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Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER | | | | | |

CANDIDATE NUMBER | | | | |

8558576842

ENVIRONMENTAL MANAGEMENT **0680/41**

Alternative to Coursework **October/November 2014**

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 an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.

Electronic calculators may be used.
You may lose marks if you do not show your working or if you do not use appropriate units.

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.

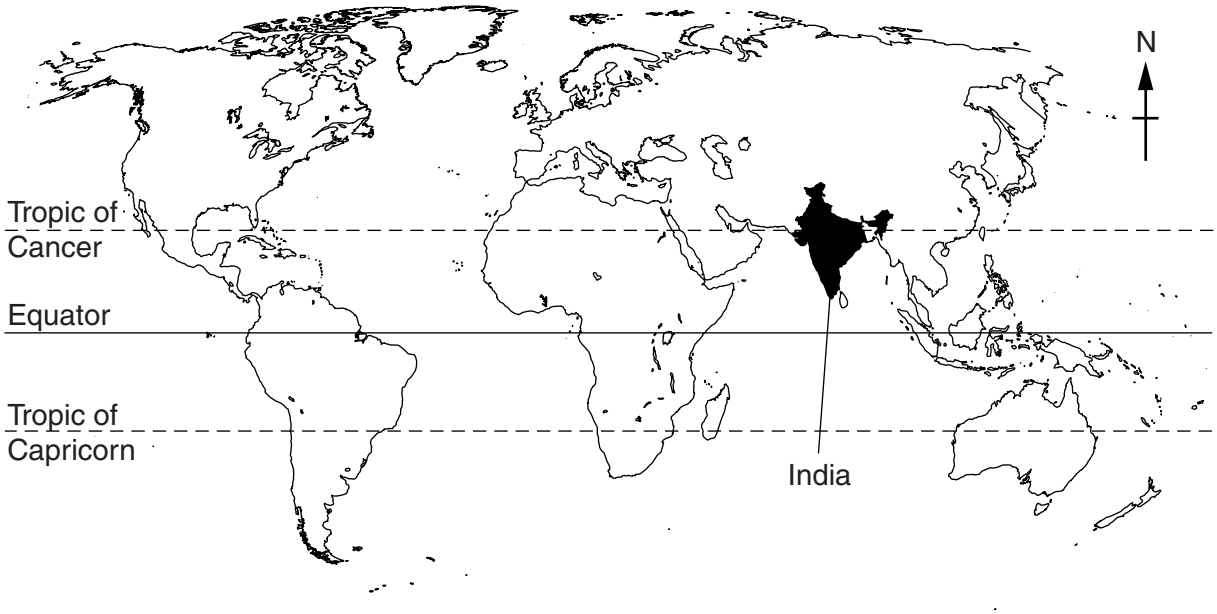
This document consists of **17** printed pages and **3** blank pages.

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world map



map of India



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Area of Orissa: 155 700 sq km

Population: about 43 million

Children per woman: 2.58

Life expectancy: 67 years

Currency: Rupee (45Rs =1US$)

Languages: Oriya, English, many other languages

Climate: tropical monsoon

Terrain: coastal plain

Orissa is the ninth largest state in India. It has a long coastline but only one deep water port. New ports are now being developed. The coastal strip supports most of the population; more than 60% work in agriculture. Orissa is rich in natural resources including coal, iron ore and bauxite.

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1 The Indian government has set up eight special economic zones in Orissa to encourage investment in projects such as steel plants and oil refineries. These projects are being resisted by people who depend on farming.

(a) Suggest why farmers do not want special economic zones set up in Orissa.

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.....[2]

(b) The coconut palm is the main crop from the coastal districts of Orissa. Most farmers have small coconut gardens. Orissa produces about 300 million coconuts each year.



One farmer said,

"I grow the Tahaji variety, as it gives the largest coconuts and so I get the biggest yield."

A second farmer said,

"I grow the Bana variety, as each tree gives the most coconuts in a year which gives me the biggest yield."

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A student wanted to find out if these claims were correct. The student carried out a small survey of the coconut harvests for one year. The results are shown below.

coconut palm tree	Tahaji variety / coconuts per year	Bana variety / coconuts per year
1	54	75
2	65	82
3	62	67
4	61	72
5	58	70
total	300	.....

(i) Complete the table shown above. [1]

(ii) A sample of coconuts from the two varieties was weighed and the average mass of one coconut was calculated. The results are shown below.

Tahaji variety 1.75 kg Bana variety 1.50 kg

Calculate the total yield for each variety.

Space for working.

Tahaji ..... kg

Bana ..... kg
[2]

(iii) Do the student's findings support the claims of the farmers on page 4? Use the information in **b(i)** and **(ii)** to help explain your answer.

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.....[3]

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(c) The student decided to carry out a more detailed study of the Tahaji coconut palm trees. The student drew a base map and used random numbers to select some palm trees as a sample for the study.

The student selected five trees using the following method:

- start at columns 1 and 2 and work down each column from the top of the random number table
- select every fifth pair of numbers and circle them
- reject any numbers above 50 and any numbers already used
- tick accepted numbers and cross rejected ones
- sample the first five accepted tree numbers between 1 and 50

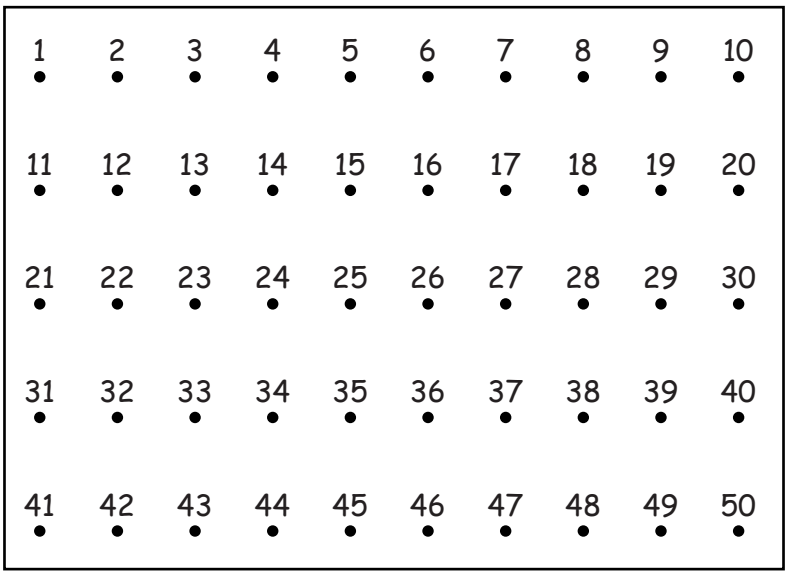
row number	column number 1 2 3 4	5 6 7 8	9 10 11 12	13 14 15 16
1	8 0 8 4	2 5 2 6	8 2 4 7	1 8 4 7
2	3 5 6 3	2 1 9 6	8 2 1 1	9 0 4 5
3	1 3 3 0	6 3 3 1	3 7 5 3	9 6 9 3
4	3 5 6 5	0 0 1 6	2 2 4 8	6 4 3 2
5	7 8 ✗ 5 0	5 9 ✗ 2 5	5 5 ✗ 8 8	7 8 1 1
6	4 4 9 0	5 4 1 7	9 7 2 7	6 1 5 3
7	6 6 4 5	9 1 0 4	9 3 1 8	8 8 1 9
8	8 6 2 6	5 9 9 5	1 2 1 5	9 7 5 3
9	4 8 5 5	4 5 2 0	7 5 5 4	0 6 1 2
10	8 4 ✗ 9 6	7 5 ✗ 1 9	0 4 ✓ 7 4	7 8 1 8
11	6 7 2 2	9 8 6 9	9 3 6 1	7 8 7 5
12	8 7 4 6	5 9 3 2	5 1 1 5	2 7 2 1
13	5 6 4 1	1 4 1 7	1 4 1 9	7 4 3 4
14	7 4 4 4	9 2 0 0	8 8 4 0	5 8 8 2
15	8 2 ✗ 7 9	3 0 ✓ 1 8	4 6 7 2	3 7 4 3
16	0 1 6 1	7 6 1 7	1 0 2 4	2 3 8 7
17	7 3 8 8	9 7 5 9	7 5 5 6	6 6 2 4
18	7 8 3 0	4 7 1 4	3 8 9 6	2 9 1 9
19	9 8 8 7	4 2 1 6	6 5 2 6	4 5 3 5
20	1 2 ✓ 6 1	2 5 ✓ 1 6	9 5 6 9	2 3 1 0
21	3 9 4 7	4 9 3 7	7 6 3 4	2 5 4 3
22	4 5 5 0	8 1 0 3	1 2 5 0	2 3 0 4
23	1 3 4 4	9 6 9 7	2 8 8 3	6 9 7 6
24	8 9 7 6	5 8 2 3	8 4 8 7	0 4 5 0
25	7 7 ✗ 1 0	9 9 ✗ 4 3	6 9 7 8	8 2 7 8
26	6 9 5 9	6 0 0 8	8 4 4 2	2 2 8 2
27	7 9 4 1	2 3 1 2	2 4 3 1	6 7 0 2
28	2 2 8 4	0 8 9 6	8 1 0 7	5 6 4 2
29	9 5 9 4	7 4 1 8	8 3 8 5	6 0 4 5
30	4 6 ✓ 1 3	8 5 ✗ 4 9	6 3 6 9	3 2 0 8

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(i) The Tahaji sample was tree numbers 12, 46, 30, 25, 04.

Mark these trees on the base map shown below, with an **X**. [1]



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(ii) The student used the same method to select a sample of the Bana coconut palm trees, starting at columns 17 and 18 on the random number table below.

row number	column number 17 18 19 20	21 22 23 24	25 26 27 28	29 30 31 32
1	7 4 3 3	3 6 2 0	1 8 9 7	2 1 3 4
2	2 6 1 8	2 7 5 1	2 6 2 7	1 0 9 5
3	8 7 3 8	6 8 1 5	1 5 3 8	8 5 4 3
4	4 7 8 6	6 0 9 5	5 2 8 3	1 6 2 0
5	2 1 8 2	4 5 4 5	3 5 3 0	5 5 8 9
6	5 9 8 1	4 8 7 8	9 9 8 0	9 8 7 7
7	7 5 3 7	2 7 8 6	9 3 7 3	2 4 4 5
8	9 2 2 3	5 6 5 8	2 9 4 4	2 8 9 9
9	9 6 8 3	4 2 5 1	9 1 3 8	1 7 0 9
10	6 8 3 2	9 6 8 3	9 8 7 2	4 0 9 0
11	4 8 8 3	1 3 1 5	9 6 7 9	8 8 3 4
12	0 0 3 3	9 3 0 3	9 7 1 3	4 0 1 2
13	8 1 6 5	7 3 6 8	1 2 1 8	6 0 3 9
14	4 3 9 8	3 9 0 4	9 1 9 9	9 3 3 6
15	3 9 7 9	4 6 8 9	9 0 2 1	6 9 9 0
16	2 8 9 1	6 6 7 7	1 5 8 5	2 4 8 2
17	9 9 7 7	2 0 0 8	5 5 9 6	9 7 4 0
18	1 8 0 4	4 0 4 4	1 0 3 4	2 5 9 7
19	4 4 3 0	5 2 7 0	9 6 0 5	0 7 6 6
20	3 8 3 9	8 7 0 3	9 8 4 1	0 3 5 3
21	6 2 3 9	7 4 5 6	2 0 5 6	7 7 9 5
22	1 1 3 8	9 7 8 6	9 1 4 4	4 5 2 6
23	6 2 5 1	4 2 0 1	2 0 3 8	6 5 5 2
24	3 1 0 6	9 1 6 8	2 7 1 7	7 8 0 1
25	9 7 1 4	9 7 0 0	1 5 6 6	2 8 8 9
26	1 5 2 4	2 5 1 7	5 8 1 8	0 0 8 1
27	9 9 8 4	3 4 6 9	3 0 8 5	4 7 6 2
28	7 3 1 9	3 7 8 2	1 0 6 8	9 5 7 4
29	1 1 6 3	5 9 1 6	9 5 9 9	1 1 4 3
30	5 1 0 9	9 6 8 0	1 1 6 8	6 1 3 3

Complete the selection of the Bana coconut palm trees, in the table below.

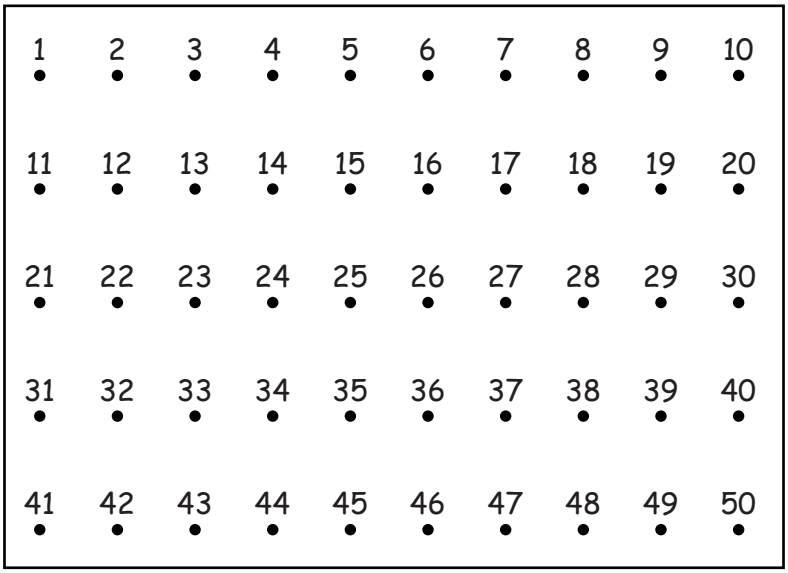
palm tree	1	2	3	4	5
number selected	21	39	.....	.....	.....

[2]

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(iii) Mark these trees on the base map shown below, with an **X**. [1]



(iv) The sampling method selected several trees that were very close together in the Bana garden.

Explain why the student used these trees as part of the survey, even though they were very close together.

.....

.....[1]

(v) Suggest **two** ways the student could have improved this study.

.....

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.....[2]

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(d) The farmers often complain that they do not earn much money from coconuts.

A survey found the following average selling prices for one coconut.



(i) Calculate the percentage (%) of the price of a coconut sold on a market stall that a farmer receives.

Space for working.

..... % [2]

(ii) The wholesalers and market stall holders say they cannot sell coconuts at a lower price because they have various costs. Suggest possible costs for wholesalers and market stall holders.

wholesalers .....

.....

.....

.....

market stall holders .....

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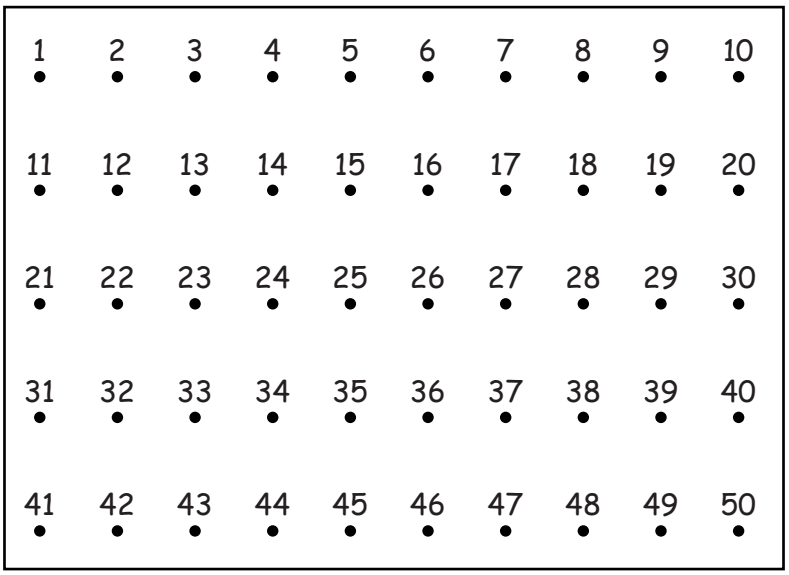
.....[4]

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(e) Many farmers only have small coconut gardens of less than 0.5 ha. There are enough ripe coconuts to make it worth harvesting from a tree every two months throughout the year. Farmers need to supply wholesalers with ripe coconuts every week.

(i) Draw and label a harvesting plan on the garden base map shown below. [3]



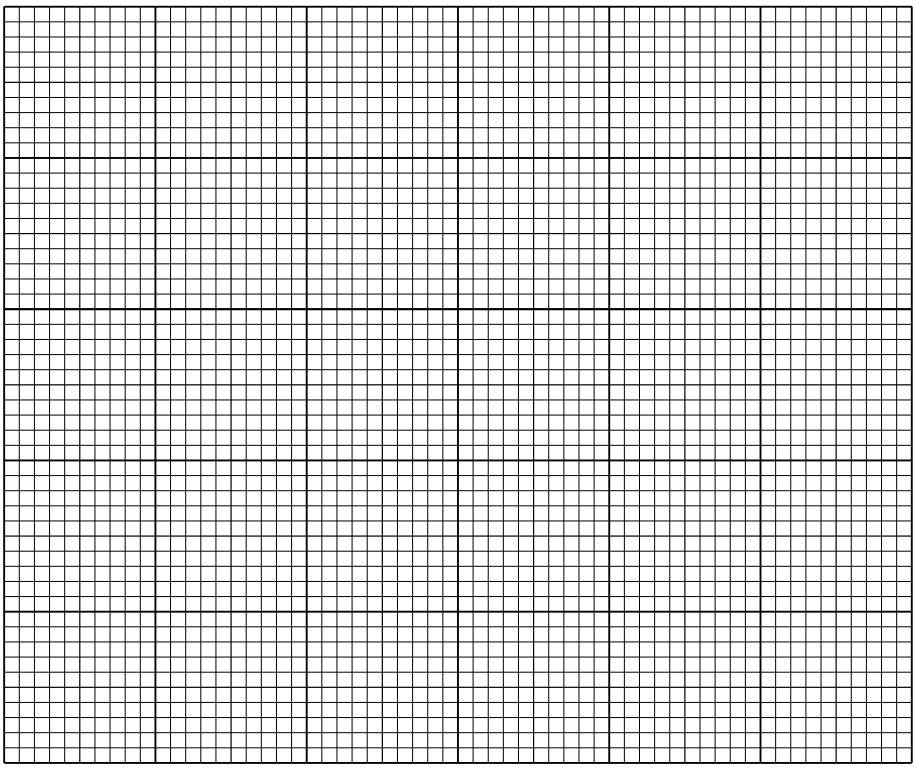
TURN OVER FOR QUESTION 1(e)(ii).

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(ii) The student visited wholesalers and found that the coconut price paid to farmers changed each month. The student was given a copy of a wholesaler's trading record for one year, which shows the average price of coconuts.

month	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
price / Rs	460	470	490	550	580	580	610	590	580	530	480	470

Plot the data as a graph on the grid below. [4]



(iii) Describe the pattern shown in the graph.

.....[1]

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(iv) In which months was the average price highest and lowest?

highest .....

lowest .....
[1]

(v) Suggest reasons for the changes in price.

.....

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.....[2]

(f) The student wanted to find out more information from farmers arriving at the wholesalers. The student used a questionnaire to interview some farmers. The results are shown below.

	percentage of farmers who said:	
	yes	no
Is your coconut garden more than 0.5 ha?	20	80
Are coconuts your main source of income?	65	35
Do you harvest more than 40 coconuts per tree in a year?	25	75
Do you earn enough from selling coconuts to support your family?	30	70

(i) Suggest **two** further questions the student could have asked the farmers.

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.....[2]

(ii) Suggest how the student could have made sure that they interviewed a representative sample of farmers.

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.....[2]

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(iii) What did the student find out about a typical coconut farmer from this questionnaire?

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.....[4]

(g) An agricultural adviser helped some farmers to try growing other crops between the coconut palms. A planting plan was proposed for three plots in a coconut garden, as shown below.

plot 1: coconut palms only

plot 2: coconut palms with cowpeas and bananas

plot 3: coconut palms with peppers and yams

The harvests were recorded for one year.

(i) Draw a suitable table to record the harvest of each crop from each plot in the space below.

[3]

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(ii) Plot 2 included cowpeas, which are leguminous plants. Explain why the agricultural adviser expected the largest harvest from this plot.

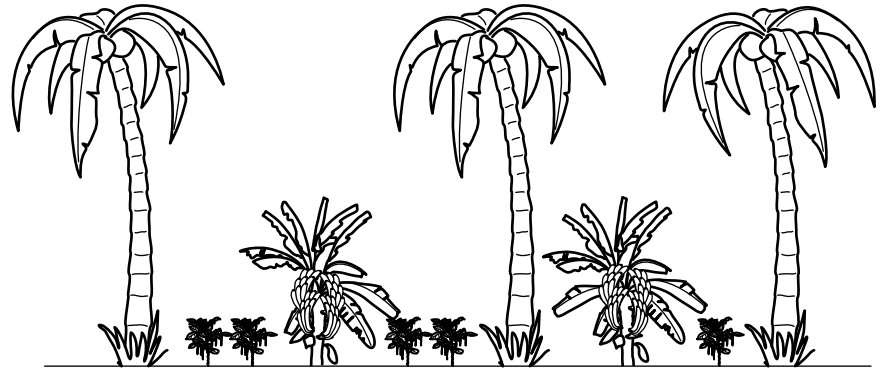
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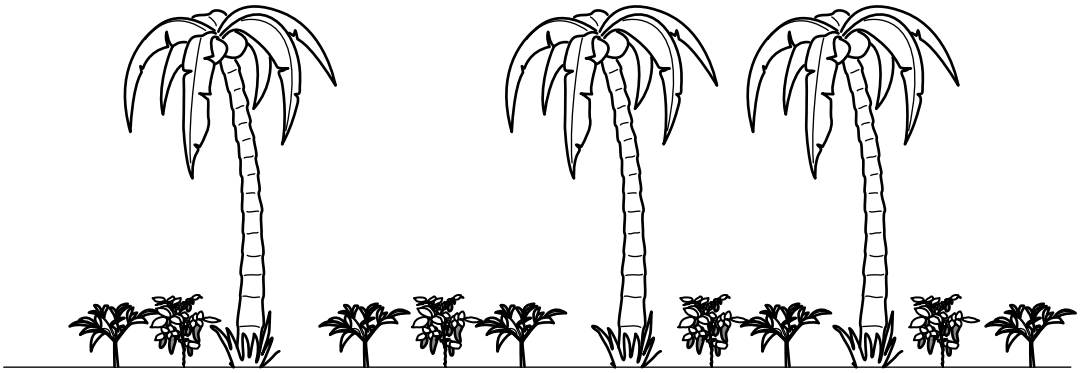
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.....[2]

Plot 2



Plot 3



(iii) Look at the sketch of plots 2 and 3 shown above. Suggest **one** other reason why the adviser expected the largest harvest from plot 2. Explain your answer.

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.....[2]

[Total: 47]

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2 Coconuts provide a wide range of products, such as:

- coconut oil
- edible copra
- coir fibres
- tender, edible coconut
- coconut water
- charcoal from shells

(a) Coconut shells can be made into charcoal and used for cooking food.

Is charcoal production a sustainable activity? Give reasons for your answer.

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.....[3]

(b) Some farmers are still harvesting from old, tall coconut palms. Other farmers are investing in growing new hybrid palms.

old, tall palms	**new hybrid palms**
give low yields	give high yields
slow growing with a long life	fast growing with a short life
allow extensive intercropping	seedlings cost more than traditional varieties
low resistance to pests	high resistance to pests

A farmer has a small coconut garden (0.75 ha) of old, tall palms with little intercropping.

Suggest how this farmer could improve the garden's income in the future.

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.....[4]

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(c) There are large reserves of low grade coal in Orissa. The government plans to build a plant to make liquid fuels, such as diesel, from coal. It will be operational in 2016. The plan states that:

- waste water will be fully recycled
- carbon dioxide will be captured in underground formations
- the diesel will produce less smoke than conventional diesel
- 30 Mt of coal per year will give 80 000 barrels of fuel a day
- rejected coal will be used in a power station to generate electricity
- no more than 1500 ha will be needed for the plant and coal mine
- about 70 000 jobs will be created directly and indirectly

Do you think local people are in favour or against this plan?

Explain your point of view.

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.....[6]

[Total: 13]

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