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ENVIRONMENTAL MANAGEMENT **0680/22**

Paper 2 Management in Context **May/June 2023**

1 hour 45 minutes

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.
- You should show all your working and use appropriate units.

INFORMATION

- The total mark for this paper is 80.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **20** pages. Any blank pages are indicated.

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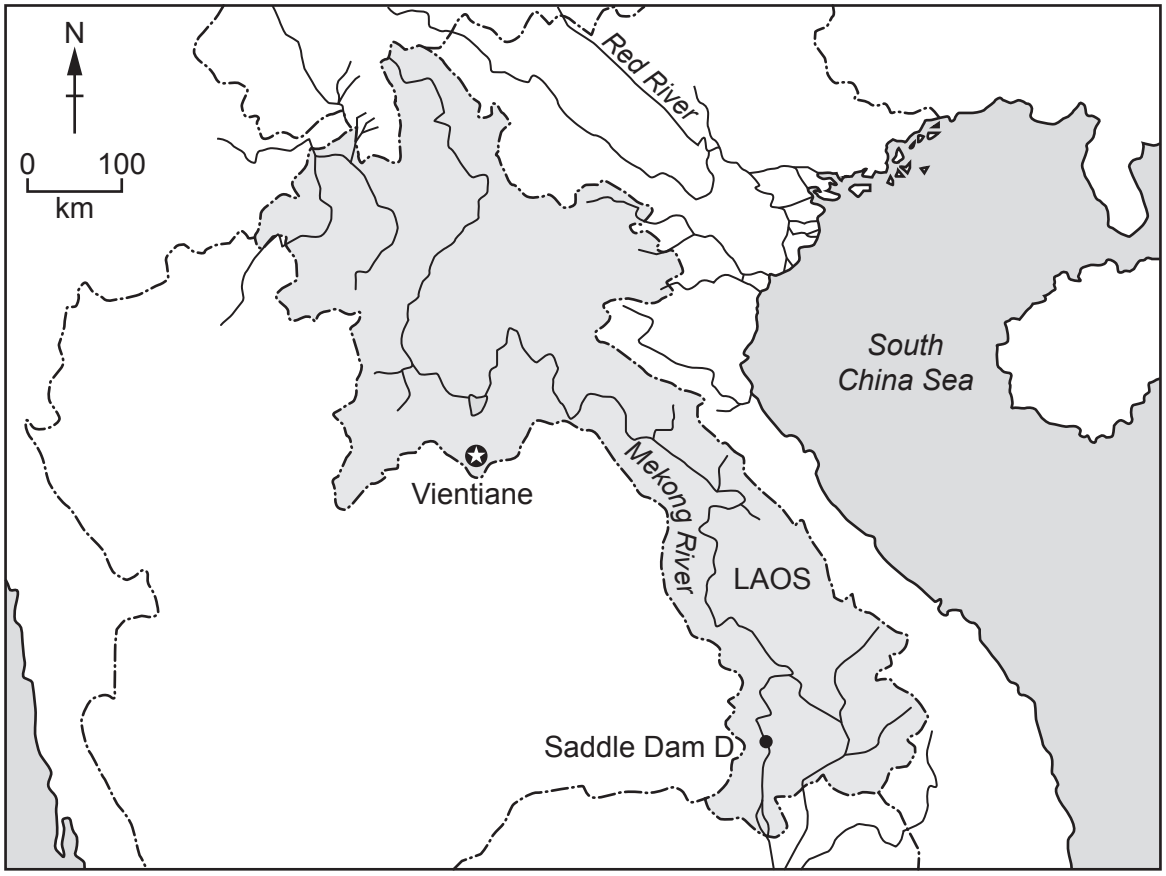
world map showing the location of Laos



map of Laos

Key

- capital city
- international boundaries
- river



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Area of Laos: 237 955 km^2

Population: 7 400 700 (in 2021)

Children per woman: 2.7

Life expectancy: 68.9 years

Currency: kip (9354 LAK = 1 USD)

Language: Lao, French, local languages

Climate of Laos: hot tropical with rainy season May to October

Terrain of Laos: mountains and steep-sided valleys

Main economic activities of Laos: agricultural production, tourism, mining, silk and cotton production

Natural resources: timber, hydroelectric power, tin, gold and gemstones

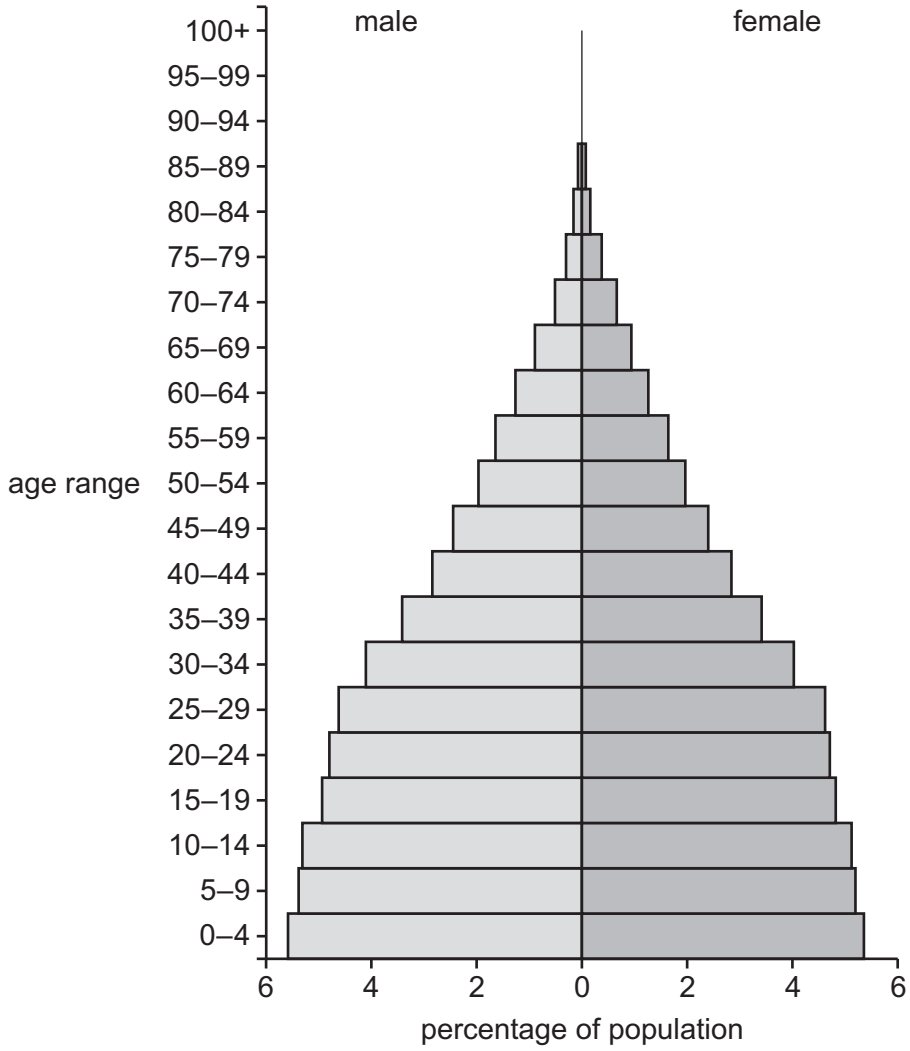
Laos is a less economically developed country (LEDC). Most parts of the economy are growing. Unemployment is low.

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1 **(a)** The diagram shows the population pyramid for Laos in 2021.



(i) Describe the **shape** of this population pyramid.

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.....

.....

..... [2]

(ii) In 1979, the population of Laos was 3 258 200.

In 2021, the population of Laos was 7 400 700.

Calculate the average annual increase in population.

..... per year [2]

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(iii) Suggest reasons why Laos has a rapidly increasing population.

.....

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..... [3]

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(b) Population growth in Laos has increased the demand for electricity.

The government of Laos has invested in hydroelectric power and will soon be generating electricity from 90 sites.

Laos has one coal-fired power station.

(i) Suggest the **environmental** advantages of using hydroelectric power rather than coal to generate electricity.

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..... [3]

(ii) Suggest reasons why Laos is suitable for using hydroelectric power to generate electricity.

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..... [3]

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(iii) Hydroelectric dams increase the supply of electricity.

Suggest other **economic** benefits of dams for local people.

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(c) Saddle Dam D was built between 2013 and 2018. It was one of the largest hydroelectric dams in Laos.

Heavy rains in 2018 caused the dam to burst.

This was reported in a newspaper.

> **Laos dam collapse – many missing after villages flooded**
>
> Saddle Dam D has burst due to heavy rain.
>
> A large volume of water (5 000 000 000 m^3) was released into the local countryside. Roads and bridges were washed away.
>
> At least 40 people are dead and more than 100 people are missing. Over 6500 people are now homeless.
>
> Some local people say they did not receive a warning before the dam burst. They think the construction company used low quality building materials.

(i) Suggest **three** reasons why many people were affected when the dam burst.

1 .....

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2 .....

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3 .....

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[3]

(ii) Suggest reasons why the number of deaths caused by this disaster increased in the long term.

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..... [4]

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(iii) The dam was rebuilt and now generates 410 megawatts (MW). 90% of this electricity is exported to other countries.

Calculate the quantity of electricity in MW that is exported.

..... MW [1]

(d) Large quantities of minerals are used to construct dams.

(i) State **four** factors that affect the cost of extraction of minerals.

1 .....

2 .....

3 .....

4 .....

[4]

(ii) Describe the process of restoring an open-pit surface mine to a forest after mineral extraction has finished.

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..... [4]

[Total: 32]

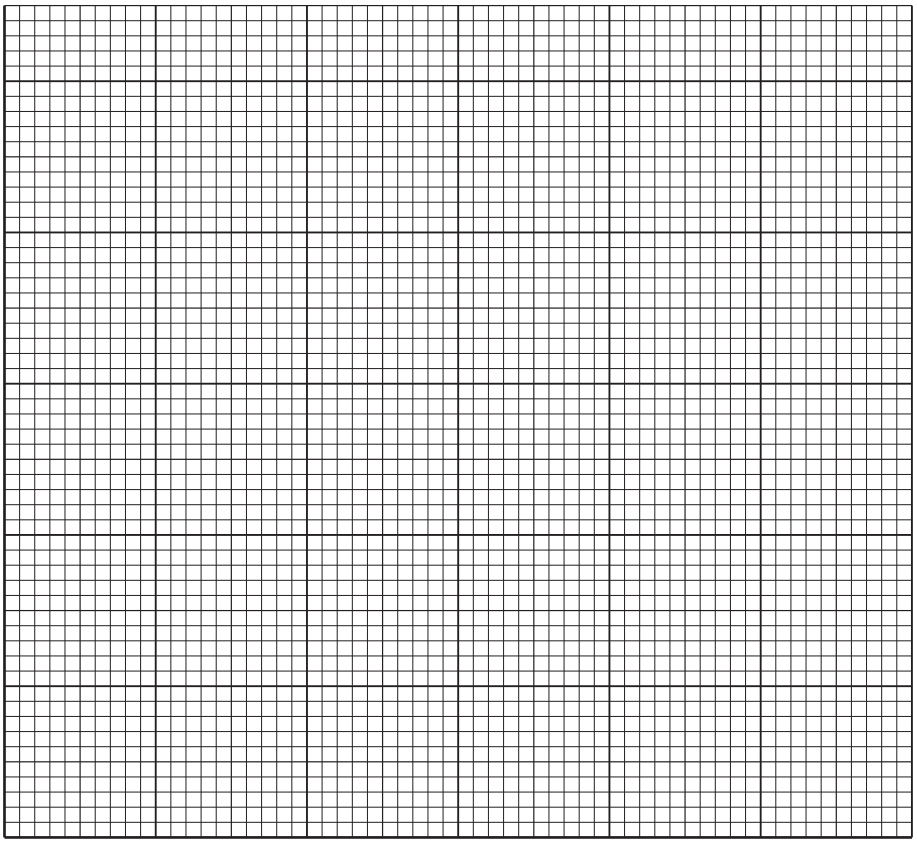
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2 Fish are an important part of the diet of people in Laos.

(a) The table shows the annual fish consumption per person for some countries.

country	annual fish consumption per person /kg
Brazil	9
Iceland	91
India	7
Laos	25
South Africa	6
USA	22

(i) Plot a bar chart of the data in the table.



[4]

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(ii) Suggest reasons why the annual fish consumption per person varies in different countries.

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..... [3]

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(b) The government of Laos wants to encourage the construction of fish farms to help meet future demand for fish.

Scientists investigate the suitability of some species for fish farming in Laos.

The results are shown in the table.

fish species	maximum length / m	maximum mass / kg	annual maximum yield / tonnes per hectare
African catfish	1.5	60	6.8
bighead carp	0.6	40	0.8
common carp	1.2	40	0.9
shark catfish	1.3	25	2.3
snakehead	1.0	8	1.4

(i) Calculate the range in maximum mass shown in the table.

..... kg [1]

(ii) Rank the fish according to their maximum length, starting with the largest.

largest 1 .....

2 .....

3 .....

4 .....

smallest 5 .....

[2]

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(iii) The African catfish is **not** normally found in the wild in Laos.

Suggest the limitations of using the African catfish for fish farming in Laos.

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..... [4]

(iv) Explain why fish farming is more sustainable than catching wild fish.

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..... [2]

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(c) A fish farmer is thinking about changing the species of fish being farmed.

The fish farmer uses a questionnaire to find out the local demand for a new species of fish.

(i) Describe **one** way the fish farmer can select a representative sample of local people to answer the questionnaire.

.....

.....

.....

..... [2]

(ii) The results of the questionnaire are shown.

	percentage	
question	**yes**	**no**
Do you eat fish at least once a week?	50	50
Do you eat more fish now than 5 years ago?	35	65
Would you eat a new species of fish?	17	83

Explain why the fish farmer decides **not** to change the species of fish being farmed.

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..... [3]

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(iii) State **three** abiotic factors that affect the growth of farmed fish.

1 .....

2 .....

3 .....

[3]

(iv) Some fish eat water plants and other fish eat mainly insects.

Explain why the farming of plant-eating fish is more energy efficient than the farming of insect-eating fish.

.....

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..... [2]

[Total: 26]

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3 The photograph shows a farmer preparing some fields for rice production.



(a) **(i)** State the name of the strategy used to reduce soil erosion which is shown in the photograph.

..... [1]

(ii) State **four** other strategies that can be used to reduce soil erosion.

1 .....

2 .....

3 .....

4 .....

[4]

(b) State how the activities shown in the photograph affect surface run-off and evaporation.

Give a reason for each answer.

surface run-off .....

.....

evaporation .....

.....

[2]

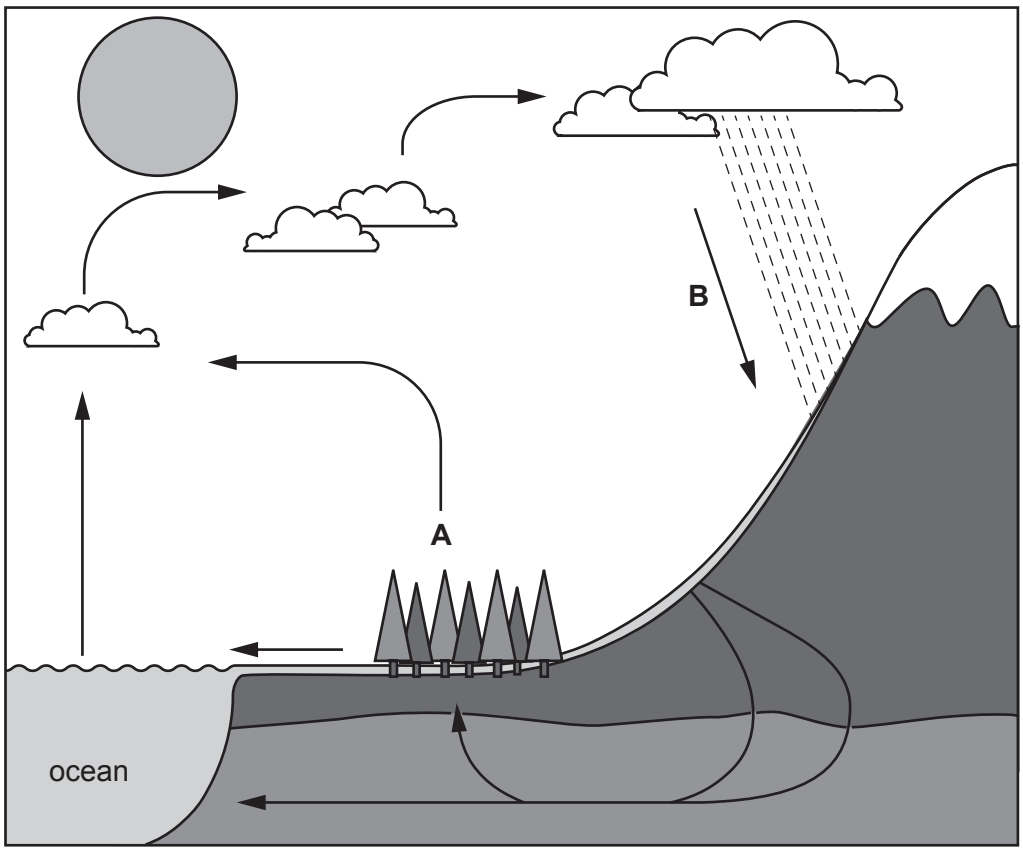
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(c) The diagram shows part of the water cycle.

Key

→ process



State the names of processes **A** and **B**.

A .....

B .....

[2]

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(d) A student in Laos investigates the growth of newly planted trees to find the best growing conditions.

The student:
- plants 100 young trees of similar size
- puts the trees into four groups, A–D, each of 25 trees
- gives each group of 25 trees a different treatment
- selects a sample of 5 trees from each group
- measures the heights of the trees in the sample after 3 years.

The results are shown in the table.

sample	increase in height after 3 years / m			
	group A	**group B**	**group C**	**group D**
	no extra treatment	**weeds removed regularly**	**fertiliser added when planting**	**tree guards added to stop grazing by animals**
tree 1	1.4	1.8	1.7	1.2
tree 2	1.0	1.9	1.9	1.3
tree 3	1.7	2.4	1.4	1.5
tree 4	1.3	2.1	1.6	1.1
tree 5	1.4	2.6	2.2	1.4
average	1.4	2.2	.....	1.3

(i) Complete the table to show the average for group C. [1]

(ii) State why the student includes group A in the investigation.

..... [1]

(iii) Write a suitable conclusion for this investigation.

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..... [3]

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(iv) Suggest **three** ways the student can confirm the results of the investigation.

1 .....

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2 .....

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3 .....

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[3]

(e) Explain how afforestation helps with the management of atmospheric pollution.

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..... [5]

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