

Population and Food Supply - Was Malthus Correct?*

by Michael A. Costello

Some years back an American economist by the name of Brooks returned to the U.S. after a five-year stay in India. Soon after his return he was interviewed by a reporter who asked him "I would like a simple yes or no answer. Please don't give me a long lecture. Is India going to find a way to provide for all of the millions of people who live there or is it doomed to perpetual poverty and famine?" The professor was unable to answer. Instead he set to work on a five-page article for the reporter's newspaper that ended with the simple phrase "it depends."¹

I'm afraid that this is the way social scientists are. The world keeps asking for yes and no answers but the professors keep on answering "it depends". So if I don't give any simple "yes" or "no" answers this afternoon, you may be little dissatisfied but at least you can have the comfort of knowing that others, too, have felt a similar dissatisfaction.

Thomas Robert Malthus was an Anglican clergyman and economist who lived about 200 years ago. As an economist, his main interest lay in the relationship between population and the food supply—the subject of my lecture this afternoon. As a clergyman he was, of course, concerned with the problems of human happiness and of human morality. These two strains

of thought in Malthus the man come together in his most famous work, his *Essay on Population*, which he published and revised in a series of six editions. The complete title of the final edition is revealing in this regard for this edition was entitled "An Essay on the Principle of Population, or a View of Its Past and Present Effects on Human Happiness, with an Inquiry into Our Prospects Respecting the Future Removal or Mitigation of the Evils which It Occasions."²

As the title's reference to "the evils which it occasions" would indicate, Malthus had a basically pessimistic view of population growth. He viewed unchecked population growth as a force that kept men in chains to a perpetual cycle of unhappiness, sickness, and death. This occurs because, according to Malthus, population tends to grow faster than the food supply. To use his famous phrase, population growth tends to occur "geometrically" (i.e. 1-2-4-8-16) while growth in agricultural output occurs "arithmetically" (1-2-3-4-5). The result, of course, is that population grows beyond the bounds of available food and some sort of disaster such as a famine or an epidemic (Malthus called such events "positive checks") is bound to happen. Due to the action of these positive checks population size is reduced to more manageable limits. Thus the food-population ba-

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lance is restored in a renewal of population growth and the whole cycle is repeated again and again.

Towards the end of his life Malthus began to see a glimmer of hope—namely that men could intervene rationally to break out of the cycle. This could be done by controlling population growth, which to Malthus meant passing laws requiring a later age at marriage. As a clergyman he appears to have felt that contraceptive techniques other than sexual abstinence were immoral. If population growth could be controlled, argued Malthus, the periodic famines and epidemics of the past could be done away with.

Before going on to criticize the work of Malthus, it is important to note that this theory—like all theories of human behavior—held certain important political implications. In particular, Malthus opposed the so-called “poor laws” of his day, which provided for government relief (i.e. charity) to poor people. He argued that if poor people were assured of government support they would be encouraged to marry early and have plenty of children. Thus, there would be more and more poor people for the government to support and famine would result when food supplies become low again. As you can imagine, this so-called “scientific” argument was quickly seized upon by the conservative forces of the day.³

Well, as you can all probably guess, given your knowledge of world history over the past 200 years, Malthus was wrong. There have been few famines or large-scale epidemics in Europe or America since Malthus published his essay, despite the fact that the population of these areas continued to grow and age at marriage tended, if anything, to become lower rather than higher. Malthus was wrong because he ignored two important social changes that were just getting underway during the period when he was

living. The first of these two factors is, of course, the great increase in food production that has happened since his time. The findings of agricultural science have enabled the food supply to grow geometrically (to use his phrase) or even more rapidly, and food output has generally been able to keep pace with population growth. The second factor that Malthus chose to ignore is the possibility of limiting growth through the use of family planning techniques. To repeat, the effect of these two factors has been to make Malthus’ gloomy predictions of the future completely incorrect, at least for the West.

If that is really the case why do we keep hearing about this fellow? Why do social scientists continue to pay homage to someone who has been consistently wrong in his main prediction? The reason for this lies in the fact that while Malthus was wrong in the past, he may, unfortunately, prove right—dead-right—in the future. This, of course, is the whole problem of the world-wide “population explosion”. Malthus may be right in the future because of two changes that have occurred with the coming of the twentieth century, i.e. population growth that is occurring faster now than it ever has during man’s history and growing evidence that the earth’s people may be approaching the limits of the supply of land and water that is needed to produce food. For example, if present trends were to continue the Philippines will have a population size roughly twice as large as that which the entire United States now holds in less than 100 years.⁴ This prospect raises the very real question as to whether this country could support that large (over 400 million people) a population.

And if the Philippines, with its relatively modern outlook and adequate resources, could be having a problem in feeding all of its people, how much more so for such densely crowded

countries of the world as India or Egypt. India, for example, is currently adding one million new people to its population every month—people that this country simply cannot feed. During the 1960's per capita consumption of food in India declined despite the fact that in some years this country received up to quarter of the entire American wheat crop.⁵ A similar picture is to be found in other developing countries, too. In 1960 the developing world had to import 24 million metric tons of grain to feed its people. By 1985 it is estimated that this figure will stand at about 100 million metric tons.⁶ Other than the obvious problem of how to grow all this extra food there are additional dilemmas to deal with such as matters of foreign exchange, marketing, and even finding enough ships to move it all. When we add to this the fact that about 40 percent of the world is already undernourished, you can see how truly staggering the problem is.

We can thus see that the true genius of Malthus lay in his perception of a very real problem in human affairs. The solutions that he devised may have been unworkable and his predictions incorrect but at least he did isolate the core of the problem—namely the interdependence between population growth, agricultural output, and a country's livelihood or standard of living. Using the Malthusian perspective we can quickly see that there are two main solutions to the problem. Either population growth can be slowed (preferably through a decline in fertility since the only other way of accomplishing this is through an increase in the death rate) or agricultural output can be further increased. Most demographers would agree that these solutions would have to be put into effect simultaneously in order to avoid the future occurrence of Malthusian-like positive checks.

Thus, a new set of questions is now raised. First, how likely is it that the world-wide birth rate is going to dec-

line within the near future? Secondly, how likely is it that agricultural output can continue to expand? My personal belief regarding these two questions is moderately optimistic. On the one hand, the most recent evidence available appears to indicate that a world-wide pattern of fertility reduction has begun to take hold. Birth rates are still very high by any standard and population growth is still occurring at an alarming pace but at least there is now some evidence of change. A recent analysis of fertility changes in 94 different developing societies, for example, found evidence for at least a small decline in the birth rate in 72 of these countries. In the Philippines, the crude birth rate has been estimated to have declined from a level of about 45 per thousand to 35 or 34 per thousand during the period 1965 to 1975, a decline of over 20 percent.⁸ There is still a long way to go before we are safely out of the dilemma of rapid population growth but at least there is evidence that the developing world is not as "changeless" and "tradition-bound" as some Westerners have claimed.

As for food production one can never be sure, but it does seem fair to point to the fact that scientific and technical advances have so far been able to keep up with population growth. Again the case of India is instructive. This country has approximately the same amount of cropland as the United States and has more than 20 times as many farmers as are now to be found in the U.S. Yet it is only able to grow small fraction of the amount of food produced yearly in the U.S. Who is to say that farmers in India, given proper education and tools, cannot achieve the same productivity as the American farmer? Moreover, if a way to desalinize sea water or if a cheap way to capture the energy of the sun could be found, there is every prospect that these yields can be increased even further. This process cannot go on indefinitely, of course, but I believe that it can at least persist for a few generations,

which will hopefully be enough time for the world to reach zero population growth.

If we just limit our attention, then, to the two variables of population and the food supply, there is cause for at least a small amount of optimism. Population growth appears to be slowing down slightly and the prospects for continued growth in agricultural output are far from gloomy. This, however, is not the whole story. The issue is more than just a demographic matter of births and deaths. It is more just a technical matter of cross-breeding new varieties of high-yield crops or of inventing new ways of irrigating fields. It is also a social and economic matter because it involves people-people in interaction with one another and people in interaction with their environment.

When other social and economic factors are introduced into the population and the food supply equation we see that the problem becomes more complex than it was originally stated. Let us take, for example, a specific type of food-beef. Beef as type of food has a cultural, as well as a nutritional aspect to it. In India it is a type of food to be avoided at all costs, due to the religious prohibition against killing and eating cows. Ghandi tells us in his autobiography that when, as a young man rebelling against the ways of tradition, he first tried to eat beef he could not keep himself from vomiting. His stomach had been culturally conditioned to become sick at the thought of eating meat. The result of this cultural belief, of course, is that a considerable amount of food is wasted in India that could be used to feed the undernourished millions in that country.

In many so-called developed countries, on the other hand, beef is highly valued as a type of food. In Japan, I have been told, people give cuts of choice meat to one another as Christmas gifts. Studies have shown that as

countries become economically developed their per capita consumption of meat, and especially of beef, has tended to increase dramatically. The average American was eating about 114 pounds of beef per year in the early 1970's and this figure is expected to increase to 140 pounds per year by 1985. By comparison, the average person in Tanzania, a country in Eastern Africa, eats only about 2 pounds of beef per year.⁹ These statistics are important for a better understanding of the problem of population and the food supply because beef is an extremely inefficient way of producing food - whether measured in terms of either calories or protein. It requires seven pounds of grain to produce a single pound of beef. By comparison pork requires four pounds of grain and chicken requires only three pounds. What this means, of course, is that Americans and Europeans, with their high-meat diets are contributing as much or more to the food problem as are people in the less developed world with their supposedly "irresponsible" habit of having large families. A second, and perhaps more important implication, is that as more countries become developed we can expect the world demand for meat to increase dramatically. This, in turn, will intensify the food problem as surplus grain that was formerly sold at a relatively low price to a starving villager in India will now be fed to a cow in Nebraska. A further irony of this is that recent research is tending to indicate a link between meat-rich diets and certain dread illnesses such as cancer and heart disease. It is unlikely, though, that too many American teenagers will be convinced to give up their beloved hamburgers for reasons of health!

If food has a cultural dimension, so do the techniques that men use for growing it. Many of the major social changes in the world today have been brought about by the new methods of producing food that agricultural science has come up with. Unfortunately, not all these social changes have been

for the better—nor can we expect that they will be so in the future. In the United States, for example, the major change has been towards a mechanization of the farm work. A modicum of mechanization is, of course, needed to create the urban labor force that is needed for industrialization and economic development. As fewer farmers are needed to feed a nation's populace more workers are freed to work in factories and other business establishments, or so classic development theory states. Many would argue, however, that this process has already gone too far, at least in North America. In the United States, for example, farming has become a big business—those who don't have the capital or management skills are simply unable to compete for the market. In the five-year period between 1959 and 1964, over 300,000 farm enterprises in the U.S. were forced out of business.¹⁰ Farm laborers, too, such as the unskilled descendants of the slaves and sharecroppers in the American South have lost their jobs to mechanical cotton pickers or tomato harvesters. In short, the food supply has kept pace with population growth, thanks to "modern" equipment and technical advances, but only at a great social cost. Small towns in rural America die while unemployed rural migrants to the city add further to the welfare rolls and crime statistics. While mechanization appears to not yet be forcing people out of agricultural work in the Philippines it is having that effect in a number of other developing countries, as is the case, for example, with Mexico.¹¹

In the less developed countries, on the other hand, the great hope for increased food production lies in the so-called "Green Revolution". This development, too, has its own social costs. True, production of cereal grains has increased dramatically due to the new plant strains, but the age-old and delicate relationship between the rural community and its environment has been upset in the process. Ecologically speaking, the Green Revolution now

appears to be producing a number of side effects. In particular, the new strains of wheat and rice are heavily dependent upon fertilizer and pesticides, both of which can have damaging consequences for the environment. When nitrogen-base fertilizers are used excessively they can lead to damage of both the soil (by destroying soil humus) and of the local water supply (as fertilizer is carried by rainwater to rivers and lakes). On the other hand, pesticides and herbicides have been shown to cause deaths among wild animals and birds as well as to be linked to cancer in man.¹²

A number of deleterious social consequences of Green Revolution technology have also been noted. In particular we can note a number of studies which have shown that type of plant production technology appears to bring about greater income inequality and social stratification in rural communities of the developing world. This is due to the fact that big landowners with the knowledge, farm-size and capital needed to use the new techniques are invariably the first to use the Green Revolution methods. As a result, the better-off members of the community are able to expand their lands even further by buying up the property of the failing small farmers in the area. A new class of rich farmers arises and social cleavages between the rich and the poor become wider than ever.¹³ Yes, food production has indeed increased, but only at the price of a number of unforeseen ecological and social costs.

In short, the problem of population and the food supply is not without a solution. The chances for a world-wide famine, though still very real, appear to be somewhat less today than they did in the early 1960's. Birth rates are beginning to fall as a number of countries exhibit higher standards of living, while farm production appears to be able to continue increasing for a generation or two thanks to increasing use of farm machinery, fertilizers

and pesticides. The only problem (and in my determination to strike a pessimistic note I am a respectful descendant of Malthus) is that the solutions themselves may be opening up a whole new Pandora's box of other problems. A higher standard of living helps to bring down the birth rate but it also means a more rapid depletion of the earth's limited resources. Farm mechanization frees workers to go to the city, but sometimes they would have been better off and happier to remain in the small town. They are free, as Marx said, to starve. The Green Revolution multiplies crop yields, but also may it increase pollution and social inequality. Food will be provided, but only at a cost—a cost, moreover, that is usually borne by the poorer countries of the world rather than the rich ones, and, within these less developed countries, by the persons who are already experiencing the lowest standard of living. With this in mind I can finish a lecture which has probably gone on too long anyway by returning to a point I made earlier. Just as Malthus' analysis of the problem of population and the food supply led to certain inherent political implications (i.e. that poor folks ought not be given govern-

ment relief funds) so also is this the case for the way in which we deal with the problem today. If we conceive of the matter in purely a technical or agricultural light, we are likely to devise solutions that favor one class of people at the expense of another. If we conceive of the problem as just a matter of "high birth rates in developing world" we are likely to demand social change for others that we are unwilling to swallow ourselves. My own countrymen, for example, are quick to view the population problem as a problem just of the less developed countries; ignoring the fact that their own standard of living and their own meat-rich diet may be more of a cause for concern than the birth rate in Bangladesh. In short, the problem of population and the food supply is too important to be left up to the technicians—the demographers (though I am one myself) and the agronomists. It should be handled by other social scientists as well as by—dare I say it?—artists, theologians and even philosophers, i.e. by men of wisdom and good will who will be willing to incorporate an all-important human dimension to the problem.¹⁴

FOOTNOTES

1 Robert R. Brooks, "Can India Make It?," *Saturday Review* (August 9, 1969): 12-16.

2 Ironically, the final edition of Malthus' work is no longer available. For the first edition, cf. Thomas Robert Malthus. *An Essay on the Principle of Population* (New York: The Modern Library, 1960).

3 Cf. for example, Mogens Boserup, "Fear of Doomsday: Past and Present," *Population and Development Review* 4 (1978): 133-144.

4 Francis C. Madigan, "Problems of Growth: The Future Population of the

Philippines," *Philippine Studies* 16 (1968): 3-31.

5 Charles H. Anderson, *The Sociology of Survival: Social Problems of Growth* (Homewood, Illinois: The Dorsey Press, 1976), pp. 208-209.

6 Mar B. Arcega, "Malthus and the Philippines," *Asian and Pacific Quarterly of Cultural and Social Affairs* 9(1977): 24.

7 W. Parker Mauldin and Bernard Berelson, "Conditions of Fertility Decline in Developing Countries, 1965-75," *Studies in Family Planning* 9(1973): 89-147.

8 Francis C. Madigan, Alfonso C. del Fierro, Jr., Teresa B. Almonte, and Staff, Preliminary Report: *The Area Fertility Studies, Surveys of 1977. Preliminary Draft of Special Report for the Five Regions* (Cagayan de Oro: Research Institute for Mindanao Culture).

9 Anderson. *op. cit.*, p. 211.

10 T. Lyn Smith, "Some Major Current Rural Social Trends in the U.S.A.," *International Social Science Journal* 21(1969): 272-285; and Robert A. Carlson, "Agricultural Extension. The U.S. Experience." *International Review of History and Political Science* 13(1970): 54-60.

11 R. H. Balance, "Mexican Agricultural Policies and Subsistence Farming," *American Journal of Econo-*

mics and Sociology 18(1972): 295-306.

12 Anderson, *op. cit.*, pp. 221-228.

13 Harry M. Cleaver, Jr. "The Contradictions of the Green Revolution," *American Economic Review* 62(1972): 177-186; Cynthia Hewitt de Alcantara, "The 'Green Revolution' as History: The Mexican Experience," *Development and Change* 2(1973-1974): 25-44; and K. Barban and B. Bardhan. "The Green Revolution and Socio-economic Tensions: The Case of India," *International Social Science Journal* 25(1973).

14 For a first step in this direction cf. E.E. Schumacher, *Small is Beautiful: Economics as if People Mattered* (New York: Harper and Row, 1975).