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STANFORD/BERKELEY—Virtually everyone in the scientific community agrees that ensuring sufficient food supplies for a surging human population, which is set to grow by 2.4 billion by mid-century, will require serious work. Indeed, we have not even succeeded at providing enough food for today's population of 7.3 billion: Nearly 800 million people currently are starving or hungry, and another couple billion do not get enough micronutrients. But there is no such consensus about how to address the food-security problem.

The scientific community is split between two main approaches: "tinker with agricultural details" (TAD) and "mend societal fundamentals" (MSF). While the former approach has support from a clear majority, the latter is more convincing.

To be sure, the TAD camp has identified many important problems with current food production and distribution systems, and addressing them could indeed improve food security. Yields could be increased by developing better crop varieties. Water, fertilizer and pesticides should be used more efficiently. Maintaining tropical forests and other relatively natural ecosystems would preserve critical ecosystem services, especially soil fertility, pollination, pest control and climate amelioration. The trend toward rising meat consumption should be reversed. Stricter regulation of fisheries and ocean pollution would maintain the supply of marine protein essential to many people. Waste in food production and distribution should be reduced. And people should be educated to choose more sustainable and nutritious foods.

Achieving these goals, TAD supporters recognize, would require policymakers to give food security high political and fiscal priority, in order to support the needed research and action. Responsibility for launching programs to distribute food more equitably would also fall to governments.

But the TAD approach is incomplete. Not only would its short-term goals be extremely difficult to achieve without more fundamental societal changes; even if they were attained, they would probably prove inadequate in the medium term, and certainly in the long term.

To see why, let us suppose that, in 2050, the TAD goals have all been reached. More food is available, thanks to higher agricultural yields and waste-reducing improvements in storage and distribution. Improved environmental policies mean that most of today's forests are still standing and no-fishing zones are widely established and enforced. Ecosystems are becoming stronger, with many corals and plankton evolving to survive in warmer, more acidic water. Add an uptick in vegetarianism, and it appears that the global temperature rise could be limited to 3 degrees celsius.

As a result, the world could avoid famines by mid-century. But, in a human population of 9.7 billion, hunger and malnutrition would be proportionately the same as they are in today's population of 7.3 billion. In other words, even with such an extraordinary and unlikely combination of accomplishments and good luck, our food-security predicament would still be with us.

The reason is simple: Our societies and economies are based on the flawed assumption that perpetual growth is possible on a finite planet. To ensure global food security — not to mention other fundamental human rights — for all, we need to recognize our limitations, in terms of both

social and biophysical factors, and do whatever it takes to ensure that we do not exceed them.

Based on this conviction, the MSF approach demands that governments take steps to empower women in all areas of society, and ensure that all sexually active people have access to modern birth control, with women free to have an abortion, if they so choose. At the same time, governments must address inequality of wealth, and thus of food, not least by curbing corporate dominance.

Short of bringing the global population down to sustainable levels, MSF reforms are the world's only hope. But, as it stands, implementing them seems unlikely. The United States, the country that consumes the most, is moving in the opposite direction: Women are struggling to hold onto their reproductive rights, wealth distribution is becoming increasingly skewed, and corporations are becoming even more powerful.

If this trend continues, in 2050, governance systems will be even more poorly equipped to deal with the fundamental problems of perpetual population and consumption growth or wealth inequality. As environments deteriorate from climate change, toxification, and loss of biodiversity and ecosystem services, people will have less time and energy for governance reform aimed at reducing inequality or preserving the environment. As a result, those in power will feel less pressure to arrange systems to provide food to those who need it most.

The social-biophysical system is replete with chicken-and-egg subsystems. Given that there is no obvious single vulnerable point in the system to initiate change, governments must address a range of issues simultaneously. Key starting points include purging politics of "big money"; introducing a more progressive tax system that effectively caps the income of the extremely wealthy; ensuring that policymakers have a basic level of scientific understanding; and strengthening women's rights, including access to free contraception.

Just as social and environmental problems can be mutually reinforcing, so can actions aimed at strengthening our social and environmental fundamentals. Only by focusing on these fundamentals, rather than merely tinkering with the details of food production, can intrinsic systemic linkages work to the advantage of future generations. Project Syndicate

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