UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education
General Certificate of Education Ordinary Level

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

2399165804

ENVIRONMENTAL MANAGEMENT **0680/04**
5014/02

Alternative to Coursework **May/June 2007**

1 hour 30 minutes

Candidates answer on the Question Paper.

Additional Materials: Ruler

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use a soft pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
Study the appropriate Source materials before you start to write your answers.
Credit will be given for appropriate selection and use of data in your answers and for relevant interpretation of these data. Suggestions for data sources are given in some questions.
You may use the source data to draw diagrams and graphs or to do calculations to illustrate your answers.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

For Examiner's Use

This document consists of **18** printed pages and **2** blank pages.

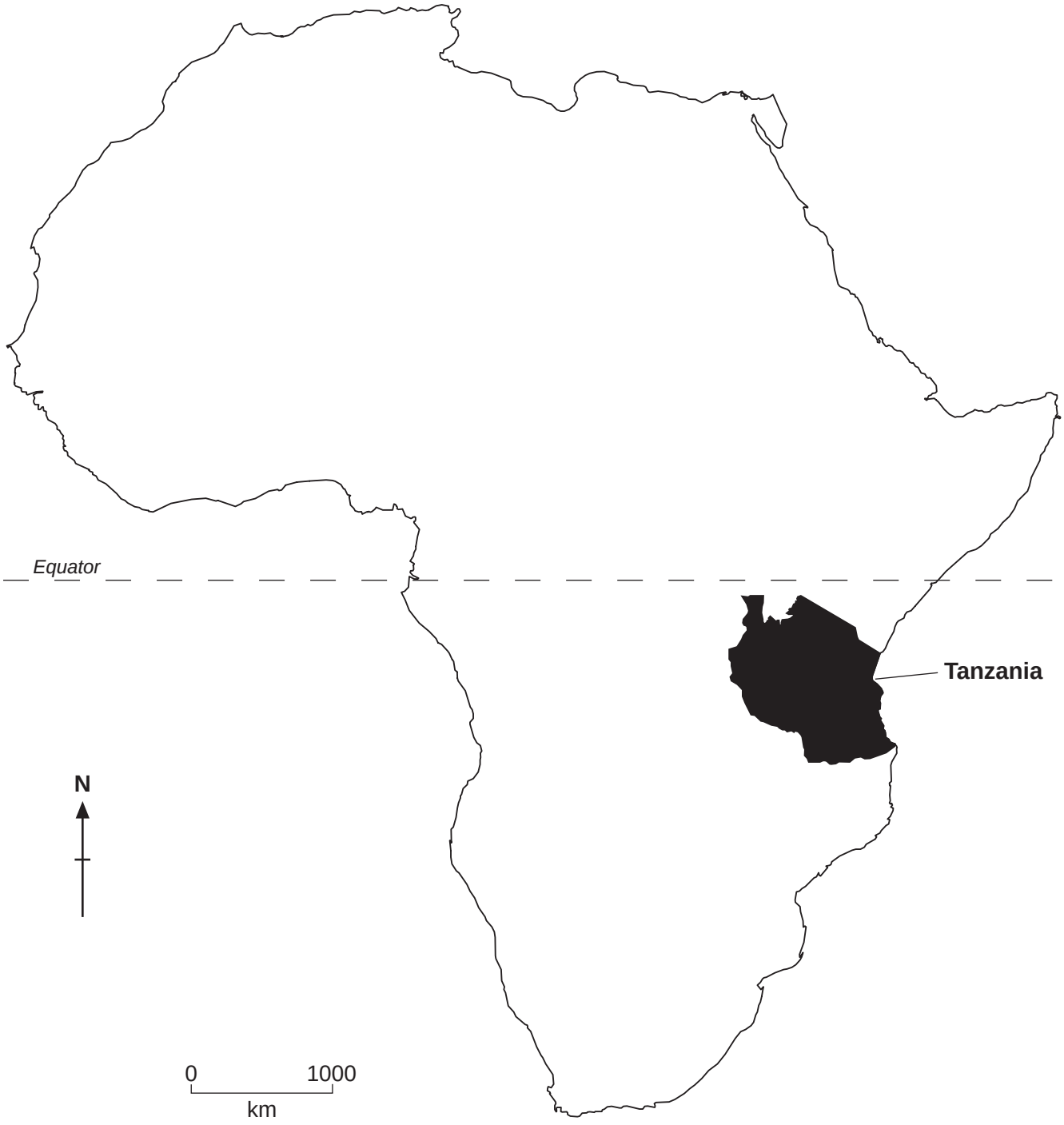


Fig. 1 Map of Africa

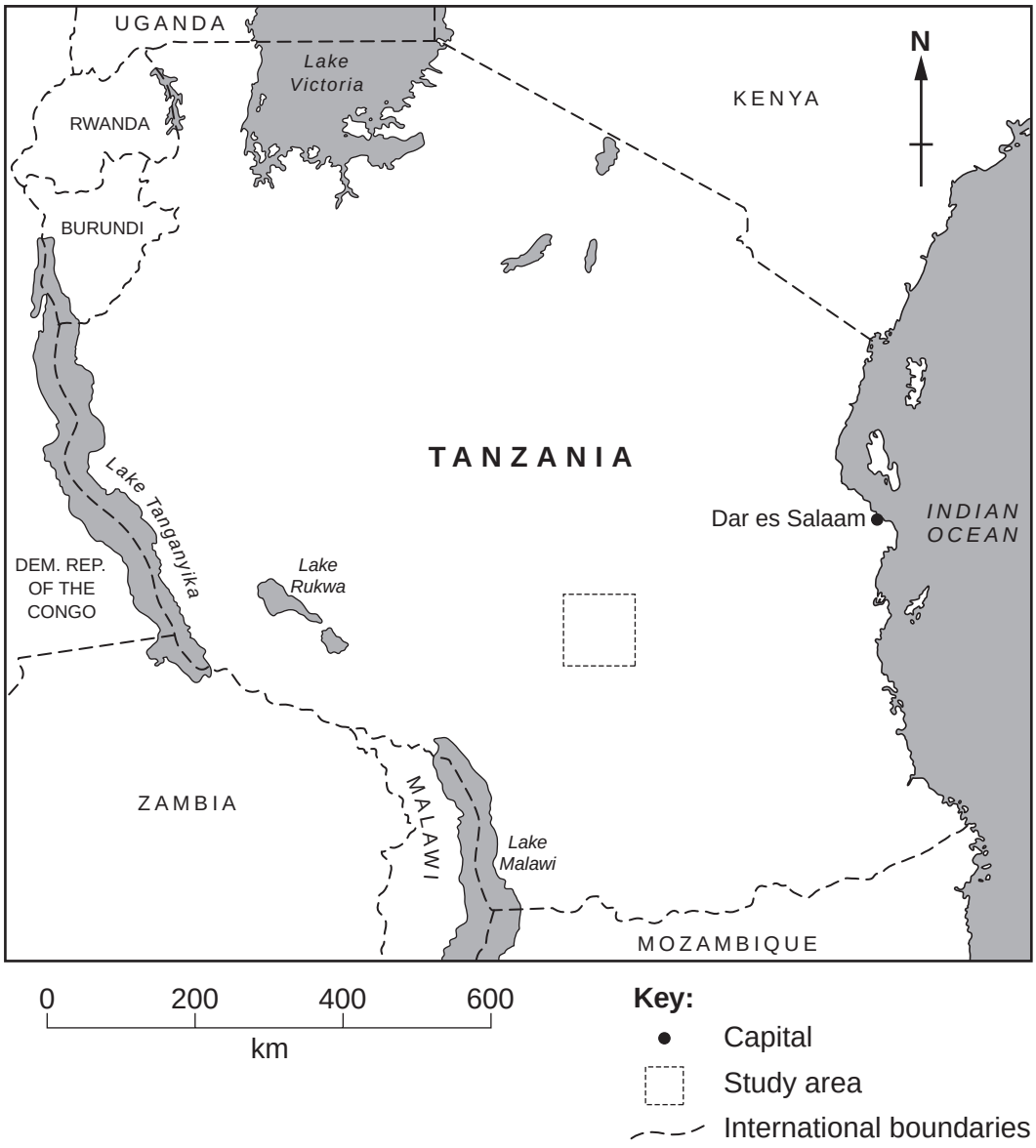


Fig. 2 Map of Tanzania

Tanzania is one of the poorest countries in the world. Farming employs 80% of the work force but crops occupy only 4% of the land area.
New policies have allowed real economic growth of 6% per year.

- Area: 945 087sq km
- Climate: Tropical in coastal regions ranging to temperate in the highlands
- Population: 37 500 000
- Population growth rate: 1.83%
- Children per woman: 5.06
- Languages: Kiswahili or Swahili (official), English (official)
- Currency: Tanzanian shilling (TZS), 1000TZS = 1US Dollar
- Exports: gold, coffee, cotton, processed goods
- Imports: consumer goods and machinery, crude oil
- Agricultural products: coffee, tea, cotton, tobacco, maize, beans, pyrethrum, cattle, sheep and goats.

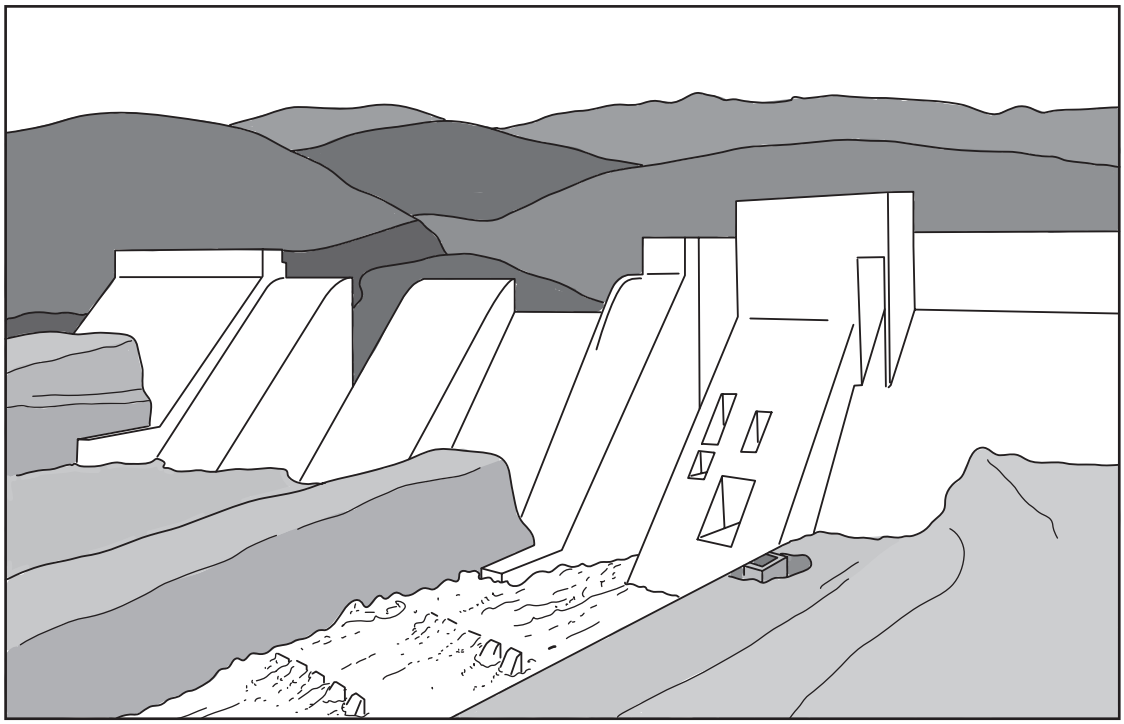
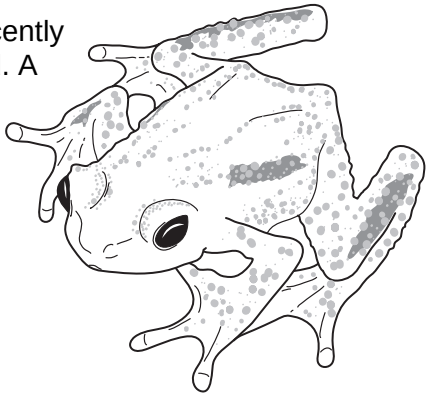


Fig. 3 Kihansi Dam

1 (a) The Kihansi Gorge Dam was a development project, recently completed by the government with the help of overseas aid. A survey of environmental impacts has found that the Kihansi spray toad is in danger of extinction as it only lives under the spray of the Kihansi waterfall. The dam has stopped nearly all the water passing over the waterfall.



The Kihansi spray toad

Three different strategies have been suggested.

Strategy 1:
Make no changes to the operations of the dam.

Strategy 2:
Collect some spray toads and breed them in captivity in a zoo.

Strategy 3:
Release more water from the dam so more water flows over the falls.

(i) Describe and explain the impact of each strategy on the spray toad.

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.....[3]

(ii) What should a government do before starting any large development project?

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.....[1]

(iii) Do you think it is important to stop the spray toad becoming extinct?

Give a reason for your answer.

.....

.....[1]

(b) The world-wide trade in endangered species is controlled by CITES (Convention on International Trade in Endangered Species). Tanzania has legally exported the leopard tortoise. The tortoises are collected from the wild and scientists have reported that this is not a sustainable activity.

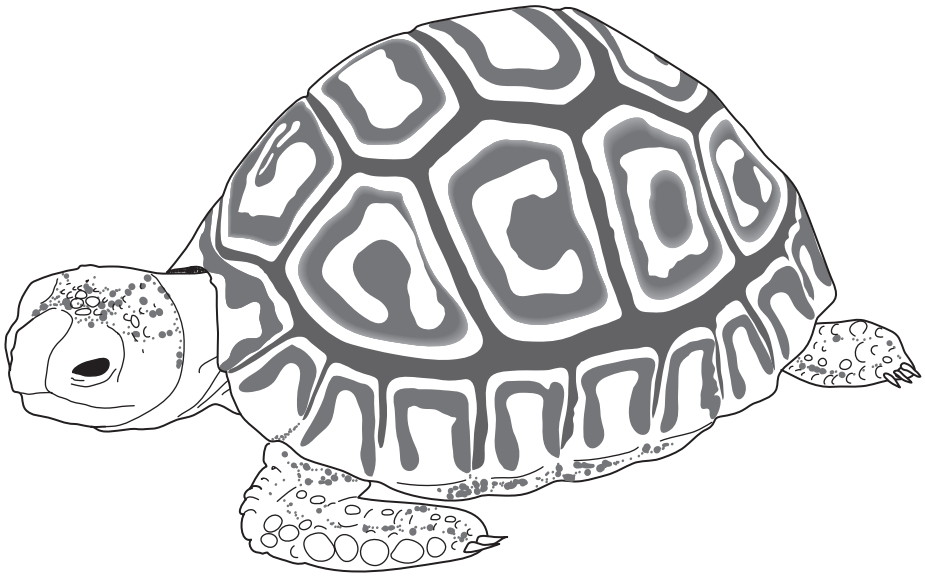

Fig. 4 leopard tortoise (juvenile)

(i) Explain why taking leopard tortoises from the wild is not a sustainable activity.

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..... [2]

The scientists suggested breeding the leopard tortoise in captivity so it could be exported legally in the future. Two trial farms were set up each with 30 tortoises.

	Farm A	**Farm B**
Enclosure	Brick wall and fenced. Sand, shade and water provided.	Brick wall and fenced. Sand, shade and water provided.
Incubation method	Natural (in sand)	Natural (in sand)
Diet	Cabbage, cut grass and papaya fruits	Natural vegetation
Tortoises at the start	30	30
Ratio of females to males	15 males 15 females	5 males 25 females
Juveniles for export after 18 months	31	180
Juvenile deaths after 18 months	8	9

Fig. 5

(ii) Which farm was more successful? Why do the scientists think it was more successful?

Farm .....

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.....[3]

(c) The scientists needed more information before giving advice to the government. On one of the farms a new trial was set up using two enclosures as shown in Fig. 6.

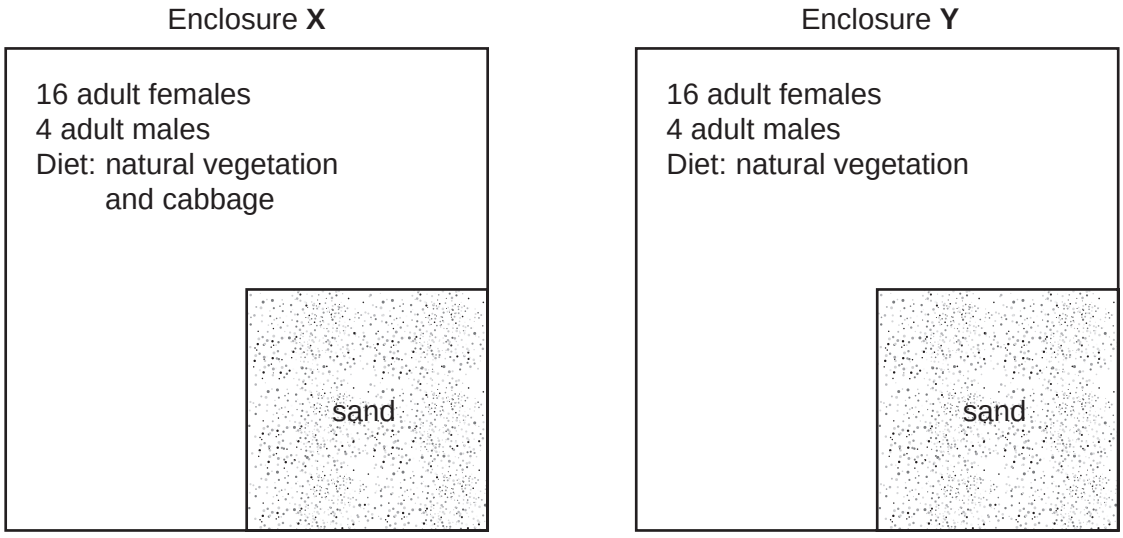


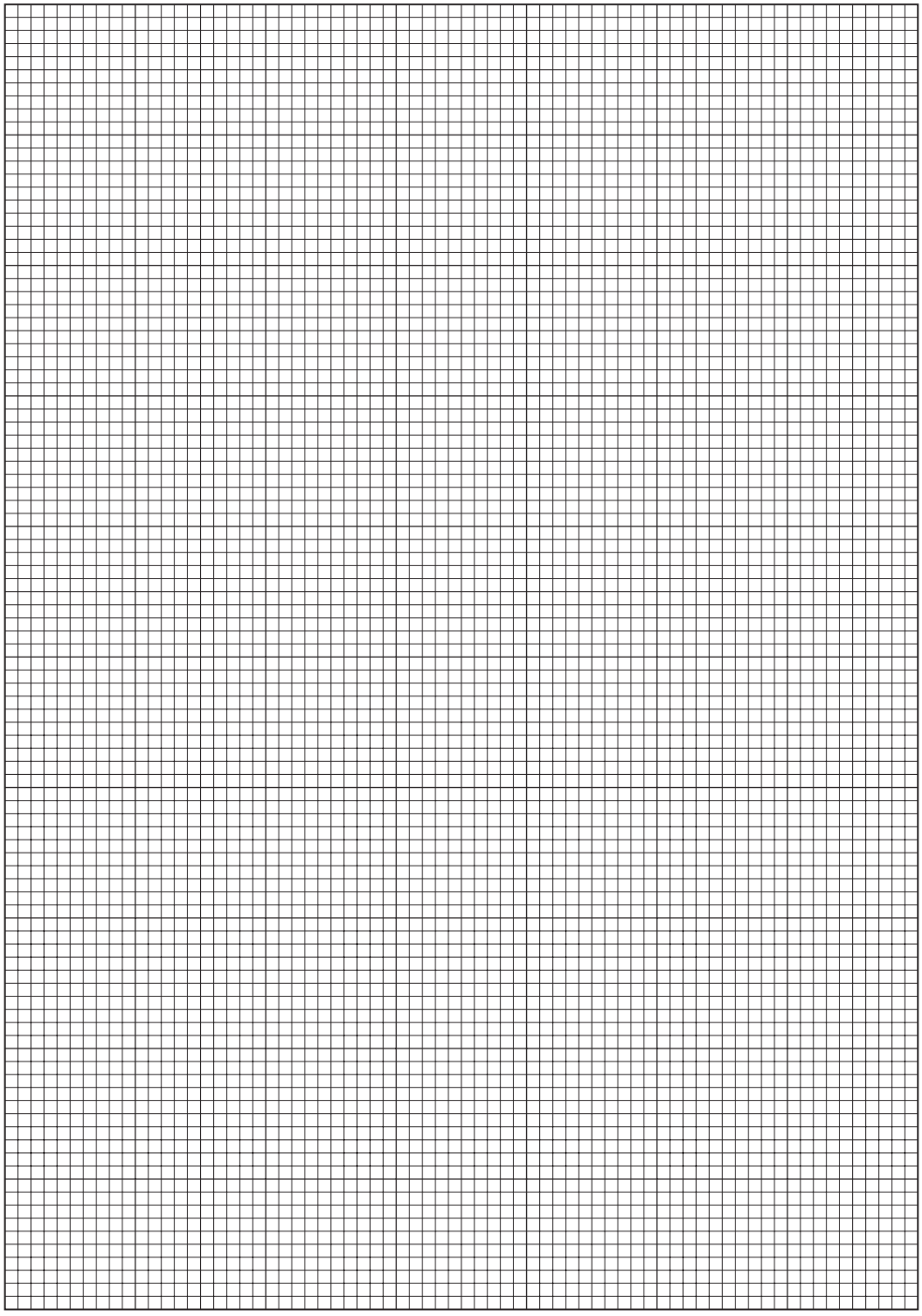
Fig. 6

Some students measured the length of the juvenile tortoises in both enclosures each month. The results are shown in Fig. 7 on page 8.

	Average length of juvenile tortoises (mm)	
Month	Enclosure **X**	Enclosure **Y**
January	45	40
February	65	55
March	90	75
April	115	100
May	145	125
June	180	145

Fig. 7

(i) Plot the data from Fig. 7 on a graph.



[4]

(ii) Using the graph, describe the differences in growth of juvenile tortoises between enclosures **X** and **Y**.

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.....[2]

(iii) Which diet for the juveniles would you recommend to the farmer?

.....[1]

(iv) Suggest why new enclosures should be built each year.

.....

.....[1]

(v) The students suggested that some wild adult leopard tortoises should be added to the enclosures every two years.

Explain how this would help sustain the tortoise farming.

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.....[2]

2 In the nearby highlands many people live in small villages. They have successfully farmed steep slopes for more than a hundred years. They have developed a method of cultivation that turns fields into a network of ridges and pits. This method gives a high yield of maize and beans.

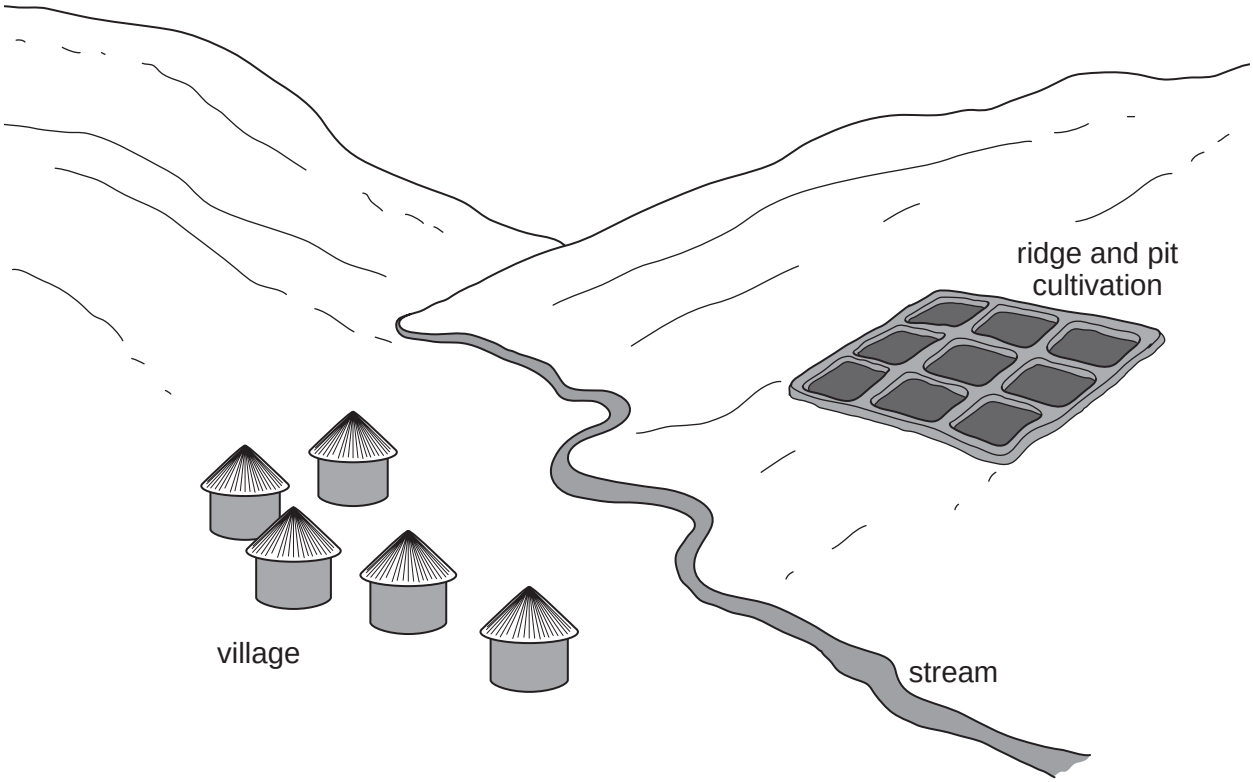

Fig. 8

The cultivation has the following steps.

1. On the first day men cut the trees and grass.

2. On the second day men lay the grass in rows in two directions across the slope and down the slope.

3. Women dig the pits and spread the soil to form ridges on top of the rows of grass.

4. Women plant the crops on the ridges.

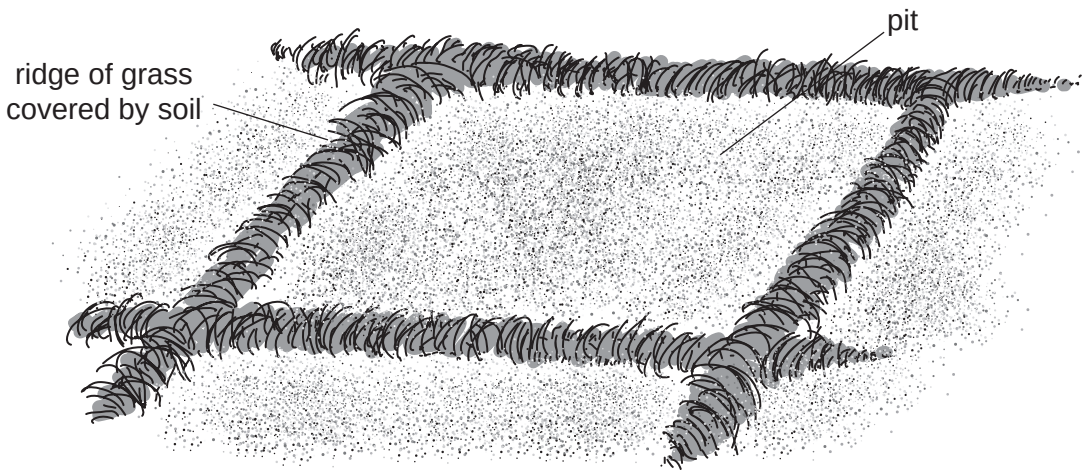

Fig. 9 Ridge and pit cultivation

(a) Suggest **one** advantage and one disadvantage of this method of cultivation.

Advantage .....

.....

Disadvantage .....

.....[2]

(b) The villagers wanted to try another method of ridge cultivation used in another village to try to increase their crop yield.
A plot of land was divided equally into either ridges and pits or ridges only. Maize was planted at 50 cm intervals on both plots. After harvesting the maize, beans were planted at 30 cm intervals.

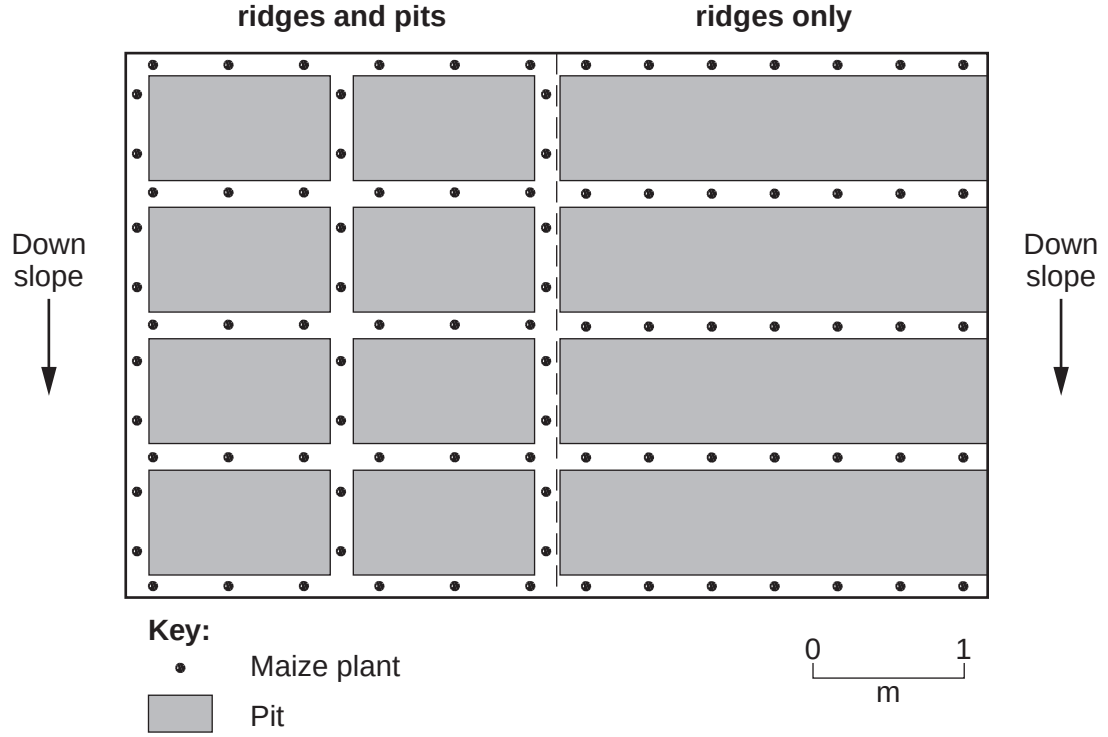

Fig. 10

(i) Suggest **two** factors that should be the same for the whole plot.

Factor one .....

Factor two .....[2]

(ii) How would you measure the maize yield from each plot?

.....[1]

(iii) How would you calculate the yield per square metre?

.....

.....[1]

[Turn over

(c) Samples of the crop of beans, that were planted after the maize, were taken. The mass in grams of each sample is shown in the table.

Sample 1 × 1m	Ridge and pit	Ridge only
1	945	560
2	840	645
3	810	605
4	400	580
5	755	610
Total	3750	3000

Fig. 11

(i) Look at sample number 4 in Fig. 11.
Suggest **two** possible explanations for the low yield in this ridge and pit sample.

First explanation .....

.....

Second explanation .....

.....[2]

(ii) Calculate the % increase in yield for the ridge and pit method compared to the ridge only method.

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.....[2]

(d) Local people know that the ridge and pit method of cultivation leads to good harvests most years but they have been told that the ridge method can fail during heavy rainfall.

(i) Describe what could happen if a ridge breaks near the top of a slope.

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.....[2]

(ii) How and why would this affect cultivation in the following year?

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.....[2]

3 **(a)** People from the village found gold in the stream bed between their village and the cultivated slopes. They decided to divert the flow of water into an artificial channel so they could look for more gold in the stream sediments. The gold was sold to buy food and farm implements. Many local people spent less time farming because they were looking for gold. People came from other villages and used mercury to extract gold from the stream sediments.

The following method was used.

- Sediments are crushed by hand labour
- Metallic mercury added
- The mercury gold amalgam is heated
- Mercury vapour goes into the air
- Gold is recovered
- Some mercury is washed into the stream

(i) Suggest the risks of using mercury to extract gold to

miners .....

.....

.....

the local environment .....

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.....[4]

(ii) Some of the villagers are worried that when they stop finding gold they will be worse off than before.

Explain how the villagers could be disadvantaged after the gold runs out.

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(b) The villagers decided to keep some water flowing along the artificial channel. Describe how the villagers could make use of the artificial channel in the future.

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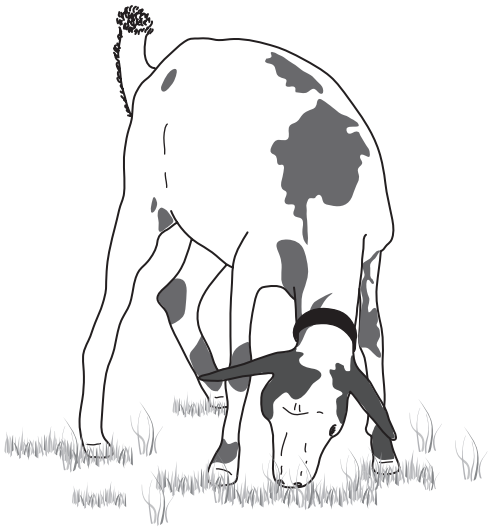

Fig. 12 African goat

(c) The villagers held a meeting to discuss the future. Some farmers keep goats as a source of meat, milk, skins and wealth. The hills are already intensively cultivated so the goats have to be kept on less fertile and drier lands. In some villages goats are tethered all year and in other villages only during the rains. The goats are kept in enclosures or goat houses at night.
They only have a limited area of suitable land for goats around the village. Two farmers were each asked to carry out a one-year trial keeping goats.

(i) Suggest **two** factors that should be kept the same by both farmers for this trial.

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..... [2]

(ii) Describe how you would measure the success of the goats in this trial.

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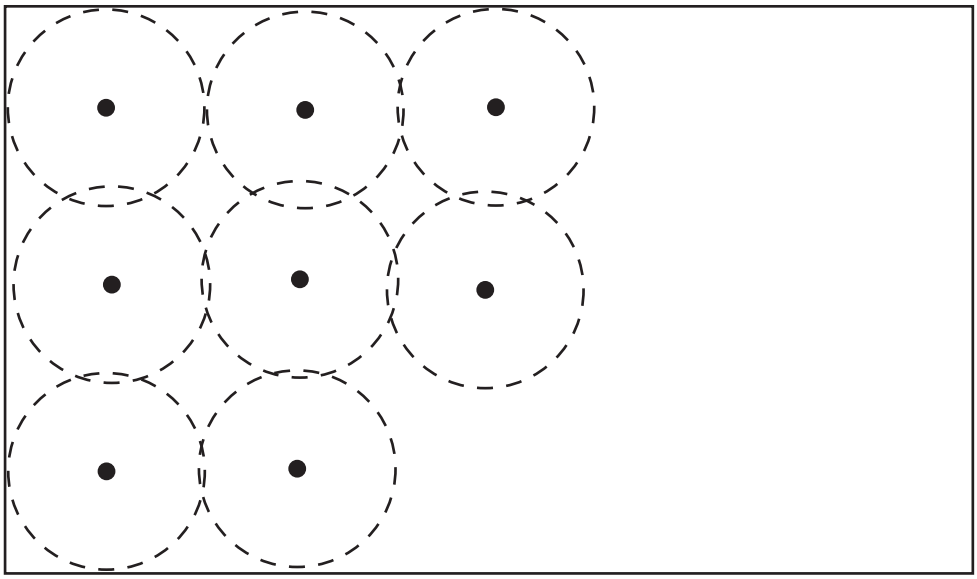
(iii) In the space below draw a table for recording measurements that the farmer could use during the year.

[3]

(d) **(i)** Complete the diagram below to show all the tether positions. [1]



Key:

● tether point

grazing area

Fig. 13

(ii) How many tether positions can this field hold?

.....[1]

(e) Crop waste was fed to the goats each evening in their enclosure.
The village produces 3000 kg of crop waste each year. One goat eats 1.0 kg of crop waste every other day. Calculate the maximum number of goats the village should keep.
(one year = 365 days)

.....

..... [2]

(f) **(i)** A group of women with families decided to start a project to produce pyrethrum from dried chrysanthemum flowers grown in small gardens.
The pyrethrum is a natural pesticide and can be sold as a cash crop.

Suggest why this project is particularly suitable for this group of women.

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..... [2]

(ii) You have been asked to talk at a meeting in another village to encourage people to set up their own pyrethrum project. Describe the advantages, to them, of starting their own project.

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..... [3]

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