Edible insects could play key role in cutting harmful emissions

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Eating insects instead of beef could help tackle climate change by reducing harmful emissions linked to livestock production, research suggests.

Replacing half of the meat eaten worldwide with crickets and mealworms would cut farmland use by a third, substantially reducing emissions of greenhouse gases, researchers say.

While consumers' reluctance to eat insects may limit their consumption, even a small increase would bring benefits, the team says. This could potentially be achieved by using insects as ingredients in some pre-packaged foods.

Using data collected primarily by the UN's Food and Agriculture Organization, scientists have compared the environmental impacts of conventional meat production with those of alternative sources of food. It is the first study to do so.

Researchers at the University of Edinburgh and Scotland's Rural College considered a scenario in which half of the current mix of animal products is replaced by insects, lab-grown meat or imitation meat.

They found that insects and imitation meat—such as soybean-based foods like tofu—are the most sustainable as they require the least land and energy to produce. Beef is by far the least sustainable, the team says.

In contrast to previous studies, lab-grown meat was found to be no more sustainable than chicken or eggs, requiring an equivalent area of land but using more energy in production.

The team says halving global consumption of animal products by eating more insects or imitation meat would free up 1680 million hectares of land—70 times the size of the UK.

Similar land savings could also be made by switching from the current mix of animal products to diets higher in chicken and eggs, the team says. They found that the land required to produce these was only marginally greater that for insects and imitation meat.

As well as being a major contributor to human-induced greenhouse gas emissions, current livestock production has other environmental impacts. Globally, pasture covers twice the area of cropland, and livestock consume around a third of all harvested crops, researchers say.

The research, published in the journal *Global Food Security*, was supported by the UK's Global Food Security Programme and the European Union's Seventh Framework Programme. It was carried out in collaboration with Scotland's Rural College, the University of York, Karlsruhe Institute of Technology and the Centre for Australian Weather and Climate Research.

Lead author Dr. Peter Alexander, of the University of Edinburgh's School of GeoSciences and Scotland's Rural College, said: "A mix of small changes in consumer behaviour, such as replacing beef with chicken, reducing food waste and potentially introducing insects more commonly into diets, would help achieve land savings and a more sustainable food system."

Professor Dominic Moran, of the University of York and Scotland's

Rural College, said: "The environmental challenges facing the global agricultural industry are increasing and this paper has studied some of the alternative foods that we can introduce into our diets to alleviate some of this pressure."

More information: Peter Alexander et al, Could consumption of insects, cultured meat or imitation meat reduce global agricultural land use?, *Global Food Security* (2017). DOI: 10.1016/j.gfs.2017.04.001

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