



A *Practical* Approach to

Geography

'O' Level Revision

- With summary notes covering syllabus objectives
- Model ZIMSEC questions and answers

 **SECONDARY
BOOK PRESS**

Anchors of the schools curricula



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INTRODUCTION

Geography is a living, informative and very exciting subject. It allows students to understand the study of the earth's landscapes, people, places and the environments. Geography O Level Revision Book covers all the topics and concepts that are found in the ZIMSEC Syllabus and are structured according to the New Curriculum expectations.

It summarises the twelve main topics that are in the Syllabus whilst equipping students with relevant information in their preparation for the O Level Geography examinations.

You must work your way through this study guide to improve your understanding, identify your areas of weakness and correct your own mistakes.

To ensure a high-quality pass, you should also substantiate your knowledge other textbooks and your class notes. We are confident that this Geography study guide can help you prepare well so that you pass the ZIMSEC O Level exams.

Overview of the exam for Geography O level Study Guide

The exam questions have been arranged topically and in the respective order in which they are taught for example, Map work, Physical Environment and Economic Geography. The questions are structured typical of ZIMSEC exam standard.

Paper 1 carries 40 multiple choice questions which carry one mark each and the student is required to answer all the questions. The first segment is Map work which comprises of 12 questions, Physical Environment with 13 questions, Economic Geography with 8 questions and Population, Settlement, Transport and Trade with 7 questions. You are required to answer all the questions.

Paper 2 carries 12 structured questions. It is divided into three sections which are section A, B and C. Section A which covers topics on Physical Geography and comprises of the first four questions, Section B covers topics on Economic Geography and has four questions and lastly, Section C which covers topics on Population, Settlement, Transport and Trade and has the last four questions. The candidate is required to answer four questions choosing one question from each of the sections and the last question from any of the four sections.

How to use this study guide

This study guide covers selected aspects of the different topics from Form 1 to 4 Geography curriculum in the order that it is usually taught. The selected aspects of each topic are presented in the following way:

- An explanation of terms and concepts
- Worked examples to explain and demonstrate
- Activities with questions for you to answer
- Answers for you to use to check your own work
- There are exercises on the notes section based on exam-type questions. Cover the answers and



do the exercises on your own. Then check your answers. Reward yourself for the things you get right. If you get any incorrect answers, make sure you understand where you went wrong before moving onto the next section.

- Typical ZIMSEC exam papers are included in the study guide for you to practice.

Top 10 study tips

Try these study tips to make learning easier

- Have all your materials ready before you begin studying – pencils, pens, highlighters, paper and all the other necessary material.
- Be positive. Make sure your brain holds on to the information you are learning by reminding yourself how important it is to remember the work and get the marks.
- Take a walk outside. A change of scenery will stimulate your learning. You'll be surprised at how much more you take in being outside in the fresh air.
- Break up your learning sections into manageable parts. Trying to learn too much at one time will only result in a tired, unfocused and anxious brain.
- Keep your study sessions short but effective and reward yourself with short, constructive breaks.
- Teach your concepts to anyone who will listen. It might feel strange at first, but it is worth reading your revision notes aloud.
- Your brain learns well with colours and pictures. Try to use them whenever you can.
- Be confident with the learning areas you know well and focus your brain energy on the sections that you find more difficult to take in.
- Repetition is the key to retaining information you must learn. Keep going, don't give up.
- Sleeping at least 8 hours every night, eating properly and drinking plenty of water are all important things you need to do for your brain. Studying for exams is like strenuous exercise, so you must be prepared physically.

Question words to help you answer questions

It is important to look for the question words (words that tell you what to do) to correctly understand what the examiner is asking. Use the following table as a guide when answering questions.

Account for –	explain the cause of; explain why; give reasons for
Analyse –	separate; examine and interpret critically; positives and negatives; pros and cons argue put forward reasons in support of or against a statement
Classify –	place things with similar characteristics in the same group; to arrange according to type or sort
Comment –	give your opinion, based on facts
Compare –	to list both similarities and differences
Contrast –	stress the differences between things, events or problems
Define –	give a concise and clear meaning
Demonstrate –	show or make clear; illustrate or explain; prove by reasoning and evidence (note that you can give examples)

- Describe** – list the main characteristics of something; give an account of (note that a diagram or map may be part of a description)
- Discuss** – give the reasons for your statement; present both sides and reaching a conclusion
- Evaluate** – express an opinion, using evidence, of how good/bad, negative/positive, successful/unsuccessful something is
- Explain** – make clear, interpret, and spell out the material you present. Give reasons for differences of opinion or of results
- Give** – to state facts without discussions or explanations (note that you may be asked to ‘give a reason’)
- Identify** – name a feature from the source material
- Interpret** – to give an explanation of; to give the meaning of

Study skills to boost your learning

This guide makes use of three study techniques you can use to help you

Learn the material:

- Mobile notes
- Mnemonics
- Mind maps

Mobile notes

Mobile notes are excellent tools for learning all the key concepts in the study guide. Mobile notes are easy to make and you can take with them with you wherever you go:

1. Fold a blank piece of paper in half. Fold it in half again. Fold it again.
2. Open the paper. It will now be divided into 8 parts.
3. Cut or tear neatly along the folded lines.
4. On one side, write the basic concept.
5. On the other side, write the meaning or the explanation of the basic concept.
6. Use different colours and add pictures to help you remember.
7. Take these mobile notes with you wherever you go and look at them whenever you can.
8. As you learn, place the cards in three different piles:
 - I know well
 - Getting there
 - I need more practice
9. The more you learn them, the better you will remember them.

Mnemonics

A mnemonic code is a useful technique for learning information that is difficult to remember. This is an example of a word mnemonic using the

word MAPPING where each letter of the word stands for something else:

M – **M**ake an effort

A – **A**pply yourself to your studies

P – **P**ractise, practise, practise your mapwork

P – **P**repare well for the exams

I – **I**gnite your passion for Geography

N – **N**otice your subject around you

G – **G**o for it – the stars are the limit!

Mnemonics code information and make it easier

to remember. The more creative you are and the more you link your ‘codes’ to familiar things, the more helpful your mnemonics will be. This guide provides several ideas for using mnemonics. Be sure to make up your own

Mind maps

There are several mind maps included in this guide, summarising some of the sections.

Mind maps work because they show information that we have to learn in the same way that our brains ‘see’ information.

As you study the mind maps in the guide, add pictures to each of the branches to help you remember the content.

You can make your own mind maps as you finish each section.

How to make your own mind maps:

1. Turn your paper sideways so your brain has space to spread out in all directions.
2. Decide on a name for your mind map that summarises the information you are going to put on it.
3. Write the name in the middle and draw a circle or bubble or picture around it.
4. Write only key words on your branches, not whole sentences. Keep it short and simple.
5. Each branch should show a different idea. Use a different colour for each idea. Connect the information that belongs together. This will help build your understanding of the learning areas.
6. Have fun adding pictures wherever you can. It does not matter if you can’t draw well.

Top 10 exam tips

1. Make sure you have all the necessary stationery for your exam, i.e. pens, pencils, eraser, protractor, compass, calculator (with new batteries), as well as your ID document and exam admission letter.

2. Arrive on time, at least one hour before the start of the exam.
3. Go to the toilet before entering the exam room. You don't want to waste valuable time going to the toilet during the exam.
4. Use the 10 minutes reading time to read the instructions carefully. This helps to 'open' the information in your brain. Start with the question you think is the easiest to get the flow going. In the mapwork exam, use this time to look carefully at the whole map.
5. Break the questions down to make sure you understand what is being asked. If you don't answer the question properly you won't get any marks for it. Look for the key words in the question to know how to answer it. A list of these words is on page ix of this study guide.
6. Try all questions. Each question has some easy marks in it so make sure that you do all the questions in the exam.
7. Never panic, even if the question seems difficult at first. It will be linked with something you have covered. Find the connection.
8. Manage your time properly. Don't waste time on questions you are unsure of. Move on and come back if time allows.
9. Check weighting – how many marks have been allocated for your answer? Take note of how marks are allocated to the questions in this study guide. Do not give more or less information than is required.
10. Write big and bold and clearly. You will get more marks if the marker can read your answer clearly.

Common errors

- Candidates deliberately ignore reading examination instructions.
- In paper 2, some candidates answer questions from one section or answer only three questions instead of four questions.
- Improper numbering or failure to number their presentation properly.
- Candidates fail to comply with the demands of the question.
- Mostly in paper 2, candidates may be able to raise points but fail to explain or expand the points appropriately.

Objectives

By the end of this topic, you should be able to:

- *distinguish between weather and climate.*
- *list the elements of weather.*
- *describe instruments used to measure weather elements.*
- *read and record weather data.*

Introduction

People talk about weather and climate everyday. They discuss usually with regards to choices of clothing to wear as well as pertaining to agriculture. Weather and climate control people and their activities. Zimbabwe is generally a hot country though cold spells are experienced during the winter season. The chapter is basically going to equip learners with the basic knowledge of weather processes.

Weather and climate

- Weather can be defined as the state of the atmosphere over a short period of time at any place and time.
- Climate can be defined as the average weather conditions calculated over a long period.
- Weather is a short term condition while climate is a long term condition.
- Weather can have changes during a day while climate does not experience abrupt changes.
- Zimbabwe is in the Savanah climate which is a tropical climate with seasonal variations.

Weather elements

- Meteorologists study weather elements and these include humidity, temperature, rainfall, wind direction, wind speed, sunshine, pressure and cloud cover.
- The summary below can be used in understanding weather elements including instruments used to measure weather elements and the SI units.

Table 1.1

Element	Instrument	SI unit
Temperature	Thermometer	Degrees Celsius
Rainfall	Rain gauge	Millimetres
Humidity	Hygrometer	Percentage
Pressure	Barometer	Millibars
Sunshine	Sunshine recorder	Hours and Minutes
Wind speed	Cup anemometer	Kilometres per hour
Wind direction	Wind vane	Compass points
Cloud cover	Eye observation	Oktas

The weather station

- This is an establishment where instruments are kept.
- Places where one can find a weather station include a school, a farm, a college, an aviation school or a national meteorological station.

- The national meteorological station for Zimbabwe is in Harare in the suburb of Belvedere.
- A weather station should be functional as it consist instruments whose readings can be used for planning purposes.

Factors to consider before constructing a weather station

- Distance from trees.
- Distance from buildings.
- Height of grass which should be short.
- Type of surface with artificial surfaces totally written off.
- Relief such that a station should be sighted on gentle ground.

The Stevenson screen



Fig. 1.1 Stevenson screen

- It is an instrument used to house weather instruments.
- The instruments found in the Stevenson screen include the barometer, the six's thermometer and the hygrometer.
- The Stevenson screen has the following characteristics:
 - It has louvered sides to allow free air circulation.

- It has a double roof so that direct sun's heat does not affect the instruments inside.
- It is painted in white since it reflects heat.
- The Stevenson screen is raised 121cm above the ground so that the instruments inside do not record ground temperatures.
- It is made of wood which is a poor absorber of heat.

Materials needed for constructing a Stevenson screen

- Wooden planks.
- Nails.
- Asbestos sheets.
- 2 hinges.
- White paint and undercoat.
- Screws, screw driver and hammer.

Steps followed in making a Stevenson screen

- Step 1 Cutting the wooden planks to the correct size to make a box of 45cm × 45cm.
- Step 2 Joining planks using a screw driver and nails.
- Step 3 Fixing a door to the box.
- Step 4 Putting the first roof.
- Step 5 Putting the second roof leaving a gap between the two roofs.
- Step 6 Painting the Stevenson screen with both coats and placing the instrument on its legs.

Exercise 1.1

- (a) Define the terms weather and climate. [2]
- (b) Give any 3 differences between weather and climate. [3]
- (c) Give the characteristics of the Stevenson screen. [6]

Instruments used to record weather data

The rain gauge



Fig. 1.2 Rain gauge

- It is found at the weather station.
- It consists of a funnel, collecting can, overflow can and the measuring cylinder.
- It is raised for at least 30cm above the ground.
- The rain gauge is made up of stainless steel.
- Its diameter is 13cm.
- Measurements are recorded on a chart or a notebook.

Cup anemometer



Fig. 1.3 Cup anemometer

- It is a metal instrument made of stainless steel consisting of four cups attached to horizontal arms.
- The cups are easily turned by wind.
- Their speed is recorded.

Six's thermometer

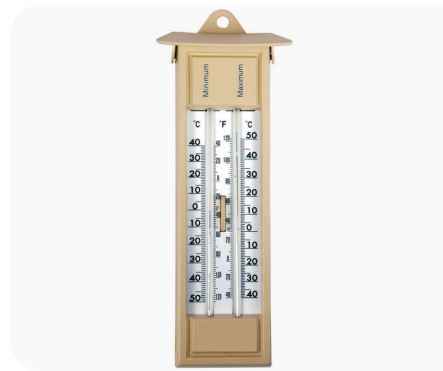


Fig. 1.4 Six's thermometer

- It is a u shaped glass tube used to measure maximum and minimum temperatures.
- It contains mercury and alcohol.
- The minimum temperature is measured on the left side.
- The upright glass tubes are known as limps.
- When temperature rises, the alcohol expands and pushes the mercury on the right side. This also pushes the metal index up.
- Readings are taken at 0800hrs.

Maximum and minimum thermometer



Fig. 1.5 Maximum and minimum thermometers

- Consists of two ordinary thermometers.
- The maximum thermometer contains mercury.
- The minimum thermometer contains alcohol.
- Readings from the two thermometers are used to calculate temperature range and mean temperatures.
- Mean temperature is calculated as maximum temperature plus minimum temperature divided by two.
- Temperature range is calculated as maximum temperature minus minimum temperature.

- The other thermometer will not be in water making it a dry bulb thermometer.
- Wet and dry bulb readings are interpreted below.

Table 1.2

Difference between thermometers	Description	Humidity
Huge difference	Air is dry	Low
Small difference	Air is moist	High
No difference	Air is saturated	Very humid

Hygrometer

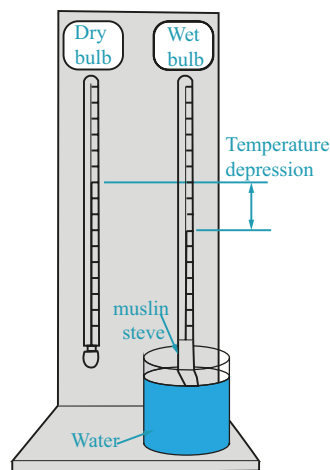


Fig. 1.6 Hygrometer

- It consists of two thermometers.
- It is also known as the wet and dry bulb thermometer.
- It is used to measure the moisture of the air (humidity).
- There are different types of hygrometers which are the electronic and the wet and dry bulb thermometer.
- The bulb of the wet bulb thermometer is covered with a muslin cloth that is put in a pan consisting of distilled water.

- Information collected can be recorded on a weather chart.
- **Relative humidity** – Is the ratio of the current absolute humidity to the highest possible absolute humidity.
- **Absolute humidity** – Is the mass of water vapour divided by the mass of dry air in a volume of dry air at a given temperature.

Wind vane

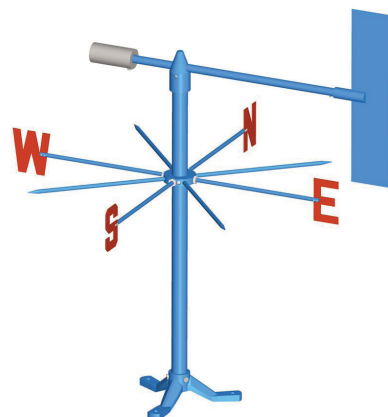


Fig. 1.7 Wind vane

- It is used to measure wind direction. It has an arrow and a pivot. Readings are taken from the direction being faced by the arrow.

- Readings can be taken during recorded intervals during the day.
- The data is recorded on a wind rose.

Wind rose

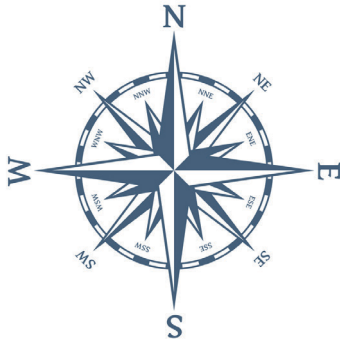


Fig. 1.8 Wind rose

- It is a device used to record information obtained from the wind vane.
- Wind direction is recorded according to the direction of the arrow.
- Calm days are recorded at the centre.
- The direction with highest frequency shows the prevailing wind.

Pressure



Fig. 1.9 Aneroid barometer

- It is an instrument kept in the Stevenson screen and used to measure pressure.
- There are two types of barometers namely the aneroid and the mercury barometer.
- Pressure is then measured in millibars.
- Pressure will be low when temperature is high.

Sunshine recorder

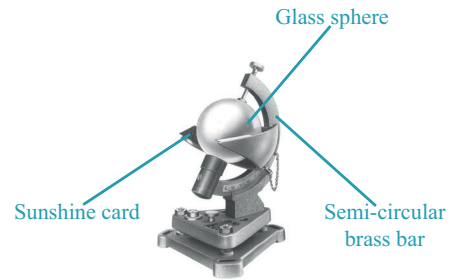


Fig. 1.10 Sunshine recorder

- The instrument is used to measure the amount of sunshine received by a certain place in hours and minutes.
- It has a glass sphere facing the sun's rays on the sensitive card.
- The sensitive card measures the sun's burn in hours and minutes.
- If it is cloudy, there will be no trace as compared to a summer sunny day.

Cloud cover

These are a natural phenomenon made up of ice crystals or water droplets. They are formed during the process of condensation. Cloud cover can only be measured using eye estimation. Clouds can be categorised into four groups which are:

- Low Level clouds (below 2km).
- Middle level clouds (2-6km).
- High level clouds (above 6km).
- Multi layered clouds.

High level clouds

- Cirrus – These are feathery, crispy clouds made up of very small ice crystals. Cirrus clouds show the presence of moisture at great heights and may indicate impending bad weather.
- Cirrostratus – These clouds are high and made up of ice crystals.

- Cirrostratus clouds have a thin layered formation allowing rays of the sun to pass, creating a halo effect.
- Cirrocumulus – These are globular and rippled thin clouds composed of ice crystals. They indicate unsettled weather.



Fig. 1.11 Cirrus clouds

Middle level clouds

- Altostratus – These are thick, fluffy, middle altitude clouds that are a patchy white and grey in colour. They are made up of water droplets in patches or layers. They appear globular and bumpy with flat bases arranged in lines or waves. Altostratus clouds indicate sunny spells.
- Altostratus – These are clusters of bluish-grey clouds that indicate that there may be rain ahead. They are usually made up of water droplets forming sheets of grey water looking clouds, partly or totally covering the sky.

Low level clouds

- Cumulus – These are thick low altitude clouds usually puffy and have very distinct edges and a noticeable vertical development. They appear like heaped-up cotton and have many shapes.

- Stratus – These are low altitude, fog like clouds that are responsible for dull, gloomy, overcast days and they indicate rainy weather associated with drizzle (guti/imvimbi).

Multi-layered clouds

- Nimbostratus – These are multi-layered clouds, which sometimes can have cumulonimbus clouds embedded within them. They can extend to 2000m. They can cause the sky to be overcast. These dark grey rain or snow bearing clouds cover the sky so completely that one cannot see the sun. They usually indicate a long spell of rain or snow.
- Cumulonimbus – These produce lightning, thunder, heavy rain, hail, strong winds and tornados. These are the tallest clouds and they span all cloud layers. They have a base and a top called an anvil.

Exercise 1.2











Weather Element	Instrument	Standard of measurement
Sunshine		
	Hygrometer	
		Degrees Celsius
	Eye estimation	
		knots
	Wind vane	

- Copy and complete the table. [12]
- Give the characteristics of the cumulonimbus clouds. [3]

Data

- Weather information recorded at a weather station is represented on a weather chart. The information is presented on a weather chart using symbols.
- Data for cloud cover can be presented in a table as shown below.

Table 1.3 Cloud cover using symbols

Symbol	Cloud Cover	Description
	0/8	Clear sky
	1/8	Few clouds
	2/8	Few clouds
	3/8	Scattered clouds
	4/8	Scattered clouds
	5/8	Broken sky
	6/8	Broken sky
	7/8	Broken sky
	8/8	Over sky
	9	Sky obscured

Data for maximum and minimum temperatures can be shown in form of a table.

Table 1.4 Temperature recorded from Monday to Friday

Day	Monday	Tuesday	Wednesday
Max temp	26	31	28
Min temp	17	20	18

Thursday	Friday	Saturday	Sunday
30	25	28	24
17	16	17	18

- Different bar graphs can be used when presenting the above data.

- The multiple bar graph can also be used.
- Temperature-rainfall graphs also known as climographs are also widely used.
- Synoptic charts which give a summary of all weather elements are also used.
- On a synoptic chart pressure is shown by lines showing areas of the same pressure which are known as isobars.
- Areas of the same weather conditions are shown using different isolines.
- Some of the isolines are:
 - Isotherms – These show areas of the same temperature.
 - Isohels – These show areas of the same sunshine.
 - Isohumes – These show areas of the same humidity.
 - Isohyets – They show areas of the same rainfall.
 - Isoneph – These show areas of the same amount of rainfall.
 - Isotheres – They show areas of the same mean summer temperature.

Exercise 1.3

1. Give any 4 ways of presenting weather data. [4]
2. What do the following represent?
 - (a) Isonephs (b) Isohels
 - (c) Isohyets (d) Isotheres [4]

Weather statistics

- Statistics are very vital in weather studies and analysis.
- The mean and range are used in climate studies.
- **Mean** – It is the average for a given period of time.
- **Average** – It is the difference between maximum temperature and minimum temperature for a given time.

Convective rainfall

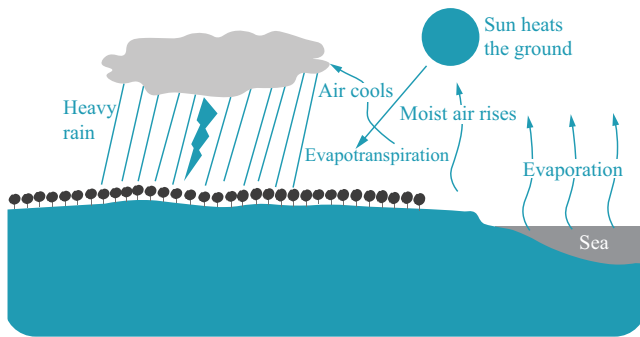


Fig. 1.12 Convective rainfall

- It is a midsummer type of rainfall formed when the ground is excessively heated.
- The air in contact with the ground is also heated.
- It rises in pockets, cools, expands and condenses forming clouds and ultimately, rainfall.
- The rainfall is associated with thunder and lightning as well as cumulonimbus clouds.
- The rainfall does not prolong though it will be torrential.

Relief rainfall

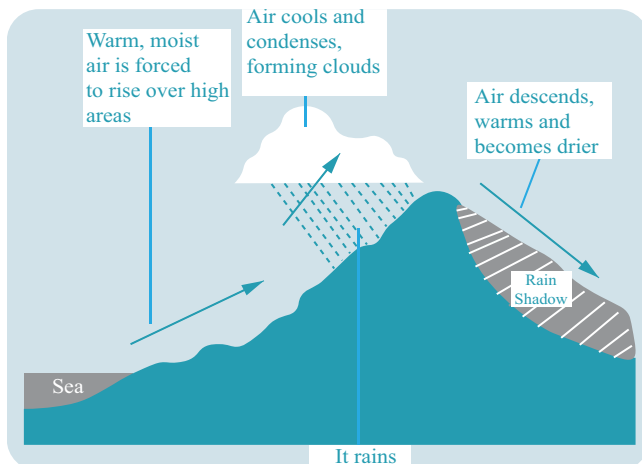


Fig. 1.13 Relief rainfall

- It is also known as orographic rainfall.
- The name orographic was derived from the Greek "oros" which means a mountain.

- The rainfall is formed when warm moist air rises from the sea towards an onshore direction.
- When approaching a mountain range, the air rises, cools and condenses resulting in rain on the windward side.
- On the leeward side, temperature decreases as well as pressure resulting in no rain.

Cyclonic rainfall

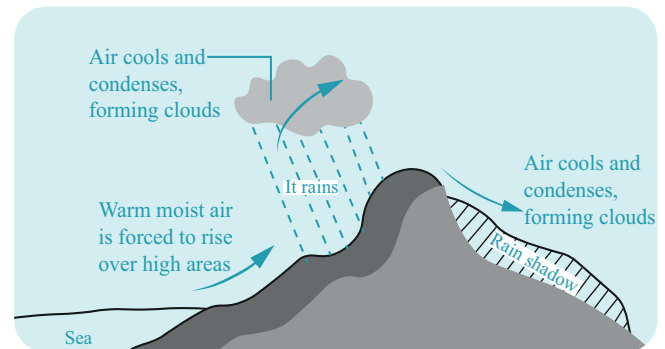


Fig. 1.14 Cyclonic rainfall

- Takes place when two air masses of different characteristics meet.
- Air streams do not mix.
- A front is formed between the two air masses.
- Warm air is light therefore rises while cold air is dense and therefore sinks.
- As the warm air rises, it cools, expands and condenses forming clouds resulting in rainfall.
- The rainfall is often prolonged.

Weather forecasting

- It is the prediction of what the weather will be like in the future.
- The prediction will be for a period of 3-4 days.
- However, prediction can sometimes be for a season.
- Prediction is done using researched data which is interpreted from synoptic maps.

- Weather forecasts are broadcasted on national television and radio.
- Weather can also be predicted using indigenous methods.
- Seasonal predictions can be done to determine El Nino and La Nina conditions.

Importance of weather forecasting

- Farmers need to know if there is going to be enough rainfall to determine the type of crop to grow.
- They also need to know the activities they can do at the farm for example when to spray.
- Farmers need to know when to put in place measures to protect crops for example against frost, hail etc.
- It is vital for farmers to know when to plant crops.
- Ordinary people need to know the type of clothes to wear.
- People also need to know when to engage in outdoor activities and when to do indoor functions.
- Tourist need to know the plans they can have for activities in advance.
- Pilots also need to know when to take-off depending on the weather.

Indigenous weather forecasting methods

- This involves knowledge of the existing surroundings and local knowledge bases to predict future weather conditions.
- Sometimes prediction methods of indigenous nature can be very accurate.
- When wild fruits are in abundance, the prediction is usually drought.
- The presence of migratory birds is a signal of impending rains.

- The sound of a cicada also signals the coming of the rains and the approaching summer season.
- In the Savannah climate, trees develop new leaves when approaching summer which is an accurate method of predicting weather.
- Wind direction is also used by indigenous people to predict future weather conditions. For example, the Nhuruka wind in Masvingo brings rainfall.
- The appearance of the rainbow signals the subsiding of rains.

Exercise 1.5

- What is weather forecasting? [2]
- Give any four IKS methods of weather forecasting. [4]
- Give any four advantages of scientific methods of weather forecasting. [4]

Weather hazards

- These are adverse weather conditions that threaten humanity.
- These include floods, cyclones and drought.

Floods



Fig. 1.15 Flooded area

- This is when water exceeds bankful discharge in rivers.

Solutions

- Cloud seeding.
- Dam construction.
- Afforestation.
- Reforestation.
- Irrigation.
- Water harvesting.
- Borehole drilling.
- Recycling and reusing of water.

Tropical cyclones

Formation of cyclones

- A cyclone is formed over oceans where moisture is in abundance.
- They are formed in areas where pressure is very low as a result of wind movements.
- It is a cell of intense low pressure associated with heavy winds and high rainfall.
- It occurs in oceans where temperatures rise above 27 degrees Celsius.
- Cyclones can move with speeds of up to 30km per hour and can last up to 14 days.
- In USA they are known as hurricanes and the most well-known hurricane in history is hurricane Katrina.
- In Southern Africa, cyclones have been regular since 2000. Some of the cyclones to have ravaged Southern Africa include Cyclone Eline, Cyclone Japhet, Cyclone Idai, Cyclone Hudah just to mention a few.

Effects of cyclones

- Strong winds and heavy rainfall cause extensive damage to property.
- People lose their lives.
- Heavy rains often result in diseases such as bilharzia and cholera.
- Shortage of water for drinking.

- Destruction of the ecosystem.
- Saturation of the soil can result in rock falls and landslides.

Solutions

- Early warning systems.
- Provision of temporary shelter.
- Resettlement of people on areas that are not prone to flooding.
- Effective disaster risk management.
- Insurance.
- Afforestation and reforestation programmes.
- Keeping first aid kits and emergency supplies.

Influence of people on weather

People can influence weather through a number of ways. People carry out activities that can be domestic or industrial. Some of them are:

- Afforestation.
- Reforestation.
- Cloud seeding.
- Construction of dams and other inland water reservoirs.
- Overstocking.
- Deforestation.
- Alluvial mining.
- Urbanisation.

People can have an impact on weather through human activities that either improve the environment or have an impact on climate. They can also perform acts that destroy the climatic patterns of a place, for example, pollution which is popular in industrialised countries. The quest to improve food supply has led to the destruction of the environment culminating into climate variability.

Climate of Zimbabwe

- Zimbabwe is located within the tropics in the Southern Hemisphere.
- It is in the Savannah climate.
- The country experiences seasonal variations with the summer and winter being the dominant seasons.
- Zimbabwe is affected by the Mozambique current, the Zaire air as well as the North Eastern monsoons bringing rainfall during the summer season.
- The country also occasionally suffers from the El Nino conditions mainly brought by the Namibian current.

Rainfall distribution

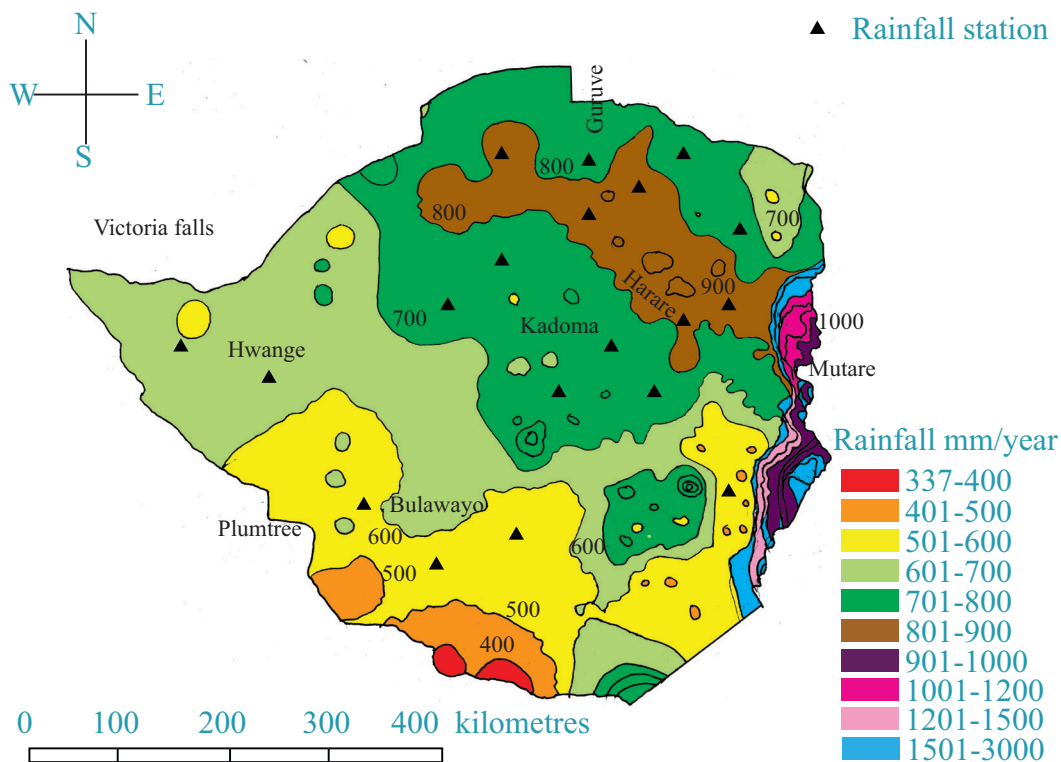


Fig. 1.16 Map of Zimbabwe showing rainfall distribution

- Highest rainfall totals are received in the Eastern Highlands as well as some parts of the central High-veld which are in region 1. The rainfall is usually orographic caused by the rising Mozambican current from the Indian ocean.
- The Eastern highlands receives rainfall of over 1200mm per year.
- Rainfall is received in summer.
- Least rainfall totals are received in region 4 and 5 in places such as Matabeleland and some parts of Masvingo with totals of 400mm to 600mm per annum.
- The areas are usually affected by the dry Namibian current which passes through the Namib and Kalahari deserts causing bareness.
- There is usually limited influence of the ITCZ in the central parts of the country during the summer season.
- Areas such as Harare and Karoi which are in region 2 receives totals of about 800mm to 1200mm per annum.

Temperature distribution

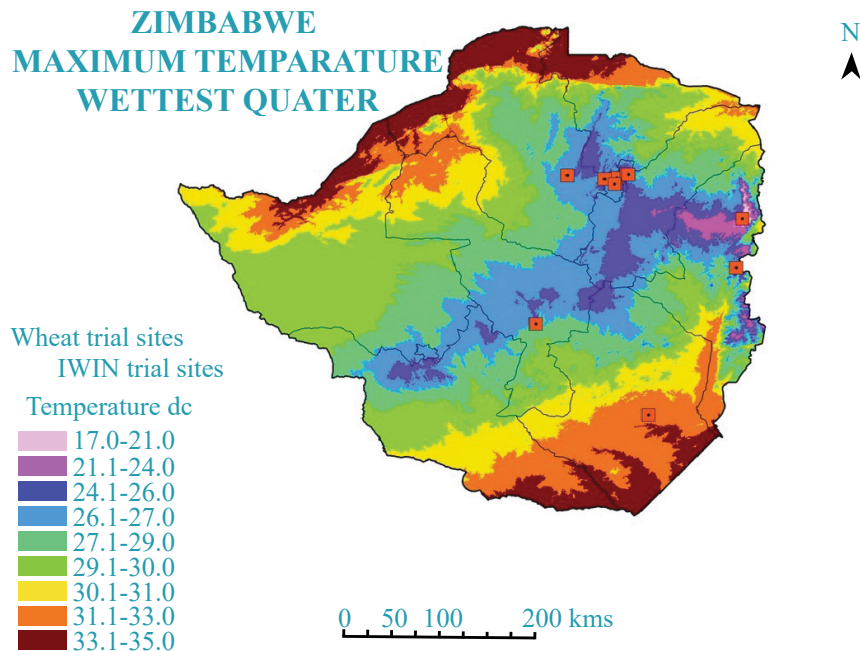


Fig. 1.17 Map of Zimbabwe showing temperature distribution

- Temperature is influenced by altitude.
- In the troposphere, temperature decreases as height above sea level increases.
- In Zimbabwe, temperatures are usually high in summer when the ITCZ will be in Zimbabwe.
- In the winter season, temperatures drop.
- In low lying areas such as Muzarabani and the Zambezi valley, temperatures are always high.
- In the Eastern highlands temperatures often drop due to high altitude.
- Warm temperatures of 17 to 20 degree are experienced in the central parts of the country.
- The region has the highest number of plantations mainly owned by the government through the forestry commission as well as multinational corporations.
- Crops grown in region 1 include macademia nuts, tea, coffee, bananas, peas, apples, potatoes and other vegetables.
- Farming in the region is both intensive and extensive.
- Cover areas such as Chipinge, Vumba, Chimanimani, Cashel Valley and Mutare.

Zimbabwe's climatic zones

REGION 1

- The region lies in the eastern part of the country.
- The region receives over 1000mm of rainfall per annum, low temperatures, high altitude and mostly rugged.

REGION 2

- Region 2 is located in the northern part of Zimbabwe.
- Rainfall is confined to summer and is moderate for levels of 700mm to 1000mm.
- The region is suitable for intensive cropping with crops such as tobacco,

maize, sugar beans, cotton and livestock production such as dairy, beef production, piggery and poultry.

- Supplementary irrigation is done for winter wheat.
- Wildlife management is also very popular.

REGION 3

- The region is located in the mid altitude areas of the country.
- Receives 650mm to 800mm of precipitation per annum.
- Rainfall is infrequent and accompanied by high temperatures making the rains ineffective.
- The region is subjected to mid-summer dry spells which lowers yield.
- The region is marginal for tobacco, maize, groundnuts, sunflower and fodder crops.
- Region 3 is occupied mainly by small holder farmers.

REGION 4

- The region receives low rainfall of between 450mm and 600mm per year.
- The region experiences periodic droughts every rainy season making cash and food crop production uncertain.
- The region is mainly occupied by communal farmers.
- Small holder farmers in this region grow small grains that are drought resistant such as sorghum, millet and rapoko.
- The region is suitable for livestock production especially cattle ranching and wildlife management.
- Tourism is also done there and anchored on wildlife viewing.

REGION 5

- The region is arid receiving less than 450mm of rainfall per year.
- Soils in the region are poor and not arable. The region is characterised by cattle ranching and wildlife management as the major activities.
- Crop production is only permissible with irrigation though cost may outweigh earnings.
- Includes areas such as Plumtree, Gwanda, Hwange and Victoria Falls.
- The region also specialises in tourism anchored on wildlife.
- Irrigation is also permissible.

Climate variability

- This refers to the inconsistencies and lack of uniformity in climatic conditions of any given place. This has a negative impact on economic activities especially agriculture which relies mostly on the climatic outlook.
- Climate variability has seen seasons that are not uniform in Zimbabwe. Sometimes rains may fall very early in summer while during other years, rains maybe very delayed resulting in farmers failing to beat the changing climate.
- Drought and floods are a result of climate variability.

Effects of climate variability

- Frequent droughts.
- Regular occurrence of droughts.
- Drying up of dams and other reservoirs.
- Occurrence of diseases that affect crops and livestock.
- Damage of infrastructure due to floods.
- An increase in the use of irrigation which is costly.

- Increased drilling of boreholes resulting in the shortage of ground water.
- An increase in the usage of genetically modified organisms.

Solutions to climate variability

- Drilling of boreholes.
- Construction of dams.
- Reforestation.
- Afforestation
- River dredging.
- Use of drought resistant crop varieties.
- Keeping of drought resistant livestock.
- Growing of short season varieties.

Exercise 1.6

- (a) How has Zimbabwe been affected by climate change? [6]
- (b) Give ways adopted by Zimbabwe to reduce the impact of climate change. [6]

Air masses

- Air masses are large bodies of air that cover large distances having homogenous characteristics.
- The homogeneity is in temperature and moisture content.
- Air masses have source regions.
- Air masses cover large distances.
- They get their characteristics from their source region.
- Air masses can originate from continental and maritime bases.
- Air masses can be dry, moist or saturated and this is determined by their source region.

Classes of air masses

Basically there are four classes of air masses in weather studies.

(a) Tropical maritime

This is a warm and moist air mass. It forms over oceans and advance towards continents. The tropical maritime air mass is unstable. The air mass brings rainfall over its path. The North East trade wind is an example of a tropical maritime air mass.

(b) Tropical continental

This is an air mass which is warm and dry. It develops over land in tropical areas. In Africa, this warm and dry air mass develops over the Sahara desert causing stable conditions. The weather associated with it is hot, calm and sunny.

(c) Polar maritime

It is a cold and humid air mass. It mainly develops in glacial areas mostly oceans. It develops in areas such as Siberia, Northern Canada, and the Atlantic and Pacific oceans. The South East trade winds originating from the Antarctic Ocean is an example. Polar maritime air mass prevails over Zimbabwe in winter.

(d) Polar continental

- This is a dry air mass developing over cold regions of the world mostly over land.
- It mainly develops in Europe and Eastern Russia in glacial lands. The air mass is stable and not associated with rainfall.

Air mass modification

- This refers to the changing of the characteristics of an air mass.
- The change is caused by the characteristics of the source region and the area over which it passes through.
- A warm and moist air mass rising from the sea can be modified by an arid environment over which it passes through as it drops moisture.

- Likewise a dry air mass rising from an arid area can pick up moisture when it passes through a humid area with vegetation.
- For example, the tropical air mass that originate from the Sahara migrates North to Europe crossing the Mediterranean. It picks up moisture on its path.

Air masses affecting Zimbabwe

- There are various air masses that affect Zimbabwe. These air masses take up the characteristics of their source regions.
- Zimbabwe is mostly affected by trade winds.

The trade winds that affect Zimbabwe are:

South East trade winds

- These originate from the Indian Ocean sweeping through Mozambique.
- This trade wind is associated with drizzle and light showers mainly on the windward side.
- This air mass brings drizzle again during the winter season.

Congo air

- The air mass rises from the Congo basin and is warm and moist.
- It originates mainly from the Atlantic Ocean due West of DR Congo.
- It blows in summer in Zimbabwe.
- It also brings widespread rainfall.

North East monsoons

- This is an air mass that is seasonal and brings rainfall in January.
- It is not as moist as the Congo air.

Ocean currents affecting Southern Africa

- There are quite a number of air masses that affect Southern Africa.
- Southern Africa is mostly affected by ocean currents. These include the Mozambican warm current, the Agulhas current, the Madagascar current, the Benguela current and the Angola current.

The Mozambican warm current

- This wind develops in the Indian Ocean and blows parallel to the Mozambique coast.
- It is warm and moist.
- It brings wide spread rainfall to South Eastern part of Africa.

The Agulhas current

- It also runs parallel to the coast of Mozambique and brings rain to the South Eastern part of Africa.
- It is a warm and moist current.

The Madagascar current

- It is a warm current originating from the Indian Ocean off the coast of Madagascar.
- The current moves towards mainland Africa causing widespread rainfall.

The Benguela current

- It is a current that originates from the Atlantic Ocean off the coast of South Africa and moves northwards.
- It causes widespread aridity to Botswana and Namibia.
- The air mass also affects the western parts of Zimbabwe.

Angola current

- It is a current flowing near the West African coast.
- The current causes the El Nino conditions due to its dryness.

The Inter Tropical Convergence Zone (ITCZ)

- This is a low pressure zone that is created when two air streams from different tropics meet.
- The ITCZ is mobile and move to different areas.
- Trade winds from the Northern and Southern Hemisphere converge at this low pressure zone.
- Temperatures at the ITCZ are very high due to the distance between the equator and the sun.
- In the Southern Hemisphere, from September to February, the ITCZ will be in the region and during the winter season, the ITCZ will be in the Northern Hemisphere.
- The common weather conditions associated with the ITCZ include:
 - Thunderstorms.
 - Cumulonimbus clouds.
 - Torrential rainfall.
 - Low pressure.
 - Lightning.

Exercise 1.7

- (a) What activities are done when the ITCZ approaches Zimbabwe? [6]
- (b) What happens when two air streams from different tropics meet? [4]

Global climates

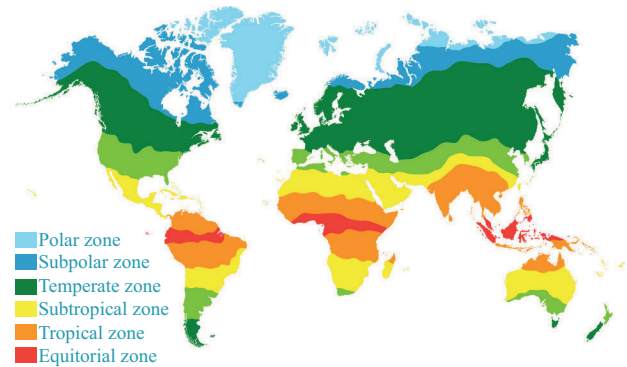


Fig. 1.18 Global climates

- There are many climates in the world and these climates vary in terms of climatic characteristics based on location.
- Climates are based on location which determines temperatures and the amount of rainfall received.
- Climates such as the equatorial climate is close to the sun hence high temperatures and high rainfall.
- Altitude also determines the type of climate. The areas such as the Alps and the Andes receive high rainfall due to altitude.
- Distance from the sea determines the type of climate as ocean currents may trigger rains onshore.

Some of the world's climates are:

1. Equatorial climate

- The climate is located between 5 and 10 degrees North and South of the equator.
- The climate covers areas such as the Amazon basin, the Congo basin and Malaysia just to mention a few.
- The climate has no seasons.
- The climate receives rainfall throughout the year. Temperatures are also very high throughout the year.

- It has very low diurnal temperature ranges.
- The temperature ranges around 27 degrees Celsius throughout the year.
- Humidity hovers around 90% throughout the year.
- Rainfall totals exceed 2000mm per annum.
- Some areas in the equatorial experience double maximum rainfall and temperature.
- The cumulonimbus cloud dominates in the equatorial climate.
- Sometimes the sky is overcast.

2. Savannah climate

- The climate is a tropical one experienced by warm countries in the tropics.
- The Savannah climate experiences seasonal variations.

The Savannah climate can be put into three sub categories which are:

(a) Humid Savannah

This climate is found near the equator and receives about 1250mm of rainfall per annum.

(b) Semi-humid Savannah

This type receives about 800mm of rainfall per annum for example the 6 central plateaus of Zimbabwe.

(c) Semi-arid Savannah

- The climate is found near the desert and receives rainfall of less than 500mm per annum.
- Zimbabwe's low veld is an example of this climate.

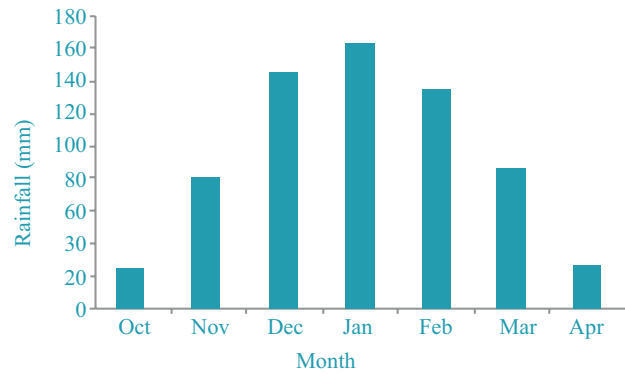


Fig. 1.19 Rainfall graph of a station in Zimbabwe

The location of the Savannah climate is between 5 degrees and 23 degrees North and South of the equator. Examples of the countries experiencing this climate include Zimbabwe, Malawi, Zambia, Columbia and some parts of India.

- The climate is seasonally humid.
- Temperatures range from 24 to 30 degrees in summer.
- Highest temperatures are usually experienced towards the rain season.
- In the Southern Hemisphere, Savannah receives rainfall during the October to March period.
- Winters are usually very dry.
- In the Northern Hemisphere, the Savannah climate receives rainfall during the May to October period.

3. Hot desert climate

- Desert climate is an extreme climate lacking moisture.
- Most deserts are located on the western sides of the continents.

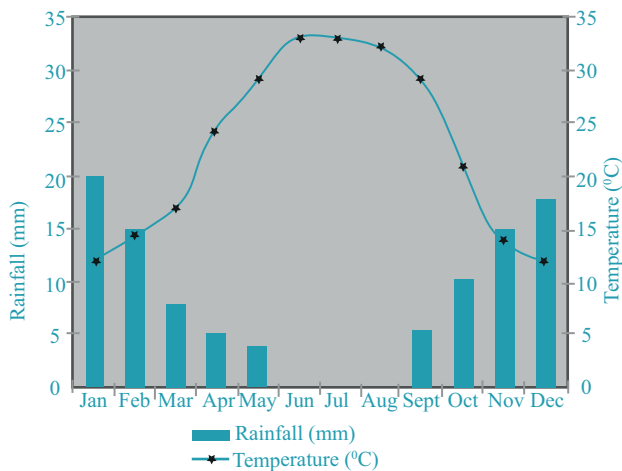


Fig. 1.20 Rainfall graph for a station in the hot desert

- Desert climate is very harsh due to its climatic conditions.
- Rainfall is very low usually less than 250mm per annum.
- Temperatures are also high throughout the year.
- Most deserts are located between 15 and 30 degrees North and South of the equator.
- In Africa there is the Sahara, Namib and the Kalahari.
- There is also the Mojave Desert and the Rocky in America.
- Temperatures can reach 50 degrees and during the night they can fall to 10 degrees.
- Egypt, Mali, Ethiopia, Djibouti, Ethiopia and Eritrea are some of the African countries with desert climate as well as Botswana and Namibia in Southern Africa.

4. Temperate desert

- This climate is found in mid latitudes.
- Mid latitudes are located between 25 and 40 degrees North and South of the equator.

- The most notable areas with such a climate is Patagonia in South America and the south western parts of USA.
- This climate has clear seasons.
- Summers are very hot with temperatures reaching as high as 31° while during winter temperatures can fall to -10 degrees Celsius.
- Temperature ranges are very high in this climate.
- Annual rainfall totals are usually not exceeding 110mm.
- Winters are usually snowy.

5. Tundra



Fig. 1.21 Antarctica

- This climate receives very low rainfall.
- It is also a desert climate which is cold.
- This climate is found at the margins of the poles usually between 60° and 75° North and South of the equator.
- Finland, Sweden, Russia and the Arctic sea experience this climate.
- Temperatures experienced are between -25 and -40 degrees in winter where nights are long.
- Maximum temperatures sometimes reach 10 degrees Celsius.
- Rainfall totals received are about 250mm per year.

6. Tropical monsoon climate

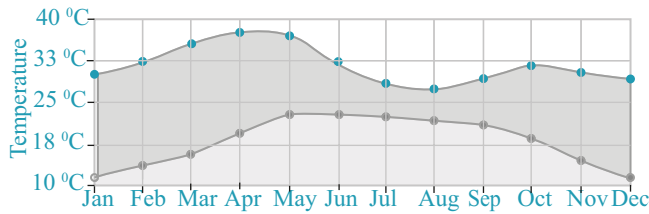


Fig. 1.22 Temperature graph of a place in India

- It resembles the equatorial climate.
- Areas with this type of climate receive very high rainfall and experience high temperatures though they are a bit different from the equatorial.
- The climate is located between 10° and 25° North and South of the equator with countries such as Sri Lanka, Bangladesh, Myanmar, French Guyana and India.
- Average annual temperatures are around 27 degrees Celsius while rainfall totals are around 1600mm.

7. Mediterranean Climate

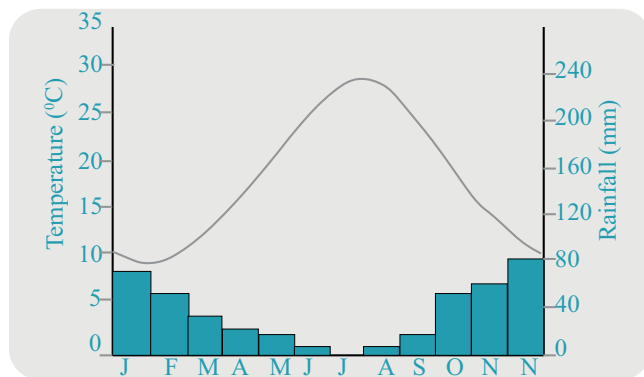


Fig. 1.23 Temperature graph of any station in the Mediterranean

- This climate is the direct opposite of the Savannah.
- Summers are dry while winters are wet.
- The climate is found between 30 and 45° North and South of the equator mainly on the western sides of continents in relatively few areas.

- The climate is mainly caused by the shifting of wind belts. The climate has influence mainly around the Mediterranean sea.
- Mediterranean regions in the world include California, Cape Town, Tunis, Adelaide and Swansland in Australia.
- The summer is warm with offshore trades and dry conditions. Rainfall is concentrated in winter with onshore westerlies.
- Local winds which are the Sirocco and the Mistral are very dominant.

Interpretation of climate data

- Climatic graphs consist of rainfall and average temperature for a given place, city or region.
- Temperature appear as a line graph.
- Some graphs can consist of the overall average temperature for a place.
- Rainfall is always appearing as a bar graph and in the blue colour.
- Temperature is always appearing as a red line graph.
- Climate graphs show rainfall averages but do not show anomalies.
- Trends should be taken into consideration when reading and analysing climate graphs.
- Temperature trends and rainfall need to be taken into consideration.
- Rises and falls need to be noted.
- Peak points giving reasons are also very significant.
- Relationships in curves also need to be noted.
- Calculation of the following need to be taken into effect:
 - Mean temperature.
 - Temperature range.
 - Mean monthly temperature.
 - Mean annual temperature.

Temperate depressions

- These are low pressure cells in the temperate areas.
- These result from the collision of polar air masses and tropical air masses in mid latitudes.
- Mid latitudes are between 40° and 60° North and South of the equator.
- These are areas where temperate depressions form.
- Air moves in a clockwise direction in the Southern Hemisphere while in the Northern Hemisphere it moves in an anticlockwise direction.
- They are associated with warm and cold fronts.

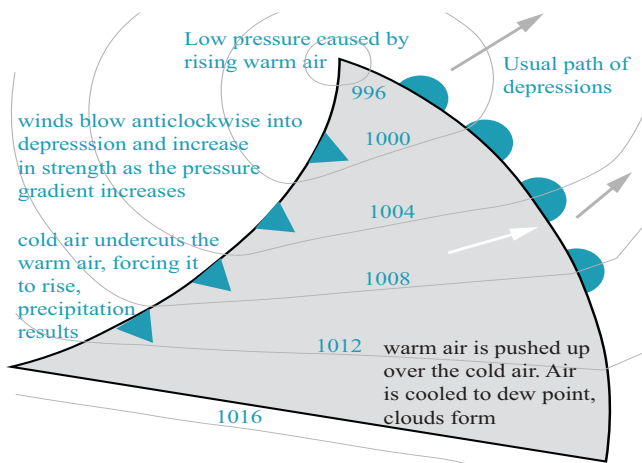


Fig. 1.24 Stages in the formation of a temperate depression

- Stage 1 – Undisturbed polar front.
- Stage 2 – Dropping of pressure.
- Stage 3 – Maturity shown by movement from the east to the west. At this stage different fronts are formed and tropical air rises over cold polar air. This causes the formation of a warm front. Cold air forces itself underneath warm air causing a cold front.
- The cold front moves faster than the warm front so that it catches up with the warm front forming an occlusion.

- An occluded front is associated with over cast skies with cumulonimbus and nimbostratus clouds, cold weather as well as continuous rainfall.

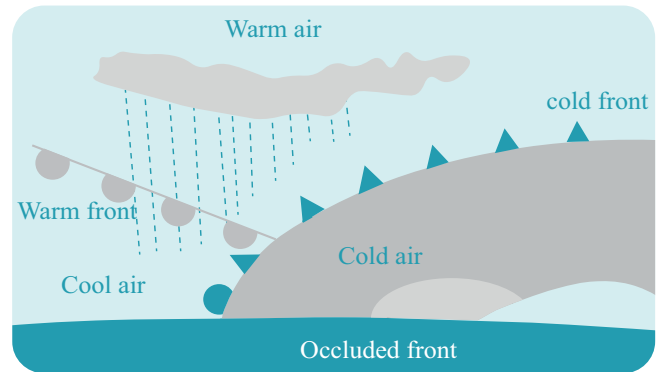


Fig. 1.25 Occluded front

Frontal systems

- When two air masses meet, they do not mix but are separated by a zone called a front.
- Types of fronts include warm front, cold front and occluded front.

Warm front

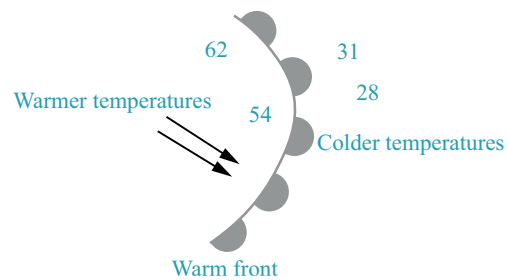


Fig. 1.26 Symbol of a warm front

- Formed when warm air rises over colder air. Warm air is light while cold air is dense therefore underlies warm air.
- The risen warm air rises, expands, cools and condenses.
- Rain takes place along the front.
- Pressure will be low along the warm front.

Cold front

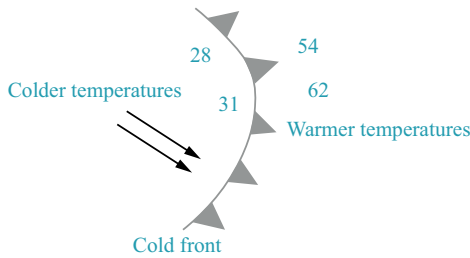


Fig. 1.27 Symbol of a cold front

- This is more severe as compared to the warm front.
- Warm air is forced by the cold air which pushes it resulting in condensation and thunderstorms along the front.
- They can cover an area exceeding 80km.

Occluded front

- Cold front move faster than warm front.
- The cold front will catch up with the warm front.
- Cold air behind the cold front meets the cold air ahead the warm front.
- The coldest air undercuts the other.
- The boundary between the two air masses is called occluded front.
- It is shown by solid purple line with alternate triangles and semi-circles pointing in the direction of its movement.
- They are also linked with areas of low pressure called depressions.

Tropical cyclones

- These occur in tropical latitudes of between 10° and 25° North and South of the equator.
- They form over oceans where temperatures will be over 27 degrees.
- They transfer heat horizontally from areas of high concentration to areas of low concentration.

- In USA, they are known as hurricanes, in Japan as typhoons and in Australia they are regarded as Willy willies.
- Cyclones have very low temperatures at the centre.
- Cyclones are associated with very high rainfall accompanied by heavy winds and great speeds.
- In the Northern Hemisphere, winds spiral in the anticlockwise while in the Southern Hemisphere it spirals in the clockwise direction.

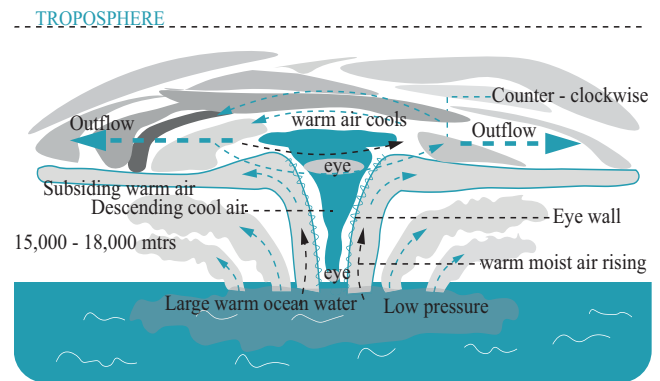


Fig. 1.28 Cyclone in Southern Hemisphere

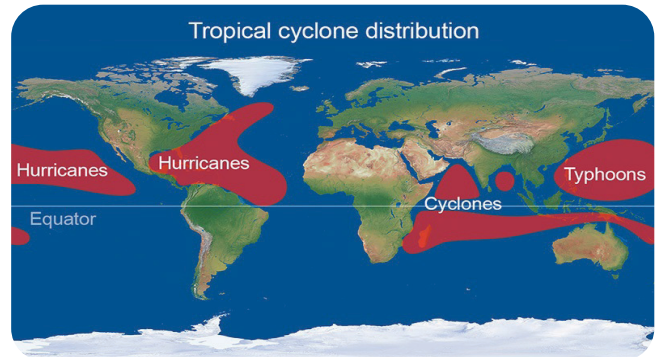


Fig. 1.29 World map showing areas where cyclones are prone

- Meteorologists give names to cyclones.
- They can have a diameter of 50 to 750km.
- Wind speed can be over 200km.
- The arrival of the vortex of a cyclone signals violent weather conditions with high wind speed and heavy rains.
- Cyclones move from the east to the west.

- Cyclones that have affected Southern Africa since the year 2000 are:
 - Cyclone Eline.
 - Cyclone Kenneth.
 - Cyclone Dineo.
 - Cyclone Idai.
 - Cyclone Japhet.
 - Cyclone Eloise.
 - Cyclone Anna.

Human influence on climate

Human actions have been very notable in changing climatic conditions over the years. Some of the human actions are:

- Dam construction.
- Reforestation.
- Afforestation.
- Veld fires.
- Cloud seeding.
- Industrialisation.
- Emission of chlorofluorocarbons into the atmosphere.
- Overstocking.
- River siltation due to mining and stream bank cultivation.

Climate change

- This is the constant shift in normal climate patterns mainly caused by natural factors as well as human causes.
- The result will be adverse climate conditions that affect both the ecosystem and human beings.
- Human causes have been at the forefront of accelerating climate change.
- Climate change has had negative impacts on the environment and humanity.
- Rivers have dried up and others have changed from being perennial and are now seasonal rivers.

- Heat waves are now common due to ozone depletion.
- Seasons have become very short.
- Agricultural seasons are now being delayed by the onset of rains.
- Desertification has accelerated in countries such as Burkina Faso and Mali.
- Animal habitats and other animal species are dwindling.

Adaptation measures

- Dam construction
- Borehole drilling
- Investing in irrigation
- Afforestation programmes
- Reforestation
- Growing drought resistant varieties
- Growing short season varieties
- Water harvesting.

Exercise 1.8

- Identify any four global climates and explain their characteristics. [12]
- Explain any two frontal systems. [4]
- Give any six ways in which people influence climate. [6]

Objectives

By the end of this topic, you should be able to:

- identify landforms.
- describe different landforms.
- give the benefits of landforms.
- explain the continental drift theory.
- describe the plate tectonics theory.
- explain vulcanicity.
- describe the concept of earthquakes.

Landforms

- These are natural geographic features which determine the shape of the landscape.
- Landforms appear in different sizes and shapes.
- The study of landforms is known as geomorphology.
- Landforms are formed by processes such as:
 - Plate tectonics.
 - Faulting.
 - Folding.
 - Earthquakes.

Benefits of landforms

- Source of building materials, for example, granite rocks, limestone blocks and limestone rocks are used in the manufacturing of concrete and cement respectively.
- Basalt can be used for road foundations.

- Limestone regions are very good for grazing particularly sheep because the surface is dry.
- Landforms are tourist attractions, for example, caves, stalactites, stalagmites, gorges and granitic tors. These attract tourists, hence, generating foreign currency.
- Rocks such as coal is used as fuel for heating, smelting of iron and thermal electricity generation.
- Rocks are very good sources of minerals, for instance, oil and coal are associated with sedimentary rocks.
- Phosphate and nitrate rocks are used to make fertiliser used in agriculture sector. A good example is the Dorowa Mine in Buhera where phosphate is found in abundance and is extracted to make agriculture fertiliser, that is, phosphate fertiliser.
- Rocks weather to form soil which is pivotal in farming.
- Formation of aquifers which store ground water and form rivers and wells that provide water for both domestic and industrial use.
- Pumice is used as a scrubbing stone.

Activity 2.1

- Undertake a visit around your locality and identify landforms that are there.
- Record your findings and classify them.

Intermontane plateaus

- Are formed between mountain ranges.
- Are also wide table lands.

Rolling plains

- Are gentle sloping anticlines demarcated by very wide synclines.
- Rolling plains are formed due to weak compressional force.

Effects of folding

Positive effects of folding

- Relief or orographic rainfall is received on the windward sides of fold mountains.
- Fold mountains are tourist attractions, for example, the Himalayas, Vumba, Nyanga and others.
- Fold mountains are good sources of minerals, for instance, gold, copper, coal and the likes.
- Fold mountains are habitats of fauna.
- They provide forest reserves.
- They are vital in the beautification of the environment.
- Creation of frontiers, for instance, mountains which provide natural frontiers between nations to avert quarrels, for instance, Zimbabwe's Eastern Highlands.
- Provide water sources.
- Produced form of defense during the wars, for example, the freedom fighters hid in caves during the outbreak of the war.

Negative effects of folding

- Loss of land for farming.
- Leads to the rain shadow effect on the leeward side, for instance, some parts of Buhera in Manicaland receive very little rainfall because they are lying on the leeward side of Eastern Highlands.

- Folding triggers earthquakes and vulcanicity.
- Folding causes mass wasting or movement hazards such as mudflow, rock fall and landslides.
- Creates steep slopes which contribute to severe overland flow and soil erosion.
- Creation of rugged and rough terrains make it difficult to construct settlements.

Faulting

- Is the creation of fractures or breaks in the earth's crust due to different forces.
- The fractures are formed due to tectonic movements caused by compressional, tensional and tear or shear forces.
- Compressional force takes place where two plates are moving towards each other.
- Tensional force takes place where two plates are pulling away from each other.
- Tear or shear force comprises two plates sliding past each other.

Types of faults

Normal faults

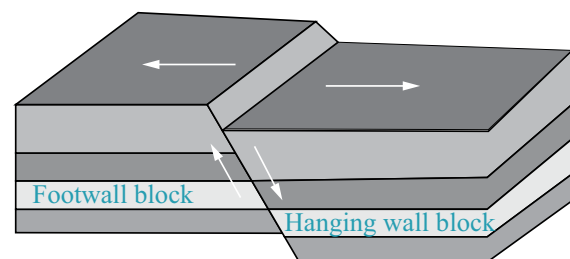


Fig. 2.31 Normal faults

- Blocks of rocks are being pulled apart by tension force.
- The side blocks move away from each other.
- The central block slides downwards along a fault plane and it sinks.

Tear fault

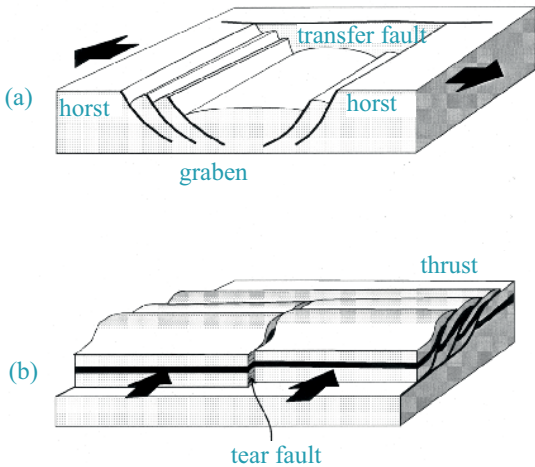


Fig. 2.32 Tear fault

- Is caused by tear/shear forces.
- The blocks are moving past each other.

Reverse fault

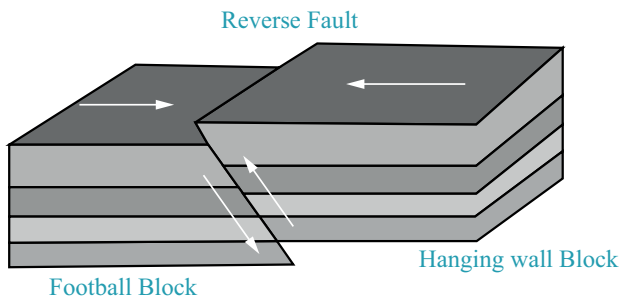


Fig. 2.33 Reverse fault

- Formed due to compressional forces.
- Blocks are pushing towards each other.
- Due to pressure from side blocks, the central block is then pushed upwards.

Thrust fault

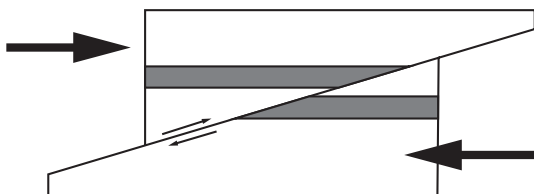


Fig. 2.34 Thrust fault

It is a break or fracture on the earth's crust across which older rocks are pushed above young rocks.

Resultant landforms formed by faulting

- The major landforms formed by faulting include
 - Block mountains.
 - Rift valleys.
 - Titled blocks.
 - Escarpments.

Block mountains

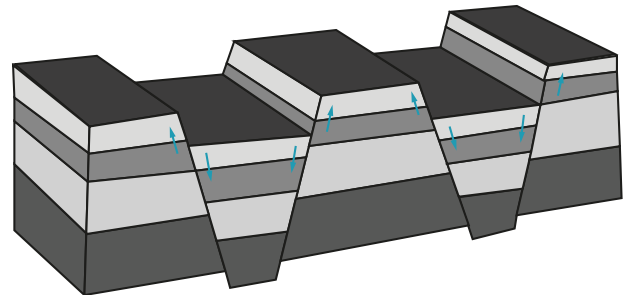


Fig. 2.35 Block mountains

- Are steep sided highlands surrounded by fault lines.
- Faulting leads to the sinking and rising of blocks along fault lines.
- The rising of block form a horst or block mountain.
- Block mountains are highlands surrounded by fault lines.
- Block mountains have steep sides called scarps or fault scarps.

Rift valley

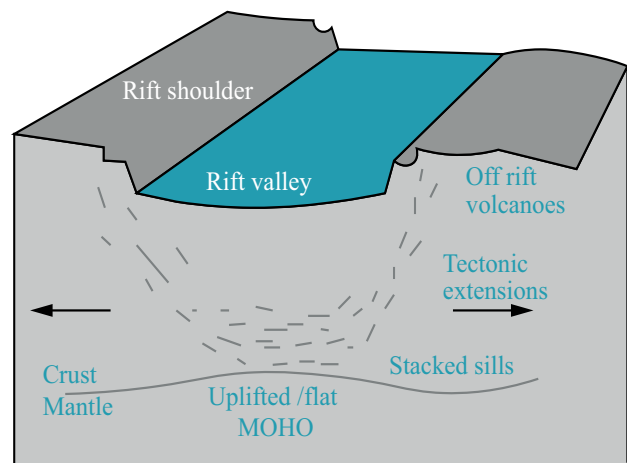


Fig. 2.36 Rift valley

- A rift valley is a low lying area with gentle sloping surface found between highlands such as block mountains.

Theories for the formation of rift valleys

- Tensional force theory
- Compressional force theory

Tensional force theory

- It states that rift valleys are formed by tensional forces.
- Side blocks move away from each other.

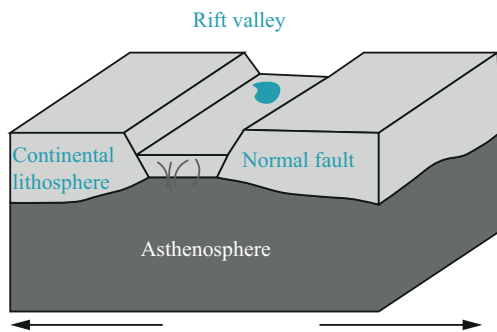


Fig. 2.37 Rift valley due to tensional forces

- Examples are the Great East Africa Rift Valley.

Compressional force theory

- It states that compression forces push the blocks towards each other.
- Fault lines develop.
- The side blocks rise above the central block.
- The side blocks also squeeze upwards due to the compression force.

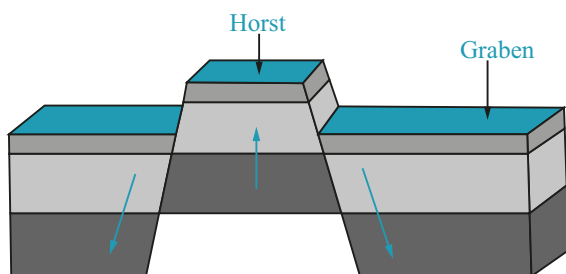


Fig. 2.38 The formation of rift valley due to compression force

Effects of faulting

Positive effects of faulting

- Formation of block mountains which leads to the bringing of orographic rainfall on the windward side.
- It facilitates the generation of hydroelectric power.
- Creation of tourist attractions such as the Victoria Falls (Mosi-oa-Tunya).
- Creation of lakes like Great Lakes of East Africa which are permanent water sources.

Negative effects of faulting

- Horsts or blocks formed lead to the rain shadow effect on the leeward side of the horst.
- Faulting leads to the destruction of settlements.
- Faulting triggers landslides, mudflow and rock fall.
- Destruction of infrastructure such as communication lines, electric power supply lines, sewage pipes, water pipes, railway lines, dams, bridges and roads.
- Faulting leads to the creation of scarps which hinder construction of buildings hence faulting discourages settlement.

Volcanoes and earthquakes



Fig. 2.39 The distribution of volcanoes and earthquakes

- Wind erosion will therefore result in tabular masses of resistant rock on top of less resistant rock.
- Weathering processes weakens the joints and wind action through abrasion continues to weaken the joints and lowering the zeugens and widening the furrows.

Yardangs

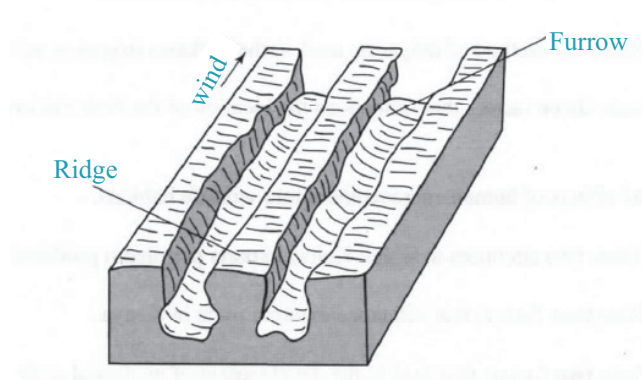


Fig. 2.45 Yardangs

- Yardangs are formed when there are bands of resistant rocks and less resistant rocks which lie horizontally and parallel to the prevailing wind.
- Wind abrasion erode the less resistant rock leading to valley-like features separated by highland areas.

Deflation hollows



Fig. 2.46 Deflation hollows

As wind blows it picks up sand and depressions are created as the removal of sand creates 'holes' which are deepened to form deflation hollows.

Barchan sand dunes



Fig. 2.47 Barchan sand dunes

- Are crescent shaped.
- Are formed when wind transporting sand meets an obstacle such as vegetation or rock outcrops.
- This leads to deposition of sand.
- The movement of sand particles is slower at the centre of an obstacle, but greatest at the sides and contributes to the creation of horns.

Seif dunes



Fig. 2.48 Seif dunes

Seif dunes are elongated mounds of sand which stretch over several hundred of kilometers.

Landforms resulting from water action in arid and semi-arid regions

The sporadic storms lead to the occurrence of the following features: wadis, alluvial fans, plateau, mesas and buttes.

Wadis



Fig. 2.49 Wadis

- Wadis are steep sided valleys.
- Are a result of rare but torrential rain storms which will give rise to rushing torrents on steep slopes and to sheet wash on gentle slopes.
- Overland flow on steep slopes is normal through shallow grooves called riles which connect with galleys.
- The galleys lead into deep, steep-sided valleys whose rocky walls rise from almost flat flows, that is, wadis.

Alluvial fan



Fig.2.50 Alluvial fan

- Alluvial fan are found within wadis.
- Are formed by alluvial deposits.

Plateau, mesas and buttes



Fig. 2.51 Plateau, mesas and buttes

Plateaus, mesas and buttes are outstanding uplands formed due to retreat of wadis sides.

Hazards associated with landform development

- There are hazards that are associated with landform development.
- These hazards can affect humanity in the short run or long run.
- Landform development can result in the formation of orographic rainfall which can develop in regular flooding affecting human beings.
- Volcanoes and earthquakes can also result in the death of people.
- Floods can also result from the raising of the sea floor by structural movements.
- Due to excessive rainfall, mounds of soil can move downslope as landslides which can affect human beings.
- Structural movements can occur in rivers resulting in the development of rapids making rivers not navigable.

Disaster risk management of volcanoes, earthquakes, flooding and mass wasting

Methods for disaster risk management

Some of the methods are:

- Early warning systems.
- Resettlement of people to safer areas.
- Investment in health delivery system.
- Awareness campaigns on disaster management.
- Proper evacuation procedures.
- Teaching local people about first aid.
- Barricading houses with bags of cement in case of floods.
- Diverting flood water to reduce risk.
- People have to move away from areas where mass movements are regular to safer areas.

Exercise 2.5

- (a) Define the following:
 - (i) Folding. [4]
 - (ii) Faulting. [4]
- (b) Draw any two landforms formed as a result of faulting. [8]
- (c) List the landforms formed by wind erosion. [4]
- (d) Draw a diagram to show the structure of an earthquake. [6]
- (e) Give any three measures that can be adopted to reduce the impact of volcanoes. [3]

Objectives

By the end of this topic, you should be able to:

- describe the meaning of systems and ecosystems.
- identify components of the ecosystem.
- explain the components of the ecosystem.
- draw food chains and food webs.
- identify and explain different biomes in Africa.
- explain sustainable use of ecosystems.
- describe biogeochemical cycles.
- explain the restoration of ecosystems.
- describe different soil forming processes.

Introduction

The environment consist of living and non-living things that are dependent on each other. Energy transfers take place as the ecosystem of interdependent components. The basis for any ecosystem is light which makes it possible for green plants to manufacture food which is then consumed by primary consumers. The environment, therefore, needs to be exploited in a sustainable way so that it remains original supporting life.

Ecosystem

- It refers to a community of living and non-living things.
- Biotic are living things which include animals and vegetation.

- It can also be defined as the interrelationship between biotic and abiotic components of the environment.
- Abiotic refers to non-living things that includes the sun, rivers and mountains.

Components of a micro ecosystem

- A micro ecosystem is a local ecosystem.
- It is also known as a small ecosystem.
- A micro ecosystem can be a garden, a small pond, or a small bush.
- In a small ecosystem, organisms also interact.
- Some of the components of a micro ecosystems for example a garden can be:
 - Vegetables
 - Birds
 - Insects
 - Locusts
 - Caterpillars
 - Frogs
 - Soil
 - Mice
 - Sun
 - Snakes
 - Bacteria
 - Fungi.

Linkages in a micro ecosystem

- There is a very close link amongst organisms in an ecosystem.

Objectives

By the end of this topic, you should be able to:

- *explain what is meant by environmental management.*
- *assess the effect of environmental legislation on environmental management.*
- *identify international treaties on environmental protection.*
- *define climate change.*
- *describe land use planning.*
- *explain land use as a strategy for sustainable environmental management.*
- *identify challenges in land use planning*
- *suggest mitigation measures to challenges in land use planning.*

Introduction

Environment refers to the ecosystem, habitats, spatial surroundings or other constituent parts whether natural or man made. It can also be defined as man made and natural phenomena that coexists in the troposphere. It also refers to the economic, social, cultural or aesthetic conditions and qualities that contribute to life. The environment consist of flora, fauna and non-living things. The environment can deplete due to human actions and natural causes. Depletion of the environment can result in it becoming obsolete and fail to support life.

Forms of environmental degradation

Soil erosion

This is the washing and wearing away of top soil by water, ice and wind. The soil is an important component of the environment supporting plant life as well as forming habitats of animals that barrow underground.

Eroded landscape



Fig. 8.1 Eroded landscape

Human causes

- **Overgrazing** – The rearing of livestock in large numbers which does not commensurate with the carrying capacity of the pastures creates a platform for overgrazing leaving the soil susceptible to erosion.
- **Monoculture** – The growing of the same crop on the same land every year or season. This affects the structure of the soil rendering it vulnerable to erosion. This is popular in communal areas.

- Construction of dams for hydroelectric generation leading to massive deforestation.
- In most African countries, the major source of power is wood which results in massive deforestation.
- Most small scale tobacco farmers use wood for curing tobacco which destroys the forest.

Mitigation

- Reforestation and afforestation.
- Use of alternative fuels.
- Rural electrification.
- Use of legislation.

Environmental legislation in Zimbabwe

The government of Zimbabwe values the environment very much. The government of Zimbabwe enacted laws that are meant to protect the environment which culminates into preserving the ecosystem for future generations. Zimbabwe is also a signatory to international treaties for the protection of the environment. Some of the local acts that were enacted include:

- The Water Act.
- The Mines and Minerals Act.
- Environmental Management Act.
- The Parks and Wildlife Act.
- The Forest Act.

The Water Act

- The Water Act was enacted for the purpose of utilising water resources effectively.
- The Act ensures that water pollution is prevented. It sets the levels of pollution accepted at a global level.
- The Act is the police for protection of water sources in the country. It ensures that all the people who pollute local water resources are prosecuted and fined.

- Pollution of water resources is mainly done by the industry during the manufacturing process.

Mines and Minerals Act

- The Act was enacted to control the exploitation of minerals in Zimbabwe. It is the Act that regulates the mining industry in terms of exploration, prospecting and mining rights.
- It tries to be compatible with the negative impact of mineral exploitation. Some of its provisions try to control poaching, deforestation and pollution.
- Miners who are already in the industry have to observe all protocols regarding environmental protection for the purposes of maintaining the environment in its originality.

Parks and Wildlife Management Act

- This Act ensures the protection of all wildlife resources in the country. This is done through national parks, sanctuaries, botanical gardens and recreational parks.
- The Act makes sure that wildlife is exploited in a sustainable manner. Wildlife management programmes are controlled by this Act in Zimbabwe.

Environmental Management Act

- This is an Act of 2002 that seeks to protect the environment by making it a point that all environmental laws are followed.
- All other environmental laws fall under this Act.
- The Act makes it compulsory for organisations and companies to carry out an environmental impact assessment.

Objectives

By the end of this topic, you should be able to:

- identify types of industry.
- explain the importance of industry.
- explain the factors influencing industry.
- describe transnational corporations.
- describe the causes, characteristics and importance of small to medium enterprises.
- describe the role of informal industries.
- discuss measures adopted in the industry occupational safety and health.
- describe service industry.
- define tourism, its problems and solutions.
- describe quaternary industries in Zimbabwe.

Introduction

Industry is any form of economic activity in which people produce goods and services. Industry is the lifeline of all the countries though they might be at different stages. Industrial growth refers to the expansion of industrial activity which translate to economic growth. Industrial growth is mainly experienced in LEDCs mostly in Africa where resources are still in abundance. Western countries are in the secondary, tertiary and quaternary industry while LEDCs are in the primary industry. Zimbabwe is in the primary industry mainly in agriculture and mining.



Fig. 10.1 An opencast mine

Types of industry

Primary industry

- This industry involves exploitation of raw materials that are provided by nature. Occupations includes mining, forestry and agriculture.
- Most LEDCs are at this industrial stage.
- This is the stage which retards development if a country does not practice value addition.
- Examples of nations at this stage include Zimbabwe, Malawi, Mauritania, Peru and Bangladesh.

Secondary industry

- This is the stage involving the conversion of raw materials into semi-finished goods and finished goods.
- This is done in the manufacturing sector.

Objectives

By the end of this topic, you should be able to:

- identify and explain factors that influence location of settlements.
- distinguish between site and situation of settlements.
- distinguish between rural and urban settlements.
- define and explain urbanisation.
- explain the process of urbanisation.
- draw and explain the urban land use models.
- describe the structure of unplanned settlements.
- suggest solutions to problems faced by unplanned settlements.
- identify various population terms.
- define migration and its patterns.
- identify population related diseases.
- draw the demographic transition mode and explain it.

Introduction

Settlement can be described as a collection of dwellings where people live. It can also be defined as habitat for people. Settlements are evolving due to globalisation and an increase in population. Population increase is taking place at a faster rate in the LEDCs than in MEDCs which translates into changes in human settlements as they expand. In Africa, there are megacities such as Lagos, Cairo, Riyadh, Johannesburg, Addis Ababa, Port Harcourt, Cape Town and Tunis that are continuously growing due to population increase.

In the world, multimillion cities such as Tokyo, New York, Mumbai, Beijing, Brasilia, Guangzhou, London, Paris, Munich and Adelaide have continued to expand due to immigration and other factors.

Harare is the biggest settlement in Zimbabwe with a population of over two million inhabitants.

Types of settlements

Rural settlements



Fig. 11. 1 Rural settlement

- These are settlements that are located in the country side. The people who live in the rural areas are engaged in primary activities mainly agriculture.
- Rural settlements are not planned and they are made of low quality housing.
- Rural settlements do not have land values hence all areas carry the same economic value.
- There are low traffic volumes in the rural areas as well as pedestrian traffic.
- Social amenities are free in the rural areas. Rural settlements are made up of homestead consisting of a collection of rural huts.

Importance of situation in the development of settlements

The situation of a settlement help in their development resulting in a settlement that started as a hamlet growing into a conurbation. The situation determines rate of growth. A situation with a lot of resources speeds up development as compared to a situation where resources are scarce. Situation is important because:

- It determines rate of growth of a settlement.
- It also determines the activities that would dominate. For example, a settlement that develops near the sea would be dominated by the fishing industry like Maputo in Mozambique.
- Land for expansion will be governed by situation.
- It determines the level of accessibility.
- Situation determines a settlement's ability to attract investors.

Rural settlement patterns

- A settlement pattern is an arrangement of dwellings at a given area.
- There are a number of rural settlement patterns that are visible in Zimbabwe.
- The most popular settlement patterns are nucleated, dispersed, radial and linear.

Nucleated settlements

- These are settlements in which the dwellings are closely packed.
- The settlements may be influenced by a nearby water source.
- People in the rural areas are closely attached which make them live near each other.
- The concept of extended families can also lead to people constructing houses close to one another.

- Rural settlements are not planned and this can lead to nucleation.

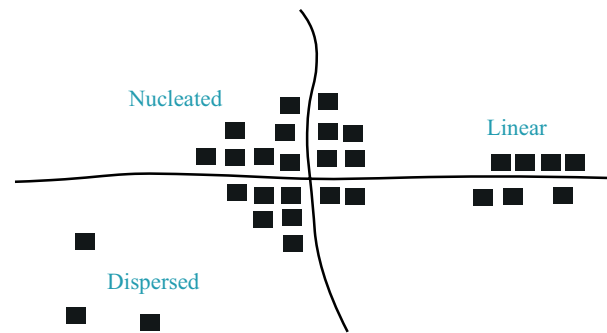


Fig. 11.3 Nucleated, dispersed and linear settlement patterns

Dispersed settlement

- This is a settlement mainly influenced by the availability of large tracts of land.
- This is popular in areas where A1 farms are located which are small holder plots.
- Shortage of resources can also lead to dispersion.
- Where water is in short supply people may be spaced.
- Dispersed settlements are also influenced by existence of barriers which may cause people to avoid those barriers.

Radial settlement

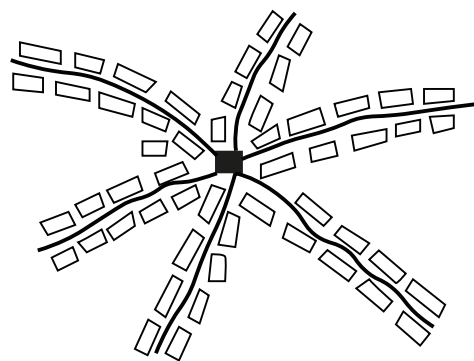


Fig. 11.4 Radial settlement pattern

- This is a rural settlement pattern found where there is a central point such as a road junction.

- The model assumes that the growth of the circle takes places in all sides. The model shows that the centre has the CBD followed by the transitional zone, low class housing, medium class housing, high class housing and the commuting zone.
- Burgess managed to discover that every city has an expansion phase outwards. The concentric model was more Eurocentric.

The Sector model

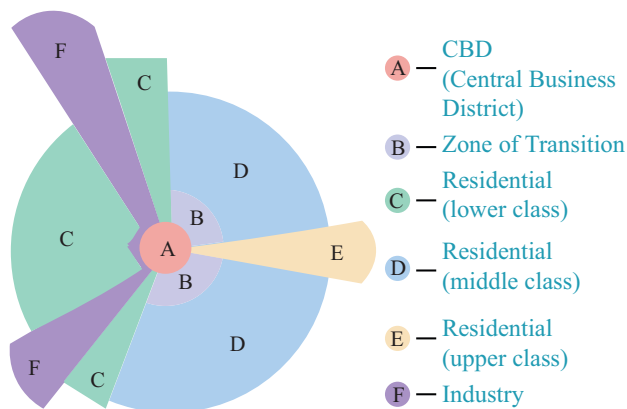


Fig. 11.10 Sector Model

- The sector model was developed by Hoyt in 1939. The model was controlled by wind movements and direction.
- The sector model also agree that the city grows from the CBD with an outward expansion.
- The city will have a wedge like appearance. The upper and middle class will be located on the Eastern side of the city where there is no pollution.
- Hoyt also identified different residential zones in relation to income, opportunity and class. The low class residential will be located near the industry and the CBD to cut transport costs.
- Land use follows transport routes from town.

The Multiple Nuclei Model

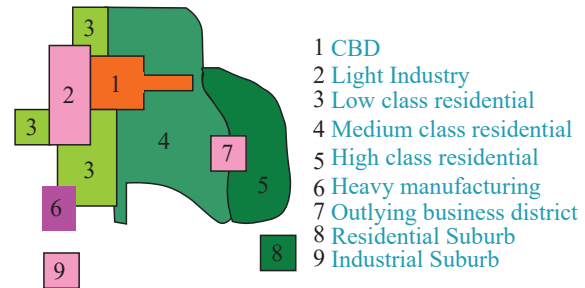


Fig. 11.11 The Multiple Nuclei Model

- The model was developed by Ullman and Harris in 1945. It assumed again that the city grows from the CBD expanding outwards.
- However, it also assumed that there will be outlying business districts that provides the same functions as the major CBD.
- Outlying business district can also expand giving customers a lot of choices in terms of shopping.
- The model is most applicable in the United Kingdom, for example, Newcastle upon Tyne.
- The model reduces congestion in the major CBD.
- The multiple nuclei model is most applicable in developed countries though other developing countries such as South Africa now have similar establishments.

Unplanned settlements

- These are settlements that develop without the approval of the local authorities or the government.
- Unplanned settlements develop in areas that would not have been designated for housing developments.
- They are mainly driven by an influx of people from the rural areas which makes it difficult for the municipalities to cope with housing demand.

EXAMINATION PRACTICE 1

PAPER 1

Time: 1 hour 15 minutes

Answer **all** questions

Mapwork

For questions **1 to 12**, refer to the 1:50 000 map extract of Mbalabala, Zimbabwe.

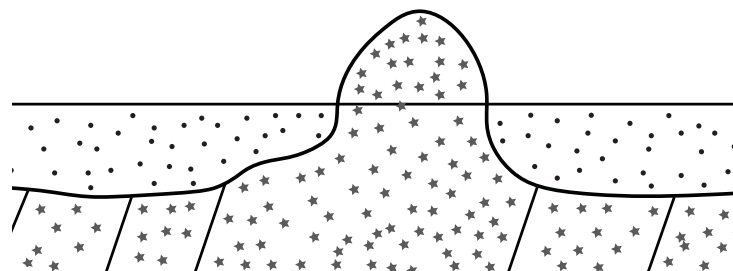
1. What is the altitude of the bridge in grid square 717300 7737900?
A. 1 300 metres. B. 1 220 metres. C. 1 000 metres. D. 1 320 metres.
2. The confluence of Umzingwani and Inyankuni is in grid square
A. 721000 7742200 B. 721400 7742300
C. 722300 7737300 D. 722400 7737300
3. The major landform along Umzingwane River is
A. meanders. B. waterfalls. C. braids. D. rapids.
4. The length of the road from the junction in grid square 713100 7737800 to where it crosses the third bridge in the eastern direction is
A. 3.2km. B. 3.3km. C. 4.2km. D. 5.2km.
5. What is the man made feature found in grid square 721400 7744600?
A. Prospecting trench. B. Cultivation. C. Quarry. D. Irrigation.
6. What is the bearing of the spot height in grid square 711300 7736300 from WABA hill in grid square 709500 7741500?
A. 080 degrees. B. 170 degrees. C. 150 degrees. D. 120 degrees.
7. What is the direction of Inyankuni river?
A. South East. B. South. C. South West. D. North.
8. The settlement pattern in grid square 710000 7746000 is
A. circular. B. clustered. C. linear. D. radial.
9. Considering population, which site will be **most** suitable to locate a school?
A. 720000 7737000. B. 718000 7744000.
C. 711000 7742000. D. 710000 7735000.
10. The main reason why Umzingwane River is unnavigable between Easting 718000 and 723000 is
A. presence of rapids.
B. presence of cataracts.
C. presence of waterfalls.
D. existence of oxbow lakes.

11. Tourism at Mbalabala is shown by the presence of a
 A. police station. B. hotel. C. barracks. D. college.
12. The area North of Northing 7743000 is dominated by
 A. mining. B. estate farming.
 C. communal farming. D. recreation.

Physical Environment

13. How many roofs does a Stevenson screen have?
 A. 4 B. 3 C. 1 D. 2
14. What is the best measure to take to assist flood victims?
 A. Awareness campaigns. B. Early warning systems.
 C. Giving them food. D. Evacuation.
15. What does it mean when the wet and dry bulbs on the hygrometer show same readings?
 A. Air is dry. B. Air is saturated.
 C. Air is moist. D. air is enough.
16. Which is the correct definition of an air mass?
 A. The weight of the volume of air.
 B. The moisture that a mass of air can hold.
 C. The amount of water in a volume of air.
 D. A large volume of air with the same characteristics covering large areas.
17. What weather hazard mainly affects farmers in winter in the Savanah climate?
 A. Drought. B. Cyclone. C. Frost. D. Hurricane.
18. Which of the following is not a plate?
 A. Nazca. B. Indo-Australian.
 C. Gondwanaland. D. South American.
19. A plate boundary responsible for the formation of oceanic ridges is
 A. constructive. B. destructive. C. transverse. D. subduction.

The photograph below shows an inselberg.



20. The landform shown below was formed as a result of

- A. wind action and deposition. B. removal of top soil and weathering.
 C. water action and decomposition. D. volcanicity and earthquake.

33. Which type of agriculture is practised in dry areas?
A. Horticulture B. Aquaculture C. Cattle ranching D. Cereal production.

Population, Settlement, Transport and Trade

34. Which one is not a rural settlement pattern?
A. Linear B. Dendritic C. Clustered D. Haphazard
35. A squatter settlement is characterised by
A. houses of the same design. B. big yards.
C. make shift houses. D. houses with different designs.
36. Which country has been affected by most deaths due to Covid 19?
A. South Africa
B. India
C. China
D. United States of America
37. Which hygiene related disease affects African cities?
A. HIV
B. Covid-19
C. Typhoid
D. Pellagra
38. What is the name given to a transport map drawn with straight lines replacing the winding routes of a transport network?
A. Topological map.
B. Topographical map.
C. Economic map.
D. Choropleth map.
39. The introduction of ZUPCO by the government is meant to
A. reduce traffic congestion.
B. bring order and protect the commuting public.
C. create employment.
D. increase accidents.
40. ZINARA stands for
A. Zimbabwe National Railways Association.
B. Zimbabwe National Roads Association.
C. Zimbabwe National Roads Authority.
D. Zimbabwe National Railways Authority.

EXAMINATION PRACTICE 1

PAPER 2

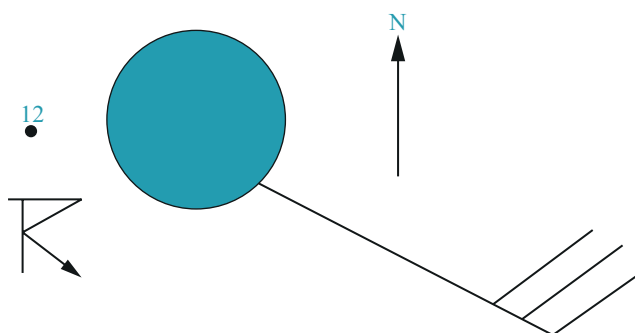
Time: 2 hours 30 minutes

Answer **one** question from each of Sections A, B and C and **one** other question from any section.

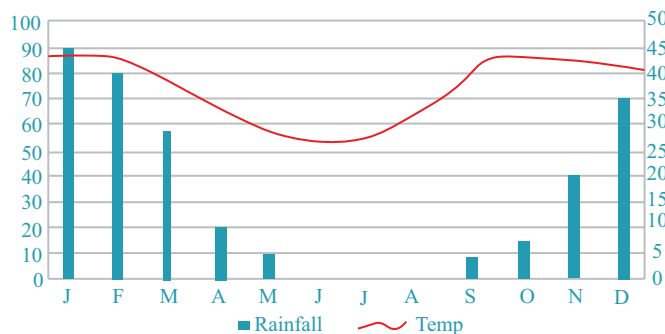
Section A (Physical Geography)

Answer at least **one** question from this section.

1. (a) (i) Draw a labelled diagram to show the instrument used to measure relative humidity. [5]
 (ii) Briefly describe how the instrument you have drawn above works. [5]
 (b) Diagram below shows a weather station's records. [5]



- (i) Describe the weather conditions shown by these symbols. [3]
 (ii) Outline the differences between cold and warm front weather. [7]
 (c) As a commercial farmer, what advice would you give to newly resettled farmers on the importance of use of weather forecast? [5]
2. (a) The diagram below shows a climatic graph for station X in Africa. [5]



- (i) What type of climate is represented by the graph? [1]
 (ii) State the month with the highest amount of rainfall. [1]
 (iii) Calculate the annual range of temperature for the station. [2]
 (iv) In which hemisphere is station X located? [1]
 (v) Using the above diagram, describe the climatic characteristics of station X. [6]

- (b) Describe the differences in the climatic characteristics of the tropical continental (Savannah) and the hot desert areas of Africa. [7]
- (c) Outline the challenges experienced by the people who live in the equatorial areas and suggest solutions to the challenges. [7]
3. (a) (i) Define the term logic. [2]
 (ii) Which instruments uses programs to perform logical functions? [2]
 (iii) Identify the segments that are used in GPS. [3]
- (b) (i) Outline uses of GPS. [5]
 (ii) Give the differences between active sensors and passive sensors. [4]
 (iii) List in terms of energy the wave bands of the electromagnetic spectrum. [7]
 (iv) Give any two reasons why the use of GPS is not popular in Africa. [2]
4. (a) (i) How do humans destroy the ecosystem? [5]
 (ii) What solutions can be proposed to protect the ecosystem? [5]
- (b) (i) Define the term wetland. [2]
 (ii) What are benefits and challenges of having wetlands in a society? [5]
- (c) (i) List the factors that affect soil formation. [3]
 (ii) Draw pie chart indicating composition of a soil. [5]

Section B (Economic Geography)

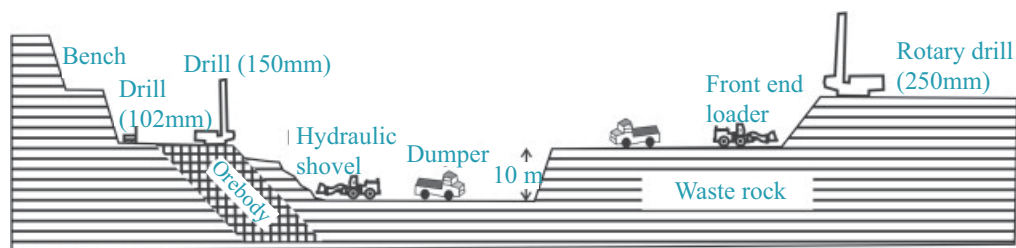
Answer at least **one** question from this section.

5. (a) Describe how you can generate solar power at your home (Indicate the stages taken in its production). [5]
 (b) Outline the risks associated with mining. [6]
 (c) Study the photograph below and answer the questions that follow.



- (i) Identify the type of energy produced from coal. [1]
 (ii) What are the negative impacts of using the source of energy shown above? [7]
 (iii) What can be done to reduce impacts caused by such use of energy noted above? [6]
6. (a) (i) What are the characteristics of a small scale mining operation? [4]
 (ii) Suggest what can be done by the government to improve small-scale mining operations. [6]

(b) Study the diagram below and answer the questions that follow.



- (i) Identify the physical features in the photograph. [3]
 - (ii) State and explain the mining method shown. [4]
 - (iii) What are environmental impacts of the mining method stated above? [3]
 - (c) Suggest the benefits of indigenisation of the mining sector in Zimbabwe. [5]
7. (a) (i) What is urban agriculture? [2]
- (ii) What are factors promoting urban agriculture in any urban area you know? [4]
 - (iii) Outline benefits and challenges of urban agriculture. [7]
- (b) (i) Outline some negative and positive impacts of climate change. [5]
- (ii) How can farmers solve the challenges of frost and drought in their areas? [7]
8. (a) (i) Distinguish primary from secondary industry. [4]
- (ii) List types of quaternary industries you know. [5]
 - (iii) Identify the challenges faced by quaternary industries in Zimbabwe. [5]
- (b) Study the photograph below and answer the questions that follow.

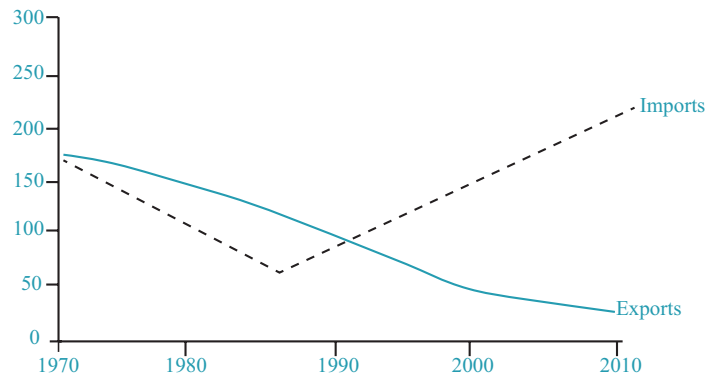


- (i) Name the type of industry represented by the livestock shown. [1]
- (ii) State the inputs of the industry. [6]
- (iii) Outline raw materials obtained from it. [4]

Section C (Population, Settlement, Transport and Trade)

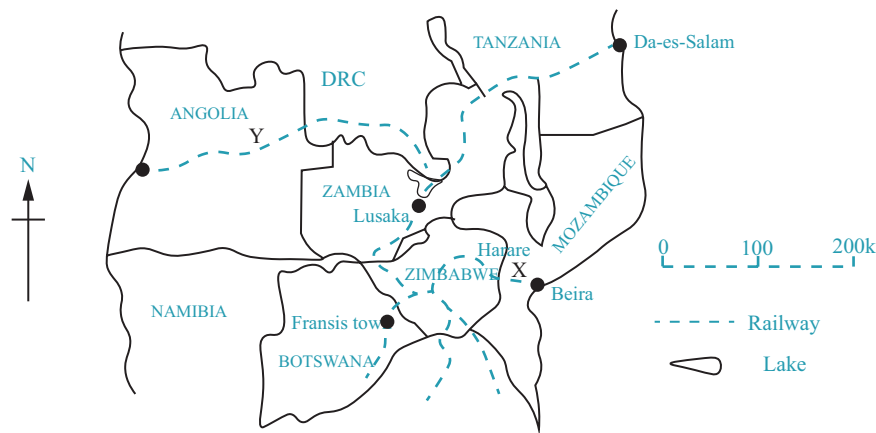
Answer at least one question from this section.

9. (a) (i) Define the term transport. [1]
 (ii) What are the advantages and disadvantages of using air transport? [6]
 (iii) What measures should be taken to solve the transport problems faced by commuters? [3]
- (b) Figure below shows the imports and exports of a country over a period of time.



- (i) Explain the trends shown. [5]
 (ii) Using a bar graph, show the exports and the imports for 1980 and 2000. [4]
 (iii) What are the problems likely to be created by the trade pattern in the year 2000? [4]
 (iv) How can these problems be solved? [2]
10. (a) (i) State population and housing questions that can be interviewed when conducting a census. [5]
 (ii) What are the importance of undertaking a census to the government? [5]
 (iii) What are the challenges one can face when undertaking a census? [3]
- (b) (i) Draw and label any three rural settlement patterns of your choice. [6]
 (ii) Explain the factors behind the formation of any three rural settlements noted above. [6]
11. (a) (i) What are the causes of veld fires in Zimbabwe? [7]
 (ii) Indicate when and where fireguards are normally constructed. [3]
 (iii) Demonstrate how you would educate the community on construction of standard fireguard. [5]
- (b) (i) What do you understand by the term wildlife management? [2]
 (ii) Identify five types of wildlife management in Zimbabwe. [5]
 (iii) State some economic benefits of wildlife management. [3]
12. (a) (i) State the difference between internal and international trade. [4]
 (ii) Outline causes of regional disparities in Zimbabwe. [4]
 (iii) What can be done by the government to solve regional disparity in Zimbabwe? [4]

(b) Figure below shows railway networks for some SADC countries.



- (i) Describe the railway network shown. [5]
- (ii) Give the reasons for the development of the routes marked X and Y. [4]
- (c) Suggest measures that should be taken to reduce road accidents in Zimbabwe. [4]

EXAMINATION PRACTICE 9

PAPER 1

Time: 1 hour 15 minutes

Answer **all** questions

Mapwork

For questions 1 to 12 refer to the map extract of Makwarimba 1:50 000, Zimbabwe

- What is the altitude of the dip tank in 3772 00 7933600?

A. 1200m B. 1160m C. 1140m D. 1300m
- Where is the confluence for Ruzawi and Chikunzwi Rivers?

A. 375900 7932200 B. 375800 7932700
C. 375200 7932100 D. 376400 7932400
- What is the length for Ruzawi river from Easting 369000 to where there is a rapid on 370500 7938400?

A. 2.5km B. 3.0km C. 4.2km D. 3.2km
- The north east part of the map shows

A. a gentle terrain. B. a rugged terrain.
C. a plateau. D. a lowland.
- What is the direction of St Annes Mission from a dip tank in 385600 7930300?

A. South West. B. North East.
C. West. D. North West.
- What is the grid bearing of Morris Bridge school in grid 376900 79278 from the rapid in 374300 7933300?

A. 160° B. 154° C. 157° D. 153°
- Which fluvial landform is the most popular along Ruzawi river?

A. Meanders B. Oxbow lakes C. Braids D. Waterfalls
- The main activity in Makwarimba area is

A. mining. B. fishing. C. agriculture. D. wildlife management.
- The main drainage pattern along Ngowe river is

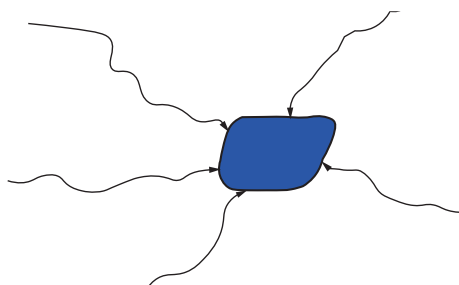
A. dendritic. B. trellis. C. inland. D. radial.
- The patterns of rural settlements in Makwarimba area are influenced by

A. transport and communications. B. agriculture activities.
C. wildlife management. D. urbanisation.

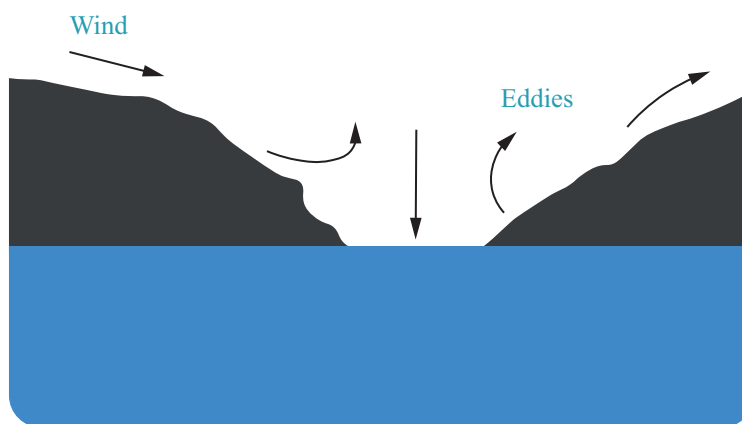
11. Which feature is found in grid point 375500 7926800?
 A. A hill. B. A mountain. C. A spot height. D. A plateau.
12. What type of roads are found in Makwarimba area?
 A. Ring roads. B. Secondary roads.
 C. Primary roads. D. Dual carriage ways.

Physical Environment

13. Which landform is located at the foot of the waterfall?
 A. U-shaped channel. B. Plunge pool
 C. Interlocking spurs. D. Braids.
14. What is this drainage pattern known as?



- A. Trellis B. Sub-parallel
 C. Inland D. Dendritic
15. The landform below is found in arid areas. Identify the resultant feature.



- A. Zuegen. B. Rock pedestal.
 C. Oasis. D. Deflation hollow.
16. Which one is a feature found in the lower course of a river?
 A. Waterfall B. Rapid C. Gorge D. Delta
17. At which of the areas A, B, C or D, is a river cliff formed?
 A. Outside part of a meander. B. In the upper course of a river long profile.
 C. Near the mouth of a river. D. Near a braid.

11. (a) (i) State the factors which influence change in a country's total population. [3]
 (ii) Outline the causes of rapid population growth in Zimbabwe. [4]
 (b) Study photograph below and answer questions that follow.



- (i) Name the type of settlement shown. [1]
 (ii) Describe the characteristics of the settlements shown. [6]
 (iii) Outline the environmental problems associated with the type of settlement shown. [4]
 (c) Suggest the social and economic effects of HIV/AIDS in Zimbabwe. [7]
12. (a) State the advantages and disadvantages of air transport. [7]
 (b) Study the table below which shows Zimbabwe's trade partners and answer questions that follow.

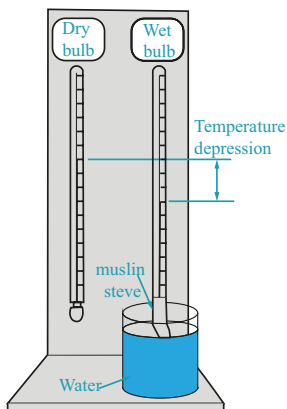
Country	Exports (\$ Million)	Imports (\$ Million)
South Africa	184,0	217,4
Italy	79,7	65,1
Canada	175,7	127,5
Germany	101,6	109,5

- (i) Explain the pattern of trade shown. [6]
 (ii) Draw a bar graph to show Zimbabwe exports. [5]
 (c) Suggest measures that would be taken to reduce traffic congestion. [7]

POSSIBLE ANSWERS FOR EXAM 1 PAPER 2

Section A (Physical environment)

1. (a) (i)



- (ii) When temperature increases and the air is dry, water evaporates from the water container to cool the bulb. This means that when it is hot the wet bulb thermometer gives a low reading than the dry bulb thermometer which is not cooled. When it is cold, less evaporation takes place as a result there is a small difference between the two thermometers. When it is raining, no evaporation takes place on the wet bulb thermometer hence there will be no difference between the two thermometers. After taking readings on the wet bulb thermometer and the dry bulb thermometer, readings are then interpreted as:

Differences on the thermometers	Humidity
Large difference.	Low.
No difference.	Very humid.
Small difference.	High.

- (b) (i) Sky overcast, wind speed 30 knots, wind direction South Easterly, thunderstorm.

(ii)

Warm front	Cold front
Low pressure.	Associated with storms in summer as well as high pressure.
Moderate rainfall.	Showers sometimes heavy.
High temperatures.	Temperatures will be low.
Associated with stratus and nimbostratus cloud formations.	Approach is associated with cirrus clouds.
Calm winds.	Gusty winds.

- (c) - They get to know which type of crop to grow.
 - Farmers will know when to plant their crops.
 - Weather forecast helps farmers to decide on issues to do with whether to irrigate or not.
 - Weather forecasting helps farmers to decide on the type of agriculture whether intensive or extensive.

2. (a) (i) Savannah climate.
 (ii) January.
 (iii) Temperature range $28^{\circ} - 16^{\circ} = 12^{\circ}$.
 (iv) Southern Hemisphere.
 (v) The station is characterised by hot summers and cold winters. The summers are characterised by rainfall and the winters are dry. June, July and August have no rainfall. At the station it shows that

humidity will be high in summer while in winter it will be at its lowest due to lack of precipitation. The station also shows that wind speeds will be high in winter and low in summer. Pressure will also be low in summer while in winter it will be high.

(b)

Tropical Savannah	Hot desert
Seasonal changes.	The climate is hot annually.
Temperatures will be low in winter and high in summer.	The temperatures are always the same throughout the year though there may be fluctuations during the night.
Humidity is high in summer and low in winter.	Humidity is low throughout the year.
Has two peak rainfall periods.	There is no peak period unless flash floods have occurred.
Pressure is high in winter and low in summer.	Pressure will be low annually.
Rainfall is usually convectional.	Rainfall is incessant and in form of flash floods.

(c) **Challenges**

- Water borne diseases.
- Wildlife in the forest that may attack people.
- A lot of leaching resulting in low agriculture output.
- Wildlife especially baboons invade agricultural fields.

Solutions

- Increase in the number of clinics that provide health services to ordinary people.
- Creation of game parks.
- People have to fence their fields for protection from wildlife.

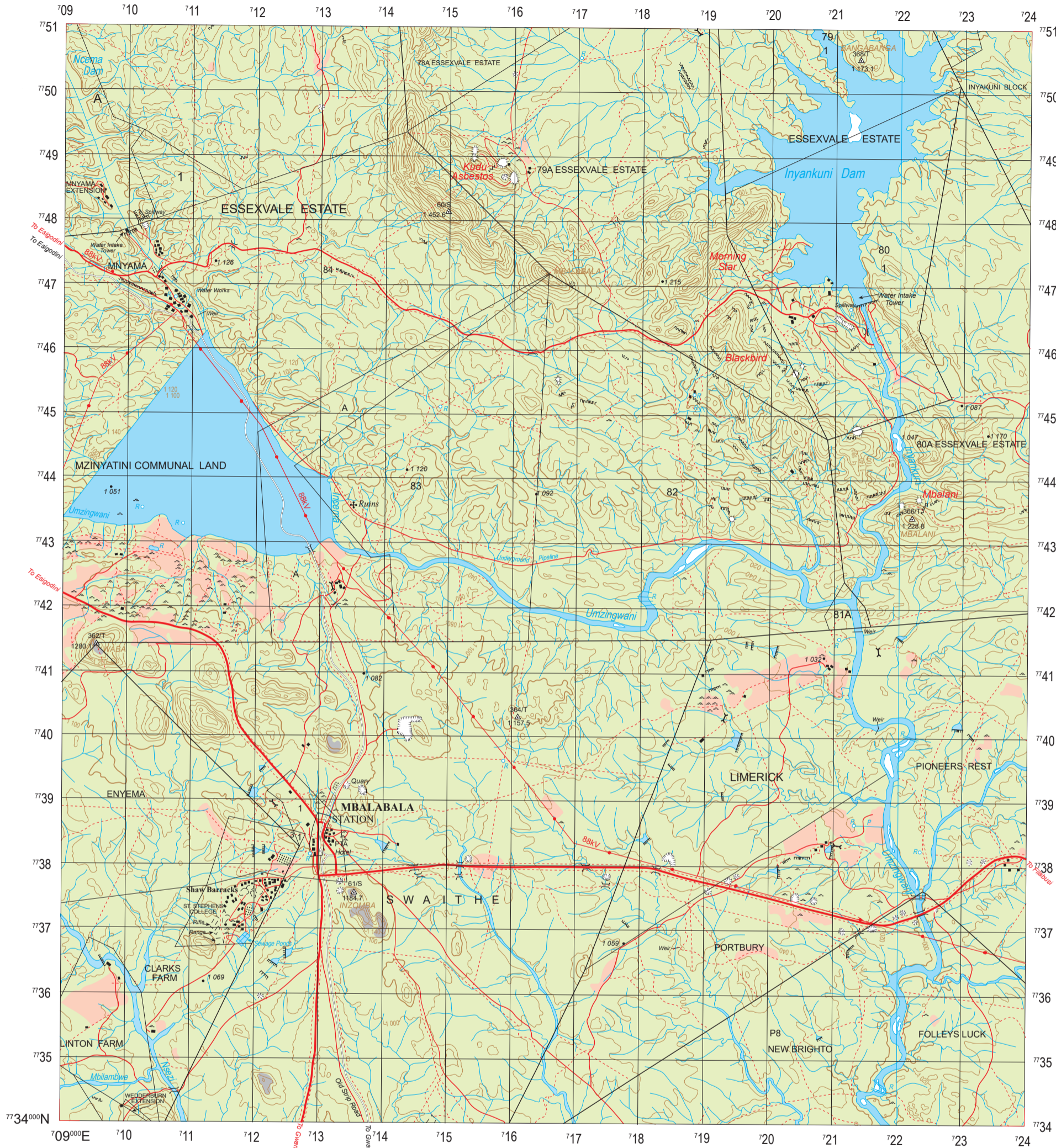
3. (a) (i) Logic refers to reasoning according to set principles.

- (ii) - Computers.
- Cell phones.
- (iii) - Space segment.
- User segment.
- Control segment.

- (b) (i) - Vehicle tracking.
- Surveys and researches.
- Ocean navigation.
- Emergency tectonic activity.
- Disaster response during natural disasters.
- (ii) - Active sensors emit radiation while passive sensors do not emit.
- Active sensors depend on their own radiation while passive sensors depend on objects they detect.

- (iii) - Radiowaves.
- Microwaves.
- Infrared.
- Visible light.
- Ultra violet.
- X-rays and gamma rays.
- (iv) - Lack of foreign currency.
- Lack of expertise.
- Brain drain.

4. (a) (i) - Veld fires during land preparation.
- Poaching.
- Stream bank cultivation.
- Deforestation.
- Monoculture.



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 Revised from Air Photography dated 1977
 Published by the Surveyor-General, Zimbabwe, 2018

NUMBERED LINES INDICATE THE 1 000 METRE UNIVERSAL
 TRANSVERSE MERCATOR GRID, ZONE36K MODIFIED
 CLARKE 1880 (S.A.) SPHEROID

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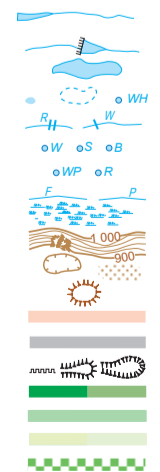
Scale 1 : 50 000 or 2 cm represents 1 km

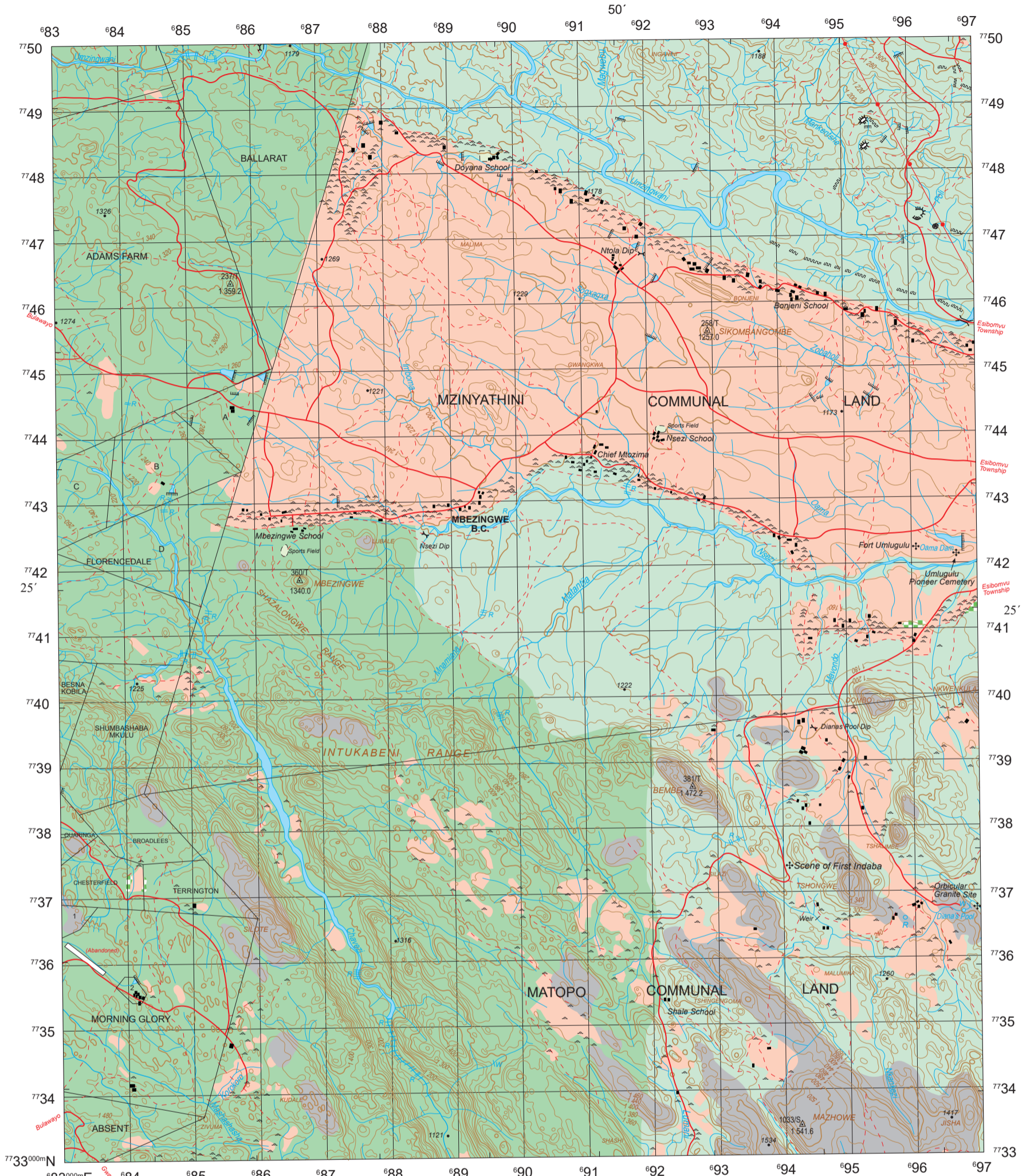


City, Town.....	BULAWAYO, GWANDA
Village, Business Centre.....	MZINYATINI, FILABUSI B.C.
Boundary: International.....	.....
" Cadastral, Original Grants, Subdivision.....	.....
Road: Wide Tarred, Narrow Tarred.....	.....
" Gravel or Earth with Bridge, Other.....	.....
Track, Outline, or Game Trail.....	.....
Aerodrome: Registered, Unregistered.....	.....
Railway with Embankment, Cutting, Tunnel.....	.....
Trigonometrical Station and Height to top of Pillar, Bench Mark.....	158P Δ 1 190.6 1 074.32
International Boundary Beacon, Mast, Magnetic Station.....	▲ 50A □
Unmarked Spot Heights: Ground Survey, Photogrammetric.....	• 1 272 • 1 179
Powerline (33kv and above) approximate alignment.....	— 33KV —
Huts, Staff Quarters.....	.....
Built-up Area, Buildings.....	.....
Church, Dip Tank, National Monument or Place of Historical Interest.....	.....
Hill Name.....	RUTSENZA
Mine Name.....	Odzi
Homestead Identification Number.....	AC94
Police Station, Post Office, Post and Telegraph Agency, District Administration Office.....	P.S. PO. P.T.A. D.A.O.



River.....	.....
Dam.....	.....
Lake.....	.....
Pan: Small, Large, Waterhole.....	.....
Rapid, Waterfall.....	.....
Well, Spring, Borehole.....	.....
Windpump, Reservoir.....	.....
Furrow, Pipeline.....	.....
Marsh.....	.....
Contours at 20 metre Vertical Interval, with cliff feature.....	.....
Depression, Sand.....	.....
Isolated Hill Feature that does not take a contour.....	.....
Cultivation.....	.....
Smooth Rock.....	.....
Mining or Prospecting Trench, Mine Dump, Quarry or Excavation.....	.....
Bush: Very Dense, Dense.....
" Medium.....
" Sparse, Open Grassland.....
Orchard or Plantation.....





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Republished with minor amendments 2014

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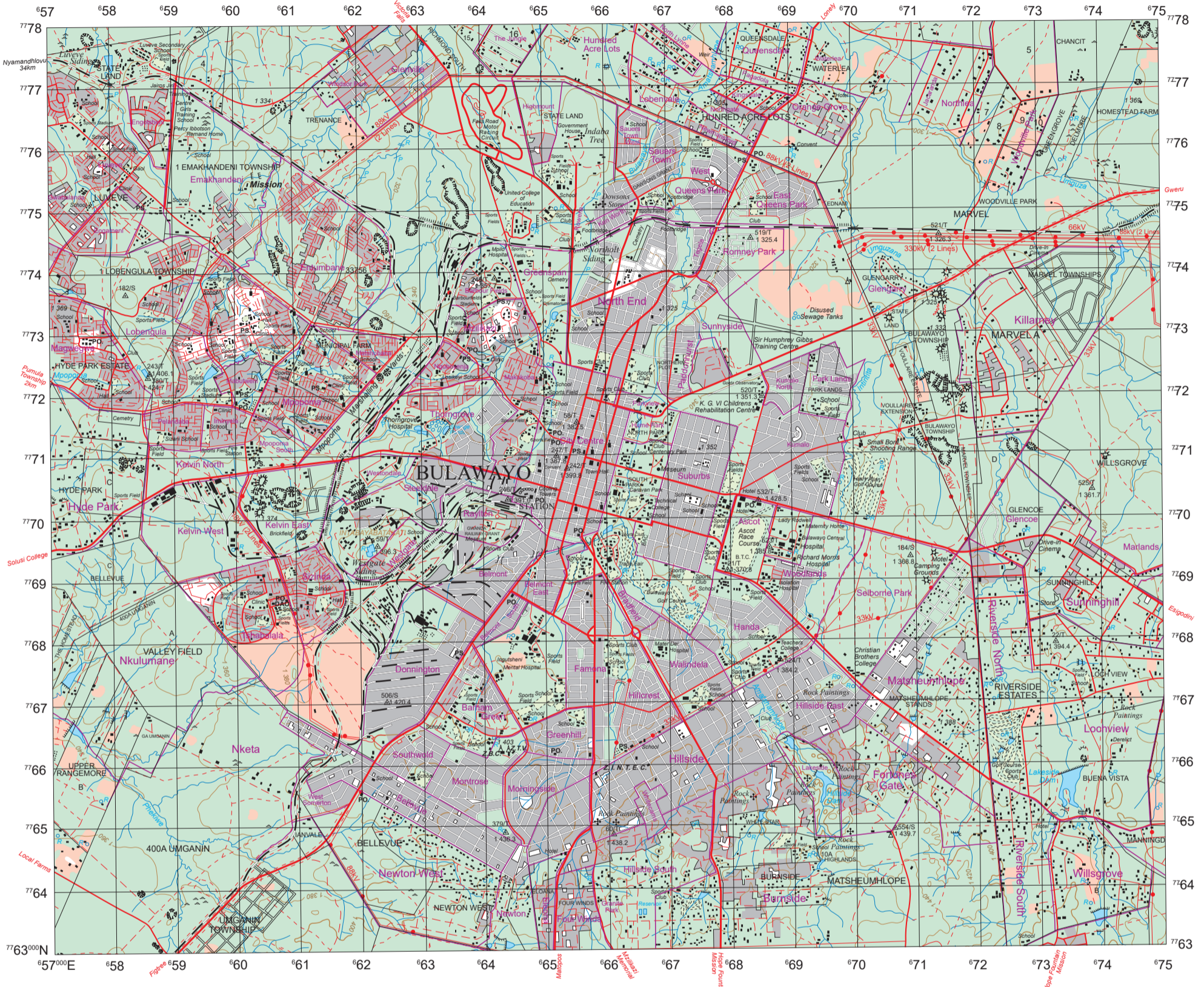
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City, Town.....		BULAWAYO, ESIGODINI
Village, Business Centre.....		ESIBOMVU, MBEZINGWE B.C.
Boundary: International.....		
" Cadastral; Original Grants, Subdivision.....		
Road: Wide Tarrad, Narrow Tarrad.....		
" Gravel or Earth with Bridge, Other.....		
Track, Cutline, or Game Trail.....		
Aerodrome: Registered, Unregistered.....		ESIGODINI
Railway with Embankment, Cutting, Tunnel.....		
Trigonometrical Station and Height to top of Pillar.....		158P Δ 1 190.6
International Boundary Beacon, Mast, Magnetic Station.....		Δ 50A Δ 1 190.6
Unmarked Spot Heights: Ground Survey, Photogrammetric.....		• 1 272 • 1 179
Powerline (33kv and above) approximate alignment.....		33kV
Huts, Staff Quarters.....		
Built-up Area, Buildings.....		
Church, Dip Tank, National Monument or Place of Historical Interest.....		
Golf Course.....		
Hill Name.....		MBEZINGWE
Mine Name.....		Falcon
Homestead Identification Number.....		AC94
Police Station, Post Office, Post and Telegraph Agency, District Administration Office.....		PS, PO, PTA, DAO.

Scale 1: 50 000 or 2 cm represents 1 km



River.....	
Dam.....	
Lake.....	
Pan: Small, Large, Waterhole.....	
Rapid, Waterfall.....	
Well, Spring, Borehole.....	
Windpump, Reservoir.....	
Furrow, Pipeline.....	
Marsh.....	
Contours at 20 metre Vertical Interval, with cliff feature.....	
Depression, Sand.....	
Isolated Hill Feature that does not take a contour.....	
Cultivation.....	
Smooth Rock.....	
Mining or Prospecting Trench, Mine Dump, Quarry or Excavation.....	
Bush: Very Dense, Dense.....	
" Medium.....	
" Sparse, Open Grassland.....	
Orchard or Plantation.....	



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NUMBERED LINES INDICATE THE 1 000 METRE UNIVERSAL

TRANSVERSE MERCATOR GRID, ZONE 35K MODIFIED

CLARKE 1880 (S.A.) SPHEROID

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Scale 1: 50 000 or 2 cm represents 1 km



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City, Town.....	HARARE, BINDURA
Village, Business Centre.....	MBERENGWA, FENGA B.C.
Boundary: International.....	—
Cadastral, Original Grants, Subdivision.....	—
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Gravel or Earth with Bridge, Other.....	—
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Aerodrome: Registered, Unregistered.....	—
Railway with Embankment, Cutting, Tunnel.....	—
Trigonometrical Station and Height to top of Pillar.....	158/P Δ 1 190.8
International Boundary Beacon, Mast, Magnetic Station.....	▲ 58A Δ
Unmarked Spot Heights: Ground Survey, Photogrammetric.....	▲ 272 ▲ 1 179
Powerline (33kv and above) approximate alignment.....	— 33kV —
Huts, Staff Quarters.....	—
Built-up Area, Buildings.....	—
Church, Dip Tank, National Monument or Place of Historical Interest.....	—
Hill Name.....	DOMBOSHAWA
Mine Name.....	Copper Queen
Police Station, Post Office, Post and Telegraph Agency, District Administration Office.....	PS, PO, PTA, DAO.



River.....	—
Dam.....	—
Lake.....	—
Pan: Small, Large, Waterhole.....	— oWH
Rapid, Waterfall.....	—
Well, Spring, Borehole.....	— oW oS oB
Windpump, Reservoir.....	— oWP oR
Furrow, Pipeline.....	—
Marsh.....	—
Contours at 50 foot Vertical Interval, with cliff feature.....	— 1 000
Depression, Sand.....	—
Isolated Hill Feature that does not take a contour.....	—
Cultivation.....	—
Smooth Rock.....	—
Mining or Prospecting Trench, Mine Dump, Quarry or Excavation.....	—
Natural Forest, Bushland.....	—
Woodland.....	—
Wooded Grassland, Open Grassland.....	—
Orchard or Plantation.....	—