

Vegetables are losing their nutrients. Can the decline be reversed?

Level 3: Advanced

1 Warmer

a. Discuss these questions with a partner.

1. How often do you eat vegetables? What are your favourite ones?
2. Do you ever eat frozen or canned vegetables? Are they as healthy as fresh ones?
3. What could you do to improve your eating habits?

2 Key words

a. Match the words on the left with their definitions on the right.

- | | |
|----------------------|--|
| 1. accelerated _____ | a. worrying |
| 2. alarming _____ | b. fell sharply and abruptly |
| 3. amendments _____ | c. made something gain speed |
| 4. crop _____ | d. caused |
| 5. deemed _____ | e. the act or process of starting to exist |
| 6. deficiency _____ | f. restore or bring something back to its earlier condition |
| 7. dwindling _____ | g. includes, contains, covers |
| 8. emergence _____ | h. a cultivated plant that is grown and harvested in large amounts |
| 9. encompasses _____ | i. characteristics, features |
| 10. enduring _____ | j. alterations or corrections made to improve a document |
| 11. plummeted _____ | k. produce something positive as a result of time, effort or work |
| 12. prompted _____ | l. lack or shortage of something that is needed |
| 13. replenish _____ | m. viewed or judged in a particular way |
| 14. traits _____ | n. long-lasting |
| 15. yield _____ | o. gradually diminishing in size, intensity, or number |

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b. Use some of the key words from task A to complete these sentences. You may need to change the form of the word.

1. The global employment situation is _____ and shows no sign of recovery in the immediate future.
2. Exports of frozen vegetables _____ in 2023, mainly due to severe weather events.
3. The rate of global forest loss _____ last year, but the government has failed to tackle this issue.
4. Small independent shops struggled due to the _____ of big supermarkets in the city.
5. After a strenuous workout, it's important to _____ your body with fluids and nutrients.
6. A balanced diet _____ a wide range of nutrients, including vitamins and proteins, to support overall health.
7. The study successfully identified some genetic _____ associated with increased risk of certain diseases.
8. The editor said her article needed a few _____.
9. Despite their efforts, negotiations failed to _____ the expected results.
10. Their actions were _____ inappropriate, so they were suspended.

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A process called biofortification puts nutrients directly into seeds and could reduce global hunger, but it's not a magic bullet.

Miranda Lipton

28 March, 2024

- 1 In 2004, Donald Davis and fellow scientists at the University of Texas made an alarming discovery: 43 foods, mostly vegetables, showed a marked decrease in nutrients between the mid- and late-twentieth century.
- 2 According to that research, the calcium in green beans dropped from 65 to 37mg. Vitamin A levels plummeted by almost half in asparagus. Broccoli stalks had less iron.
- 3 Nutrient loss has continued since that study. More recent research has documented the declining nutrient value in some staple crops due to rising atmospheric carbon dioxide (CO₂) levels; a 2018 study that tested rice found that higher CO₂ levels reduced its protein, iron and zinc content.
- 4 The climate crisis has only accelerated concerns about crops' nutritional value. That has prompted the emergence of a process called biofortification, a strategy to replenish lost nutrients or those that foods never had in the first place.
- 5 Biofortification encompasses multiple technologies. One involves genetically modifying a crop to increase its nutritional contents, which allows for the rapid introduction of new traits. Another, agronomic biofortification, utilises nutrient-rich fertilisers or soil amendments to concentrate particular minerals in plants. Lastly, selective plant breeding can produce new varieties, though it can take a decade or more to yield a single variety.
- 6 Biofortification is an alternative to fortification, which has been part of the US industrial food system since the 1920s, when the nation began boosting table salt with iodine to reduce conditions related to mineral deficiency, such as goitre. Biofortification puts nutrients directly into the seed, as opposed to fortification, which adds nutrients to food once it's grown. On the global stage, international stakeholders such as the World Health Organization (WHO) have deemed the development of nutrient-enhanced biofortified crops as one of their leading goals in achieving food security.
- 7 HarvestPlus is an organisation that provides global leadership on biofortification evidence and technology. It is currently working with governments in more than 30 countries, and its biofortified varieties have been planted by more than 100 million farmers across the world, predominantly in developing countries. By 2030, the organisation estimates, 1 billion people will be benefiting from biofortified foods.
- 8 While malnutrition demonstrates the urgent need to increase the nutrient density of crops globally, Benjamin Cohen, professor of Environmental Studies, points to biofortification as a plaster rather than a solution to the problem.
- 9 "My concerns are about funders, based on policymakers, choosing to invest in biofortification instead of supporting more enduring smallholder models of farming that could be more efficient and resilient than large-scale systems," said Cohen. "Promoting biofortification suggests solving a problem that should not exist if not for large-scale, capital-intensive agriculture. It's likely that those same agricultural processes would only be further entrenched with biofortification."
- 10 Davis, who led the original University of Texas study demonstrating dwindling nutrient value in crops, said: "A limitation of biofortification is that it focuses on one or possibly two nutrients per plant, whereas nutrient decline tends to affect many nutrients simultaneously."
- 11 And then there's the hurdle of accessibility. Walton noted that there's not yet a consistent supply of biofortified seeds. HarvestPlus also intends for its biofortified seeds to cost less than traditional seeds. But those lowered costs are the result of government subsidies. For example, India has partnered with HarvestPlus to make biofortified food available for children in a country with a high rate of malnutrition, stunting youth's growth.

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- 12 The government partnership model may pay off in low-to-middle-income nations where malnutrition is common, and businesses are working directly with the smallholder farmers growing biofortified varieties rather than at an industrial scale because the seed supply can't yet reach that volume.
- 13 Cohen pointed out that while the need might be greatest in less industrialised countries, such countries may have fewer mechanisms to resist policies originating in better-resourced countries. They may have fewer regulations about genetically modified, biofortified crops, such as the controversial golden rice, which was altered to produce beta-carotene and, as a result, vitamin A. While golden rice was bred to help alleviate vitamin A deficiencies, Cohen has written that this strategy adopts "technical fixes to problems that could be addressed in ways less dependent on mono-cropped environments". Essentially, if we plant diversified crops that have the vitamins a given population lacks, the same nutritional outcome could be achieved.
- 14 Peter Kelly, CEO of Grow Further, a philanthropic organisation that invests in early-stage, scalable agricultural innovations in developing countries, stated that all their work "is about adapting to climate change in some sense. Carbon dioxide levels can affect the nutrient levels in plants; we have to do this plant breeding just to keep up."

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3 Comprehension check

a. Complete the sentences using words and phrases from the article.

1. According to research, one of the main culprits of the decrease in the nutrients present in rice is _____.
2. Through biofortification, food can recover its nutrients or even acquire nutrients it _____.
3. Biofortification can be achieved through the utilisation of _____.
4. Fortification was first introduced in the _____.
5. As opposed to biofortification, fortification boosts food _____.
6. HarvestPlus works mostly with _____.
7. Cohen believes biofortification isn't a real _____.
8. At the moment, the lower cost of seeds is highly dependent on _____, which impacts accessibility.

4 Key language

a. Complete the phrases with the correct prepositions to form collocations from the article.

1. Forty-three foods, mostly vegetables, showed a marked **decrease** _____ nutrients between the mid and late twentieth century.
2. More recent research has documented the declining nutrient **value** _____ some staple crops **due** _____ rising atmospheric carbon dioxide levels.
3. The climate crisis has only accelerated **concerns** _____ crops' nutritional value.
4. Biofortification is an **alternative** _____ fortification, which has been part of the US industrial food system since the 1920s.
5. Biofortification adds nutrients directly to the seed, as **opposed** _____ fortification, which adds nutrients _____ food once it's grown.
6. By 2030, the organisation estimates, 1 billion people will be **benefiting** _____ biofortified foods.
7. A limitation of biofortification is that it **focuses** _____ one or possibly two nutrients per plant.

b. Used three phrases from task A to write personalised sentences.

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5 Discussion

a. Discuss these statements.

- “Promoting biofortification suggests solving a problem that should not exist if not for large-scale, capital-intensive agriculture. It’s likely that those same agricultural processes would only be further entrenched with biofortification.”
- “While the need might be greatest in less industrialised countries, such countries may have fewer mechanisms to resist policies originating in better-resourced countries.”
- “If we plant diversified crops that have the vitamins a given population lacks, the same nutritional outcome could be achieved.”
- “It is (all) about adapting to climate change in some sense. Carbon dioxide levels can affect the nutrient levels in plants; we have to do this plant breeding just to keep up.”

6 In your own words

- a. Prepare a presentation outlining different initiatives that could help reduce global hunger. Do some online research and gather relevant information to support your views.