LIVESTOCK TO 2020: THE NEXT FOOD REVOLUTION

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A revolution is taking place in global agriculture that has profound implications for human health, livelihoods, and the environment. Population growth, urbanization, and income growth in developing countries are fueling a massive increase in demand for food of animal origin. These changes in the diets of billions of people could significantly improve the well-being of many rural poor. Governments and industry must prepare for this continuing revolution with long-run policies and investments that will satisfy consumer demand, improve nutrition, direct income growth opportunities to those who need them most, and alleviate environmental and public health stress.

TRANSFORMATION OF CONSUMPTION AND PRODUCTION

Unlike the supply-led Green Revolution, the "Livestock Revolution" is driven by demand. From the early 1970s to the mid-1990s, the volume of meat consumed in developing countries grew almost three times as much as it did in the developed countries. Developing-world consumption grew at an even faster rate in the second half of this period, with Asia in the lead (see table).

Beginning from a small base, developing countries have begun to catch up with developed-world consumption levels, but they have a fairly long way to go, primarily because of low income levels. People in developed countries obtain an average of 27 percent of their calories and 56 percent of their protein from animal food products. The averages for developing countries are 11 and 26 percent, respectively. The difference in consumption levels gives an indication of the dramatic changes in store for global food production as the Livestock Revolution unfolds.

Production of animal food products grew most rapidly where consumption did. Total meat production in developing countries grew by 5.4 percent per year between the early 1980s and mid-1990s, more than five times the developed-world rate. Per capita production kept up with population in most developing regions, except in Sub-Saharan Africa (for meat) and West Asia/North Africa (for milk).

Whether these consumption trends will continue in the future is a question explored through IFPRI's global food model, which includes data for 37 countries and country groups and 18 commodities. Known as IMPACT (International Model for Policy Analysis of Agricultural Consumption), the model's baseline scenario projects that consumption of meat and milk in developing countries will grow 2.8 and 3.3 percent per year between the early 1990s and 2020. The corresponding developed-world growth rates are 0.6 and 0.2 percent per year. By 2020 developing countries will consume 100 million metric tons more meat and 223 million metric tons more milk than they did in 1993, dwarfing developed-country increases of 18 million metric tons for both meat and milk.

Actual and projected meat consumption by region

Region	Annual growth of total meat consumption		Total meat consumption		
	1982–94	1993–2020	1983	1993	2020
	(percent)		(million metric tons)		
China	8.6	3.0	16	38	85
Other East Asia	5.8	2.4	1	3	8
India	3.6	2.9	3	4	8
Other South Asia	4.8	3.2	1	2	5
Southeast Asia	5.6	3.0	4	7	16
Latin America	3.3	2.3	15	21	39
West Asia/North Africa	2.4	2.8	5	6	15
Sub-Saharan Africa	2.2	3.5	4	5	12
Developing world	5.4	2.8	50	88	188
Developed world	1.0	0.6	88	97	115
World	2.9	1.8	139	184	303

Sources: FAO annual data. Total meat consumption for 1983 and 1993 are three-year moving averages. 2020 projections come from IFPRI's global model, IMPACT.

Notes: Meat includes beef, pork, mutton, goat, and poultry. Suspected overestimation of meat production in China in the early 1990s suggests that actual 1993 consumption was 30 million metric tons (a 6.3 percent annual growth rate since 1983). If so, the level of world meat consumption for 1993 is overestimated here by at most 4.3 percent and by even less than that for 2020 because IMPACT incorporates pessimistic assumptions that are compatible with the conservative view for 1993.

Growth rates for meat production through 2020 again follow those for meat consumption quite closely in most regions. Meat production will grow about four times as fast in developing countries as it will in developed countries. By 2020 developing countries will produce 60 percent of the world's meat and 52 percent of the world's milk. China will lead meat production and India milk production.

IMPLICATIONS FOR WORLD FOOD PRICES

The increase in livestock production will require annual feed consumption of cereals to rise by 292 million metric tons between 1993 and 2020. While some are concerned that such large increases will raise cereal prices substantially over time, the inflation-adjusted prices of livestock and feed commodities in fact are expected to fall by 2020, though not as rapidly as they have in the past 20 years. In a "worst-case" scenario, which by common accord is much too pessimistic, feedgrain requirements per unit of meat are assumed to rise 1 percent per year through 2020 due to increased industrialization of production and lack of a countervailing increase in livestock feeding

efficiency. Even so, IMPACT shows that real maize prices in 2020 would be at most one-fifth above their present levels and remain substantially below their levels in the early 1980s.

Even with increases in livestock productivity far below historical trends, enough meat, milk, and feed will be available in 2020 without prices rising above 1992–94 levels. The key issue, then, is not availability, but what direct effect rapidly escalating livestock production and consumption will have on the poor, the environment, and human health.

LIVESTOCK AND THE POOR

Far from being a drain on the food available to the poor, increased consumption of animal products can help increase the food purchasing power of the poor. Considerable evidence exists that the rural poor and landless, especially women, get a higher share of their income from livestock than better-off rural people (with the main exceptions found in areas with large-scale ranching, such as parts of Latin America). Furthermore, livestock provide the poor with fertilizer and draft power, along with the opportunity to exploit common grazing areas, build collateral and savings, and diversify income. The Livestock Revolution could well become a key means of alleviating poverty in the next 20 years. But rapid industrialization of production abetted by widespread current subsidies for large-scale credit and land use could harm this major mechanism of income and asset generation for the poor. Policymakers need to make sure that policy distortions do not drive the poor out of the one growing market in which they are presently competitive.

Livestock products also benefit the poor by alleviating the protein and micronutrient deficiencies prevalent in developing countries. Increased consumption of even small additional amounts of meat and milk can provide the same level of nutrients, protein, and calories to the poor that a large and diverse amount of vegetables and cereals could provide.

ENVIRONMENTAL SUSTAINABILITY AND PUBLIC HEALTH

At the low levels of calories consumed by the poor, lack of access to animal products, not overconsumption, should be the concern of policymakers. The greater health risks from livestock products in developing countries come from animal-borne diseases, such as avian flu and salmonella, microbial contamination from unsafe handling of foods, and a build-up of pesticides and antibiotics in the food chain through production practices.

The effects of the Livestock Revolution on the environment are also potentially worrisome. Livestock typically contribute to environmental sustainability in mixed farming systems that strike a proper balance between crop and livestock intensification. In these systems livestock provide the manure and draft power to sustain intensive crop production. But the larger concentrations of animals in periurban areas needed to meet growing urban meat and milk demand have led to the degradation of grazing areas and pollution problems. Policies have also encouraged overstocking or deforestation by shielding producers and consumers from the true costs of environmental degradation. In high-intensity systems, the large quantities of greenhouse gases and excess levels of nutrients produced by livestock pose dangers to the environment. This pollution needs to be, but rarely is, reflected in financial costs to the producer and consumer.

CONCLUSIONS FOR POLICY

Some want to halt the Livestock Revolution. But the ongoing nutritional transformation in developing countries driven by income, population, and urban growth leaves little room for policy to alter the widespread increase in demand for animal food products. Policy can, however, help make the form of the revolution as beneficial as possible to the overall well-being of the poor. To do this, policymakers will have to focus on four key issues:

Small-scale producers have to be linked vertically with processors and marketers of perishable products. The poor find it difficult to gain access to productive assets such as credit and refrigeration facilities and to information such as knowledge about microbial infection prevention. The integration of small-scale livestock producers and larger-scale processors would combine the environmental and poverty-alleviation benefits of small-scale livestock production with the economies of scale and human health benefits that can be had from larger-scale processing.

Policy can help facilitate the incorporation of smallholders into commercial production by remedying distortions that promote artificial economies of scale, such as subsidies to large-scale credit and grazing. Success in this effort will require political commitment as well as public and private partnership to develop the technologies and practices necessary to minimize risks from animal disease that are inevitable when animals from large numbers of small-scale producers are mixed in a single finishing or processing facility. Much greater attention should be given to livestock productivity and health issues, including in postharvest processing and marketing.

Regulatory mechanisms for dealing with the health and environmental problems arising from livestock production need to be developed. Technologies that address environmental and public health dangers will not work unless regulatory enforcement backs them up. Such institutional developments will likely occur when the political demands for better regulation become strong.

Above all, small-scale producers need to be included in the response to this dynamic opportunity. Lack of policy action will not stop the Livestock Revolution, but it will ensure that the form it takes is less favorable for growth, poverty alleviation, and sustainability in developing countries.

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2020 VISION

"A 2020 Vision for Food, Agriculture, and the Environment" is an initiative of the International Food Policy Research Institute (IFPRI) to develop a shared vision and a consensus for action on how to meet future world food needs while reducing poverty and protecting the environment. Through the 2020 Vision initiative, IFPRI is bringing together divergent schools of thought on these issues, generating research, and identifying recommendations. The *2020 Briefs* present information on various aspects of the issues.