
Migration	The movement of people from one place to another resulting in a permanent change of residence which lasts for at least a year.
Immigration	The movement of people into a particular area.
Emigration	The movement of people out of a particular area.
Net migration	The surplus (or deficit) of immigration over emigration. It is calculated by subtracting emigration from immigration.



Time

You are expected to take an average of **10 hours** to go through this unit.

24.1 Migration and its Causes

What is migration? We have already given you the definition for migration in the key words section. It is important for me to stress that the movement that is considered to be migration must result in a permanent change of address. Note that the word *permanent* here means lasting for at least one year.

What causes people to move and change the place they live in? People move because the places they have been living in have conditions that are no longer good for them. This movement is called migration. People also move because they have been attracted by better conditions in other places. We, therefore, can classify causes of migration into *push factors* and *pull factors*. Pull factors are those conditions that attract people to move to a particular place. Push factors are the conditions in a particular place that force people to move away from that place. In the next section we will look at the push and pull factors in details.



Activity 24.1 What is migration?

1. From the list of movements below, identify which ones can be classified as migration. Tick against those that are migration; put an X against those that are not. Give reasons for putting a tick or an X.

Movement made by people	Tick or X	Reason for your choice
(a) A man from Silobela is called for a job in Kwekwe.		
(b) A learner goes to boarding school at the beginning of the term		
(c) A woman from Gokwe goes to live with her husband in Murehwa.		
(d) A stock thief from Kenzamba Makonde district convicted and sentenced to stay in jail for 12 years in Chikurubi Harare		
(e) A man from Masvingo goes to Musina to buy groceries returns after two days.		

24.1.1 Push factors

Have you ever you ever had a time that you were forced to go somewhere? Or perhaps when you witnessed someone who had to go to a certain place without fail. If so, the reason why you or the other person had to move is a push factor. In migration as in your example situations, there are factors that force people to move from a certain area. These factors are called **push factors**. They *push* people away from a place. In this section we will look at different push factors that force people to move away from a place.

1. Wars

We will start by looking at the occurrence of wars causing people to move away from a place. You might have seen on television or newspapers or heard on radios of a war taking place somewhere. You will have noticed that when wars occur, people run away from their homes to look for safety. This movement is forced and the people are pushed from their homes to another place.

Examples of the push factor of wars that have taken place in recent years is the movement of people from the Dafur region in the South Sudan. An estimated number of 3 million people were displaced from the Dafur region in the South Sudan. Further away from you in Syria an estimated 1.5 million people were displaced during the war with ISIS. We are sure you appreciate the large numbers of people that are affected by wars in term of movement.

2. Poor soils

In some cases, you will find that people move away from an area because it has poor soils. People who earn a living by farming consider soil fertility as key to their economic life. If the soil loses its fertility beyond production, they are forced to move away from that area and look for other areas with better soils. You may also find that in other cases the people are moved by the government in resettlement programs.

In your own country of Zimbabwe, the government carried out a resettlement program to move people from areas that had poor fertility. By 1997, 71000 people had been resettled. This was before the fast track land reform programme. We must emphasise that the movement of people in this case was made necessary because of poor soil. The poor soil was in this case a push factor.

3. Poor climate

People move as a result of extreme temperatures or extreme rainfall and rainfall shortage. You must note that humans prefer moderate conditions of temperature and rainfall. Any extreme condition may force people to leave the area. The least populated areas in Zimbabwe are those that have extremely high temperatures. When people in areas like the Zambezi valley and some areas of Binga in the Matabeleland province had a chance for relocation, they moved from those areas that have extremely

high temperatures. You will notice that these areas also have low rainfall as well. This makes agriculture difficult.

Note that in other parts of the world the extreme climatic conditions could be cold temperatures. In such areas people move away due to the fact that it is impossible to cultivate the ground that is always frozen. There is what is known as a **permafrost** in such areas. You must understand that the term permafrost means permanently frozen ground. Even if tractors may turn such ground with force, the seed would not germinate in frozen conditions. So, instead people opt to move away from such areas. This is common in Northern Scotland, northern Finland and in Siberia in Russia.

4. Pests and Diseases

Another problem you will find to be a cause of migration away from a place is pests and diseases. Pests like tsetse flies and locusts tend to force people to relocate from areas where they are found. Tsetse flies affect both people and livestock. You must note that in people they cause sleeping sickness while in animals they cause nagana.

In Zimbabwe the tsetse flies are common in the Zambezi valley. These are the areas that also have low population densities. People have moved away from such areas because of the tsetse flies. See Figure 22.1 that shows areas that are affected by tsetse flies in Zimbabwe. Another example we must highlight for you is the locusts of north Africa. There are few people who live in the locust affected areas, like the Sahel region. People have been forced to move away from those areas because of the locust. Note that locusts fly in large swarms and eat every green crop in their path. This is a loss to people in terms of their livelihood.

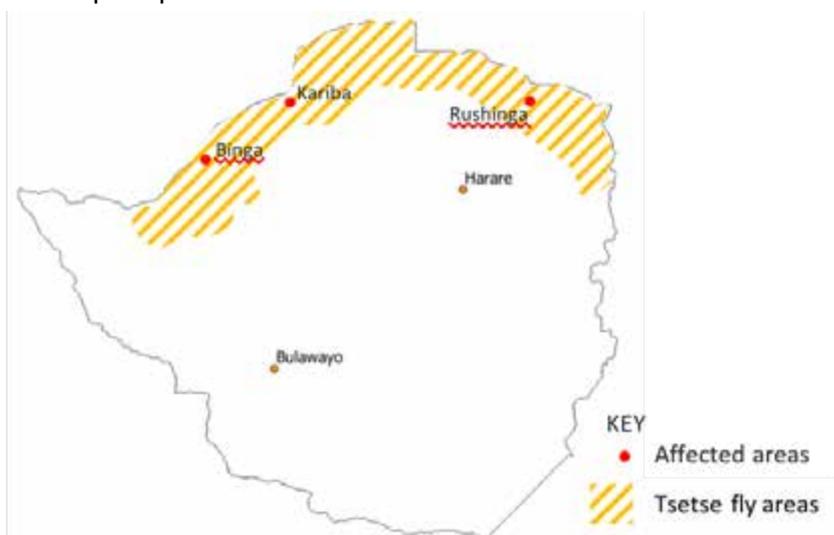


Figure 22.1 Tsetse fly affected areas in Zimbabwe with a low population density

In West Africa and in the Democratic Republic of the Congo they have had outbreaks of the ebola virus. You will note that many people left their homes after these outbreaks and ran away from the possibility of being infected with ebola virus. The recent extreme cases you will find happened in Sierra Leon in West Africa as well.

5. Drought and Hunger

We must also look at the influence of drought in forcing people to move away from a place. The lack of rainfall leads to the shortage of water. The **shortage of water in a particular place is called drought**. We must also mention that when drought occurs crop failure occurs and hunger results. You must note that drought then forces people to move to other regions to look for water. Areas that are continuously affected by droughts usually have few people living on them because the rest of the people will have left to look for wetter places.

In Zimbabwe such areas are in the driest parts of the country in Matabeleland. Note that people locate to wetter areas with their livestock. In 2018, 2.4 million people were left in need of food aid because of crop failure due to drought. Further note that the drought has even affected the city of Bulawayo. In 2019 from the middle months of the year there was water rationing due to the impact of drought. You will notice that companies have relocated from Bulawayo to parts of the country, mainly Harare. This is a push factor.

6. Natural disasters

When areas are affected by natural disasters like the 2019 Cyclone Idai, forced migration takes place. Take note that the natural disaster becomes a push factor in that migration. You will also find natural disasters in the form of floods, volcanic eruptions and earthquakes. You have people relocating because of the disaster because they take lives and destroy property. We have to mention that natural disasters also cause famine and outbreak diseases. At the end of it all you will have people relocating from the areas that are affected by natural disasters to safe areas.

The trauma associated with loss of loved ones, property and destruction of a familiar neighbourhood, all force people to decide to relocate. Take note that, as after Cyclone Idai effects in the Chipinge area, some people lost all members of the family. Some

have relocated due to the emotional and psychological effects the losses have. In the long run you have migration taking place due to the push factor.

7. Political instability

Let us turn to the effects of political instability on migration. There are movements of people that happen in an area due to the fear of political instability. You will notice that in situations where there is political instability, people are uncertain of their security so they end up moving away from a politically unstable area. In most case, as you will notice political instability goes hand in hand with unstable economies. The poor economy further causes people to move away from the country.

Take note of the example of the 2019 Venezuelan crisis that forced people to leave Venezuela because of the political instability of the country. We must emphasise that there were food shortages in Venezuela and people were leaving the country on foot to the neighbouring countries of Colombia, Brazil and Guyana.

8. Religious persecution

Some run away from their homes in fear for their lives due to religious persecution. You must note that this is common in Middle Eastern countries where religious extremists are common. In such cases people leave and go to countries they think are safe for them. In some countries they use religious laws that some people find too extreme. In such cases, you will find people being pushed out of those countries.

In some African countries, there are suspicions of witchcraft that can also force people to leave an area. There have been also cases in recent years of people running away from areas suspected of satanism or people accused of satanism leaving an area. In such, cases, people are forced to leave their homes and seek new ones. You must note that with migration, it does not matter if something is true or if it is only belief. As long as it causes people to move it is a push factor.



Activity 24.2 Push factors in migration

1. Explain how the following factors cause migration.

- (a) Wars
- (b) Suspicion of witchcraft

2. For each of the following cases, identify push factors that would occur. Give reasons why your factor would occur.

- (a) In a congested rural area.
- (b) In a small district with many university graduates.
- (c) In an urban area with 2 million residents and 400mm rainfall per year.

24.1.2 Pull Factors

Let us now cross the floor and move to the areas that attract people and examine the factors that attract people to those areas. Remember that those conditions that attract people to a particular place are called **pull factors**. They *pull* people towards them as illustrated in Figure 24.2.

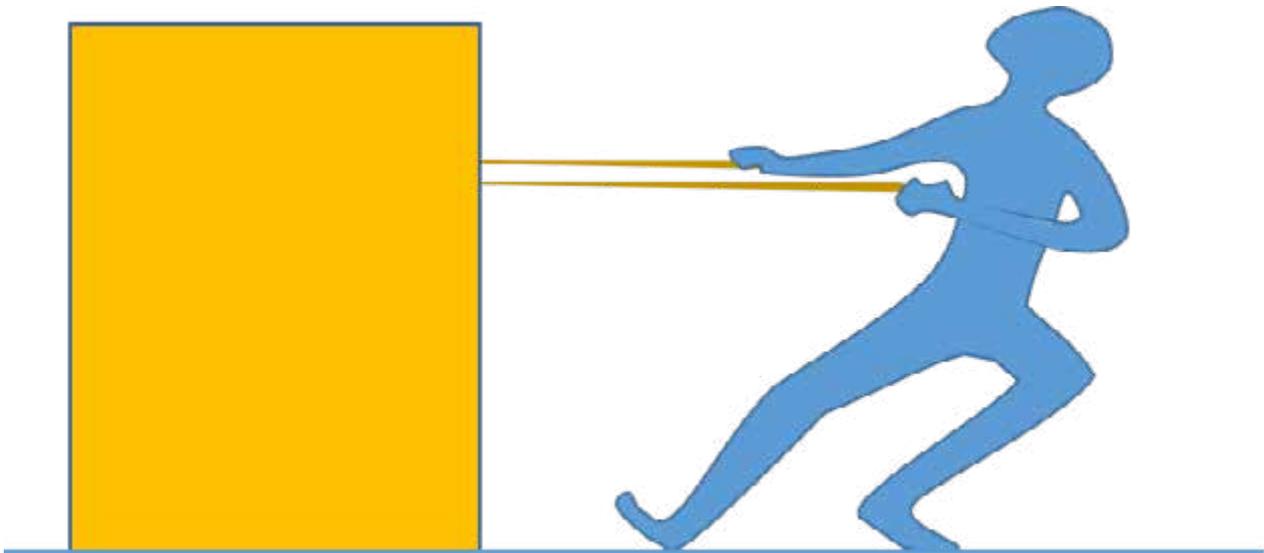


Figure 24.2 Pull factors act on people the same way a person pulls a box

1. Employment opportunities

The most common factor that you will find attracting people to a particular place is job opportunities. When people leave their area for another, it is often for job opportunities. It is both skilled and unskilled people who move for job opportunities.

Note that such migration is into urban areas most of the times. This is where there are factories and other different businesses where people can be employed.

One example of this factor is people moving from rural areas to urban areas for employment. Meanwhile, internationally, South Africa is another example. People from Zimbabwe move to South Africa for jobs. You might also be aware that people from all over Africa move to South Africa for employment. Johannesburg is the main destination for people coming from all over Africa.

2. Good climate

Let us now consider the attraction caused by climate and weather conditions in a place. Good climate attracts people to a place. The moderate temperature and rainfall that is high enough for agriculture is what people prefer. The rainfall and temperatures are not the only parts that are considered by people. You will find that calm places also attract people. Areas that are known for dust storms and heavy wind are attractive to people.

You will further find that sunny places attract people more. It is easy for people to work in calm, sunny climates. These conditions are also good for leisure time. So, there are more people in sunny places that have moderate temperature and rainfall as they are attracted there by that good climate.

3. Fertile soils

As we discussed the push factors earlier, we mentioned that the poor soils cause people to move away from a place. When the soils are fertile, they attract people, especially those whose livelihood is depended on farming. You will remember that we said that agriculture is the reason why people need fertile soils.

4. Availability of water

People often move to areas that have rivers, dams or any reliable sources of water supply. You must note that rivers and fresh water lakes tend to attract people. It is not only rivers that attract people even areas with a lot of ground water also attract people. Note that people use both indigenous and scientific methods to prospect for water. Underground water feeds boreholes and wells.

In Zimbabwean aquifers are targeted even to supply cities. You must note that part of Bulawayo's water comes from the Nyamandlovu **aquifer**. What is an aquifer? Do not worry if you are not sure what it is. It is **a rock that is lies beneath the surface that has a lot of air spaces (called pore spaces) and therefore contains a lot of water**. Note that places that have aquifers in the ground attract people. They are good for people because they secure people's water supply.

5. Political stability

We have already seen that people do not want to stay where there is political instability. On the other hand, people are attracted to places where there is political stability and peace. Remember that political stability is usually associated with a good economy. So, people stay in such a place.

6. Religious freedom

Religion is an important part of people's lives. You will notice that whatever people believe in they are ready to value a place that will allow them to practise their religion freely. Note that people tend to favour democratic countries that often allow religious freedom.

7. Better education

As you go through this module your main reason is to acquire education. The hope of better education also attracts people to places with schools and universities. What is it that people are really after when they seek better education? You will notice that people are after quality education facilities and provision. They are also after higher levels of education. Their place of origin might not go up to tertiary education. So, they may migrate to a city where they can attend college. Note that people also seek particular courses and programmes in a particular city. So, in that way education becomes a pull factor, where the desired kind of education is available, attracts people.

8. Family ties

People will also migrate because their family is now in a certain place. That place becomes attractive to them. An example is a wife who migrates to a new city because the husband now works there. It could be also that a son who is now working in a different city takes his parents there. You must note there are many family situations that will attract a person to a particular place.

9. Less crime

Security of property is important to people. You will notice that people are attracted to places where they are safe with their property. Most people who have lost some property through theft or robbery will definitely choose the safer places where there is less crime.

Remember that any loss is traumatic to people. So, after experiencing a theft or robbery; a murder or any other crime people are traumatised. A change of place of residence usually does such people well. In this way lack of crime becomes an attraction in the place where people want to go to.



Activity 24.3 Pull factors in migration

1. Which of the following areas is likely to have pull factors? Write **"Pull"** in the box provided for each of the areas. Leave the ones that do not have pull factors blank.

Area	Box
(a) A large city with 5 million people.	
(b) A rural area supported by an NGO with maize.	
(c) A small fishing town with a new fish canning factory	
(d) A gold mining area with a lot of illegal miners	

2. Evaluate the effect of distance on pull factors.

24.2 Types of migration

We will now look at what types of migration are caused by the factors that we were discussing in the previous section. Take note that there are two types of migration.

This is when migration is classified according to scale. These two are internal and international migration.

24.2.1 Internal migration

Internal migration is the movement of people from one place to another within the boundary of a country. For example, the movement of a person from Sanyati in Midlands to Chivi to go and live in Masvingo is internal migration because these two places are both within the boundaries of one country; Zimbabwe. Let us now look at the different types of internal migration.

1. Rural to urban

Rural to urban migration, as you might guess from the name is the movement of people from rural areas. The purpose of the movement is usually the search for jobs. You may also have people migrating for education and because of family ties. An example of this type of migration is a movement of a person from Bare in Mashonaland Central to Harare.



Figure 24.3 Rural versus Urban areas in terms of migration

2. Urban to rural

Look closely at figure 24.3. What can you say about push and pull factors according to figure 24.3? We guess you have gone beyond what is written and identified issues related to infrastructure and bright lights. Urban to rural migration is the movement

of people from urban areas to rural areas. You will notice that this is typical of people who have retired from work and now going back to their rural homes. An example would be a person who has retired from work in Bulawayo and is going back to live in Dakamela in Nkayi. They are numerous causes of urban to rural migration as reflected on figure 24.3.

3. Urban to urban

Urban to urban migration is movement of people from one urban area to another. The reasons for this vary from social to economic reasons. We must also mention that other reasons for this type of migration could include marriage, education, job transfer and spirit of adventure. Can you suggest some of these reasons and discuss them with your study partner?

4. Rural to rural

Rural to rural migration is the movement of a person from one rural area to another. The reasons for a migration could be resettlement by the authorities. It could also be marriage reasons or search for fertile land. An example of such migration is movement of a man from Sianungu in Binga to Mafungabusi in Gokwe. Think of other situations that may trigger people to migrate from rural area to another.

5. Intra-urban

You will also find that people move within one urban area. An example is the change of residence from Highfield to Warren Park within Harare. Again, the are reasons to such movements. These may include change of employment, status, where people may want to stay in affluent residential areas or move to less costly residential areas due to various circumstances. You can suggest more reasons for this type of migration.

6. Intra-rural

Intra rural migration is the movement of a person from one location of a rural area to another. An example is a man who is chased from ward 2 and goes to live in ward 14 of the same district because of suspected witchcraft. There are several reasons for intra-rural migration. You can list some of these and discuss them with your study partner.



Activity 24.4 Internal migration

1. Explain what is meant by intra-rural migration.
2. Outline, with examples the reasons for the occurrence of the process of urban to urban migration.

24.2.2 International Migration

In this section we are going to look at the other broad type of migration which is international migration. The word international is built from two words, that is, “Inter” which means between or across and “National” which means countries. So, what do you think is international migration from this word? Certainly, **international migration should be the movement of a person from one country to another country, and thus involves cross-boarder movement of migrants.** For example, the movement of a person from Harare, Zimbabwe to Blantyre in Malawi is international migration.

The reasons for international migration are usually economic, political, educational and social. You must note by far the largest number of people that migrate internationally are searching for jobs in countries they see as better than theirs. Most long-travelled migrants end up in large cities searching for employment.

You will also find that international *migrants* also move due to political reasons. Such people become refugees or asylum seekers or *refugees*. We have highlighted two terms here – migrant and refugee. A migrant is a person who migrates from one place to another. **A refugee is a person who leaves his or her country to live in another because he or she cannot remain in his or her country for fear of political, economic or religious harm or persecution.**

24.2.3 Voluntary and involuntary migration

We are going to cover another way of classifying migration. Migration can also be classified according to the nature of the cause. Note that when classified this way, there are two classes; voluntary and involuntary migration. What is *involuntary migration*? You got it correct if you said: it is where the cause of the movement is a push factor that leaves the person without a choice but to move. So, we can safely say involuntary migration is forced migration. One of the well-known examples of involuntary migration is the forced migration of Indians from Uganda in the 1970s. They were forced to leave by the then leader of Uganda, Idi Amin. Natural hazards such as floods, cyclones, drought, pest and diseases can also force people to migrate. Think of examples of forced migration in Zimbabwe and discuss on what could have caused the migration.

Note that *voluntary migration* is the movement of a person where the reason for migrating is out of choice. An example of this type of migration is a person migrating for adventure and discovery, education or marriage.



Activity 24.5 International migration

1. Distinguish between voluntary migration and international migration.
2. Give reasons why some countries have refugees.

24.3 Effects of migration

We are now turning our attention to the effects of migration. Note that we also use the term results of migration. There are two types of results of migration. These are resulting in the sending and receiving areas. These results can also be negative and positive. We will start by looking at the results of migration in the sending area. As we go through this section, we are trying to answer the question: what will happen to the sending area after people have moved out of that place?

24.3.1 Effects of migration in the sending area

Let us begin this session by looking at what a sending area is? A sending area is a place where the migrant is coming from. When a person migrates from Tsholotsho to Harare, Tsholotsho is the sending area. The sending areas cause the results discussed below.

1. Reduction in total population

Migration out of an area results in the drop in total population. Remember that migration is one of the causes of population change. In this case migration causes a reduction in the number of people in the area as people leave.

A point for you to note is that it is usually the economically active age group that migrates out of the sending areas. Do you remember who the economically active age group are? You must have covered this in unit 21. The economically active age group is the people age between 16 and 64 years of age. This is the age group that is economically productive; they are employed in the industry; they provide farm and mining labour. It is also the age group of those who are creative. The age group also comprise the most fertile age group. Further note that when these people leave the area, the elderly and children are left behind. Remember that the children are part of the population that is 15 years and below. Meanwhile, the elderly is those who are 65 years and above.

You will discover that the sending areas are left with more of the elderly and the children. That type of a population is not balanced. Note that the population pyramid of such an area will have a narrow middle and a broad base. The top is also wider than usual.

2. Loss of skilled labour (brain drain)

One of the major effects of migration that you will realise occurring in the sending area is the loss of skilled labour. The loss of skilled people makes the area be underdeveloped. It is called the brain drain because the area is drained of its skilled people who are the brain of their development.

3. Relief on resources

Let us now focus on the fact that there is relief on available resources once some people leave. You must note also that the relief on the resources like land, water and social services such as schools and health facilities. The area is also relieved environmentally. Note that this happens if there was a strain on the fuel wood or water, it is relieved. In urban areas housing lists and demand for electricity and council services are all shortened and relieved.

4. Remittances

You must note people who leave may send money back to their relative in the area they left. They may also send materials for building and clothing for their relatives. Such money and goods sent back home by those who emigrated is called remittances.

These remittances are good for development. As you might have realised, they raise the standard of living and improve even the infrastructure. A good example is rural Bulilima, Mangwe and Tsholotsho where life styles are improved by remittances from people who emigrated to South Africa. Note that these people who are working in South Africa build modern houses in the rural areas. You will also find that they send even food stuffs to their relatives in their areas of origin.

5. Lowered crime rate

Another point you must note is that there is reduced crime rate when the population totals are lowered. The effect is that when the numbers of the economically active are lower the crime rate is also lowered. Moreover, note that the relief on resources means that there are less shortages even of jobs in some cases. Crime is reduced once people are working and making a living.

6. Shortage of labour

The loss of the economically active means that there is shortage of labour. We must make the point that in the rural areas labour is reduced for working in the fields. This means that production in the fields is reduced. The elderly and children, people who are left behind barely afford to cultivate enough for their own survival.

Note that the few economically active people who could be remaining in the area usually hire out their labour. This may be too costly for the poor old people who are remaining in the area. You will, therefore notice that the shortage of labour leads to poverty and hunger for some of the people.

7. Break down of social structure

One of the social effects that you will find occurring in the sending areas is the breakdown of social structure. By this we mean that in the African culture where families would be extended with parents, grandparents, uncles and aunts, we end

up with grandparents raising children. The younger parents would have gone away to other places to seek for employment. Even though they may fully support their parents and children with money and materials, the gap they live cannot be filled. This is a breakdown in the social structure.

You have probably heard of *vuzu* parties. These are wild parties that are held by young people in urban areas without the supervision of adults. In these parties, young people behave wildly. You notice that in most of the cases the venues are houses where children live on their own because parents are working outside the country. These parties are common in Harare and Bulawayo. The parents are working out of the country. The young people lack the parenting and supervision of adults and parents. This is also a breakdown in society.

8. Preservation of culture

The advantage of having the elderly mostly remaining in an area is that they usually preserve culture. Moreover, where these elderly people are raising their grandchildren, they teach them their culture. This also preserves culture. You will notice that the food they eat, the clothing they put on and even the language they use will be well guided by the elderly people. Note that the elderly will be passing their knowledge to the children they are raising with little dilution.



Activity 24.6 Effects of migration in the sending area

1. Describe any two positive effects of migration on the sending areas.
2. To what extent does the loss of the economically active population affect a rural area?

24.3.2 Effects of migration in the receiving area

We are now going to turn our attention to the effects of migration in the receiving areas. As the name suggests, receiving areas are the areas of destination for migrants. If a man migrates from Marange to Rusape in Manicaland, Rusape is the receiving area. The discussion below looks at the effects of the receiving areas.

1. Brain gain

The receiving areas gain skilled labour. This is one of the effects that you will find in the receiving areas. Skilled people like doctors, teachers, engineers and accountants are a gain when they bring their skills with them into a country. The cost of training workers is always one that governments can avoid if they could. You must note that the value they bring benefits the receiving country.

South Africa, Botswana and Namibia have benefitted from Zimbabwean skilled workers who have migrated there. Most of these people have the quality of Zimbabwean education now benefitting those countries. For example, it is estimated that Zimbabwe supplies South Africa with more than 50% of all its foreign teachers. This is a gain for South Africa.

2. Increase in total population

The receiving areas also experiences increase in population. You will notice that as more people come into a place there is an increase in the total population. The population that moves into the receiving areas is usually the economically developing age group. So, the receiving area grows especially in the economically active age group.

The increase that we are discussing here is mainly in areas that are experiencing emigration that is lower than the immigration. The positive net migration makes the population of the grow. You must note that the growth of population by immigration contributes to the overall population growth rate of a place.

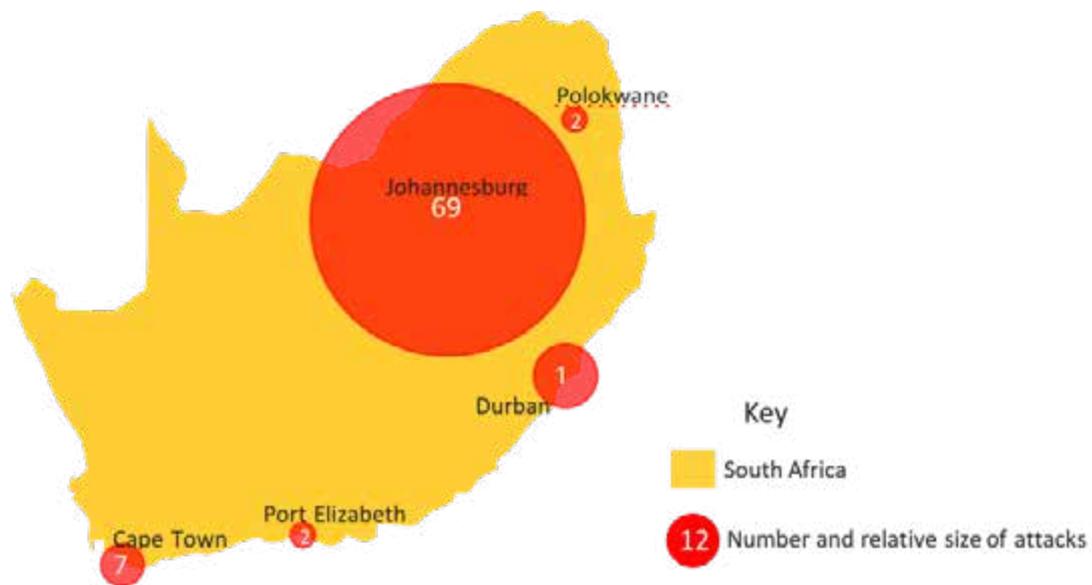
3. Multiracial societies

Multiracial societies are communities of people that are composed of people from different races. In our case, the different races are brought together by migration. This is typical in large cities where immigrants are from different places. You should also note that in smaller societies it could be multi-tribal societies.

Note that cities like Johannesburg, London and New York are good examples of cities with multiracial societies. In London people from all over the world meet. Note that

there are people from different continents and different countries in those continents too.

You must understand that multiracial societies lead to racial segregation. Racial segregation is the hatred and discrimination of people of another race. You must understand that discrimination is the targeting of people of a different race so that they are denied a particular thing. We have to mention that it is this racial discrimination that leads to xenophobic attacks. What is xenophobia? You are right if you said that it is the lack of tolerance of one race by another. When this intolerance leads to violence it is called xenophobic attacks. Figure 24.4 shows you xenophobic attacks in South Africa in 2017.



Adapted from Chabikwa et al (2019)

Figure 24.4 Xenophobic attacks in South Africa's major cities in January 2017

4. Unemployment

We are now going to look at unemployment as an effect of migration in receiving areas. When a place experiences the growth of population, shortage of employment results. There will be more people that can be employed in the different work places. You will notice that very often people compete for the available jobs. Those who cannot get jobs increase the unemployment of the area.

5. The increase in strain on resources

You should further note that the growth of population in the receiving areas causes the strain on the resources. Resources include land, accommodation, food and water. You must understand that all areas especially cities have resources that are planned with a limited number of people. Any increase in the number of people increases the demand for the resources. You will also notice that a strain on resources can also lead to conflicts as people fight over the few resources,

6. Destitution and poverty

In some of the cases the increase in the number of people leads to poverty and destitution. The poverty results from lack of employment and the strain on resources that we discussed in the previous section. When people are poor, they become homeless. Such people who are poor and homeless are called *destitutes*. Meanwhile their condition is called *destitution*.

7. Improved lifestyles

It can also happen that you find that people who immigrate into an area become successful and experience an improvement in lifestyle. This happens when the immigrants find jobs. Lifestyles improves in terms of the immigrants buying houses, cars and household property.

Thus, as you have gone through the effects, you must have noticed that some are positive and others are negative. Go over each one of the effects in both sending and receiving areas and identify which ones are positive and which ones are negative. Otherwise we are now turning our attention to population policy.



Activity 24.7 Effects of migration in the receiving areas

1. With reference to examples, describe how receiving areas can be disadvantaged by immigration.
2. Explain what you understand by the term brain gain.

24.4 What is a Population Policy?

We have to start this section by defining what population policy is. **Population policy is a set of measures that are put forward by government in order to control the growth and nature of population in a given country.** Notice that population policies for different countries respond to the nature of the population and the way it is growing. With this in mind, you will notice that we have two types of population policy when we classify them according to the intended effect on the population.

There are policies that are meant to reduce the growth rate of a population. Such policies are called *antinatalist* policies. Note that the other type of population policy is the *pronatalist* policy. This is where the government intends to encourage a high population growth in order to build a larger population.

We can further classify population policy according to the clearness of the goals set by the policy. When a policy is clear on its targets and its statements express the intentions clearly, it is called an *explicit population* policy. You will find other policies that achieve control of population characteristics indirectly. Such policies are called *implicit population policies*.

You should note that population policies are also put forward to control migration. A government may want to control the entry of people into its country. You will find that in most cases immigration is controlled through visas. Note that for a visa to be issued out there are interviews and fees that must be paid. So, this may block out certain unwanted people from entering into a country.



Activity 24.8 What is Population policy?

1. Define the term population policy.
2. Describe how population policies are classified.

24.4.1 Why do countries need population policies?

The growth of population through natural increase and even through net migration affects government planning one way or the other. You have to note that the number of people in a country is of interest to government because it has to provide for those people. You will also find that resources that the government administers are always looked at in terms of population totals. That is why governments have got to

put in measures to control population policy. Note that governments may want to control population by encouraging people to increase the population. They may also control it by encouraging people to reduce it.

Governments seek to control population in order to be able to *provide resources and services* to the people. You must understand that a population that grows too large for the resources gives the government problems. What problems do you think these are? You must have said shortage of commodities, land and opportunities of making a living.

Note also that governments also develop population policies for them to *be able to plan for the people* well. Planning involves thinking about the future and how people will be provided for. You will find that governments will plan for increasing services like education and health. This is to say building more schools, universities and more clinics and hospitals.

You have to note that governments also put forward population policies in order to *strengthen their countries* through the growth of the population. Where there are many people there is more human potential for development. An example to many governments is China which is the country with the most people in the world. You must understand that China currently has the fastest growing population.

Governments also control population in order to *reduce poverty*. You must note that the population that grows too large means that people are exposed to poverty. Governments often encourage fewer children so that parents can afford supporting the children.



Activity 24.9 Why do countries need population policies?

Outline the reasons why countries need to have population policies

24.4.2 Population policies for developed countries

In developing countries there are two types of policies that you can find. There are antinatalist and pronatalist policies. In this session we will look at China's One-Child policy as the antinatalist policy and the Swedish population policy as a pronatalist policy.

1. The Chinese One-Child Policy

The most well-known population policy you will find is the Chinese One-Child policy. In this policy China wanted to lower the rate of its population growth. So, from our discussion above you will see that the population policy of China is an antinatalist policy. Note also that it is an explicit policy. It was stated with clear targets and figures. The main targets of the policy were:

- To reduce the total fertility rate to 1 in the urban areas from about 6
- Increased the legal age at first marriage for women to 20 and to 22 for men
- To reduce the age at first marriage for men to 22
- Provide financial and social incentives to families for following the law
- To make families who were not following the law pay fines.

Note that at the time the population policy was put forward the population in China had grown by about 400 million people between 1949 and 1976. As we have discussed above, the government wanted to reduce the population in order to be able to provide for the people in the country.

The policy had successes in that it reduced the growth rate of the country. You will notice that even today the growth rate is still slower than what it had been. The policy is thought to have prevented up to 400 million births since it started. You must also note that the government relaxed the law in November 2013 for parents who were only-children. Only-children are those people who were born as the only children to their parents during the one child policy. Now these parents can have two children.

You can also see the success of the policy by that the total fertility rate was about 6 children but has dropped to about 2. Note that between 1970 and 1980 the crude birth rate dropped from 44 per 1000 to 18 per 1000.

The major failures that you will notice about the One-Child policy is that it made parents to choose boy children over girl children for their one child. We must also mention that the sex ratio in China became unfairly biased towards males. It further created the 4 – 2 – 1 system where each family had 1 child, 2 parents and 4 grandparents. You must also note that these children were spoiled only-children.



Activity 24.10 China's One-child policy

1. State the main targets of China's One-child policy.
2. Justify the statement that China's One-child policy was a perfect success

2. Sweden's Population Policy

You have seen how China's population policy is all about reducing birth rates. Now let us look at Sweden's population policy. This one is about increasing the birth rates. The main points of the Swedish population policy are:

- Parents are given a leave from work with 80% pay for 13 months
- After the 13 months they can return to work.
- Parents also make a commitment to do parental duties like picking children from school.
- The government gives a €900 (900 Euro) for the child care.
- The children are given day care in preschool and at main school.

This policy succeeded as the population of Sweden has increased by about 1 million between 1990 when it was introduced and 2016. You have to note that the full benefit of the policy be seen later in the future. The crude birth rate is expected to increase by 10 per 1000 to 20 per 1000. You must note, again, that the Sweden still has few economically active people. The policy's full effect has not yet been felt for now.



Activity 24.11 Sweden's population policy?

1. Describe the efforts taken by Swedish government in trying to raise their birth rates.
2. To what extent was the Swedish policy a success?

A population policy for a developing country

Let us not look at the population policy of Zimbabwe. We must start by stating that the Zimbabwean population policy is an implicit population policy. This means that its effects are indirectly from several programmes. Study table 24.1 which explains for the ways in which the population policy on Zimbabwe is like.

Table 24.1 Zimbabwe's population policy

Programme/ Regulation	Description of programme/ regulation	Effect as a policy
Maternity leave for civil servants	<ul style="list-style-type: none"> • Maternity leave in Zimbabwe is paid and allowed for female members of the civil service. • It is taken for 98 days. • Each female member of the civil service is allowed a maximum number of 3 maternity leaves in her lifetime 	<ul style="list-style-type: none"> • The government is indirectly saying to the civil servants you are allowed 3 children. • It is however not against the law to have more than 3 children.
Family planning programme	<ul style="list-style-type: none"> • The programmes are done by the National Family Planning Council (NFPC) • They educate people (mainly women) on family planning • They supply contraception to people through clinics and their offices. • They provide counselling sessions for those that need them in issues of reproductive health (these are issues to do with having or not children). 	<ul style="list-style-type: none"> • Contraception lowers fertility measures like the crude birth rate and the total fertility rate (refer to unit 21) • It prevents maternal deaths. They lower the maternal mortality rates.

Programme/ Regulation	Description of programme/ regulation	Effect as a policy
Maternal and Child Health Integrated Program (MCHIP)	<ul style="list-style-type: none"> • The programme is run by the United Nations with the Zimbabwean government (Ministry of Health) • It aims at reducing deaths to children as well expecting mothers and those who have just given birth. • It promotes antenatal and postnatal clinic programmes. (before birth and after giving birth) • The programme targets maternal mortality. 	<ul style="list-style-type: none"> • Maternal mortality caused to drop from 612 per 100 thousand live births between 2005 and 2006 to 525 per 100 thousand live births by 2017.
National AIDS Council (NAC) programmes	<ul style="list-style-type: none"> • The programmes fight against HIV/AIDS infections • The programmes educate people • Educating people against stigmatisation in HIV/AIDS issues (looking down upon people living with HIV/AIDS) • Promote use of condoms and abstinence 	<ul style="list-style-type: none"> • These programmes reduce deaths and cause population to rise • They also lower fertility through the use of condoms.

We are sure you appreciate the differences in the two policies that we have discussed above. The Zimbabwean one is really “by accident” while the Chinese one is deliberate. Note also that there are other programmes in Zimbabwe that are causing change to the population that we did not discuss here – these you can read on in your further reading.

Population policies affect populations as we have seen in the discussions above. You have to note, however they are not the only ones that affect population. Diseases also affect population. In the next session we are going to be looking at diseases. We will look at diseases in developing and developed countries.



Activity 24.10 China's One-child policy

1. What type of a population policy does Zimbabwe have?
2. If you were a population expert with a local N.G.O., what reasons for or against would you suggest to the government to have a pronatalist population policy.

24.5 Population and Diseases

Have you ever fallen ill? We are sure never liked the experience of being ill. We are also sure you are aware of the many diseases that affect people in your community. The effect of diseases on population is important because diseases cause death. Death reduces population totals. In this section of the topic we will look at diseases that affect developing countries and those that affect developed countries.

24.5.1 Diseases associated with developing countries

Zimbabwe is a developing country. What disease are associated with Zimbabwe. You must have mentioned HIV/AIDS, cholera, malaria and kwashiorkor. We are going to discuss malaria, cholera and kwashiorkor. Table 24.2 summarises these diseases.

Table 24.2 Diseases affecting developing countries

Disease	Characteristics of the disease	Effects on the population
Cholera (water-borne disease)	<ul style="list-style-type: none"> • It is water-borne which means the microorganisms causing it are found in water. • It is caused by the vibrio cholerae bacteria. • It is caught by consuming contaminated water or food. • It causes vomiting • It also causes diarrhoea • It also causes severe dehydration. • It can cause death as well 	<ul style="list-style-type: none"> • Cholera causes deaths • It causes trauma • It reduces the work force • It also creates bad publicity by creating an impression of dirt in the country. This chases away potential investors.
Malaria (vector-borne)	<ul style="list-style-type: none"> • It is caused by a protozoa (Note a protozoa is type of microorganism) called plasmodium. • It is carried by the female anopheles mosquito. The mosquito is called a vector because it carries the disease. • It causes severe headaches and fever. • It can cause death if untreated • It can also infect the brain causing cerebral malaria • It is common in the tropics where it is warm and wet. 	<ul style="list-style-type: none"> • Malaria causes a high infant mortality rate. • It also affects the future work of any country. • Globally malaria is responsible for 1 to 3 million deaths
Kwashiorkor (malnutrition)	<ul style="list-style-type: none"> • It is caused by severe lack of proteins in the diet. • It affects children who do not get enough nutrition. • It causes a large tummy and a large head with thin limbs. • It causes pale, unhealthy skin and a sickly appearance • It also causes weakness in the affected children 	<ul style="list-style-type: none"> • Kwashiorkor also increases the infant mortality rate. • It also affects the future work force. • Kwashiorkor is severe in countries like Angola, Mali and Ethiopia in Africa. • Note that in Angola more than 1350 per 100 thousand inhabitants are affected by kwashiorkor.



Activity 24.13 Diseases associated with developing countries

1. Describe the symptoms of any **two** diseases you have studied.
2. For any **two** given programmes, evaluate how they affect the population of Zimbabwe.

24.5.2 Diseases associated with developed countries

Now we will turn your attention to the diseases that affect people in more economically developed countries. These affect people because of life style rather unlike in the less economically developed countries. Study Table 24.3 which shows three diseases that affect people in developed countries.

Table 24.3 Diseases affecting developed countries

Disease	Characteristics of the disease	Effects on the population
Hypertension	<ul style="list-style-type: none">• It is commonly known as high blood pressure.• It can be hereditary (passed from parents to children)• It can also be caused by eating too much salt.• It can also be caused by body weight increase.• It can cause heart failure• It can also cause kidney disease	<ul style="list-style-type: none">• Hypertension causes deaths. It therefore increases mortality rates.• It also affects the economically and the elderly people.• This can affect productivity of an area.
Diabetes (type 2)	<ul style="list-style-type: none">• It is caused by increased sugar levels• It is also characterised by insulin resistance. (Insulin is an enzyme that processes sugar in the body).• It causes frequent urination, increase feeling hungry, unexplained weight loss and fatigue and sores that do not heal.• It may cause kidney failure, heart strokes and blindness.• It can be treated by regular exercise and dietary changes	<ul style="list-style-type: none">• Diabetes affects the elderly and economically active age group mainly.• It therefore affects production at work places.

Disease	Characteristics of the disease	Effects on the population
Coronary Heart Disease	<ul style="list-style-type: none"> It is when the blood vessel leading to the heart are blocked by fat called cholesterol. It is also caused when these arteries are inflamed. It causes shortness of breath. It also causes chest pains. It can also cause heart attacks. It is caused by smoking. It can also result from diabetes. A life style of fatty diet and lack of exercise also causes coronary heart disease. 	<ul style="list-style-type: none"> It raises mortality rates. There is loss of economically active population and the elderly. The loss of adults may cause shortages of labour in countries that already have very low birth rates. It also causes high costs in health care for controlling and treating the disease.

Now, study Figure 24.5 which shows the world in terms of the share of diabetes cases. As you can see Africa and South America are “very thin” in terms of diabetes cases. The dominant country in terms of diabetes cases is India.

Number of adults (20–79 years) with diabetes worldwide

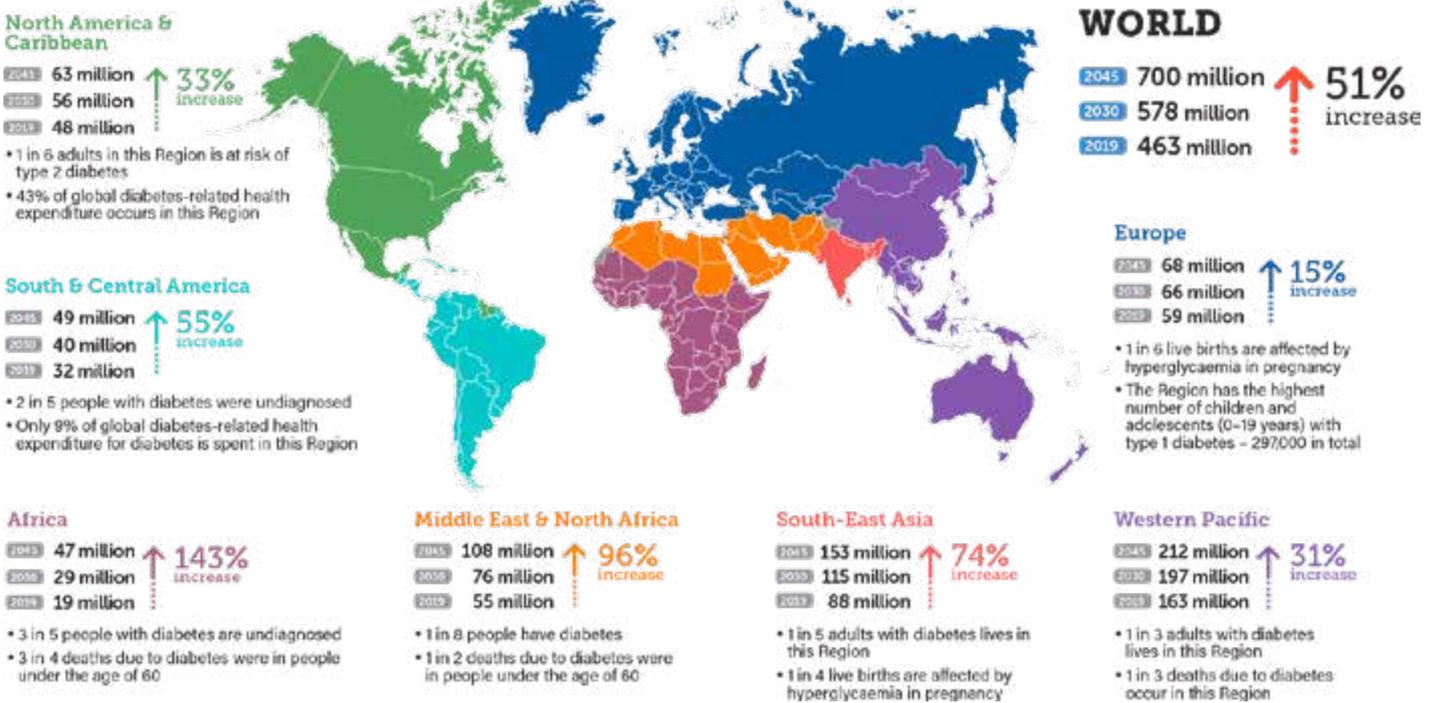


Figure 24.5 Share of diabetes cases in the world



Activity 24.14 Diseases associated with developed countries

1. With reference to the any two diseases affecting developed countries, describe its effects on the population.
2. "Diseases that affect developed countries are diseases of wealth while disease that affect developing countries are diseases of poverty." How far true is this claim?

Well done, you have come to the end of the unit. It is my hope that you have understood the geographical topics I took you through. Now, you have to go through the summary below as a reminder of what we covered.



Summary

- At the beginning of the unit we covered the definition of migration. We looked at migration as movement that results in a permanent change of residence. The permanent change of residence being one that lasts for at least a year.
- We also looked at the causes of migration. Remember we looked at the causes of migration as classified into push and pull factors. We covered individual push factors such as wars, poor soils, poor climate, drought and hunger.
- Likewise, we also looked at the individual pull factors like employment opportunities, availability of water and political stability.
- After covering the causes of migration, we then moved on to look at the types of migration. We took you through internal migration and international migration.
- Under internal migration you covered rural to urban migration, rural to rural migration and urban to urban migration among others.
- You also went through voluntary and involuntary migration. When we looked at these, we saw that migration can be forced or can be by a person's own choice.
- Our attention then shifted to the effects of migration. You were taken through the effects of the sending areas and the receiving areas. We also stressed the point that these effects are either positive or negative.
- You then went on to population policies. The main areas you covered were the types of policies – antinatalist and pronatalist policies
- The examples that you covered for the population policies were China, Sweden and Zimbabwe.
- In the last section we looked at the distribution of diseases. The distribution we looked at in terms of diseases in developing and in developed countries.

End of Unit Assessment

1. Match the following types of migration with their effects by filling-in the spaces provided.

Type of Migration	Effects	
	Sending area	Receiving area
Rural to urban migration	(a)	Brain gain
Rural to rural migration	Availability of land	(b)
Urban to rural migration	Retirement	(c)
Urban to urban	(d)	Shortage of accommodation
International migration	(e)	Multiracial societies

2. (a) Define the term **xenophobia**.

(b) Describe and explain the causes and effects of xenophobia.

(c) In what ways does brain drain affect the economy and society of developing countries.

(d) To what extent does malaria affect the population of the countries where it occurs?

Research Work



Progress Check list

Now let us go through the objectives we listed at the beginning of the unit and check how many of them you have achieved. Tick against those you are sure you have achieved. Put an X against those you feel you have not yet to achieved. Then for any that you put an X against, find the section dealing with it in the unit and go over it again.

Objectives Are you now able to	Check Box
• describe causes of migration.	
• explain effects of migration.	
• outline different categories of migration.	
• describe the rationale of having population policies.	
• explain the effects of population policies for named.	
• developed and developing countries.	
• describe diseases associated with developing countries.	
• describe diseases associated with developed countries.	
• explain the differences in diseases between developed and developing countries.	
• explain social and economic effects of the diseases explained above.	

Further reading

Chabikwa, B., Phiri, F., & Mapungwana, M. (2019). **Total Geography Book 3**. Harare: Priority Publishers.

Gocha, N. M., Ncube, R., & Nembabware, L. (2007). **Dynamics of O'Level Human and Economic Geography**. Harare: College Press.

Waugh, D. (2014). **Geography: An integrated approach**. Oxford: Oxford University Press.

Unit 25 Transport and trade

25.1 Regional imbalances in trade

25.2 Trading blocs

Introduction

Trade is an important aspect of our lives. Why do you think this is so? People earn a living through trade. They get what they cannot produce on their own through trade. Countries cannot produce everything they need and they depend on trade for commodities they do not have. In Level 1 you learnt about trade patterns in Zimbabwe, SADC and the world as well as domestic and foreign trade. For a moment try to reflect on what you learnt and take down important points of what you can remember. In this unit, we proceed with the topic and look at regional imbalances in trade and trading blocs.



Objectives

After going through this unit, you should be able to:

- demonstrate how trading patterns may create imbalances regionally
- name economic groupings such as SADC, COMESA, ECOWAS, OPEC and EU
- explain the reasons for the formation of trading blocs.



Key Words

Internal trade	exchange of goods and services within a country.
International trade	exchange of goods and services between countries.
Imports	goods bought from other countries.
Exports	goods sold to other countries.
Balance of trade	the difference between exports and imports.
Adverse or unfavourable balance of trade	when the value of imports exceeds that of exports

Favourable balance of trade	a situation in which the value of exports exceeds that of imports
Beneficiation	the process by which mineral ores are concentrated or semi-processed at the site of extraction so as to add value and reduce transport costs.
Trading blocs	trading groups set up by two or more countries in order to promote favourable trading terms amongst themselves.



Time guide

You are expected to take an average of **10 hours** to go through this unit.



Study skills

Before you proceed with this unit, you are advised to read through your Level 1 topics so as to have a recap of your previous knowledge. This shall help you to understand topics in this unit. You are also being advised to research further on this topic. Always take down notes on important points and attempt all activities in this unit. If you are doing Commerce or Commercial Studies, you can also get some useful information on trade from these two learning areas.

25.1 Regional imbalances in trade

In this Unit we are going to discuss regional imbalances in trade. We guess you are aware that the word imbalance means unequal or disproportionate trade. You should know that this is measure against the amount of export and import trade between regional countries.

25.1.1 What is trade?

Have you ever been involved in buying and selling of products and services? Yes, when people buy and sell goods and services we call it trading. So we are going to define trade as the exchange of goods and services between producers and consumers. There are two types of trade, namely visible trade and invisible trade.

Visible trade involves trade in tangible goods or commodities such as food, raw materials, fuels and other manufactured goods. Invisible trade constitute trade in services such as telecommunication, insurance and tourism. A great deal of trade occurs within Zimbabwe and this is called **internal** or **home trade**. For example, gold miners sell their gold to Fidelity Printers and different kinds of grain crops are sold to Grain Marketing Board (GMB). In your area, people buy commodities from retail shops and from the market, is that correct? Can you describe the trade activities that are carried out by people in your area? Now, look at the flow chart on Figure 25.1 below which shows internal trade activities.

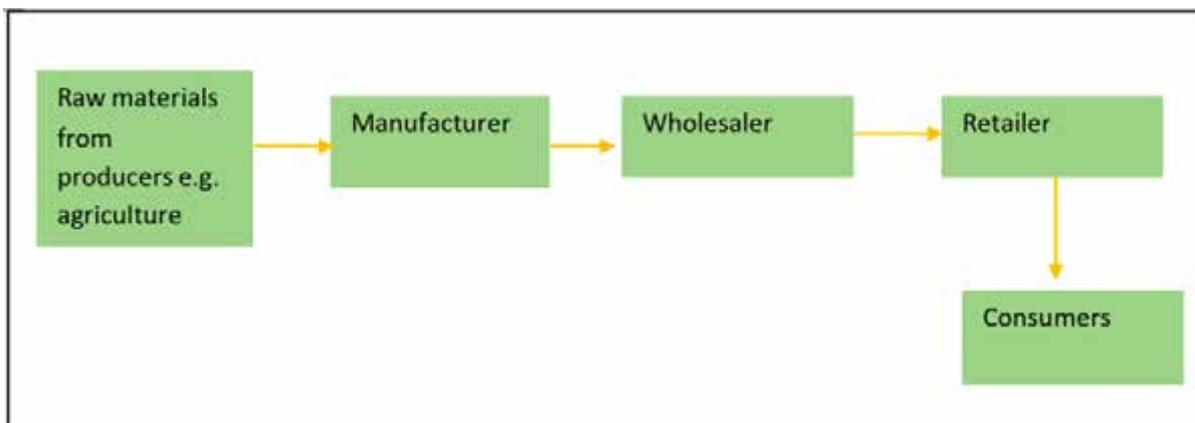


Figure 25.1 Flow of goods in internal trade

Now, what have you noticed from the flow diagram? On your own, try to describe the movement of goods and services shown. We are sure you have done it! Compare your description with this discussion here.

As you can see from the flow diagram, raw materials move from producers or primary industries such as agriculture or mining to the manufacturers where they are processed, and then processed goods are transported to the wholesalers. Can you give examples of raw materials and processed products? We guess you mentioned examples of raw materials such as minerals and various agricultural products. From the wholesalers, goods go to the retailers then to consumers. Wholesalers act as a link between the producers or manufacturers and the retailers and they buy goods in bulk. They then repack goods into smaller packages and label them before selling to retailers. This process is called break- of- bulk.

On the other hand, retailers sell single items to consumers. Like what? Just mention a few examples of goods that are sold by retailers. If you mentioned grocery items (like sugar, cooking oil, soap), clothes, electronic gadgets and farm implements, you

are correct. We guess you have heard of or have seen people buying goods from surrounding countries like South Africa, Zambia and Botswana. Sometimes they sell goods to these countries. This trade is called **international trade** or **external trade**. It is sometimes known as cross-border trading as it involves people crossing international boundaries to buy and sell goods and services. Probably you have once been involved in this form of trade! If you did, what were your experiences?

International trade involves exchange of goods and services between countries. It involves importing and exporting of goods and services. Goods sold to other countries are called **exports** whereas goods bought from other countries are known as **imports**. The difference between exports and imports is referred to as **balance of trade**. If the value of exports exceeds that of imports, we have a favourable balance of trade. Yes, it is favourable because we would not like a situation where we spend more money on importing goods and services! It is every country's wish to have a **favourable balance of trade** although it is difficult to achieve. However, if the value of imports exceeds that of exports then we have a **negative or adverse balance of trade** or **trade deficit**. What do you think are the effects of a negative balance of trade?



Activity 25.1 Balance of trade

Study Table 25.1 shows the value of imports and exports for six countries. State whether each country has a favourable or unfavourable balance of trade.

Table 25.1: Value of imports and exports for six countries

Country	Imports	Exports	Balance of trade
e.g. Zimbabwe	78 550 000	30 435 000	<i>Unfavourable</i>
South Africa	95 430 000	88 729 000	
Britain	83 725 000	16 298 646 000	
USA	94 576 000	22 210 390 000	
Malawi	65 322 000	42 450 000	
China	99 798 000	23 955 776 000	

We hope you managed to comment on the balance of trade for the six countries. South Africa and Malawi have unfavourable whereas Britain, USA and China have a favourable balance of trade. If this corresponds with your answer, you did well. You might have noted that for more economically developed countries (MEDCs), exports are higher than imports and the opposite is true for less economically developed countries (LEDCs).

The most prominent feature of the current pattern of international trade is that it is dominated by developed countries or MEDCs such as Britain, United States of America (USA), China, Canada, Japan, Australia and New Zealand. This brings up **trade imbalances** between the developed world and the developing world. You would realise that the nature of trade benefits developed countries to a greater extent than it does to developing countries. Can you quickly suggest reasons why this might be so? When you are done compare your work with the reasons for trade imbalances which we are going to discuss after Activity 25.1.



Activity 25.2 Trade

1. Giving an example, define the following terms as they are used in trade
 - (a) Internal trade
 - (b) International trade (2)
2.
 - (a) What do you understand by the term balance of trade? (2)
 - (b) Most developing countries suffer a negative balance of trade. Explain the meaning of this statement using examples. (2)

25.1.2 Reasons for regional trade imbalances

Countries in the developing world such as Zimbabwe, Malawi, Zambia and many other African countries, export mainly primary products which are of low value (e.g. minerals and agricultural products) to the developed world. Can you name three examples of mineral and three examples of agricultural products traded by developing countries? On the other hand, more economically developed countries export processed or manufactured goods which are of high value such as machinery. Before you proceed, quickly mention some examples of goods and services that are imported from developed countries. When you are done, compare your answer with information in

Table 25.2. This trading pattern results in a situation whereby developing countries have a higher value of imports than exports which cause a trade deficit. The opposite is true for developed countries.

Table 25.2 Products exported by developing and developed countries

Products exported by developing countries	Products exported by developed countries
<ul style="list-style-type: none"> • agricultural products e. g maize, cotton, soya beans, tobacco, tea, coffee vegetables and flowers 	<ul style="list-style-type: none"> • information technologies e.g. mobile phones, computers, laptops, televisions
<ul style="list-style-type: none"> • minerals such as gold, diamond, copper and platinum 	<ul style="list-style-type: none"> • machinery e.g. industrial machines, farm machinery
<ul style="list-style-type: none"> • timber 	<ul style="list-style-type: none"> • vehicles
<ul style="list-style-type: none"> • Fish 	<ul style="list-style-type: none"> • jewellery

The prices for primary products such as minerals, flowers and vegetables exported by developing countries are always fluctuating and sometimes declining, On the other hand, the price of manufactured goods such as technology, vehicles and other machinery are steady and always rising to the extent that sometimes developing countries cannot afford them and can only purchase them through loans. Imagine the value of equipment which is needed to establish an iron and steel processing plant or to repair an existing one such as ZISCO! It is quite huge; isn't it? So, importing from developed countries becomes very expensive.

Another source of trade imbalance is like this. Developing countries do not determine the market prices for their commodities at the international market. Instead, these are determined by the international commodity markets themselves depending on supply and demand of the products. Imagine if you were a player in the international market selling your flowers to developed countries and they determine the price for you, how would you feel?

In developing countries, trade is often dominated by a few Multinational companies (MNCs) which repatriate profits back to their mother countries in the developed world. What are multinational companies? We guess you are aware that these are companies that operate and have subsidiaries or branches in many countries in the world but

have their head offices in their mother countries. Can you name examples of such companies? Yes, you might have mentioned such companies as Bata, Lonhro, Delta, Coca Cola and Unilever. When they make profit from their operations in developing countries, they send it back to their mother countries instead of developing local resources. On the other hand, all the profits obtained from exports by developed countries are retained and used to develop their own countries. Can you see where the trade imbalance is coming from?

Now in relation to infrastructure, comes another source of disparities in trade. Most developing countries are characterised by poor transport infrastructure which does not promote trade whereas in the developed countries trade is facilitated by well-developed transport systems. In addition, most countries in Africa are landlocked. What do we mean by landlocked country by the way? If you have forgotten, please revisit your level one notes. We are sure you noted that these are countries that are surrounded by land. Study the map of Africa below and find out how many African countries have an access to the sea. Surely you would find that most of the countries are landlocked. What it implies is that all those countries that do not have direct access to the sea find it expensive to access their goods from sea ports. For example, if Zimbabwe wants to get petroleum products from overseas oil producing countries, it has to pass through Mozambique to Port Beira or through South Africa to Port Durban or Port Elizabeth which are quite far away from, say, Harare. This has a bearing on transport costs. In developed countries, the demand for primary products continues to decline because of a shift towards new materials. For example, substitution of copper by optic fibre in telecommunication has reduced demand for copper at the world market.

Reduced content of traditional materials in finished products to plastic and synthetic fibre also contributes to declining demand of primary raw materials from developing countries. Have you ever noted that telecommunication service providers now use open networks and optic fibre instead of copper cables? This implies that the market for copper which is one of the major trading commodities from developing countries is going down.

From what we have discussed here, you might appreciate that there are serious disparities in trade between developed and developing countries which might take long to redress or might never be redressed. Developing countries have the highest

proportion of the world's population yet their economies depend on export of raw materials of low value. This keeps the bulk of their population poor.

Coming closer home, you would realise that there are also some trade imbalances between southern African countries and South Africa. Most of these countries export primary products of low value to South Africa and in turn import processed commodities which are more expensive. This again brings regional trade imbalances. Zimbabwe, for example, imports many grocery and clothing items from South Africa which impacts negatively on the Zimbabwean economy. Now study the bar graph on Figure 25.3 below which summarises the nature of trade for five developing countries in Southern Africa.

Billions of US dollars 1

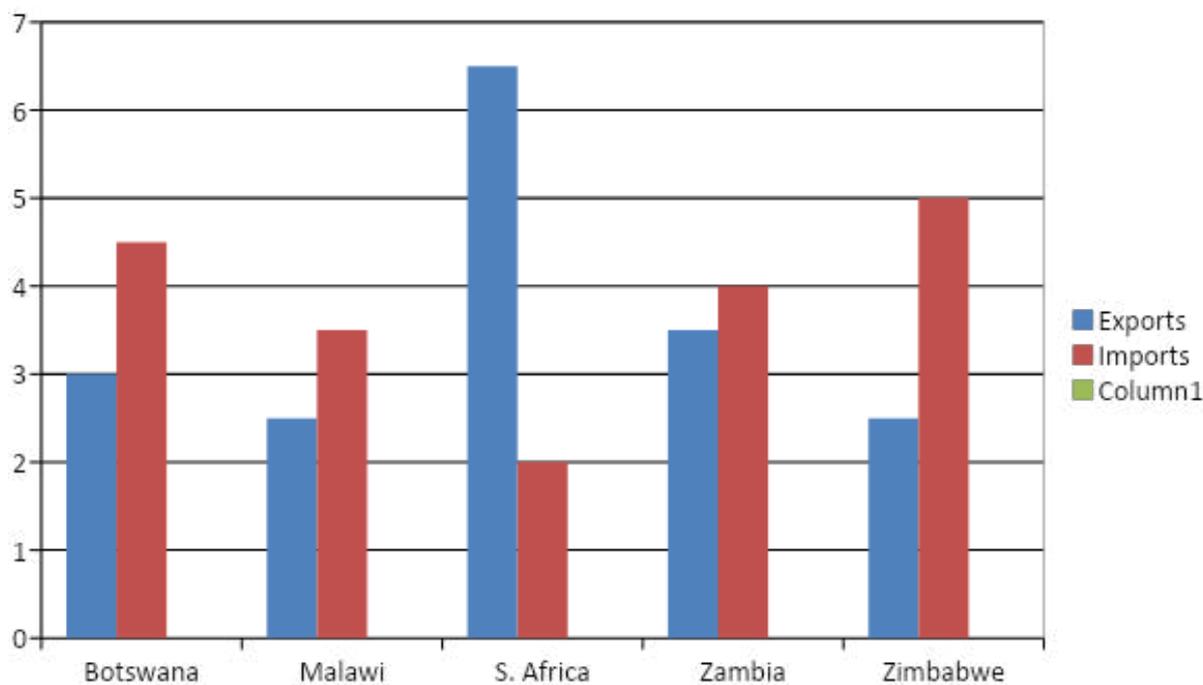


Figure 25.2 Value of exports and imports for five developing countries in Southern Africa.



Activity 25.3 Value of exports and imports

Using information from Figure 25.3, answer the following questions.

1. Which country has the highest value of exports in the region? (1)
2. Name the countries with a negative balance of trade in the region. (4)
3. Suggest reasons for a negative balance of trade for the developing countries named above. (5)
4. Name the country that dominates trade in the region. (1)

25.1.3 How can the trade imbalances be reduced?

Before we look at measures to reduce trade imbalances, can you suggest some of the strategies that countries such as Zimbabwe can put in place. Now, let us look at some of the ways to improve trade and reduce the imbalances in developing countries.

Developing countries can practice **beneficiation** and **value addition**. This is whereby mineral ores are semi-processed at the site of extraction in order to add value to them and reduce costs of transporting bulky waste materials. For example, iron ore is processed into iron and steel. Steel is then mixed with chrome to form ferrochrome or stainless steel before it is exported to other countries. Stainless steel has more value and fetches a higher price than unprocessed iron.

Less economically developed countries must reduce dependence on export of primary products whose demand is ever decreasing and concentrate on the development of secondary industry, this means that their products should be processed before exporting. There is need to diversify into new products of high quality to increase competitiveness. Can you name some of the new products that they can adopt? We guess you mentioned such products as plastic, synthetic fibre and optic fibre

Firms in developing countries should use high technology equipment in production in order to reduce costs of production. Did you know that reduced cost of production means that they can set reasonable prices for their products which enable them to be competitive at the world market? They should also invest in human resources in order to produce highly skilled manpower for the new industries. Improving packaging of goods to international standards may also help to improve trade in developing countries. Upgrading transport systems and improving other basic infrastructure such as water, fuel and power supplies. Do you still remember the effects of poor transport systems that we discussed in the previous section? There is need for protectionist policies by the government in order to safeguard local companies. For example, use of tariffs to discourage the importation of goods into the country and allocation of quotas control the quantities of imports coming into the country. For example, Zimbabwe charges high tariffs on imported vehicles in order to protect local car manufacturers. Joining regional trading blocs and signing agreements and treaties on trade such as SADC, ECOWAS, and COMESA has also been another way of reducing economic problems of the developing countries.



Activity 25.4 Pattern of trade between LEDCs and MEDCs

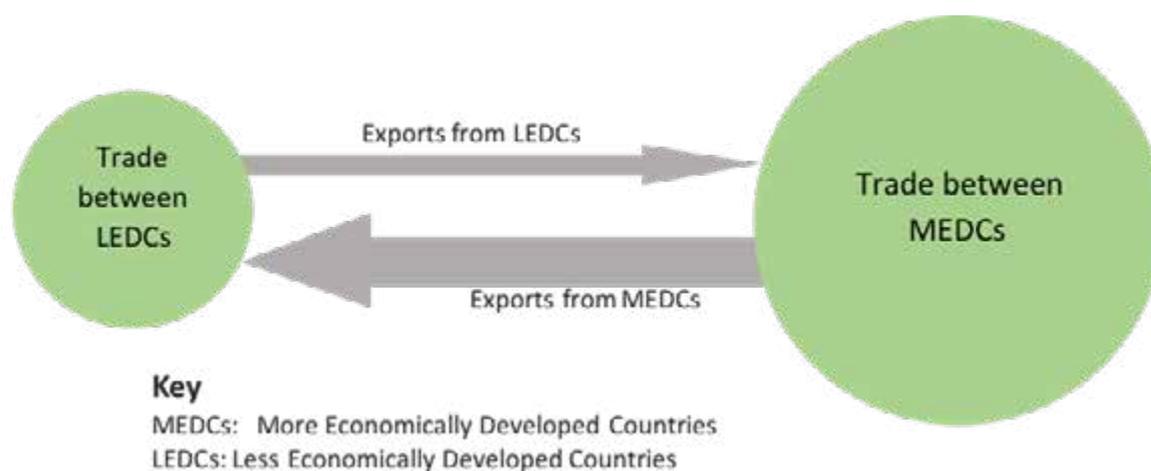


Figure 25.3 Nature of trade between developing and developed countries.

1. Describe the pattern of trade shown. (5)
2. Outline problems associated with the pattern of trade shown (3)

25.2 Trading blocs

In this section you are going to learn about trading blocs. You might have heard about some of these trading blocs. If so, can you name them? Trading blocs are also known as **economic groupings**. These are groups of countries in the same geographical region or environment which come together to enhance economic progress. The process of coming together is called **economic integration**. In this case, two or more countries with the same economic characteristics (e.g. trade, economic growth, technological development and population) join together with the aim of improving their economies and solve their economic problems such as poor trade, poor technology and low levels of industrialisation. We will look at such trading blocs namely the Southern African Development Community (SADC), the Common Market for Eastern and Southern Africa (COMESA), the Economic Community of West African States (ECOWAS) and European Union (EU). Can you name at least two members of each group? Now compare your responses with what we have in the discussion as you go through the following sections. Our focus shall be on the reasons for their formation or aims of each trading bloc.

Basically, these economic groupings were formed to enhance economic progress, to improve trade as well as to solve economic problems affecting each member collectively, through removal of trade restrictions, improvement of transport networks and sharing of ideas. They were also driven by the need to improve relations between member states. We shall look at each trading bloc's aims and reasons for their existence.

25.2.1 Southern African Development Community (SADC)

SADC is made up of 12 member countries namely Zimbabwe, Malawi, Botswana, Lesotho, Swaziland, Mozambique, South Africa, Tanzania, Zambia, Democratic Republic of Congo (DRC), Mauritius and Angola. Label these countries on the map on Figure 25.4

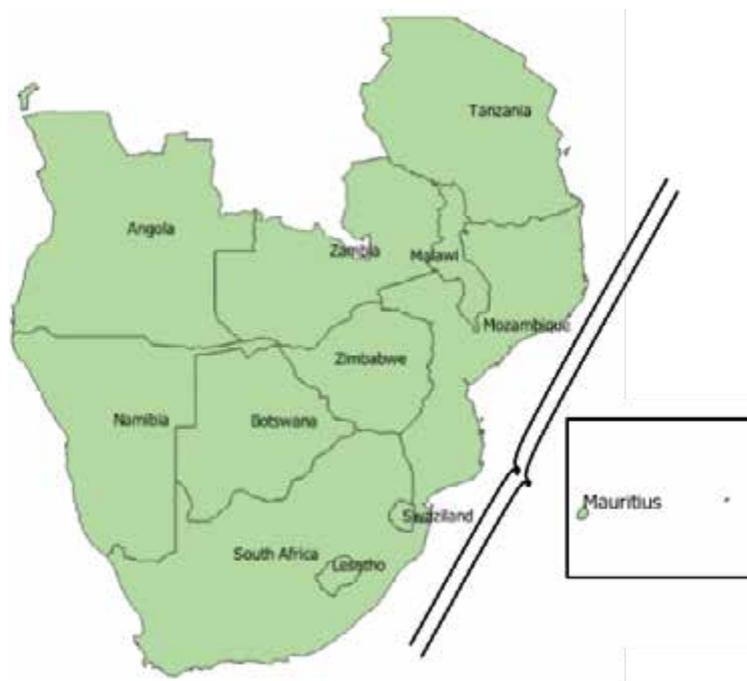


Figure 25.4 SADC member states

Aims of SADC

The aims of SADC were to:

- bring together economic resources to encourage economic growth,
- promote self-sufficiency among member countries,
- create international and regional security and cooperation within member states,
- improve the living standards of the people of Southern Africa,
- reduce economic dependence of SADC countries on South Africa,

- promote free movement of goods and people in the region by reducing tariffs on basic goods,
- Control movement of sensitive and specialised products such as drugs and precious metals.



Activity 25.5 Responsibilities of SADC states

The responsibilities and SADC member states in Table 25.2 are mixed up. Rearrange them to match each member state with its responsibility.

Table 25.2 SADC countries and their responsibilities

Country	Responsibility
Angola	Soil and water conservation and land utilisation
Botswana	Energy conservation and development
Lesotho	Southern Africa development fund and mining
Malawi	Fisheries, wildlife and forestry
Mozambique	Transport and communication
Mauritius	Food security
Namibia	Sea fisheries
Tanzania	Tourism
Swaziland	Finance and investment
South Africa	Manpower development and trade
Zambia	Industry and trade
Zimbabwe	Agricultural research and animal disease control

You should take that between 2000 and 2001 SADC went through a transition where it dropped the sector-based decentralised approach and adopted a centralised approach. The Sector-based decentralised approach is the one that gave the member states decentralised responsibilities as detailed in Table 25.2. Meanwhile, you will discover that the SADC now is more centralised spearheaded by a ministerial committee that comes up with 5-year plans for the region.

Achievements

Do you think SADC has any achievements during its time of operation? Yes, SADC has made a number of successes which have contributed to economic and political development in the SADC region. Can you just state some of SADC's achievements that you know? SADC has managed to promote trade within the region. They also managed to improve growth of industries based on local raw materials such as agro-based industries. Agro-based industries are those firms that are connected to agricultural activities such as processing agricultural products or manufacturing products that are needed as inputs in agriculture. Can you name examples of industries that are agro-based? If you mentioned manufacturers of farm implements and millers, you are in the right track. Good examples are Silo, Red Seal, Blue Ribbon and National Foods in Zimbabwe.

SADC member states were also successful, to a greater extent, in the development of regional transport and communication infrastructure. SADC member states are well-linked together in terms of road and rail networks which facilitates trade between countries. They are also well connected through wireless telecommunication services which improves movement of information and exchange of ideas.

Is it not unfair to talk about SADC's successes without mentioning its ability to increase political and economic cooperation in the region? Yes, the member states managed to bring peace in the region. For example, they contributed in bringing of peace in Mozambique in the 1980s and 1990s, in DRC in the 1990s, as well as in Angola. In 2009, they assisted in the formation of a Government of National Unit (GNU) in Zimbabwe.

25.2.2 Common Market for Eastern and Southern Africa (COMESA)

Now we look at COMESA. This is made up of 19 member states. It consists of the SADC member countries as well as some East African countries such as Eritrea, Ethiopia and Sudan. The reasons for the formation of this economic grouping can be explained through its aims as outlined below.



Figure 25.5 COMESA member states

Aims of COMESA

The aims were to:

- enhance commercial and economic cooperation in the region,
- promote a common market for member states' goods and services,
- promote development of basic and strategic industries,
- promote cooperation in agricultural development,
- improve transport network and links among member states,
- transform the methods of production of national economies in the region so as to improve productivity and capacity utilisation,
- reduce trade barriers or trade restrictions by reducing tariffs for selected commodities,
- promote development of technical and professional skills through training of human resources.

Achievements

Now what do you think were the contributions of COMESA to member countries? Just list down some of the achievements that you know and compare your list with what is in the discussion below.

There was increased volume of trade between member states. This was made possible by the elimination of trade barriers which increased free movement of goods between countries. There was also increased access to markets in member countries which benefited exporters in the region. The fact that each nation was allowed to specialise in what it can produce, has led to increased efficiency in production. Just like in the SADC region, COMESA member states have succeeded in improving transport and communication facilities which improved movement of goods and information. There has also been an improvement in political and economic cooperation which has helped to bring peace and economic prosperity in the region.

25.2.3 Economic Community of West African States (ECOWAS)

This was formed in Lagos in 1975 joining 15 nations of West Africa. Nigeria was the major founder of ECOWAS. You would realise that the reasons for its formation were mostly economic just like the other economic groupings as reflected by its aims.



Figure 25.6 ECOWAS member states

Aims of ECOWAS

- To promote development of a complete customs union,
- To introduce a common currency to ease trade in the region,
- To finance development of long-term projects such as dam projects, infrastructural development and mining,
- To improve transport and communication to allow ease of movement of goods, services and people in the region,
- To increase volume of trade between member states i.e. countries in the same region importing and exporting amongst themselves.

Achievements

Let us now discuss the successes of ECOWAS as it operates. Can you suggest any achievements that you know and then compare with what we have in our discussion here? Like the other organisations ECOWAS has also recorded some achievements during its operations. ECOWAS succeeded in bringing peace to troubled nations like Liberia and Sierra Leone. They also worked together to improve trade among member countries. Another notable achievement was the establishment of schools to train people in peace keeping. Because of peace in the region, there is now free movement of goods among member states.

25.2.4 European Union (EU)

This economic grouping consists of Western European countries namely United Kingdom, Denmark, Ireland, France, Italy, Greece, Germany, Netherlands, Portugal, Luxembourg, Belgium, Sweden and Spain. It operates as a common market. We can explain the reasons for its formation through its aims.



Figure 25.7 EU member states

- To remove trade barriers to all member states,
- To establish a single commercial policy towards non-member countries,
- To coordinate the transportation system throughout the region,
- To promote free competition by removing all trade restrictions,
- To enhance free movement of labour, capital and entrepreneurship within the region,
- To provide development aid to developing countries and also to depressed regions of the member countries.

Achievements

Now we discuss the achievements of EU. They abolished trade barriers and created free trade among member states. This increases flow of goods among countries. There has also been high agricultural production as farmers receive guaranteed prices which have enabled them to increase efficiency. EU also promoted free movement of factors of production among member countries. Can you quickly state examples of factors of production? If you mentioned capital and labour you are correct. This contributed to economic development in member states.

25.2.5 Problems facing regional trading blocs

Now we conclude this unit by summarising the problems facing regional trading blocs.

- Civil wars taking place in some countries which has caused insecurity in turn affecting between countries.
- Political differences among leaders of member states may affect cooperation among member states
- Some countries produce similar goods making the volume of trade to be low and less rewarding
- Free trade affects local industries as the imported goods without taxes are usually cheaper than locally produced goods
- Free trade denies countries revenue they would have earned from taxing imported goods
- Some member states do not remit their annual subscriptions which affects the operations of the organisations.



Activity 25.6 Aims and achievements of economic groupings

Complete the table below on aims and achievements of each economic grouping. State one aim and one achievement for each bloc.

Table 25.3 Aims and achievements of economic groupings

Trading bloc	Aims	Achievement
e.g. SADC	<ul style="list-style-type: none">• promote self-sufficiency among member countries,	

When you finish, compare your responses with the aims and achievements of each trading bloc that we discussed in this section.



Summary

In this unit, we learnt about the types of trade in which Zimbabwe is involved in, that is, internal and external trade. We also explained the nature of trade between developing and developed countries and the reasons for the imbalances that exist between these two camps. The different trading blocs were named and reasons for their formation were well explained. It is my hope that you found your study of this topic fruitful and enjoyable. We wish you the best as you prepare for your final exams. Attempt exam type questions in the assessment below.

End of Unit Assessment

Multiple choice questions

1. Which of the following commodities is involved in visible trade?
 - A tourism
 - B telecommunications
 - C raw material sales
 - D insurance

2. When you go to local shops to buy bread this is
 - A external trade.
 - B international trade.
 - C cross-border trade.
 - D internal trade.

3. The following make up the various stages involved in the flow of internal trade except
- A manufacturer
 - B wholesalers
 - C retailers
 - D health
4. A favourable balance of trade is one where
- A value of exports exceeds the value of imports.
 - B a country exports to many countries.
 - C value of imports exceeds the value of exports.
 - D a country has a variety of commodities for trade.
5. Which of the following is not a reason for the formation of trading blocs?
- A to solve economic challenges facing member countries
 - B to fight against colonialism
 - C to promote economic progress
 - D to improve transport networks

Structured Questions

- 6 (a) What do the following stand for?
SADC, COMESA, EU? (3)
- (b) State any three members of SADC and their responsibilities (6)
- (c) Outline the reasons why SADC was formed. (5)

7. Study Figure 25.1 and answer the questions that follow.

- a) State any three examples of developing countries and three examples of developed countries. (6)
- b) Describe and explain the pattern of trade shown in Figure 25.1. (5)
- c) If you were the Minister of trade in Zimbabwe, what measures would you take to correct the imbalances of trade shown on Figure 25.1? (5)

Research Work

4. Visit a local market place and compile information on the following

- (a) goods and services traded at the market
- (b) benefits of that type of trade to the traders
- (c) problems faced by the traders



Progress Check list

Now that you have come to the end of this unit, go through the objectives we listed at the beginning of the unit and check how many of them you have achieved. Tick against those you are sure you have achieved. Put an X against those you feel you have not yet achieved. Then for any that you put an X against, find the section dealing with it in the unit and go over it again.

Objective	Check Box
Are you now able to...	
• demonstrate how trading patterns may create imbalances regionally	
• name economic groupings such as SADC, COMESA, ECOWAS, OPEC and EU	
• explain the reasons for the formation of trading blocs.	

Further reading

Chabikwa, B., Phiri, F., & Mapungwana, M. (2019). *Total Geography Book 3*. Harare: Priority Publishers.

Gocha, N. M., Ncube, R., & Nembabware, L. (2007). *Dynamics of O'Level Human and Economic Geography*. Harare: College Press.

Munowenyu, E. M. (2008). *Step Ahead:O'Level Human and Economic Geograghy*. Harare: Longman Zimbabwe (Pvt) Ltd.

