CORRESPONDENCE

Nature's special issue 'Can Science Feed the World?' (29 July 2010; www.nature.com/food) prompted a considerable response from readers.

Mitigate food loss to feed more people right now

The proposals for agricultural monitoring systems by Jeffrey Sachs and colleagues (*Nature* **466,** 558–560; 2010) will take five years to mature and deliver value. We can make an immediate difference to agricultural advisory services and farmers by providing access to pragmatic advice about strategies that are appropriate to their local environment.

At present, for example, there are no reliable means of tracking plant pests and diseases globally. So we lose 40% of what we grow to pest and disease damage to crops in the field, in transit and during storage. This threat is set to increase as trade flows and climate change accelerate the movement of plant pests and pathogens. By losing less, we can feed more people right now — without extra land, water, energy or chemicals, or creating new crop varieties. Using data and information that already exist, a knowledge bank to reduce losses in all major food and cash crops could be up and running within three years. The UK-based CABI (Centre for Agricultural Bioscience International) already has a prototype that could start delivering useful data on a few key crops within a year.

More funding for agricultural research is essential, but the greatest challenge is to transfer the knowledge we already have, applying known remedies and simple technologies that farmers can afford and readily adapt. Much of the hand-wringing by developed countries about food production skirts around this central problem: that however much we know, we still do not get the information to the smallholders and communities in developing countries that are the backbone of local food production — but have the lowest food security.

Trevor Nicholls CABI, Wallingford, Oxfordshire, OX10 8DE, UK
e-mail: t.nicholls@cabi.org

Culturing practices can make roots more robust too

The growth and performance of root systems can be enhanced by altered management practices, not just by plant breeding (*Nature* **466,** 552–553; 2010).

Researchers in China, India, Thailand and Japan have shown how the structure and function of rice roots, for instance, can be improved by modifying factors such as seedling age, plant spacing, water management, active soil aeration and sources of fertilization. Plants with better root systems become more efficient at using water and fixing carbon dioxide and are more protected against drought and storm damage (see, for example, A. K. Thakur *et al. Exp. Agr.* **46,** 77–98; 2010).

Changing crop physiology and morphology through altered culturing practices can help agriculture to meet the challenges of population growth and climate change in the decades ahead.

Norman Uphoff Cornell International Institute for Food, Agriculture and Development, New York 14853, USA
e-mail: ntu1@cornell.edu

Reduce soil damage for more sustainable crop production

Your series on solving world hunger in the future (*Nature* **466,** 531 and 546–561; 2010) focuses mainly on biological measures. Better management of soil and cropping systems could improve productivity right away, with minimal environmental threat.

Reducing soil disturbance is crucial to sustainable crop production in most environments. The principles of no-tillage, permanent soil cover and rotation need less energy and pesticide input than tillage-based alternatives, and are the foundations of conservation agriculture, which inhibits wind and water erosion.

Large grain harvesters flatten the soil with an axle load of 18–20 tonnes each — about twice that allowed for heavy trucks. Driving these loads over soil destroys porosity and productivity, so tillage seems the only option. Yet compaction can be avoided by no-till cropping of permanent beds in controlled-traffic farming systems, in which the wheels of heavy machinery are restricted to hard permanent traffic lanes (see www.ctfsolutions.com.au).

Jeff Tullberg University of Queensland, Queensland 4069, Australia
e-mail: jtullb@bigpond.net.au
Competing financial interests: declared (see http://dx.doi.org/10.1038/466920c for details).

Monitoring systems outdated and protectionist

None of Jeffrey Sachs and colleagues' cited monitoring systems (*Nature* **466,** 558–560; 2010) meets the innovation requirements for the comprehensive monitoring of agro-ecological zones worldwide.

Information technologies now offer an array of approaches and tools for rapid collation, organization and dissemination of interactive data, but most monitoring systems are outdated and protectionist. They are often developed and maintained in isolation, which severely reduces the utility of the data and information gathered. New platforms and different ways of collecting information will be required to build a global system.

There is a growing disconnect between ambitious international agendas set by Western scientists and the realities on the ground in developing countries. To achieve policy and governance targets that are associated with sustainable agriculture, conservation and human welfare, monitoring should be participatory and decentralized to take advantage of the wealth of experience and information embodied in traditional farming knowledge and practices and in decentralized governance regimes.

Kamaljit S. Bawa University of Massachusetts, Boston, Massachusetts 02125, USA; Ashoka Trust for Research in Ecology and the Environment, Bangalore, India
e-mail: kamal.bawa@umb.edu

Track social and economic impacts of food production

Food security depends on efficient distribution and affordability as well as on sustainable production (*Nature* **466,** 558–560; 2010). We are already seeing the acquisition of African farmland by Asian countries to feed their own populations, and we can expect more dislocation globally between sites of food production and consumption, exacerbated by growing urbanization. This will aggravate distribution problems and adversely affect affordability by increasing financial barriers (transport costs) and economic impediments (market distortions).

As well as ecological indicators of sustainable food production, we need metrics to track socio-economic factors affecting affordability and distribution gaps.

Don Gunasekera, John Finnigan Centre for Complex Systems Science, CSIRO Marine and Atmospheric Research, Canberra ACT 2601, Australia
e-mail: don.gunasekera@csiro.au