A CREEPY-CRAWLY FOOD REVOLUTION

Long considered pests, insects are now on the menu for farmed fish and poultry in Kenya and Uganda, where scientists are looking for cheaper, healthier ways to boost animal growth and develop the local economy

POSTED BY BRIAN OWENS ON MARCH 22, 2017

Raising chickens or fish in Africa can be an expensive proposition. Most of the money goes into just keeping them fed, which accounts for 60 to 70 per cent of the cost of rearing the animals.

"Around here, the high cost can discourage farmers from using high-quality feeds," says Komi Fiaboe, an agricultural entomologist at the International Centre of Insect Physiology and Ecology in Nairobi, Kenya.

The feed's most expensive component is protein, which usually comes from imported soybeans or a combination of imported and locally sourced fishmeal, and the cost of the latter has doubled in the past couple of years. So researchers in Uganda and Kenya are investigating a cheaper, local alternative that could reduce the price of feed while providing economic opportunities in the region: insects.

But first, Fiaboe and his colleagues have to find solutions to three problems: they must demonstrate that insects are at least as nutritious as the protein in existing feed, determine whether enough insects can be grown to satisfy demand, and get regulations in place that will allow insects to be used as feed.

Fiaboe's findings have been promising. After insects were boiled and toasted to kill any harmful microbes and ground into flour to be mixed with conventional feed ingredients, they turned out to be a very good protein source. "Most have a higher proportion and higher quality of protein than fishmeal," Fiaboe says, adding that the insects also have more fatty acids, which is a nutritional advantage.

The insect feed also led to better results when tested on fish and poultry. Tilapia raised on feed that had 33 per cent of its protein come from insects had higher growth rates after four weeks than fish raised on conventional feed, while chickens raised on insect feed produced more and better quality eggs, says Fiaboe.

But those results won't matter if farmers can't get enough of the bugs. In Kenya, for instance, substituting 30 per cent of the protein found in fish feed would require 50,000 metric tonnes of insects every year. Substituting just five per cent of the fishmeal protein in Kenya's poultry feed would require between 27,000 and 32,000 metric tonnes of insects annually.

A staff member at the International Centre of Insect Physiology and Ecology checks trays of black soldier fly larvae that will be used in fish and poultry feed. (Photo: Courtesy of ICIPE)

Adult black soldier flies on a plant at the International Centre of Insect Physiology and Ecology in Nairobi, Kenya. Scientists at the facility are studying how to use insects such as the black soldier fly in fish and poultry feed. (Photo: Courtesy of ICIPE)

This is why Fiaboe and his colleagues are working out how to quickly grow lots of insects in a small space. The best option they've found so far is using the black soldier fly. Not only is it a nutritious option for fish and chickens, but it multiplies quickly and is simple to rear. A 10-by-five-metre screen house filled with stacked trays of the fly larvae can produce two metric tonnes of insects per month.

The flies have other advantages, too. They aren't a nuisance species that spreads disease or blights crops, and they can be raised on barley waste from local breweries, so they don't compete with humans or livestock for food. Fiaboe is also testing other insects, including crickets and silkworm pupae, which are usually discarded once their cocoons are harvested.

The relatively small area needed for an insect-rearing operation means it could provide economic opportunities for women and young people. These groups in particular face barriers in access to land, says Jemimah Njuki, a senior program specialist with the International Development Research Centre, which is supporting Fiaboe's research along with the Australian Centre for International Agriculture Research. "So if you only need a small area to grow insects, that could be potentially huge for their employment."

Commercial feed companies were already enthusiastic about including insect protein in their products, says Fiaboe. They were just waiting for someone to show that the bugs were a good nutritional option, and for proper regulations. In many places, insects are considered impurities, but there are no regulations governing their use in animal feed in Kenya or Uganda.

The project's leaders have been working with the Uganda National Bureau of Standards and the Kenya Bureau of Standards to develop guidelines for including insects in livestock feed. If all goes well in that process and in ramping up production to the required levels, insect-based feeds could be on the market in both countries within one or two years.

"The idea is to move the science alongside the standards development process," says Njuki, "so the rules are in place when the technology is ready."

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READING AS THINKING

Answer the following in complete sentences.

1. a) Skim the article and highlight keywords. Sort the words into themes below.

THEME:	THEME:	THEME:
•	•	•
•	•	•
•	•	•

b) What is the main message that the writer is trying to share?

2. How are farmers cutting the costs of raising chickens and fish in Africa?

3. What three problems must be solved before insects can be used to reduce the price of feed?

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4. Explain how Komi Fiaboe and his colleagues are working to address the three problems.

PROBLEM 1:	PROBLEM 2:	PROBLEM 3:
•	•	•

5. Why is the black soldier fly an optimal protein source?

6. What are some ways in which insect-rearing could be beneficial for young people and women?

7. Fiaboe's research is supported by the International Development Research Centre and the Australian Centre for International Agriculture Research. Discuss the importance of partnerships.

8. In the article, Jemimah Njuki says, "The idea is to move the science alongside the standards development process, so the rules are in place when the technology is ready." What does this statement mean? What are some implications?

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Think-Pair-Share

9. *Think*
   Reread the last couple of paragraphs. Pretend that you are working with the Uganda National Bureau of Standards and the Kenya Bureau of Standards to develop guidelines for including insects in livestock feed. What would these guidelines be?

10. *Pair*
    In a group, develop an informative advertising campaign (print, video, social media, etc.) that encourages farmers to use insects in livestock feed. Be sure to include the guidelines that they are to follow.

11. *Share*
    Each group can share their campaign with the class.

ONLINE

1. Using Google Maps, locate Nairobi in Kenya and explore the city using Street View and the satellite and map modes. Use the quick facts section and other research tools to find the following:
   a. Population
   b. Neighbouring cities
   c. Major bodies of water
   d. Parks and reserves within a 200 kilometre radius
   e. Neighbouring countries
2. Familiarize yourself with one topic of research (human, animal, environmental or plant health) that is covered by the International Centre of Insect Physiology and Ecology.
3. Learn all about edible insects.
4. Learn about the process and benefits of using cassava peels to feed animals.
5. Will we be eating insects in the future? Learn about this possibility here.
6. Read the FDA's Defect Levels Handbook to learn about how many insects might be in food that you consume every day.
7. Watch this video about researchers in China exploring the possible role of insects in the process of waste disposal and food.
8. Check out this article about some popular edible insects and their respective flavours.

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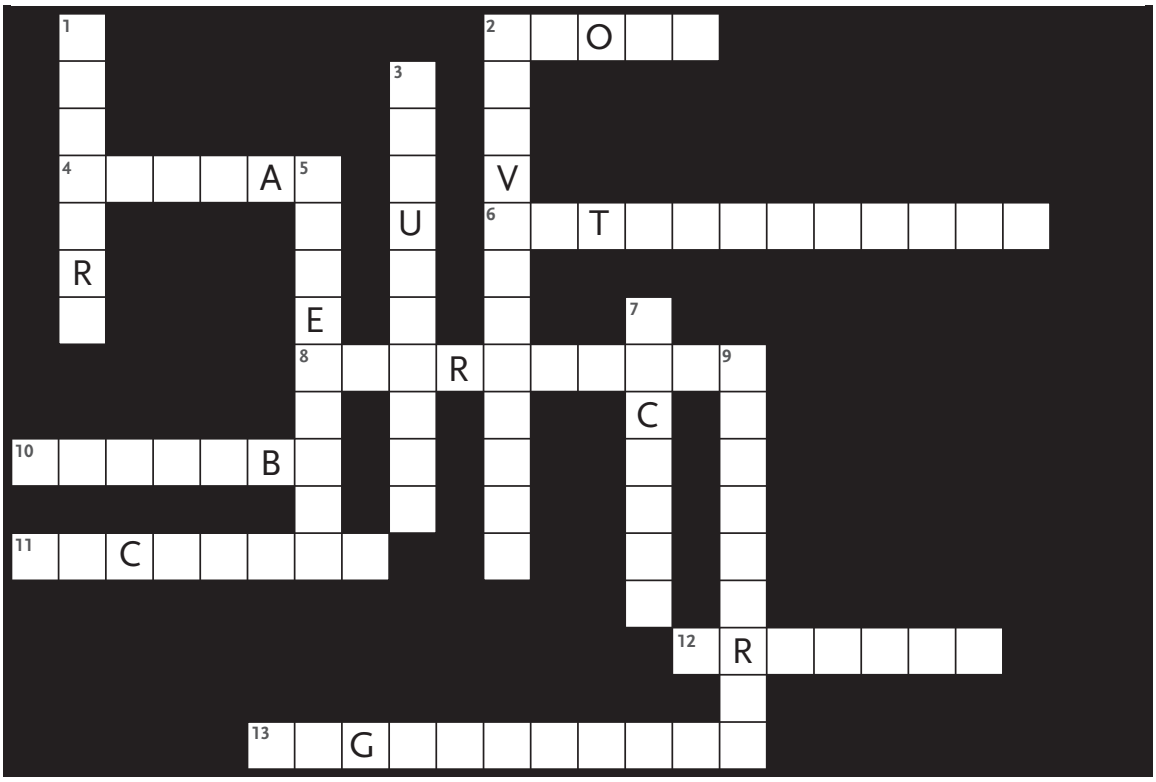

CROSSWORD:

Across

2. Once ripe, they are harvested
4. The feeding stage of a fly's development
6. Komi Fiaboe's profession
8. Good for one's health
10. The capital city of Kenya
11. These are killed by boiling or toasting the insects
12. Insects are a good source of this
13. Authoritative rules

Down

1. Birds raised for their eggs or meat
2. Regular, current
3. In many places, insects are considered to be this
5. High costing
7. These are harvested from the silkworm
9. Base requirements