

EarthTrends: Featured Topic

Title: **Carnivorous Cravings: Charting the World's Protein Shift**

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A shift in global dietary patterns is taking place, one that will have far-reaching implications for international trade, the rural economy, agricultural land use, and the environment. Simply put, the world is eating much more meat than ever before. Increased incomes and standards of living are enabling an expanding global middle class to adopt diets that are higher in protein. The experience of Japan could provide a glimpse of things to come. As its economy expanded, meat consumption increased 360 percent between 1960 and 1990 (Shah and Strong 1999:19).

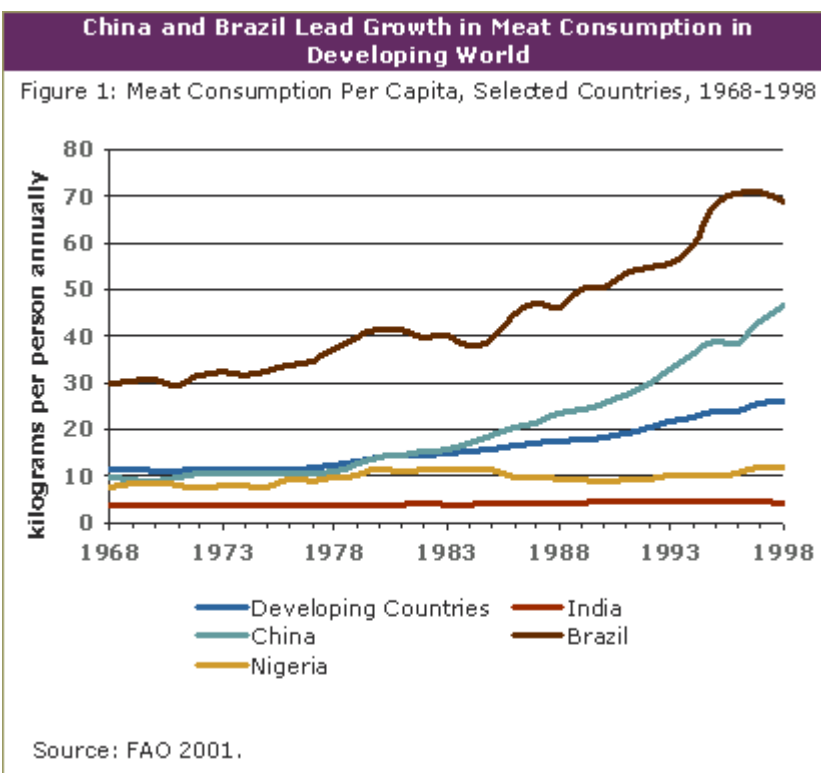
Global consumption of livestock products has more than doubled in the past 30 years, driven mainly by substantial growth in meat and dairy consumption in developing nations. In fact, demand for livestock products in developing countries grew three times faster than in industrialized countries (Delgado et al. 1999; Pinstrup-Andersen et al. 1999:5). The average resident of a developing country ate 11 kilograms (kg) of meat per year in the mid-1970s, but by the mid-1990s ate 23 kg of meat each year (FAO 2000:72-73).

Between 1995 and 2020, developing countries will account for 85 percent of the growth in demand for both meat products and livestock feed grains (Pinstrup-Andersen et al. 1999:5).

However, much of the current growth in meat demand in the developing world is taking place in a few large nations, especially China and Brazil, which have accounted for more than half the increase in per capita meat consumption in developing nations since the 1970s (see

Figure 1). In the past decade alone, meat consumption in China has been rising an average of 2 kg per capita per year (FAO 2001).

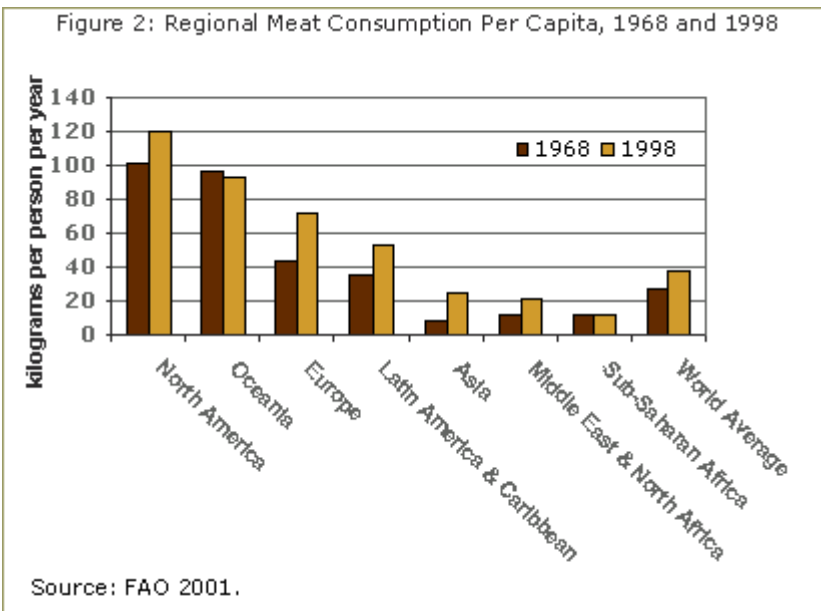
Despite this dramatic growth in China and elsewhere, in 2020 the average developing country citizen will still consume only one-third as much meat as an industrialized country citizen (Pinstrup-Andersen et al. 1999:5). And, although there is a strong need for increased protein in the diets of people in sub-Saharan Africa and much of the Near



East and North Africa, these regions are largely being left out of this “livestock revolution” (FAO 2000:8) (see Figure 2). Residents of Burundi, the Congo, and Mozambique still consume less than 50 calories a day of animal products—the lowest levels in the world. In more than half of sub-Saharan African countries, per capita caloric intake of animal products actually decreased between 1987 and 1997 (WRI 2000:274-275). (See also *EarthTrends* Agriculture and Food/Data Tables or Country Profiles/Food Security.)

Meat and International Trade

Trade liberalization is expanding markets for meat in the global food economy (FAO 2000:9). Japan is now the world’s largest net importer of meat, and the United States—a net importer of poultry in the 1960s—is now the largest poultry exporter, exporting approximately 2.5 million tons each year since the mid-1990s (FAO 2000:76-77; FAO 2001). However, because many developing countries lack modern transportation infrastructure for shipping food (particularly meat, which must be kept refrigerated), most of the expanded production of livestock and feed grains to feed their populations will have to be close to home (Wood et al. 2000:4). Accordingly, developing countries are



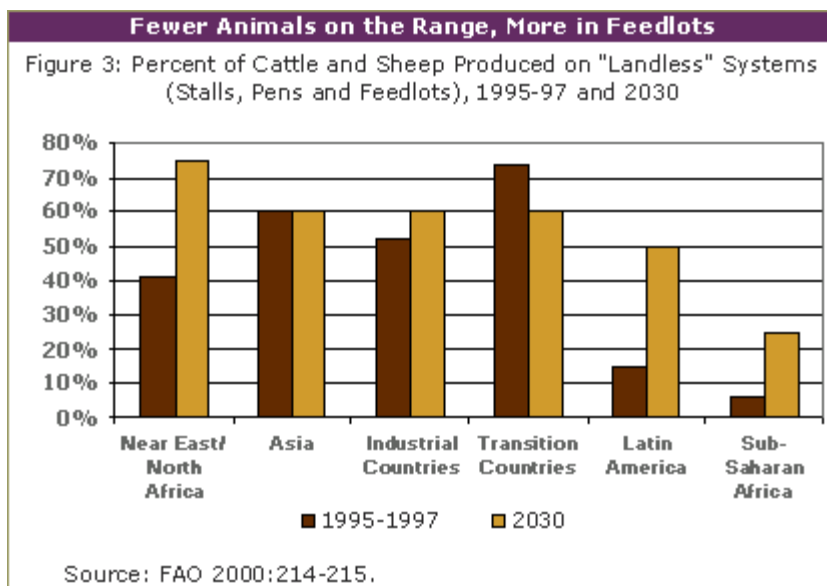
expected to account for an increasing share of world livestock production—63 percent of meat production by 2030 (up from 51 percent in the mid-1990s) and 54 percent of milk production (up from 36 percent) (FAO 2000:12).

Impacts of the Dietary Shift on Rural Land Use and Economies

The expansion and intensification of livestock production in developing countries is likely to have dramatic effects on rural lands and economies. Many are hopeful that rising demand for livestock products, largely centered in the more affluent, urban areas of developing countries, could be a catalyst for development, creating employment opportunities and better incomes in poorer rural areas. However, such opportunities seem unlikely to materialize if small-scale, multi-

purpose farms end up being displaced by large-scale, specialized commercial livestock operations.

Indeed, industrial livestock farming systems—virtually nonexistent 30 years ago—are growing at twice the rate of traditional mixed farming systems and six times as fast as grazing-based production. Industrial systems account for 74 percent of the world’s poultry production, 40 percent of pork, and 68 percent of the egg supply (FAO 2000:138). More than half of industrial or “landless” production of poultry and pork occurs in the developed world. The majority of beef is still produced in grazing and mixed-farming systems, also called “land-based” systems, particularly in regions like Central and South America. However, the trend is toward production of beef in industrial systems, too, with these large-scale feedlots already common in the United



States and in transition countries (see Figure 3).

Livestock producers increasingly favor industrial farming systems because they offer a cheap way to produce millions of animals on one site, on little land, often close to markets or ports. For example, industrial meat production near Beijing, Shanghai, Mumbai, and Calcutta is growing rapidly to be close to those burgeoning consumer markets (de Haan et al. 1997:57). Economic policies also tend to favor large producers with capital subsidies (Fritschel and Mohan 1999).

The Protein Shift's Impacts on Water and Air

In addition to limiting the opportunities for the small-scale rural farmer, a trend toward intensive animal production systems has serious implications for water, air, and human health in both developed and developing

countries. Thousands of animals in a confined place create a huge concentration of animal wastes. Though it can serve as valuable fertilizer, the vast quantity of manure that is the by-product of an industrial livestock production system provides far more nitrogen, phosphorous, and other crop nutrients than can be safely sprayed on or absorbed by fields without risking dangerous runoff into waterways. Manure quantities in East Asia are so great that capacity of plants to use the nutrients provided is sometimes exceeded by 1,000 kg of nitrogen per hectare (Fritschel and Mohan 1999).

Manure also produces greenhouse gases—16 percent of annual methane emissions and 7 percent of the more aggressive nitrous oxide—that cause global climate change (Fritschel and Mohan 1999). Ammonia emissions from livestock farming, a prime culprit in damage to waterways,

are projected to rise from 30 million tons annually in the mid-1990s to 49 million tons annually by 2030 (FAO 2000:217). Emissions will continue to grow in developed countries, where most of the world's intensive livestock production has traditionally taken place. And, in all regions of the developing world, the spread of industrial livestock farming is expected to produce levels of ammonia pollution equal to those that have already caused serious ecosystem damage in the industrialized countries. In the Netherlands, for example, livestock manure contributed 181,000 of the 208,000 tons of ammonia emissions in 1993, resulting in about 55 percent of total acid precipitation in the country (de Haan et al. 1997:55 citing Heij 1995).

A growing awareness of the environmental impacts of industrial feedlots has pushed many countries to enact at least basic regulations. The United States and Malaysia, for example, ban the discharge of manure into surface waters. Indonesia, the United States, and many European countries require large livestock producers to establish a management plan for dealing with their manure. Most countries with high animal densities also have guidelines on manure storage and application methods, and most industrialized countries regulate the proximity of animal manure storage facilities to urban areas, given the risk

that manure poses via air and water pollution to large numbers of people. Farmers in Denmark can send their manure to large common storage facilities—joint biogas plants—to reduce storage costs for individual farmers. Without

such a service, Danish farmers would face prohibitively high manure storage costs, as Denmark protects its water resources by allowing manure to be applied only during the growing season (de Haan et al. 1997:62). China similarly

converts some livestock waste into biogas for household heating, cooking, poultry hatching, and other uses through 5.3 million rural biogas systems (Steinfeld et al 1996:41).

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