

AGRICULTURAL EMISSIONS

Benefits of a pea and tonic

Environ. Int. **130**, 104870 (2019)



Credit: David Cabrera Navarro/Alamy Stock Photo

Agriculture is a large source of greenhouse gas emissions, and fertilizer runoff can cause other environmental issues. Legumes could be a greener alternative, because of their nitrogen-fixing ability and reduced emissions relative to other crops, while also providing protein for humans and animals.

To investigate this potential, Theophile Lienhardt of Bangor University, Wales, and collaborators conduct a life-cycle analysis of peas (*Pisum sativum* L.) for gin production. In 12 of the 14 considered categories, pea gin had a smaller environmental footprint

than wheat gin, including 12% lower global warming. The distillation and fermentation process resulted in a protein-rich animal feed coproduct, further mitigating emissions due to land clearing, cultivations, processing and transport associated with the production of alternatives. Overall, they conclude that each litre of pea gin avoids 2.2 kg CO₂e emissions.

The authors suggest there is great potential for use of legume starches in alcohol and biofuel production, which could reduce reliance on South American soybean, and mitigate the large associated emissions. *BW*

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AGRICULTURE

Climate and food goals

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Demand for cereals such as maize is expected to triple in sub-Saharan Africa by 2050 due to population growth and dietary changes. To meet this demand, agricultural production will need to increase, either by intensifying existing production through higher fertilizer inputs, or expanding the agricultural area through conversion of grasslands and forests to farmland.

Agriculture is a large emitter of greenhouse gases and so efforts to reduce emissions may compromise food security. Marloes van Loon of Wageningen University, the Netherlands, and colleagues investigate the impacts that achieving self-sufficiency in cereal production would have on greenhouse gas emissions in ten sub-Saharan countries. They find that meeting food demand leads to increased emissions, regardless of strategy. However, these are lower with agricultural intensification



Credit: Jon Arnold Images Ltd/Alamy Stock Photo

than expansion, particularly if gains are made in nutrient use efficiency through good agricultural practices. Achieving food security and climate goals together in sub-Saharan Africa will therefore require careful management to mitigate emissions associated with increasing food production. *AF*

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MEDIA STUDIES

National frames

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News media plays an important role in shaping public knowledge about the scientific, social and political dimensions of climate change. While previous research has noted variation in media framing across countries, the relationship between media frame use and national context remains under-investigated.

Hong Tien Vu of the University of Kansas, USA, and colleagues conduct a content analysis of 37,670 news articles published between 2011 and 2015 from 84 publications covering 45 countries to explore popular media frames and assess their macroeconomic and political context. They find that globally climate change news was most frequently discussed in terms of international relations (for example, UN conferences and international agreements), followed by economic impact and social progress. Notably, news in countries with higher gross domestic product (GDP) per capita was more likely to be framed in terms of scientific evidence and domestic politics, while countries with lower per capita income more often emphasized international relations and physical impacts (for example, melting glaciers and natural disasters). Although climate change is a global phenomenon, this research suggests distinct national constructions of the issue are possible. *AY*

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DEFORESTATION

Temperature definitions matter

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Deforestation has complex feedbacks. Clearing trees can change surface brightness and the amount of sunlight reflected to space, modify the partitioning of surface latent and sensible heat, and affect land-atmosphere interaction. Clarifying the net impact of these processes on local temperature, however, is hindered by differences in how that is defined. Common options include surface temperature, measured at the 'skin' of the land surface, and 2-m temperature, representing a thermometer reading 2 m aloft.

Johannes Winckler of the Max Planck Institute for Meteorology, Germany, and colleagues investigate the impact of deforestation on these variables in climate models. Removing high-latitude trees decreases temperature locally at the surface and at 2 m in the annual mean, though with warming during local summer. Tropical deforestation, by contrast, leads to year-round warming, strongest at the surface. The magnitude of change between air and surface temperatures can differ by a factor of two. This highlights the importance of temperature definition when comparing models and observations, especially for policy-relevant impacts of land use change. *BL*

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