# CONTENTS

# NATURAL ECONOMY

**Paper 0670/01**

**Paper 1**

## General comments

In general, this paper addressed areas with which most candidates were familiar. Although many candidates found some parts of the paper difficult, many Examiners reported that the general standard of answers continues to show a slow and steady improvement. At the top end of the mark range, there were some really excellent scripts, and it certainly seemed to be the case that fewer candidates than in previous years found the paper inaccessible.

## Comments on specific questions

### Question 1

This question certainly proved to be the most testing, and a significant number of candidates struggled to gain marks, despite it being on an area of the syllabus which has been examined in previous years.

**(a)** This part of the question referred to two pie charts concerning energy use in Canada and Quebec. Surprisingly, many candidates named HEP as a fossil fuel in part **(i)**, and this made it unlikely that they would be able to answer part **(ii)** correctly. In part **(iii)**, however, most candidates were able to correctly complete the required calculation.

**(b)(i)** This section required candidates to explain an environmental advantage of using HEP. While most candidates recognised HEP as a 'clean' form of energy, very few went into sufficient detail to gain more than one of the three marks on offer.

   **(ii)** This was more successfully answered by many candidates; the most common response referring to the loss of land through flooding following the construction of a dam.

   **(iii)** This question achieved many vague responses, which could have applied to forms of energy other than HEP. The better answers stressed the idea that, while HEP stations are often expensive to set up, they are cheap to run; and some of the best answers also mentioned the multi-purpose nature of many HEP schemes in terms of flood control, irrigation, etc.

**(c)** In this section, many candidates failed to suggest any positive strategies for conserving damaged environments, falling back on rather vague statements about not extracting the minerals or fossil fuels in the first place. The better answers suggested positive strategies, such as landscaping or afforestation.

### Question 2

**(a)(i)** In this part of the question, candidates were asked to complete a bar chart. Relatively few were able to do so with a high degree of accuracy.

   **(ii)** This was normally answered correctly.

   **(iii)** In this part of the question, very few candidates gained the mark. Many did not calculate correctly, and hardly any included the units to produce the correct answer of 6 864 000 tonnes per year.

**(b)(i)** Most were able to gain at least one of the two marks available here.

   **(ii)** This was generally well-known, with increasing numbers of candidates addressing the issue of sustainability in their answers.

**(iii)** A significant number of candidates misread the question, and merely gave details of practices which lead to over-fishing. Most correct answers referred to the issue of pollution.

**(iv)** Most candidates were able to display some understanding of fishing quotas.

**(c)** This question was generally well answered, with many candidates referring to the difficulty of enforcing quotas, and the fact that many fishermen may ignore the restrictions.

**Question 3**

**(a)** In part **(a)(i)**, most candidates were able to name three rivers correctly. Part **(a)(ii)**, however, proved to be much more testing. Very few candidates noticed that while Xai-Xai was close to the mouth of a river basin affected by the floods, Beira was not. Part **(a)(iii)** was largely answered correctly.

**(b)** This part of the question referred to the characteristics of, and the damage caused by, tropical cyclones, and was generally well-known.

**(c)** In this part, most candidates were able to name a water-related disease, and most showed at least some understanding of the increased risk of disease, which often follows a flood.

**(d)** Again, this part of the question was generally well-known by the candidates.

**Question 4**

**(a)** The first part of this question was generally well answered, and many candidates were able to gain the four marks on offer.

**(b)** In part **(b)(i)**, most candidates were able to describe differences between subsistence and commercial farming. Part **(b)(ii)** required candidates to explain the meaning of intensive farming, and proved much more testing, with very few gaining the two marks available. Part **(b)(iii)** was better known, though a significant number of candidates gave rather vague responses, and some confused over cultivation with overgrazing or overstocking. Part **(b)(iv)** was generally quite well known.

**(c)** Although this section was generally quite well known, too many candidates confined themselves to negative strategies which merely stated what should not be done. While such answers show some understanding, answers which suggest positive strategies like planting trees or terracing are more likely to be productive of marks.

> **Paper 0670/02**
> **Paper 2**

**General comments**

As usual, there was often little difference in candidate performance between **Questions 1** and **2**. If anything, candidates achieved better on **Question 2**. The fact that **Question 2** was taken from the lithosphere part of the syllabus was offset by the popularity of, and familiarity with, earthquakes as a topic. The majority of candidates attempted answers to all the questions. This was a reflection of how well the syllabus content had been covered in Centres. Only occasionally did pressure of time appear to be an issue, suggested by short or non-existent answers to **(f)** and **(g)**, the final two parts of **Question 2**. Written answers, which were continued by candidates either into spaces below the printed lines or on to page 18 (one of the blank pages), were more common than answers left un-attempted. However, there remained a marked tendency for candidates to stop answering once all lines provided for the answer had been filled, irrespective of levels of knowledge and precision of answering. Candidates should be encouraged to use empty spaces in the question paper booklet whenever they feel able to offer fuller answers than allowed by the number of lines, particularly to longer questions worth 4 or more marks. The number of lines that are sufficient for a full mark answer from one candidate can be inadequate for another candidate, who has larger hand writing or less incisive written English.

Inadequate understanding of certain key words led to answers which lacked a sufficiently clear focus on question needs. Five examples are highlighted below. Good marks were difficult to obtain without precise understanding of what the following words meant.

**Question 1 (b) Climate** – in many answers references to vegetation outnumbered those to temperature and precipitation.

**Question 1 (g) Logging** – a majority of answers were about farming, instead of forest clearance in order to make money from the sale of timber.

**Question 1 (h) Biodiversity** – many candidates defined ecosystem instead of biodiversity in part **(i)**, and gave too much attention to abiotic factors in both parts of the question.

**Question 2 Earthquakes and volcanoes** – references to magma release were included by some under earthquake in **(a)(iii)**. Later in parts **(c)(v)** and **(d)(iii)** many of the same candidates believed that the mudslide, set off by earth movements, was a lava flow. In some instances this led to references to fires, as a cause of the devastation to buildings and trees, which continued the misunderstanding.

Important ideas in the syllabus about sustainable development and the need for management of resources were shown to be well known and understood by most candidates. However, one important way in which good candidates distinguished themselves from others in this examination was by the application of their knowledge and understanding of key words and issues to the context of the question. Examples of this were for 'recycle' in **Question 1 (c)(i)**, 'sustainable' in **Question 1 (d)(iv)**, 'soil erosion' in **Question 1 (f)(iii)**, and 'human factors' in loss of life in earthquakes in **Question 2 (c)(v)**. There was no doubting that these four words and terms were widely understood, but some candidates were unable to adapt their comments to the context stated in the question. Many answers to **Question 1 (c)(i)** were about recycling in order to conserve the Earth's resources, or were written in terms of the water cycle; no mention of recycling nutrients was included. Answers to **Question 1 (d)(iv)** contained some splendid definitions of sustainable, despite the inability of candidates to explain how the way of life of the Indian tribe matched the definition. There were plenty of answers to **Question 1 (f)(iii)** about the general causes of soil erosion, in which there was no discernible use of photographic evidence by observation. Examples of poor building practices responsible for houses being vulnerable to earthquake damage were abundant in answers given to **Question 2 (c)(v)**, but only in a proportion of them was the particular situation in Las Colinas considered.

**Comments on specific questions**

**Question 1**

Part **(a)** turned out not to be the easy starter question that had been intended. Candidates needed only to use information from the diagram in order to gain full marks. Only about a quarter of candidates quoted the height of the emergents (above 30m) in **(a)(i)**; even fewer mentioned the concentration of branches at the top. Many candidates referred irrelevantly to the canopy layer or smaller trees when attempting to find a second feature. Others concentrated upon describing general forest features; whether or not they applied to the emergents was a matter of chance. In **(a)(ii)** lists of labels copied from the diagram abounded; understanding was firmly established only by those who either linked them together by meaningful comments, or used heights.

As had been anticipated, hot and wet all year were the two climatic characteristics stated most often in part **(b)**, even if these two basic points were stated in many different ways. In answers most likely to receive the third mark, one of these characteristics was elaborated upon by stating values. Weaker candidates showed limited understanding of what climate meant and continued vegetation based answers from the previous part, usually with much repetition of material.

Most of the candidates, who placed the focus in their answers on nutrient recycling in part **(c)(i)**, had little difficulty claiming all 3 marks. This was well known and understood. However, answers based on the water cycle were almost as common; sometimes these answers were broadened to include nutrients right at the end, which allowed one or two marks to be salvaged. Answers less likely to receive any marks were those based upon the recycling of rubbish and household wastes. Some candidates totally misinterpreted the needs of **(c)(ii)** by explaining how wind and water caused surface erosion and leaching. Otherwise, the importance of surface vegetation in reducing opportunities for erosion by wind and water, as well as the presence of vegetation to absorb water and nutrients, were widely appreciated by candidates of all levels of ability.

The weakest answers to **(d)(i)** were descriptive; candidates made statements about what was shown on the diagram, without demonstrating any understanding of their significance to village location. The location of the village next to the river was the starting point for almost all of the successful answers. This opened up ample opportunities for comments about river use, and nearness to cultivated land and forest resources on that side of the river. Use of the river for irrigation, however, was considered too unlikely to be credited. This was included mostly in answers from less strong candidates. The map key was the source for the answer to **(d)(ii)**. The best answer to **(d)(iii)** was 27 years since there were nine plots not in use at any one time. An answer of 30 years was also allowed. This question discriminated well according to ability. Less able candidates struggled to understand what needed to be done. Among them, three or six years were the most common answers, because they took into consideration only one or two of the cultivation plots. An answer of nine was given by those who had not allowed for the three year period of cultivation during which each plot was used. The most straightforward way to apply sustainability in part **(d)(iv)** was by noting that the plots were rotated and that this allowed time for soil recovery. Many 2 mark answers followed this route to answering. Those who were wise enough took account of the existence of 3 marks for this question mentioned additionally either the larger extent of natural rainforest compared with cultivation or the usefulness of having such a large area from which food can be obtained using natural resources in relation to village size.

Those candidates who chose a scale of one square for one percent were the ones least likely to make an error in plotting the graph in part **(e)**. Using bars was the most effective method of representation; these were used by the overwhelming majority of candidates. Many accurate and visually effective graphs were drawn, so that the full four marks were awarded quite frequently. The most serious inadequacy was using a variable (non-uniform) scale for percentages. These faulty scales rarely started from zero. Often the same size of gap was used from 30 to 20, from 20 to 18 and from 18 to 17. Two other widespread weaknesses were non-inclusion of a bar for world average percentage, and varying widths of bars.

The safest answer to **(f)(i)** was cattle rearing, because it showed that the candidate had derived the answer directly from photographic observation. In **(f)(ii)** the answer of 'trees' was too glib. Answers were improved by reference to where they were found; in the best answers a brief comment about significance was included as well. The theme of high risk of soil erosion was given equal credit in answers to **(f)(iii)**, but this line of answering was less easy to justify from photographic evidence than low risk, which meant that it tended to lead to two mark answers. Many well argued low risk answers were seen, based upon complete grass coverage, shelter from the trees and limited numbers of cattle visible on the photograph. The poorest answers to **(f)(ii)** and **(iii)** were those in which use of the photograph was minimal or even non-existent.

The general poverty of answers to both parts of **(g)** was a surprise. This was also the question most likely to be left unanswered by candidates. Some appeared unable to make the switch between questions from farming to logging; irrelevant answers, which included references to crop rotation, making terraces and using irrigation, were surprisingly plentiful. Even in logging based answers the one valid idea usually included was replanting trees. This often made an appearance in both **(g)(i)** and **(ii)**. The occasional very good answer which mentioned the profit motive at the expense of environmental considerations in **(g)(i)** and developed one of the strategies named in the syllabus (selective logging, agro-forestry, community forestry or reforestation) in **(g)(ii)**, provided a welcome contrast with the majority of answers.

Part **(h)** was answered more successfully. Within **(h)(i)** finding an example of a change in the local environment (either run off increases or soil erosion leads to sediment blocking rivers) proved to be the most difficult of the three choices. Except for those answers to **(h)(ii)** which followed rigidly the ecosystem path or which were overcome by the carbon cycle, candidates at least hinted at the correct meaning of biodiversity. Mention of sources of foods and medicines were most likely to be included in what were often list-like responses to **(h)(iii)**. Reference to food chains and webs was one of the signs of a superior answer.

Examiners were left with an overall feeling of mild disappointment from many of the answers seen to **Question 1**, especially because a familiar topic was being examined. Questions in previous examinations had attracted more consistent answers. Apart from the question on logging, the majority seemed to hit a poor patch when answering another part of the question, which varied from candidate to candidate.

**Question 2**

Wide variations in levels of answer quality between candidates emerged in part **(a)**. Some candidates made **(a)(i)** more difficult than had been intended by using compass directions in their answers, such as from the west and towards the south east, for which there was no indication on the diagram. The correct answer to **(a)(ii)**, either destructive or convergent, was largely a matter of knowledge, although convergent was suggested by the directions of plate movement marked on the diagram. Candidates were not compelled to use the type of plate boundary shown on the diagram in their answers to **(a)(iii)**; some accurate and full answers were seen for volcanoes along constructive/divergent boundaries and earthquakes along conservative boundaries. Nevertheless most candidates continued to use destructive/convergent boundaries in both parts, for which a little help was available from the diagram. Least successful were answers in which confusion between earthquakes and volcanoes existed.

'Iran' was the most common answer to part **(b)(i)**, although some who had perhaps made a less careful study of the graph chose 'India'. 'No loss of life' and 'the strongest earthquake' were the two expected answers in **(b)(ii)**; these were also the two most common answers. However, significant numbers of candidates increased the difficulty of this question by speculating upon reasons for the low loss of life, without having stated 'no loss of life' in the first place. Also a few 1 mark answers occurred as a result of reversal of the axes; this still gave no loss of life, but led to the incorrect conclusion that the earthquake in the Bellany Islands was the weakest. Usually there are few problems with practical skills questions like **(b)(iii)**; the commonest mark for this question was 2, despite the limited amount of space available for plotting on the graph and the requirement for accuracy. Those candidates who reversed the axes again earned 1 mark.

Parts **(c)(i)** and **(ii)** posed few problems. Incorrect answers were mainly given by candidates whose poor understanding of English led them to select inappropriate information from the newspaper report. Less well answered were parts **(c)(iii)** and **(iv)**. Answers to both parts were short of recorded observations from the sketches. Additionally in **(iii)** information 'after the earthquake' was sometimes included; this was not needed and its inclusion reduced the worth of some answers that began in the manner intended. The most noticeable change shown on the two sketches was the separation of the settlement into two parts by the mudslide. Reference to this was considered essential before both marks were awarded in **(iv)**, but its inclusion was restricted to a small number of candidates. The result was many 1 mark answers. Understanding of the combined roles of natural and human factors in causing loss of life in earthquakes seemed to be better than the clarity with which it was expressed. Differences between natural and human causes were usually implied or hinted at, instead of being explicitly stated. There appeared to be a general appreciation that the earthquake was the root cause, and that this was a natural hazard which people were powerless to prevent. Equally most candidates understood that humans by their actions can limit loss of life in an earthquake. To earn all 3 marks, however, the answer needed to be based on the example of Las Colinas. After establishing the natural cause, there was a tendency for some candidates to divert into poor house building practices, thereby losing sight of the importance of clearing trees and building on steep slopes as significant factors in this example.

In **(d)**, marks were awarded more regularly in parts **(i)** and **(iii)** than in **(ii)**. Weaker answers to part **(d)(ii)** stemmed from lack of use of the map. Many candidates tried to answer this part entirely from information in the boxes around the map. Instead the locations of Ahamabad and Mumbai away from the centre of the earthquake were of critical importance in answering. Location was not used by up to half of the candidates. One common misunderstanding was that there would be time for people living in these two cities to be given a warning after the arrival of the earthquake in Bhachau, which was why so many had time to reach the streets. Candidates found explanation easier in **(d)(iii)**. Two mark answers were distinguished from the more common one mark answers by greater elaboration, or increased willingness to search for a second reason.

In part **(e)** most candidates had little difficulty finding at least two of the four possible reasons given in the newspaper report to explain why so few deaths occurred in the Seattle earthquake. There were relatively few 4 and 5 mark answers to part **(f)**, although 2 and 3 mark answers were normal. Often only one idea was explained and exemplified, which meant that the majority of answers lacked the breadth needed for a response worth 5 marks. The most common answer stated to **(f)(i)** was 'partly true', for which there was no separate mark, but choice of this answer had the advantage of leaving the gate open for the greatest number of explanatory options in **(f)(ii)**. Most frequently used reasons were building strength, wealth and density of population, for which appropriate examples already existed in parts **(b)**, **(c)** and **(d)**. One persistent misunderstanding was that developed/rich countries can predict where and when an earthquake will occur. It was not recognised that strengthening buildings and practising emergency drills were undertaken throughout the zone at risk from earthquakes in rich countries such as the USA. Also many demonstrated a failure to recognise that the earthquake strength in Mumbai was much less than the 7.9 registered on the Richter scale in Bhachau at the epicentre.

The full range of quality was on view in answers to part **(g)**. Some candidates understood well the problems for rescuing people after a natural disaster and wrote about them at some length and with precision. Others paid scant attention to the mention of 'rescue efforts' in the question and wrote long but general answers about the usefulness of their two chosen public services. The latter type of answer was rarely worth more than 1 mark.

Overall answers given to **Question 2** by individual candidates showed greater consistency. After relatively low marks in part **(a)**, the majority were able to keep scoring marks in parts **(b)** to **(e)** at levels which seemed to reflect fairly the extent of their knowledge and understanding. The lack of gaps showed that even less able candidates could achieve in several parts of the question, while more able candidates accumulated a high proportion of the available marks throughout each part.

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**Paper 0670/04**

**Alternative to Coursework**

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## General comments

Overall, the candidates were able to give sensible answers to all the questions. There were some thoughtful responses with good, justifying comments. However, at times, candidates did not seem to have read the question carefully enough; this gave rise to answers that were not appropriate to the context of the question. The Examiners were pleased to see an improvement in the understanding of the basic methods of practical investigations, for instance is was clear from the candidates' answers, that many of them were familiar with rain gauges and thermometers. Many good tables for data were also drawn this year. Centres must recognise that this paper is an alternative to coursework, so questions about practical work will be part of every examination paper. The mark scheme is published and the comments that follow do not cover every alternative marking point.

## Comments on specific questions

### Question 1

**(a)** Nearly all candidates completed the table of climate data. The average was usually correctly calculated, but unfortunately some candidates did not give the total rainfall, but worked out another average. Completion of a data table is likely to be part of any examination and it is expected that candidates study tables carefully before starting their work.

**(b)** The wettest month was usually given correctly, the dry season - May to September - proved a little more difficult, only a minority appeared to suggest months without reference to the data.

**(c)** Many candidates gave appropriate answers suggesting months of extreme temperature events.

**(d)(i)** Candidates were often familiar with the apparatus and they gained two or three marks.

**(ii)** Nearly all candidates drew sensible tables with headings, some unfortunately gave average temperature/rainfall headings; these did not gain credit.

### Question 2

**(a)(i)** Most candidates drew boxes to represent sample areas that were to a satisfactory scale, unfortunately, a significant number only drew three additional boxes instead of the four required by the question.

**(ii)** The need for more than one sample was appreciated by about half the candidates.

**(b)** Candidates were required to use the numbers provided in the question to calculate the total number of trees in the plot; this proved a little more challenging than expected, as several complex calculations were required.

**(c)**    Only a minority of candidates made sensible suggestions.  Sometimes, details of how to find the average were given, however this did not answer the question.  This type of estimation is likely to be needed in real fieldwork situations.

**(d)**    The correct answer was obtained by multiplying 900 by 8.  However, a consequential error was allowed here, so if a wrong answer from **(b)** was multiplied correctly then credit was given.

**(e)(i)**    Nearly all candidates could give three uses of wood.

**(ii)**    If candidates understood that they needed to describe tasks that would be necessary to establish a plot of trees, they usually gained most or all of the marks.  However, some candidates described how to persuade villagers that they needed to set a plot of trees, unfortunately, this was not answering the question.

**(f)**    There were a wide range of sensible guidelines, suggested with good reasons supporting them.  Only a small number of candidates found it difficult to gain marks from this section.

**Question 3**

**(a)(i)**    The table was always attempted and the total was usually correct.

**(ii)**    The response in the *X* and *Y* column was sometimes incomplete, or the correct numerical value was placed in the wrong column; there were also a good many correct answers.

**(b)**    The graph was nearly always attempted, and if a sensible scale was chosen the plotting was nearly always correct.  The Examiners were pleased to see that most scales were labelled.

**(c)**    Candidates often selected the year 2000 rather than 1999.  However, these candidates often went on to give a good answer to explain limited supply and therefore, high demand.  Again the Examiners were pleased to see this concept has become more widely understood by candidates.

**(d)(i)**    Candidates stated a wide range of answers and, those that recognised conditions to mean the environment around the plants, gained two marks easily.  There were some misleading answers about keeping the amount of striga the same, yet the diagram clearly showed that striga does not stay the same.

**(ii)**    Some candidates correctly identified that one trial would have an increased level of nitrogen.  From the diagram, it could have been found that the striga had decreased in A, but increased in B.  The Examiners are marking the ideas rather than a perfectly expressed answer; however, there were a significant number of answers that were too ambiguous for credit.

**(iii)**    Candidates sometimes suggested that using more plants or repeating the whole experiment would make the findings more reliable.  There were some other sensible suggestions, but it was clear that the concept of reliability of practical findings, was not widely understood.

**(e)(i)**    The field plan was often filled in correctly indicating that the candidate had absorbed the information given.  Only a small number of candidates failed to plant all three crops as required and only a small number planted other crops of their choice.  The yields were usually appropriate to the planting plan.

**(ii)**    The Examiners were disappointed to see that large numbers of candidates did not discuss or mention crop rotation.  Sensible developments from their plan for each of the next three years would have secured maximum marks.  Crop rotation has been examined many times in the past, yet candidates from some Centres did not respond as expected here.

**Question 4**

**(a)** Many candidates suggested dust or air pollution and there were some good suggestions about the risks to human health. Some candidates thought there would be deforestation just because it was a form of open cast mining.

**(b)** Candidates were being invited to describe some specific jobs that would become available. The diagram of chemical conversions only stimulated suggestions from a small number of candidates. Vague references to increases in exports were not given credit.

**(c)** This was a challenging question and candidates were able to bring their own knowledge of pollution to their answers. Some good responses were given about the problems of use of fuel to provide heat and possible ammonia escapes.

**(d)** This question was trying to get candidates to think about why there might be problems, either mining or transporting sodium carbonate. Some good answers were given about use of fuel for transport and high investment costs.