GUEST EDITORIAL

Feeding Tomorrow's People from Today's Land

The world's farmers and agricultural scientists deserve a global round of applause. Thomas Malthus and Paul Ehrlich both misjudged their capacities, and as population has grown from one thousand million human beings (in Malthus' lifetime) to 5.7 thousand millions (in Ehrlich's), the total food production has grown ever faster. If only the food produced were distributed equitably, everyone in the world could eat enough fo reasonable activity and good health.

Can we, then, call off the debate about population and food, and narrow our focus to improving access to food? Unfortunately not. In this case, the past is an unreliable guide to the future. The distressing reality is that, while Malthus has not yet been proved completely right, he most assuredly has not been proved unreservedly wrong.

Reasons for Continuing Concern

First, despite the accomplishments of the last two centuries, the recent record is not at all encouraging. Since the mid-1980s, increases in food production have barely kept up with the world's 1.6% annual population growth. *Per caput* crop production reached its peak a full decade ago and has wavered at slightly lower levels ever since. Moreover, much of the increase in food production since Malthus' time came from the steady expansion of farmland, but the agricultural frontier is now closing, and there is little unoccupied space to fill with productive agriculture.

Most of the world's current population growth is occurring in countries — India, Pakistan, China, Mexico, and Ethiopia, for example — that have almost no potential for adding to their farmland (such factual materials are from Engelman & LeRoy, 1995). Indeed, these countries are actually losing cultivated land to the ubiquitous spread of factories, office buildings, shops, homes, playing-fields, and highways. The food that will be required to feed a world population of 8 thousand million or more in the next century will have to come almost entirely from today's farmland.

Yet much of that farmland is not only shrinking in area, but is drying up, taking on salt and toxic metals, or losing topsoil and the nutrients on which plant and human health depend. An area of land the size of China and India combined has lost productive potential, while an estimated 25 thousand million tons of topsoil wash off the land each year.

A single natural resource — fresh water, which is as critical to growing food as it is to all life — bears examining. Renewable fresh water is no more abundant today than it was at the dawn of agriculture; yet it is all that farmers in future centuries will be able to depend on, given the ongoing depletion of non-renewable 'fossil' aquifers for farming and other purposes. (In fact, human beings have already moved enough of this non-renewable fresh water from the continents to the oceans to raise sea levels by an estimated 50 mm in the past century.) By the middle of the next century, renewable fresh water is projected to be in short supply for 4.4 thousand million people in 58 countries.

Shrinking Farmland-to-Person Ratio

At the same time, the variety of species used for crops, livestock, and rooted in soil, itself is declining, and many pests have developed a resistance to the chemicals that have been used against them. Any or all of these trends may contribute to such declines in yields as have recently been discovered in rice — the staple food for more of the world's people than any other — when grown in intensively cultivated test-plots. Collectively, these trends clearly argue for policies that would be capable of ending world population growth. Prudence suggests that, despite the promise of future technological innovations, a food production system that is unsustainable at current population levels may not be able to endure further pressure — especially when we recall that 700 million people are malnourished today and surely deserve better access to food.

The challenge which farmers will face in feeding projected increases in world population is evident when we consider the world's cropland as a shared natural resource. The latest United Nations population projections suggest that, by AD 2025, only one-sixth of a hectare of arable land will be available to each person on Earth on average — a figure that is down from nearly one-half of a hectare in the early 1960s. By AD 2050 somewhere between 1.6 and 5.5 thousand million people are projected to live in countries with less than 0.07 hectare of arable land *per caput* — so little that only intensive use of fertilizers would allow farmers to feed their countries' people.

Towards Sustainable Food Security

Some continued population growth is all but inevitable, but we need to recognize the risk which it poses to farming's natural resource-base of soil and water. The real question is: how fast and how far will world population grow. We know already how to slow this growth and achieve stabilization of human numbers by early in the next century. As 179 countries agreed at the United Nations' International Conference on Population and Development, held in Cairo, Egypt, in September 1994, this can best be achieved through enhancing the capacity and freedom of individuals — especially women — to make decisions about child-bearing and other important aspects of their lives.

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Such population policies are not an alternative but a supplement to the many steps which will be needed to put farming on a foreseeably sustainable footing, but ultimately that footing will not be secure until the world's population stabilizes. Only then will farmers be able to turn away from the unrelenting drive to boost yields and towards conservation and restoration of soils and water supplies for tomorrow's use.

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REFERENCE

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GUEST EDITORIAL

Trade and the Environment

How do the liberalized trade policies, that have been catalysed by the recent technology-driven globalization, interact with those concerns which have emerged over the past ten years or so under the heading of global environmental governance? The 1992 Rio 'Earth Summit' addressed the interaction between (economic) development and the protection of the environment in Principle 4 of the 'Rio Declaration on Environment and Development' as follows:

> 'In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it.'

In order to assess whether this fundamental principle is being respected in the negotiation of agreements concerning the international economy, the recently established World Trade Organization (WTO) is a revealing test-case. The environment has not been completely forgotten; the preamble of the WTO agreement endorses the notion of ecologically sustainable development, and it should now become easier to bring scientific evidence and advice to bear on the environment with the dispute-settlement panels. The fact of the matter is, however, that none of the key issues in the trade–environment relationship, such as full cost pricing reflecting environmental externalities, environmental trade measures, or cross-border environmental liability, have been seriously dealt with. Environmental issues have mostly been put aside until 1996, when the WTO's Committee on Trade and Environment is supposed to suggest a framework to the signatory parties specifying the WTO's responsibilities in this domain (Shaw & Cosbey, 1994).

In the meantime, nations will be trading with one another according to the new rules of the WTO, but with regard to the environment it will be largely 'business as usual'. As a consequence, one cannot escape from concluding that the dozens of governments which have signed both the Rio Declaration and the WTO Agreement, have not only violated the above-mentioned Principle 4, but have put the fledgling WTO from the beginning on a conflict course with the very notion of ecologically sustainable development.

The WTO Agreement is particularly inadequate in the area of trade in natural resources, which cannot sensibly be regulated by the same rules as trade in manufactured goods. The prohibition or restraints regarding subsidies and other support mechanisms to protect the environment — for instance in agriculture, forestry, fishing, or in the mining industry — has very wide-ranging negative environmental consequences. These include impediments on soil-erosion control, crop rotation techniques, integrated pest-management systems, and reforestation efforts or policies aimed at protecting small diversified farms from being merged into huge cattle-ranches with serious environmental problems (Bremond, 1993).

Perhaps the biggest new threat, however, looms from the integration into the trade regime of intellectual property rights governing the use of transgenic biocides. They have been made possible by genetic 'engineering', and they will further increase the push towards huge and ecologically fragile monocultures. At the same time, they increase the farmers' need for chemical supplies and their dependence on the biological engineering support-system. The suppliers of seed, fertilizer, and pesticides, and other components of the more and more invading agribusiness, are tightening their control of agriculture in both the North and South, with ecological consequences which are unknown and largely unpredictable.

It is natural that some environmentally progressive countries will want to protect their relatively high environmental standards against a watering-down due to pressures to abide by the 'lowest common denominator'. They will attempt to do this first and foremost through multilateral negotiations, and if a minimally acceptable consensus cannot be achieved in this way, they may have to resort to unilateral measures in exceptional cases — in spite of the fact that these are very unpopular in most diplomatic circles (Charnovitz, 1993).

I don't wish to imply that institutionalized trade liberalization is fundamentally incompatible with environmental priorities. On the contrary, a rather straightforward argument supporting the WTO can be made on theoretical grounds. The implementation of a linkage between the ecology and the economy at the policy level — which is what I call the *ecolomy* — is the core principle of the sustainable development notion.

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