

Ins in Agriculture for One Family and for Whole World

Nathan Russell and Grant Scobie



Zigwanamuto Kezekia, a small-scale farmer in southeastern Uganda, has never heard of Malthus. Nor is he aware of the current debate about Malthusian predictions concerning population growth, food production, and environmental destruction in the next century. Nonetheless, he does understand the issues, and in fact, he is living them.

One Man's Fear

With a young man's energy, Kezekia once cleared forest near the village of Ikulwe to grow food and build a life for himself and his family. But now, with an older man's wisdom, he worries about the prospects for his children and grandchildren.

Kezekia and his neighbours have woven a complex web of food security from a striking variety of staple and cash crops. The fabric of this web is starting to fray, however, as a rapidly growing population depletes the soil through ever more intensive cultivation. "The yields of our crops have gone down," he says, and "there's no longer enough land for everyone."

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The Plight of a Continent

If Kezekia knew about current trends in his continent's population growth and food production, he would see that they largely confirm his worst fears.

"Between 1990 and 2050 . . . Africa's population will swell to perhaps 2.3 billion from 600 million, a 280 percent increase," writes Robert Paarlberg, associate at the Harvard Centre for International Affairs, in a recent book review. Food production, he points out, is growing at an annual rate of only 2 percent, lagging far behind the explosive rates of population increase. As a result, says Paarlberg, Africa's "food deficit could increase more than sevenfold between 1990 and 2020, to 74 million tons of food grains."

African farmers currently increase production largely by expanding the area cultivated, just as Kezekia, his family, and neighbours have done. One consequence, notes Paarlberg, is that the continent "loses roughly 12 million acres of forest every year, primarily as a result of clearance for agriculture."

To help protect forest and other fragile ecologies, it is essential that farmers raise crop yields on the land already occupied. But in many places, just the opposite is occurring. "Among 41 African countries, 15 saw declines in yields of roots and tubers between 1985 and 1993," says Paarlberg.

A Global Predicament

One can perhaps write Africa off as a hopeless case, consign its people to a destiny of suffering, and seek consolation in the happier experience of developing countries that have built thriving industries on the back of agricultural revolutions.

But quite apart from humanitarian concerns, such callousness would obscure our vision of problems that come much closer to home. Africa's plight is one especially severe manifestation of a global predicament that does not affect everyone equally but must eventually affect everyone.

By the year 2000, world population will have reached 6.25 billion, up sharply from 5.0 billion in 1987, which was double the population of 1950, according to Derek Tribe of Australia's Crawford Fund for International Agricultural Research. "It has been projected," says Tribe, "that if the present rate of population growth continues, the land surface of the earth will be packed solid with people by the year 2667."

This, of course, is only a theoretical prospect, Tribe notes, which will be forestalled by war, famine, and a host of other ills. But are there alternatives? Can humanity cope with the consequences of rapid population growth in a way that minimizes suffering, allows increasing numbers of people to escape grinding poverty, and thus reduces the pressures that give rise to social and political instability, sending shock waves and waves of immigrants to foreign shores?

Given that many developing countries are essentially agrarian, the answer to this question depends heavily on the outlook for agriculture. The picture is mixed, with signs of danger and of hope. Even though the world now produces enough food for its current population, explains Tribe, some 800 million people go hungry, and over a billion live in absolute poverty. Agricultural livelihoods are simply not generating enough income to allow these and many more people to escape lives of deep deprivation.

On the other hand, says Tribe, "during the last 30 or 40 years, science-based advances in farming have resulted in unprecedented increases in food production." Asia's grain production has

doubled in 25 years, keeping just ahead of population growth, and the average daily intake of calories per person has risen significantly. Moreover, as a result of more efficient production, the real prices of major staples have come down, making food more accessible to the poor. Progress has been uneven, however, excluding many farmers in certain regions, particularly sub-Saharan Africa, South Asia, and pockets of Latin America.

One Family's Solutions

Malthus underestimated the power of technology to stimulate agricultural development. Two hundred years later, with much more advanced technology available, the pessimists of today could be making the same mistake. Whether they are eventually proved wrong will depend largely on worldwide public support for the national and international institutions that develop and promote new technology with farmers. Over the last several years, funding for this work has declined precipitously.

Zigwanamuto Kezekia is worried but hardly fatalistic. On the contrary, he and his wife are actively seeking solutions, some of which are already evident in their fields and family compound. For example, they have adopted higher yielding, disease resistant bean varieties identified by Uganda's national bean program with support from the International Centre for Tropical Agriculture (CIAT). Interestingly, some of the new varieties come from Latin America, where CIAT is headquartered and where this crop was domesticated millennia ago.

To deal with the problem of declining soil fertility, the Kezekias are experimenting with *Mucuna* and other so-called "green manure" species, which return nitrogen and organic matter to the soil. The *Mucuna* planted in the spaces between their banana trees "conserves moisture, improves the soil, and suppresses weeds," they explain. The research method that treats the Kezekias as partners rather than passive recipients was developed by CIAT staff in Latin America and is now being applied in Africa and Asia.

Other international centres are placing new technology within these farmers' reach as well. For example, scientists of the International Institute of Tropical Agriculture (IITA), which is headquartered in Nigeria, are working with the national program to provide disease and insect resistant clones of banana. CIAT and IITA work jointly to improve cassava, a staple root crop, which, like beans, originated in Latin America; cassava is now under threat from a major viral epidemic in Uganda.

Solutions for a Whole World

These two centres are among 16 (see accompanying list) that belong to the Consultative Group on International Agricultural Research (CGIAR), which is co-sponsored by the World Bank and the United Nations Development Programme (UNDP), the Environment Programme (UNEP), and the Food and Agriculture Organization (FAO).

The Group's 49 contributing members include 22 industrialised countries, 13 developing countries, as well as numerous foundations and international or regional organisations. New Zealand was previously a member of the CGIAR and encouragingly, is giving serious consideration to rejoining the Group.

The Consultative Group (CG) centres conduct research on food crops, forestry, livestock, irrigation management, and aquatic resources, while providing a wide range of services, such as training, to national research systems, including universities and non-government organisations.

The CG's impressive record of achievement and impact gives substance to the hope that, in the words of Yale University professor Paul Kennedy, "effective global solutions" can be found to "free the poorer three-quarters of humankind from the growing Malthusian trap of malnutrition, starvation, resource depletion, unrest, enforced migration, and armed conflict."

For example, modern wheat varieties developed at the International Centre for Maize and Wheat Improvement (CIMMYT) in Mexico are sown on over 50 million of the nearly 70 million hectares of this crop grown in developing countries, including China. Steady progress is also being made in the improvement of millet, sorghum, potato, sweet potato, cassava, plantain, and forages. Over half the beans grown in Argentina, Costa Rica, Cuba, Guatemala, and Rwanda are derived from varieties developed by CIAT. The benefits generated by these and other innovations (valued in the billions) vastly exceed the millions invested in CG research.

This extended family of international centres, supported by a family of donors, is perhaps the best hope for enabling families like the Kezekias to find ways of increasing crop production while maintaining the natural resources on which their agricultural livelihood depends.

New Zealand, with its strong agricultural science community, could contribute importantly as a member of the CGIAR, while deriving considerable benefits from its association with the most extensive scientific research network in the world. Above all, CGIAR membership would serve the goals of our foreign assistance programmes by giving us an active role as a donor to a multilateral organisation that has a distinguished record of impact, is scrupulously apolitical, and is devoted solely to the application of science to the twin goals of poverty alleviation and environmental enhancement.

Members of the CGIAR

Industrialised Countries

Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Luxembourg, The Netherlands, Norway, Romania, Russian Federation, Spain, Sweden, Switzerland, United Kingdom, USA.

Developing Countries

Brazil, China, Colombia, Cote d'Ivoire, Egypt, India, Indonesia, Iran, Kenya, Korea, Mexico, Nigeria, the Philippines.

Foundations

Ford Foundation, International Development Research Centre, Kellogg Foundation, Rockefeller Foundation.

International and Regional Organisations

African Development Bank, Arab Fund for Economic and Social Development, Asian Development Bank, European Commission, Food and Agriculture Organization of the United Nations, Inter American Development Bank, International Fund for Agricultural Development, OPEC Fund for International Development, United Nations Development Programme, United Nations Environment Programme, World Bank.

Regional Representatives

Ghana and Zimbabwe

Malaysia and Nepal

The Czech Republic and Estonia

Chile and El Salvador

Egypt and Iran

CGIAR Centres

CIAT

International Centre for Tropical Agriculture

CIFOR

Centre for International Forestry Research

CIMMYT

International Maize and Wheat Improvement Centre

CIP

International Potato Centre

ICARDA

International Centre for Agricultural Research in the Dry Areas

ICLARM

International Centre for Living Aquatic Resources Management

International Centre for Research in Agroforestry

ICRISAT

International Crops Research Institute for the SemiArid Tropics

IFPRI

International Food Policy Research Institute

IIMI

International Irrigation Management Institute

IITA

International Institute of Tropical Agriculture

ILRI

International Livestock Research Institute

IPGRI

International Plant Genetic Resources Institute

IRRI

International Rice Research Institute

ISNAR

International Service for National Agricultural Research

WARDA

West Africa Rice Development Association