

Trying to fight global warming, one pig at a time

MEAT, From Page 1

High-technology solutions include those like the Dutch project, called "methane capture," as well as inventing feed that would make cows belch less methane, which traps heat with 25 times the efficiency of carbon dioxide. California is already working on a program to encourage such systems in pig and dairy farms like the one in Sterksel.

Other proposals include everything from persuading consumers to eat less meat to slapping a "sin tax" on pork and beef. Next year, Sweden will start labeling food products so that shoppers can compare how much emissions a serving of steak will generate, compared with, say, chicken or turkey.

"Of course, for the environment, it's better to eat beans than beef, but if you want to eat beef for New Year's, you'll know which beef is best to buy," said Claes Johansson, chief of sustainability at the Swedish agricultural group Lantmannen.

But such fledgling proposals are part of a daunting game of catch-up. In large developing countries like China, India and Brazil, consumption of red meat has risen 33 percent in the last decade. It is expected to double globally between 2000 and 2050. While the global economic downturn may slow the globe's appetite for meat momentarily, it is not likely to reverse a profound trend.

Of the more than 2,000 projects supported by the United Nations' "green" financing system, designed to curb emissions, only 98 are in agriculture. There is no standardized green labeling system for meat, as there is for electric appliances and even for fish.

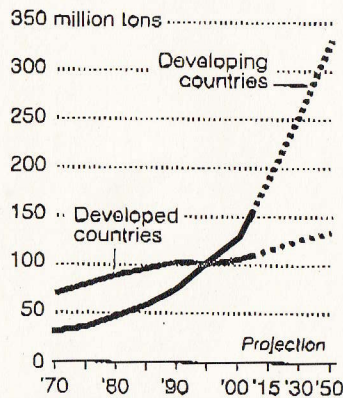
Scientists are still trying to define the practical, low-carbon version of a slab of bacon or a hamburger. Every step of producing meat creates emissions.

Flatus and manure from animals

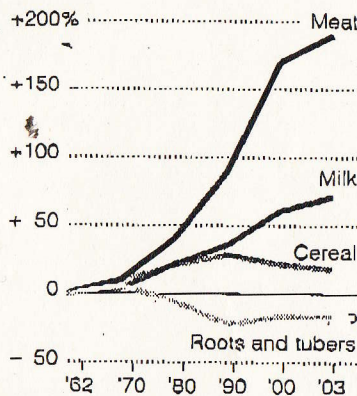
Meat consumption and CO₂ emissions

According to a report by the United Nations Food and Agriculture Organization, livestock generates 18 percent of the world's greenhouse gas emissions. The problem is expected to grow, as developing countries increase their consumption of meat and byproducts.

Meat production



Food consumption in developing countries

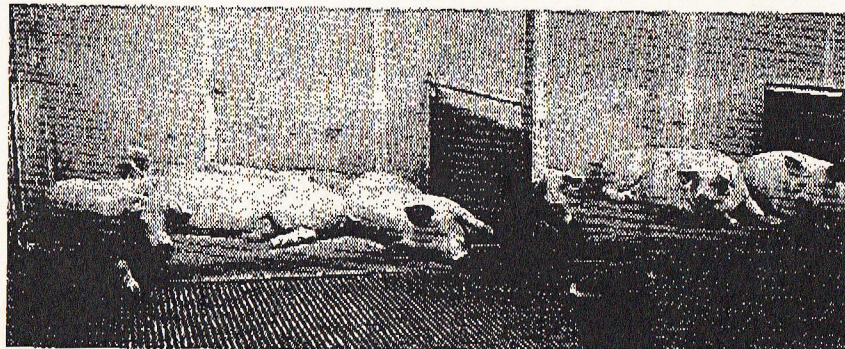


CO₂ produced

Pounds of CO₂ per pound of product

Milk	1
Cheese	10.8
Chicken	1.8
Pork	4.9
Salmon	6
Shrimp	12
Beef (milk production)	15
Beef (only meat)	20
Oat flakes	0.7
Flour, wheat	0.5
Carrots	0.2
Tomatoes, greenhouse	2.7

Source: "Livestock's Long Shadow," by United Nations Food and Agriculture Organization, 2006; Lantmannen



Michel de Groot for The New York Times

Swine at Sterksel, an experimental center that converts manure into electricity.



livestock-related emissions, saying the the United States produces extraordinary waste materials — outdated carrot juice

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contain not only methane, but also nitrous oxide, an even more potent warming agent. And meat requires energy for refrigeration as it moves from farm to market to home.

Producing meat in a crowded world requires creating new pastures and planting more land for imported feeds, particularly soy, instead of relying on local grazing. That has contributed to the clearing of rainforests, particularly in South America, which in turn robs the world of crucial "carbon sinks," the vast tracts of trees and vegetation that absorb carbon dioxide.

"I'm not sure that the system we have for livestock can be sustainable," said Pachauri. He suggests that "the most attractive" near-term solution is for everyone simply to "reduce meat consumption," a change that he says would have more effect than switching to a hybrid-energy car.

Groups like the Food Ethics Council in Britain and the medical journal *The Lancet* have supported his suggestion that people eat less red meat to control global emissions, noting that Westerners eat more meat than is healthy anyway.

Producing a kilogram, or 2.2 pounds, of beef creates seven times as much greenhouse gas emissions as a kilogram of chicken and more than 50 times as much as a kilogram of vegetables, according to Lantmannen.

But suggestions to eat less meat run into resistance from a growing number of carnivores and a booming global livestock industry. Meat producers have taken issue with the UN estimate of

figure is inflated because it includes the Amazon deforestation, a phenomenon that the Brazilian producers say might have occurred anyway.

UN scientists defend their accounting. With so much demand for meat, "you do slash rainforest," said Pierre Gerber, a senior official at the UN Food and Agriculture Organization. Soy cultivation has doubled in Brazil in the past decade, and more than half is used for animal feed.

Laurence Wrixon, executive director of the International Meat Secretariat, said that his members were working with the Food and Agriculture Organization to reduce emissions but that the main problem was fast-rising consumption in developing countries.

"So whether you like it or not," he said, "there's going to be rising demand for meat, and our job is to make it as sustainable as possible."

Estimates of emissions from agriculture as a percentage of all emissions vary widely from country to country, but they are clearly more than 50 percent in big agricultural and meat-producing countries like Brazil, Australia and New Zealand.

Last year, after a decade of relative stability, methane levels jumped worldwide. An estimated 60 percent is related to farming activities, like livestock and rice growing.

In the United States, agriculture accounted for just 7.4 percent of its greenhouse gas emissions in 2006, according to the Environmental Protection Agency.

The percentage was lower because

namely high levels of emissions in other areas, like transportation and landfills, compared with other nations. The figure also did not include fuel-burning and land-use changes.

Wealthy, environmentally conscious countries with large livestock sectors — including the Netherlands, Denmark, Germany and New Zealand — have started experimenting with solutions.

In Denmark, by law, farmers now inject manure under the soil instead of laying it on top of the fields, a process that enhances its fertilizing effect, reduces odors and also prevents emissions from escaping. By contrast, in many parts of the developing world, manure is left in open pools and lathered on fields.

Others suggest including agriculture emissions in carbon cap-and-trade systems, which currently focus on heavy industries like cement-making and power generation. Farms that produce more than their preset limit of emissions would have to buy permits to pollute from greener colleagues.

New Zealand recently announced that it would include agricultural emissions in its new emissions-trading program by 2013. To that end, the government is spending tens of millions of dollars financing research and projects, like breeding cows that produce less gas and inventing feed that makes cows belch less methane, said Philip Gurnsey of the New Zealand Environment Ministry.

At the electricity-from-manure project in Sterksel, the refuse from thousands of pigs is combined with local

and crumbs from a cookie factory — and pumped into warmed tanks called digesters. There, resident bacteria release the natural gas within, which is burned to generate heat and electricity.

The farm uses 25 percent of the electricity, and the rest is sold to a local power provider. The leftover mineral slurry is an ideal fertilizer that avoids the use of chemical fertilizers, whose production would create a heavy dose of carbon dioxide.

For this farm, the program has provided a substantial payback: By reducing its emissions, it has been able to sell carbon credits on European markets. It makes money by selling electricity. It gets free fertilizer.

And, in a small country where farmers are required to have manure trucked away, it saves €150,000 a year in disposal fees.

John Horrevorts, the Sterksel project's experiment coordinator, whose family has long raised swine, said that dozens of such farms had been set up in the Netherlands, though cost still made it impractical for small piggeries. Indeed, one question that troubles green farmers is whether consumers will pay more for their sustainable meat.

"In the U.K., supermarkets are sometimes asking about green, but there's no global system yet," said Bent Clausen Lassen, chairman of the Danish Bacon and Meat Council, which supports green production. "We're worried that other countries not producing in a green way, like Brazil, could undercut us on price."