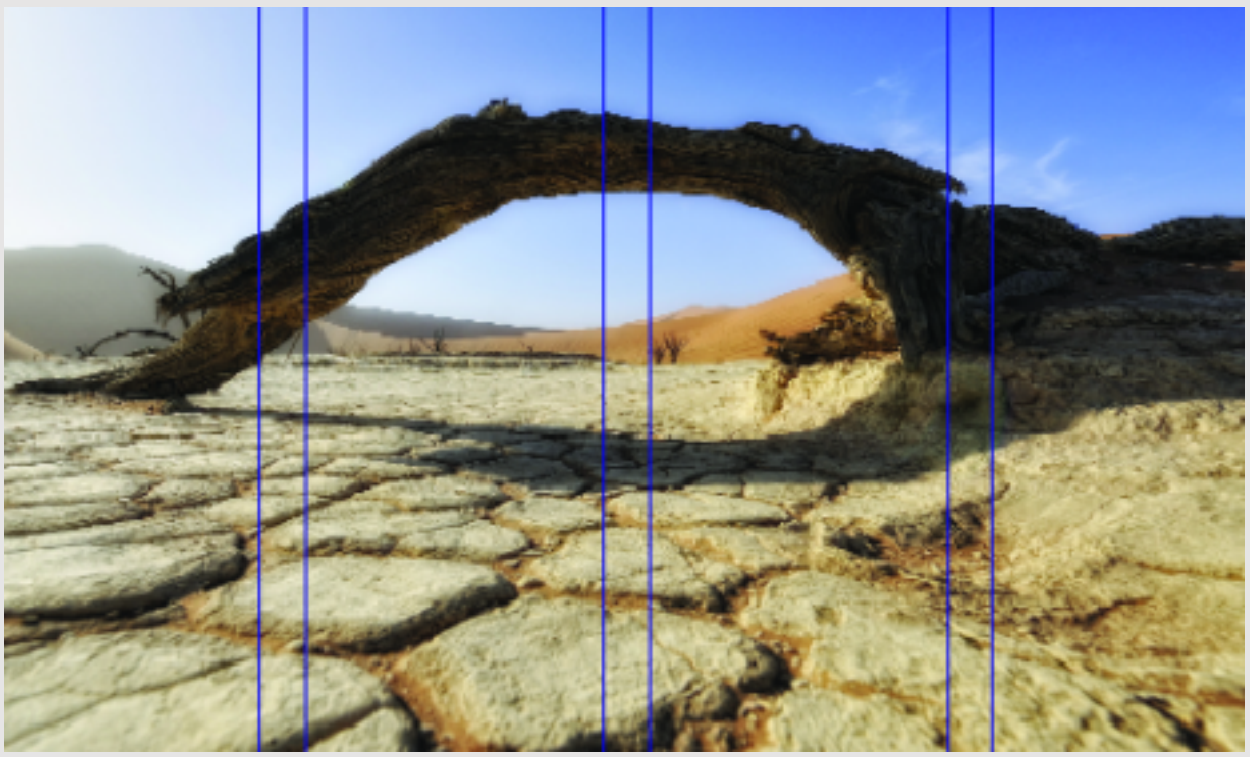

This edition contains articles on the expected effects of climate change on agricultural production in China and on the role of plant breeding in adapting to the evolving situation.

Preparing to live in a world where there is a substantial change in climate is one of the most important tasks for researchers, policy makers and those who invest in agriculture and food production. China accounts for 19% of the world population.

As recently as 2002 China had a small net export balance in agricultural and food trade, by 2011 it had a deficit in excess of 40billion US$.

As real incomes continue to rise demand is likely to rise for more expensive and resource demanding food products. The consequences are of global significance.

Changes in agricultural productivity as a result of climate change in China have far reaching consequences for producers and consumers everywhere.

China has invested in agricultural technology and research and has greatly increased domestic production but even so the increased level of demand cannot be met from domestic production alone. Environmental constraints seem likely to make further progress more difficult.

Climate change in China will increase production in some areas, as plants benefit from higher levels of atmospheric CO2. Elsewhere, loss of sunlight, shortages of water and the frequency of extreme weather events will reduce output.

This article foresees the overall crop yield loss to be between 5% and 10%. As a member of WTO, China's impact on world trade in agriculture is likely to outweigh that of existing importers.

It has already made significant agricultural investments in Africa. There the potential for additional food production to meet both African needs and supply export markets is substantial.

For this to be realised there is a need for political stability and, within agriculture, improved management, new technology and new capital. Such development, whilst essential to meet market demands will add the difficulty of restraining and adapting to global warming.

The thrust of the argument for government action on climate change is that the long run cost of continued 'business as usual' is huge and not recognized by the market.

As a result resources are used in ways that do not reflect their total cost to society. It is a classic example of market failure – the sort of issue economic policy is supposed to address.

Relevant policies can address both the mitigation of climate change, by reducing greenhouse gas emissions and adaptation of production and consumption to changes that result from global warming.

An effective response will involve major constraints on the established and preferred pattern of consumption-e.g. leading to a reduction in intensive animal production.

This is counter to the aspiration of most countries, including the poorest to attain higher real incomes. Such higher incomes generate demand for both private and public goods and services.

Political realities will determine the extent to which policy can constrain consumption to lower levels of greenhouse gas emissions. The difficulty of implementing such policies is indicated by reactions to austerity policies during the recent financial crisis.

The outcome tends to be a series of gesture policies that have minimal, or even adverse, effect on the need to curtail emissions.

Wind farms, bio-energy and higher taxes on fossil fuels sound like relevant policies, but are nowhere near a solution. Nuclear fuel and fracking, that might ease the medium term threat, are resisted by a diversity of pressure groups.

Stronger policies that tackle consumption patterns directly are inhibited by their social consequences – they bear most heavily on poorest people in developed economies and on countries with very low levels of real per capita income.

There is a pressing need to devise and apply ways in which the real resource cost of production per unit of output is reduced. Such costs include not only the resources directly used, but also consequential costs of damage to the environment and of social disruption the pattern of employment changes.

Much of the new technology in farming has arisen from developments in other sectors of the economy. For example developments in information technology, that may have originated in military research, alter the functioning of markets and the control of production processes.

The scope for further improvement is substantial both by the better application of known technologies and by the introduction of new research based systems of production.

The application of new methods and the research on which further progress depends demand substantial investment. Innovation thus hinges on the development of the economy as a whole.

When economies slow, both the capacity and the willingness to invest are reduced. This raises the paradox that policies aimed at curbing consumption in the short run may inhibit the development of new, more efficient and less environmentally damaging processes in the long run.

Funding for research is vulnerable when economies slow. The role of the state in sustaining fundamental research and disseminating efficient discoveries becomes even more important when pressures on public spending are most acute.

The papers in this edition show the urgency and the possibility of introducing less damaging systems of production. As the world seeks to respond to the challenge of climate change the response of production and consumption in China is of major importance.

Other countries will learn from experience in China and China can benefit from experience elsewhere of the benefits and the problems of technologies that seek to minimise the environmental cost of feeding a growing and richer population.

The green party is wrong in many ways –by insisting on the development of more wind farms and stopping the consumption of fossil fuels now, it will depress the UK's competitive edge and there will not be the income to spend on research into more efficient use of solar energy.

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Professor Sir John Marsh

30th April 2015

Comments