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High tech, high yields? The Kenyan farmers deploying AI to increase productivity

Level 3: Advanced

1 Warmer

a. These countries are the world's leading producers of the following crops. Match the countries with the crops.

1. Brazil	a. olives
2. China	b. sunflower seeds
3. Ivory Coast	c. coffee
4. Spain	d. potatoes
5. Russia	e. maize
6. USA	f. cocoa

2 Key words

a. Fill the gaps in the sentences using these key words from the text.

coordinate	humidity	indigenous	plot	stride
erosion	inadequate	pest	ragged	yield

1. If you _____, you walk with energy and confidence.
2. A(n) _____ is one of a set of numbers that gives the exact position of something on a map.
3. A(n)_____ is the amount of something such as a crop that is produced.
4. If something is described as _____, it is not enough or nor good enough for a particular purpose.
5. A(n) _____ is an insect or small animal that damages plants.
6. If something, such as a leaf, is _____, it has edges that are not smooth or straight.
7. A(n) _____ is a piece of land used for a particular purpose.

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8. If a practice is _____, it belongs to a particular area.
9. _____ is the gradual reduction or destruction of something important.
10. _____ is the amount of water in the air.

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AI apps are increasingly popular among small-scale farmers seeking to improve the quality and quantity of their crop

Carlos Mureithi

30 September, 2024

1 Sammy Selim strode through the dense, shiny green bushes on the slopes of his coffee farm in Kericho, Kenya, accompanied by a younger farmer. They paused at each corner to send the farm's coordinates to a WhatsApp conversation.

2 The conversation was with Virtual Agronomist, a tool that uses artificial intelligence to provide fertiliser application advice using chat prompts. The chatbot asked some further questions before producing a report saying that Selim should target a yield of 7.9 tonnes and use three types of fertiliser in specific quantities to achieve that goal.

3 "My God!" Selim said upon receipt of the report. He had planned to use much more fertiliser than Virtual Agronomist was recommending. "I could have wasted money."

4 In Kericho and other parts of Kenya, AI-powered tools have become increasingly popular among small-scale farmers seeking to improve the quality and quantity of their produce.

5 Pests, diseases and a lack of technical knowhow mean farmers have become accustomed to suffering crop losses on a large scale. They used to rely on advice from agricultural extension officers but their numbers have declined in recent years due to inadequate funding.

6 Selim started using Virtual Agronomist on his 0.4-hectare farm in 2022, with the help of another farmer who had a smartphone at the time. Following its recommendations, his farm produced 7.3 tonnes of coffee, his highest yield ever. He's optimistic that the new recommendations will work too. "Technology helps," he said.

7 Before adopting Virtual Agronomist, Selim would simply apply fertiliser using what he described as "general farmer's knowledge", putting different types at different times of the year without knowing the soil health. The farm's productivity was low. In one season, he managed to produce only 2.3 tonnes of coffee.

8 At other times, he'd take samples of his soil for testing at labs far away, but the results would take months to come back and sometimes they wouldn't arrive at all.

9 "A big challenge for farmers is not knowing exactly what their soil needs," said Florah Maritim, factory manager at Sorwot Coffee Farmers Cooperative Society, which buys coffee from local farmers.

10 The story is similar for farmers trying to determine what pests and diseases have affected their crops.

11 Musau Mutisya, from Machakos County, said he used to rely on his own knowledge to identify pests and diseases, but he wasn't always accurate.

12 On a recent sunny morning on his 0.6-hectare (1.5-acre) farm, he stood next to a maize plant, pointing his phone's camera at a ragged, torn leaf using PlantVillage, an AI-powered app for diagnosing pests and diseases.

13 A voice assistant instructed him on where to hold the phone, identified the pest and gave him advice on how to control it. "It was just guesswork in the past," he said. "You end up spending more money treating what you don't know."

14 Farmers need information to succeed, said Enock Chikava, director for agricultural delivery systems at the Gates Foundation, which supports the non-profit outfit iSDA that created Virtual Agronomist. Technology can help fill the gap left by the lack of extension officers, he said.

15 A report released in July by the GSM Association found that most use cases of AI in Kenya, Nigeria and South Africa were in agriculture and food security. The report said the potential for the technology to support socioeconomic growth on the continent was massive, but to realise it, efforts needed to be made to tackle digital-skills shortages and get more smartphones in people's hands.

16 Both PlantVillage and Virtual Agronomist use a "lead-farmer" model, whereby farmers with smartphones are trained to use the tools not only on their own farms but also on neighbouring plots. PlantVillage is free to use, as is Virtual Agronomist for all crops apart from coffee, for which it charges300 Kenyan shillings (about 1.70 British pounds) for advice.

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17 Despite the promise, some scientists caution about dependence on AI tools for agriculture. Angeline Wairegi, who has researched the use of the technology in agriculture in east Africa, said most AI training datasets exclude indigenous knowledge, meaning the information they provide can exclude successful localised practices.

18 "Heavy reliance on AI tools to set farming practices may result in the erosion of long-held, and tested, indigenous agricultural practices," said Wairegi. But for farmers such as Boniface Nzivo in Machakos County, AI is a game changer. He uses a system called FarmShield to monitor temperature, humidity and soil moisture, and advise him on when to water his cucumbers – aspects that he used to struggle with.

19 "I don't waste time trying to figure out how much water to use," he said while inside a greenhouse for growing the plant, which needs a consistent water supply. "It's a great technology."

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3 Comprehension check

a. Answer the questions using information from the article.

1. How does Virtual Agronomist work?
2. How could Selim have wasted money?
3. Why are AI tools popular among farmers in Kenya?
4. What did farmers rely on before the use of AI tools?
5. How much more coffee has Selim produced since he started using Virtual Agronomist, since his low yield of 2.3 tonnes?
6. What did farmers use in the past to identify pests and diseases?
7. Where is AI most used in Kenya?
8. How much does it cost to use Virtual Agronomist for crops other than coffee?
9. What do some scientists believe is a possible negative aspect of AI tools?
10. What does FarmShield advise Boniface Nzivo to do?

4 Key language

a. Match the verbs words to make expressions from the text.

1. achieve	a. samples
2. waste	b. a gap
3. suffer	c. a goal
4. water	d. money
5. take	e. plants
6. fill	f. losses

b. Use the correct form of two of the phrases from task a to fill the gaps in the sentences.

1. Doctors had to _____ from hundreds of patients to identify the disease.

2. She studied hard and _____ of becoming a doctor.

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5 Discussion

a. Discuss these statements.

- 'AI will benefit everyone on Earth'.
- 'Consumers should pay more for food products from poor countries'.
- 'It is better to buy products from small producers than from big companies'.

6 In your own words

a. Use an internet search engine to find more information about the use of artificial intelligence in farming.

b. Report your findings to the class.