READING PASSAGE 2

*You should spend about 20 minutes on **Questions 14–26**, which are based on Reading Passage 2 below.*

Questions 14–19

*Reading Passage 2 has six paragraphs, **A–F**.*

Choose the correct heading for each paragraph from the list of headings below.

*Write the correct number, **i–ix**, in boxes **14–19** on your answer sheet.*

List of Headings	
i	Potential production capabilities of vertical farms
ii	Opposition to new ideas about food production
iii	A successful application of vertical-farming technology
iv	The potential to provide urgent relief
v	The original inspiration for vertical farming
vi	Various environmental benefits of vertical farming
vii	An increasing problem for farmers worldwide
viii	A return to traditional farming methods
ix	A rising demand for food

14 Paragraph **A**

15 Paragraph **B**

16 Paragraph **C**

17 Paragraph **D**

18 Paragraph **E**

19 Paragraph **F**

Skyscraper Farming

A Today's environmental scientists are in no doubt that the world's resources of fertile soil are rapidly deteriorating, and that new land for agriculture is becoming ever more sparse. Intensive farming, urbanisation, desertification and sea-level rises are all putting growing pressure on the planet's agricultural land and therefore on food supplies. Currently 24 per cent of the world's 11.5 billion hectares of cultivated land has already undergone human-induced soil degradation, particularly through erosion, according to a recent study by the UK Government Office for Science.

B The global population is expected to exceed nine billion by 2050 — up a third from today's level — and studies suggest that food production will have to go up by 70 per cent if we are to feed all of those new mouths. This means that scientists will have to develop new ways of growing crops if we are to avoid a humanitarian crisis. Indeed, UN Food and Agriculture Organization figures suggest that the number of under-nourished people is already growing, and with escalating climate change, crop yields in many areas have been projected to decline.

C With this in mind, some scientists and agricultural experts are advocating an innovative alternative to traditional farming whereby skyscrapers packed with shelf-based systems for growing vegetables on each storey — known as 'vertical farms' — could hold the key to revolutionising agriculture. Columbia University professor Dickson Despommier claims that vertical farming could boost crop yields many times over. A single 20-storey vertical farm could theoretically feed 50 000 people. And if the theory translates into reality as proposed, 160 skyscraper-sized vertical farms could feed the entire population of New York City, while 180 would be needed for London, 289 for Cairo and 302 for Kolkata.

D It's a compelling vision, and one that has already been put into practice in Asia — albeit on a smaller scale. 'But there are problems, such as initial investment and operating costs that are too great,' says a spokesman for Japan's Ministry of Agriculture, Forestry and Fisheries. Nevertheless, Tokyo-based mushroom producer Hokuto Corporation is a model example of how a vertical farm can be profitable. With 28 vertical mushroom farms operating across the country, it produces some 68 000 tonnes of mushrooms annually. 'Vertical mushroom farms have more advantages than ground-level farms,' says Hokuto's Ted Yamanoko, who highlights the relative cost-effectiveness of his organisation's farming practices together with reduced emissions of greenhouse gases.

E And the impact of vertical farms could extend beyond feeding established urban populations. Despommier sees them as being capable of helping centres of displaced persons — such as refugee camps — in much the same way that Mobile Army Surgical Hospital (MASH) units are deployed in emergencies. ‘Developing an emergency-response system for crop production inside specially constructed modular and highly transportable greenhouses would allow for humanitarian interventions,’ he says. ‘If you have three or four storeys of food already growing someplace, they could become mobile units that could be picked up by helicopters and dropped into the middle of a crisis zone.’

F But it isn’t only about increasing food production. Despommier is concerned about the harm that farming has done to the world’s landscape over a relatively short time span, particularly the elimination of hardwood forests. ‘Farming is only 12 000 years old,’ he points out. ‘Vertical farming could allow us for the first time to feed everyone on Earth and still return land to its original ecological function.’ Natalie Jeremijenko of New York University agrees. Reducing the land needed for food production could enrich biodiversity, which in turn can raise the productivity of conventional farms. Furthermore, vertical farming could dramatically cut fossil-fuel use and reduce geopolitical tensions in regions where poor farming conditions drive conflict and malnutrition.

Questions 20–22

Complete the sentences below.

*Choose **NO MORE THAN TWO WORDS** from the passage for each answer.*

*Write your answers in boxes **20–22** on your answer sheet.*

20 A UK Government study found that _____ is a significant factor contributing to worldwide levels of soil degradation.

21 Disadvantages of vertical-farming projects include the expense of setting them up, as well as their high _____.

22 _____ could potentially be used to take vertical-farming facilities to areas where there is a critical food shortage.

Questions 23–26

Look at the following statements (Questions 23–26) and the list of people below.

*Match each statement with the correct person, **A, B or C**.*

*Write the correct letter, **A, B or C**, in boxes **23–26** on your answer sheet.*

***NB** You may use any letter more than once.*

23 Vertical farming can have financial benefits.

24 Traditional farming has had a negative effect on the natural world.

25 Vertical farming could dramatically increase world food production.

26 Traditional farms may benefit from wider use of vertical farming.

List of People

A Dickson Despommier

B Ted Yamanoko

C Natalie Jeremijenko

段落标题匹配 (14 – 19)

题号	正确标题	定位 & 关键理由
14 A	**vii An increasing problem for farmers worldwide**	A 段整段都在说耕地肥力迅速下降、可耕新地越来越“*sparse*”，24% 耕地已退化——集中描写“日益严重的全球农业难题”。
15 B	**ix A rising demand for food**	B 段核心句“*The global population is expected to exceed nine billion by 2050 … food production will have to go up by 70 per cent*”直接聚焦“对粮食需求激增”。
16 C	**i Potential production capabilities of vertical farms**	C 段提出高层垂直农场理念，并给出“*could boost crop yields many times over … a single 20-storey vertical farm could theoretically feed 50 000 people*”等产量估算。
17 D	**iii A successful application of vertical-farming technology**	D 段介绍日本 Hokuto Corporation 已运营 28 座垂直蘑菇农场，年产 68 000 吨，说明“成功实践”与盈利模式。
18 E	**iv The potential to provide urgent relief**	E 段强调可将模块化温室做成“*mobile units that could be picked up by helicopters and dropped into the middle of a crisis zone*”，突出紧急人道救援。
19 F	**vi Various environmental benefits of vertical farming**	F 段先批评传统农业破坏森林，再列举垂直农业可“*return land to its original ecological function*”、减少化石燃料使用、缓解地缘冲突等多重环保收益。

填空题 (20 – 22)

题号	答案	关键词定位
20	**erosion**	A 段末句“*… soil degradation, particularly through **erosion**, according to a recent study by the UK Government Office for Science.*”
21	**operating costs**	D 段引语“*initial investment and **operating costs** that are too great*”。题干已含 setup expense，另一缺点即高 operating costs。
22	**helicopters**	E 段“*mobile units that could be picked up by **helicopters** and dropped into the middle of a crisis zone.*”

人物配对 (23 – 26)

题号	正确人名	定位 & 解释
23	**B Ted Yamanoko**	D 段“*highlights the relative **cost-effectiveness** of its organisation's farming practices*” → 说明垂直农场“有经济收益”。
24	**A Dickson Despommier**	F 段开头 Despommier 指出传统农业在短时间内对景观造成“*harm*”，如森林被砍伐——负面影响。
25	**A Dickson Despommier**	C 段 Despommier 估算一座 20 层农场可养活 50 000 人，多座可养活整个纽约，说明可“极大提高全球粮食产量”。
26	**C Natalie Jeremijenko**	F 段末“*Reducing the land needed for food production could enrich biodiversity, which in turn can **raise the productivity of conventional farms***” → 传统农场可因垂直农场而受益。