References

1. Hathaway, D. E. 1974. Food Prices and Inflation. Mimeographed. Ford Foundation, New York.
2. Cochrane, W. W. 1974 *Famine: The Uncertain World of Food and Agriculture and Its Policy Implications for the United States*. National Planning Association, Washington, D.C.
3. Johnson, D. G. 1973. *World Agriculture in Disarray*. Macmillan-St. Martin's Press, London.
4. U.S. Department of Agriculture. 1974. World Grain Situation: Review and Outlook. Foreign Agr. Circ. FG 17-74. Foreign Agriculture Service, U.S. Department of Agriculture, Washington, D.C.
5. Houck, J. R. 1974. Some Economic Aspects of Agricultural Regulation and Stabilization. *American Journal of Agricultural Economics* 56(5):1113-1125.
6. International Bank for Reconstruction and Development. 1972. Agricultural Sector Working Paper (June 1972). p. 39. International Bank for Reconstruction and Development, Washington, D.C.
7. Hayami, Y., and V. W. Ruttan. 1971. *Agricultural Development: An International Perspective*, pp. 241-284. Johns Hopkins University Press, Baltimore, Md.
8. Wortman, S. 1973. Extending the Green Revolution. *World Development* 1:45-51.
9. Hayami and Ruttan, *op. cit.*, p. 59.
10. Olson, M., Jr. 1968. *The Logic of Collective Action: Public Goods and the Theory of Groups*. Schocken Books, New York.
11. Niskanen, W. A., Jr. 1971. *Bureaucracy and Representative Government*. Aldine-Atherton, Chicago, Ill.
12. Haeffele, E. T. 1973. *Representative Government and Environmental Management*. Johns Hopkins University Press, Baltimore, Md.
13. Stigler, G. J. 1941. Euler's Theorem and the Marginal Productivity Theory. Pages 320-387 in *Production and Distribution Theories*. Macmillan, New York.
14. _____. 1965. The Ricardian Theory of Value and Distribution. Pages 156-159 in *Essays in the History of Economics*. University of Chicago Press, Chicago, Ill.
15. Krueger, A. O. 1974. The Political Economy of the Rent-Seeking Society. *American Economic Review* 64:291-303.
16. Frankel, F. R. 1971. *India's Green Revolution: Economic Gains and Political Costs*. Princeton University Press, Princeton, N.J.
17. Hirschman, A. O. 1973. The Changing Tolerance for Income Inequality in the Course of Economic Development. *Quarterly Journal of Economics* 87: 544.
18. Ruttan, V. W. 1974. Rural Development Programs: A Skeptical Perspective. Mimeographed. Agricultural Development Council, New York.

The World Food Crisis — The Watergate of Animal Agriculture

M. James Riemann

Abstract

Many individuals have emerged recently as strong critics of animal production, particularly grain feeding of cattle, and have used exaggerated information, perhaps intentionally or because of ignorance, regarding cattle production. Critics' claims that 20 pounds of grain are required to produce one pound of beef are refuted. The conversion from grass to grain feeding of slaughter cattle is discussed along with the accusation that cattle are competing for our food supply.

In the last three or four years the livestock and meat industries have been attacked from a variety of fronts. Some attacks have been backed by considerable scientific research and little common sense, such as the banning of diethylstilbestrol from cattle feeds. Others, such as the suggestion to eat one less hamburger a week to free grain for starving Asians, are prompted by emotionalism rather than an objective analysis of the situation.

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The present animal agriculture predicament can be likened to the Watergate episode because of the many different versions of the livestock and meat production story, all supposedly authoritative and factual. Some critics of animal agriculture are individuals who have little or no understanding of animal and meat production but freely blast animal production practices because it is in vogue to do so, and it satisfies their need for a "cause." Other critics are knowledgeable in regard to one or more aspects of animal agriculture but refuse to look at the total picture.

Meat Consumption Increased

People in the United States eat more beef than any other meat, which may be one reason why beef has been the primary target of consumer complaints and boycotts. Total per capita meat consumption increased 16.8 percent from 1960 (160.9 pounds) to 1974 (188.0 pounds), according to the U.S. Department of Agriculture. Beef consumption increased 37.5 percent from 85.1 to 117.0 pounds during that time and pork increased slightly, to 66.5 pounds in 1974. Veal and lamb and mutton decreased to 2.0 and 2.5 pounds, respectively, in 1974.

It must be emphasized that these consumption figures are determined on a carcass weight basis and are not a true picture of actual meat consumption because each carcass contains bone and some fat that must be trimmed to make acceptable retail cuts. Removal of all bone and any excess fat may leave 60 to 70 percent of the original weight of a choice grade beef carcass as red meat, depending on the degree of fatness. Pork carcasses may yield 70 to 75 percent edible product and lamb carcasses may cut out approximately 60 percent red meat, again depending on fatness. This information weakens any defense of meat production but is necessary to the discussion.

Grass to Grain

Beef was produced in the early years of this country by grazing cattle on abundant grasslands. Cattle grew slowly and reached slaughter weight at a much older age compared to today's standards. As the demand for beef grew, cattlemen searched for ways to increase rate of production. The use of feed grains such as corn, grain sorghum, oats, and barley proved highly useful in increasing production rate, and the market value of these grains was so low that feeding them to livestock was a very economical practice. Consumers preferred grain-fed beef and demanded more of it. This situation existed for many years and, with advances in feed processing technology, the efficiency of livestock production improved steadily. The desire to continually improve efficiency of meat production led to the establishment of commercial feedlots where large numbers of cattle were concentrated in small areas and fed rations that were processed in a way that provided maximum feed utilization.

After many hard years cattlemen finally reached a point at which the return from their investments began to approach a level comparable to some small industries in this country. Then the rate of inflation began to climb more rapidly, new labor contracts were awarded with staggering increases in salaries and benefits, housewives began to boycott because of high meat prices, the government established a freeze on wholesale and retail meat prices, cattle numbers increased at a monumental rate, weather conditions prevented the planting and harvesting of much of our feed grain crops and thus accelerated the cost of the feed rations, and interest rates on borrowed money hit an all-time high.

To further complicate the situation, because of a crop failure in the Soviet Union, Russia, along with several other countries, turned to the United States for purchase of the needed grains. United States grain reserves were rapidly depleted. Demand for feed grains by exporters and the livestock feeding industry increased feed prices to the point where even the best of cattle feeders were challenged to operate at a minimal loss. More recently, droughts in South Africa and Asia left millions starving. In India, the minimal food reserves that were just beginning to be established were rapidly used by refugees who fled to India to escape the war between Pakistan and Bangladesh.

The United States is unequaled in providing food aid to these countries. Even so, some authorities on the world crisis say we should use our feed grains, such as corn and grain sorghum, as further aid to the starving nations instead of feeding them to our livestock. Some animal industry critics claim Americans are responsible for the present world food shortage because we are feeding these grains to livestock instead of building a food reserve or putting the grain into foreign aid programs. The present world food situation is more severe than normal because of drought and war; holding animal agriculturists responsible for that is completely unreasonable.

The world now has two ruminants for every three people according to the Council for Agricultural Science and Technology (CAST) report **Ruminants as Food Products**. The report reveals that 60 percent of these ruminants are in developing countries and produce a quantity of food nearly equal to that obtained from the 8 percent of the world ruminant population found in the United States.

Competition for Food

Livestock have recently been accused of competing with humans for the world food supply. A frequently used accusation that it takes 20 pounds of grain to produce 1 pound of beef is false. Cattle commonly gain 1 pound for every 7 to 10 pounds of feed consumed. Lambs gain 1 pound on 5 to 7 pounds of feed and hogs gain 1 pound from about 3 pounds of feed. In contrast to ruminants, hogs are simple-stomached animals which require a high proportion of grain in their rations. Ruminants, however, can and do grow on forage produced by land unsuitable for human food production. Land currently classified as range or grassland in the United States totals 1.2 million acres or 63 percent of the continental area.

Slaughter cattle are normally grown on grass until they weigh 700 to 800 pounds before grain feeding is started. According to the CAST report every 10 pounds of grass eaten by a calf in a cow-calf operation will yield 1 pound of live weight. Cattle are usually slaughtered at 1,000 pounds or heavier; thus 70 to 80 percent of that total weight is produced by consumption of forage totally unusable by humans. During the finishing or grain feeding period approximately 250 pounds of live weight are produced with rations that consist of 0 to 80 percent grain.

Assuming that the finishing ration averaged 70 percent grain, and that 7 pounds of ration produced a 1-pound live weight gain, then 1,225 pounds of grain plus 525 pounds of forage and animal by-products would produce a 1,000-pound slaughter animal. It could also be stated that only 1.2 pounds of grain were used per pound of live animal. It is misleading to stop at this point, however. That slaughter animal is not completely edible. An average of 60 percent of a live steer is recovered as carcass and, depending on degree of fatness, 65 to 70 percent or about 400 pounds of the carcass is edible product.

That means there is a three-to-one ratio of grain conversion to beef or 1.2 pounds of grain yielded 0.4 pound of edible beef. In addition to the meat, a wide variety of by-products beneficial to humans and animals are produced — products such as leather from hides; drugs, essential for saving many human lives, from various glands and viscera; and meat-and-bone meal, a high-protein supplement for animal feeds.

Nutritional Comparison

The nutritional value one would derive from eating feed grains (corn and sorghum) normally fed to cattle compared to meat and other animal food products makes the three-to-one ratio look very favorable. Meat (beef, pork, veal, and lamb) contains 30 to 40 percent less energy than corn but contains twice as much high quality protein as corn or sorghum. Meat is unequaled by any cereal grain used for feeding livestock in both quantity and proportion of amino acids needed by humans for good health. A highly significant nutritional advantage of meat and other animal food products over cereal grains and higher plants is the presence of Vitamin B12 which is nonexistent in higher plant foods. Animal products are also excellent sources of Vitamin A as well as calcium, phosphorus, iron, sodium, potassium, magnesium, and copper.

Historically, meat has been an important part of man's diet. History also shows that consumption of meat and other animal products increases as countries develop and their populations become more affluent. The value of animal products to human nutrition was recognized at the 1974 World Food Conference by the recommendation of greater utilization of world animal resources.

Grain to Grass?

Production in this country of grains that could be used for human consumption is more than adequate to meet both livestock and food and industry demand. The CAST report reveals that, of total 1971 U.S. grain production, livestock consumed 84 percent of the sorghum, 86 percent of the oats, and 77 percent of the corn compared to 0.8, 5.0, and 7.5 percent of these respective grains utilized for food and industrial purposes. This indicates there has been no need for a high proportion of the U.S. grain supply to go into human food. Wheat, which is readily utilized by humans, had 35 percent distribution to food and 22 percent to livestock feed. The percentage of these crops exported included: sorghum, 15 percent; oats, 3 percent; corn, 15.3 percent; and wheat, 43.0 percent. If these grains were needed for human food in the United States or any other country, demand would increase prices to the point where it would be prohibitive to feed them to livestock. In the last year feed grain prices increased for a variety of reasons and forced a sharp reduction in the number of cattle being grain fed.

Moral Obligation

Many argue the humanitarian aspects of this issue and the obligation of Americans to feed the starving people in the world. But, regardless of our humanitarian or moral obligation, the basic underlying question of who will pay for this action must be answered. Without some small profit incentive, farmers will not produce needed grain, grain dealers and exporters will not buy and sell, and shippers will not transport the grain to starving nations. The humanitarian approach is noble but leaves many vital questions unanswered.

Conclusion

Meat and other animal products have always been an important part of the American diet and they will continue to be valuable in fulfilling human nutritional needs. Future availability of grain-fed beef will depend, as it always has in the past, on supply and demand of both feeder cattle and feed grains. If world feed grain production, particularly in the United States, does not recover quickly from the recent slump, strong demand for feed grains may force a continuation of the sharp reduction in the number of cattle being fed grain that occurred within the last year. The decision of whether cattle will be fed grain in the last phase of beef production or kept entirely on a forage ration will be determined by profit incentive — not by humanitarian pleas of individuals who have adopted this issue as their "cause."

Reference

1. Council for Agricultural Science and Technology. 1975. Ruminants as Food Producers Now and for the Future. Special Publication No. 4. Council for Agricultural Science and Technology. Department of Agronomy, Iowa State University, Ames.

Aspects of the Food Problem

David A. Zarkin

Abstract

Comments by Willard W. Cochrane, agricultural economist at the University of Minnesota, are presented regarding important factors of the world food problem.

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On the earth today there are almost 4 billion people — 200,000 more than there were yesterday. By the year 2000 there will be 2.4 billion more people than there are today.

An estimated 10,000 people die each week from lack of food and the United Nations reports that almost 400 million suffer from protein and energy malnutrition. Total food production has increased 2.9 percent per year in the developed world and 2.6 percent per year in the less developed world, excluding Mainland China. This favorable record resulted in part from bringing new land into production and in part from technological advances.