

Ask Pablo: What's the Impact of Imported Tropical Fruit?

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By

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Dear Pablo: What is the environmental impact of importing tropical fruit? Should I eat only what is grown in the US?

In our globalized world, products travel halfway around the world all the time. Water is shipped from Fiji and Italy, wine comes from Australia and Chile, shoes and electronics come from China, and beer is imported from just about anywhere that produces it. Unless we take the extreme stance that nothing should be transported (in which case we can go back to subsistence farming, making our own clothes, and walking everywhere), we should instead focus on minimizing the negative impacts of our contribution to the global economy.

Global trade is also filled with interesting paradoxes that are worth examining. Here we take a closer look at a commodity shipped all over the globe -- tropical fruits. There are times when global trade makes sense. A [study from New Zealand's Lincoln University](#) that proved New Zealand lamb transported to the UK to have a lesser carbon footprint (688 kg per tonne)

than UK raised lamb (2,849 kg per tonne). My own [life cycle assessment of global wine production and distribution](#) found, to the annoyance of the California Wine Institute, that French wine had a lower carbon footprint than California wines roughly East of the Mississippi, mainly due to the inefficiency of truck transportation versus container ship. The numbers behind this "wine line" were recently reinforced in a new paper published by the [Journal of Wine Research](#) (co-authored by a UC Berkeley PhD student and me).

Never Mind Apples And Oranges, Can We Compare Apples To Bananas?



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In some cases we can compare tropical fruit grown in Central America to the same fruit grown domestically but, like the New Zealand lamb example above, the net emissions will likely favor the imports because non-tropical climates simply do not support the efficient production of tropical fruits. Fertilizer use, watering requirements, pesticides use, greenhouse infrastructure, and yield will all favor tropical imports.

So it is clear that trying to grow most tropical fruits domestically isn't going to benefit the environment, but should we be eating them at all? This philosophical question is much more of a personal choice than anything. If we followed a strict local-only fruit policy, many of us would be limited to little more than apples, and only when they are in season. Some regions in the far north or in especially dry climates don't even support fruit production. I would

argue that the vitamins, minerals, fiber, and other nutrients provided by tropical fruit, not to mention the sensory enjoyment of enjoying them justify their importation and consumption (in moderation of course).

So What Is The Carbon Footprint Of Tropical Fruit?



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A life cycle assessment (LCA) is currently being conducted by Erik Svanes, Research Scientist at [Ostfold Research AS](#) in Norway, on Dole Bananas produced in Costa Rica and distributed in Norway but the results are not yet available. However, a study by Tobias Bandel of [Soil and More](#), provides us with a look into the water footprint, which is around the amount of water held by a bathtub for each kilogram of banana, and a little bit less for pineapples. The exact amount of water use is split into "green water" (consumptive use of rainwater), "blue water" (consumptive use of water withdrawn from groundwater or surface water) and "gray water" (water pollution), and varies widely based on location and the packing plant's processing technology. One kg of pineapples can require as little as 57 liters of green water per year to as much as 116 liters of green water and 7 liters of blue water per year for growing and between 3 and 8 liters of gray water for processing. Bananas range around 200 liters of green and gray water for cultivation and between 0.12 and 5.5 liters for processing per kg of banana.

Several LCA studies of bananas and pineapples have been conducted but are not available online. According to CE Delft's [Greenhouse Gas Emissions for Shipping and Implementation Guidance for the Marine Fuel Sulphur Directive](#) a container ship emits 24.4 grams of CO₂ for every tonne transported by one nautical mile. From Costa Rica, Dole's container ships travel over 1800 nautical miles over one week to deliver refrigerated containers full of fruit to

a US port. For each tonne of fruit, the results in 43.92 kilograms of CO₂ (or 44 grams per kg of fruit). But by far the largest emissions component is the contribution from keeping the fruit at 8°C in the refrigerated containers. This contribution brings the total transportation emissions to at least 220 grams per kilogram of fruit. The full life cycle assessment currently being undertaken will include all of the other elements not considered here and will probably result in total emissions around 500 grams per kg of fruit (although I'm not putting any money on that).

What this means for us is that you will probably emit more greenhouse gasses on your drive to the store than emitted in the fruit's entire supply chain.

What Is Being Done To Reduce The Impact Of Tropical Fruit Production and Transportation



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On a recent stakeholder visit to Costa Rica with the Dole Food Company (excellent summary available [here](#) and [here](#)) I was able to witness firsthand the realities of tropical fruit production, the amazing level of effort being put into innovation and social/environmental/economic advancement, and the exciting projects that have been undertaken. This trip, which involved stakeholders representing international and local NGOs, universities, institutes, customers and the media, and was fully paid for by Dole.

In the fields we witnessed soil conservation and habitat protection and in the processing plants we learned about various innovative water-saving projects. At the port we visited one of Dole's container ships and learned about the enormous reduction in greenhouse gas emissions achieved in recent years. Though a combination of purchasing new refrigerated containers with more efficient refrigeration technology, and proactive refrigerant gas leakage detection they have cut energy use in half and have reduced greenhouse gas emissions by over 90% (refrigerant gasses have a much higher relative global warming impact than CO₂).