

Workshop Report

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Sustainability, Agricultural Development and the World's Future Food Needs

Lauren Power

Acting Research Manager

Global Food and Water Crises Research Programme

Summary

The final round of consultations hosted by Future Directions International's Global Food and Water Crises Research Programme used the outcomes of previous roundtables to examine the issue of sustainability in farming systems and its importance in meeting future food needs.

The roundtable and associated interviews sought to answer the following question: "How do we prepare farming communities to provide food requirements, noting the differences between developed and developing communities, while ensuring that the environment is sustained?"

The discussion focused on the concept of sustainable intensification, its application to both smallholder farming and large-scale industrial farming, and on the relative importance of environmental sustainability and profitability in achieving beneficial outcomes in agricultural development.

The results of the consultations are summarised in this document. The major conclusions derived from the consultation process will be included in our global landmark study to be released early in 2014. That publication will draw together the outcomes from the programme's roundtable series and research carried out between 2011 and 2013. The aim is to consider the possibility of a global food and water crisis between now and 2050; how extensive it might be; how it might unfold and what impact it could have on Australia.

Key Points

- Sustainable intensification should not be associated with any one approach to agriculture; it should be treated as a necessary paradigm shift, which must be applied to all agriculture, whatever its scale, to ensure that food systems can provide for the needs of future generations.

- For farming to be sustainable it must be profitable for those people directly involved in it and it must be able to support and perpetuate rural communities. Furthermore, profitability is essential to enable innovation and the introduction of sustainable technologies.
- The intensification of smallholder farming has great potential for increasing yields and incomes in an environmentally sustainable manner. For this development to be profitable though, some increase in the size of farm holdings may be required.
- Australian agriculture is not getting high enough returns from the food supply chain; to survive farmers have been deferring costs of production, such as environmental or nutritional issues, seriously undermining the system's sustainability.
- The real cost of food, in terms of environmental and social sustainability, is not reflected in the prices paid by consumers.

Analysis

Future Directions International's latest series of interviews and roundtables has focused on the sustainability of farming systems in both the developed and developing worlds. Given the burgeoning food demand and resource pressures identified in earlier workshops, we have explored the idea that future food production will require the "sustainable intensification" of agriculture to achieve food security.

The Challenge for Farming Systems

How do we prepare farming communities to meet global food needs to 2050, as the world's population increases by two billion to over 9 billion people? As well as increased demand from this growing population, incomes are expected to rise, leading to shifts in consumption patterns that will place additional pressure on the Earth's already strained resource base. Estimates indicate that, in the absence of successful measures to restrain growth in food demand from affluent populations, the production of food calories worldwide will have to increase by at least 60 per cent to ensure the world's population is adequately fed in 2050.

Only 27 per cent of this increase will come from expanding the area of land under cultivation; the remaining 73 per cent will have to be met from either yield increases or increases in cropping intensity because of the scarcity of key resources, including arable land, water and fertiliser. In the past four decades, massive advances have been made in food production, as the world more than doubled agricultural output to feed an additional four billion people. Estimates show that we will have to repeat this achievement to ensure global food security to 2050.

Continued reliance on, and expansion of, environmentally damaging forms of agricultural production, could lead to reduced productivity because of the ecological costs. The sustainability of current agricultural systems is limited by high levels of waste; this affects both inputs and also the post-harvest stage. Another concern is the reliance on resources that either have limited renewability or are non-renewable. Without moving to more sustainable modes of production, we could threaten the viability of our future food supply.

What is Sustainable Intensification?

In recent years, the term “sustainable intensification” has gained currency as a descriptor of the paradigm shift considered necessary for agriculture to sustainably meet the food needs of future generations. In this context, ‘sustainable’ refers to both purely environmental goals, such as ensuring that natural resource bases can remain productive into the future, as well as socioeconomic considerations, including the economic viability of agriculture for farmers. ‘Intensification’ refers to a system of production that is “knowledge-, technology-, natural capital- and land-intensive”, but which reduces the intensity of use of non-renewable resources. Sustainable intensification should improve the efficiency with which inputs are used relative to desired outcomes; that is, increasing productivity and positive ecosystem effects, while reducing undesirable outputs such as pollution and degradation.

Considerable controversy has surrounded the concept of sustainable intensification and whether applies only to conventional large-scale Western modes of agriculture, or is also applicable to the development of smallholder agriculture. The view is increasingly gaining traction that sustainable intensification should not be associated with any one approach to agriculture; it should be treated as a necessary paradigm shift, which must be applied to all agriculture, whatever its scale, to ensure that food systems can provide for the needs of future generations.

The key element of sustainable intensification is the need to ensure that the full environmental and social costs of food production are recovered, to safeguard the viability of future food systems. One of the overwhelming outcomes from our roundtable discussion was the conclusion that for farming to be sustainable, it must also be profitable. It must be profitable for those people directly involved in it and it must also be able to support and perpetuate rural communities. If farming systems don’t return a profit, farmers will leave the sector and this will undermine future food security. Furthermore, profitability is essential to enable innovation and the introduction of sustainable technologies. This is a fundamental consideration for the sustainability of both large-scale and smallholder farming systems.

Sustainable Development and Smallholder Farming

In FDI’s discussions on sustainable farming systems there was a broad consensus that the intensification of smallholder farming is an area with great potential for increasing yields and incomes in an environmentally sustainable manner. For the development of smallholder farming to be viable though, it is essential that it become more profitable. To enable this to happen, our roundtable participants suggested that either the size of farm holdings must increase somewhat, or that individual farmers must be drawn into collective marketing groups, through contract farming or public-private partnerships. This would enable farmers to adopt new technologies, give them better access to inputs and strengthen market linkages, reducing their vulnerability to risk. These profitability-promoting measures were considered necessary to enable smallholder farming to provide a sustainable solution to food security issues.

Peter Batt stated that if smallholder farming is not profitable, the consequences for an already overpopulated planet will be severe, because of the pressures that the resultant

rural-urban migration will have on the environment, urban infrastructure and food systems. “The challenge we have is to keep smallholder farmers on the land. We have to make them profitable and sustainable from the point of view of adopting more appropriate land management practices.” Richard Bell emphasised the fact that there is a great deal of opportunity for growth and improved profitability in smallholder farming, because smallholder farmers have been largely forgotten in the research and development push of the last fifty years. We can now focus our attention on a large target population with the potential to create a significant amount of benefit for a large number of people.

For the potential development of smallholder farming to be achieved, considerable changes are needed, to improve risk management, connect producers with markets and strengthen supply chains. This will allow technology and innovations to be productively implemented. A general agreement was reached during the roundtable that to ensure the development, profitability and sustainability of smallholder farming, some consolidation of operations and the size of holdings is required. This would enable research and development to be effectively implemented and allow farmers to become active participants in modern food production.

Consolidation and Mechanisation on Smallholder Farms

Bell identified two overlapping demographic trends that are driving the future of food production in much of the developing world. The first of these is that as populations have grown, farm sizes have decreased as holdings are divided into smaller and smaller plots. This trend continues in most parts of the developing world. Alongside this, in South Asia, labour shortages and rising labour costs are very quickly emerging as a major challenge. As a result of these two overlapping trends, consolidation and mechanisation are becoming necessary and are proving to be beneficial for the sustainability of smallholder farming in some parts of the developing world.

The majority of agriculture in South Asia has grown used to plentiful labour and is therefore very labour intensive. But in Bangladesh the daily labour rate has trebled in the past four years, as the country has become more integrated into the global economy and employment opportunities have opened up in the manufacturing sector and overseas. There are two to three million young people, particularly women, working in the garment industry and another two or three million young men working on construction sites overseas. This has drawn a large pool of labour out of rural Bangladesh, which means that these areas have to very quickly adjust and look to a food production future with more mechanisation and less human labour. Right across the region – in Nepal, Eastern India, Vietnam and China – labour shortages and rising costs are leading a big push towards mechanisation on small farms. Difficulties emerge, however, because most new technology is designed for large farms and is unsuitable for the ever-shrinking smallholder plots.

Consequently, the size of smallholder farms – 85 per cent of the world’s farms are smaller than 2 hectares – prevents the adoption of many forms of technological innovation. Even where ground-breaking technology can be introduced, the scale of its implementation limits the gains to farmers. Richard Bell gave the example of the introduction of conservation agriculture methods, such as minimum tillage crop sowing and the retention of residues.

These practices may produce an additional profit of US\$50 per hectare, but for a small farm that game-changing technology is still only going to put an extra US\$100-150 in farmers' pockets. While this may be a 50 per cent increase in farmers' incomes, it's not enough to make life-changing improvements for a rural family.

Bell said, 'Realistically, those farms will have to get bigger over time. We might be talking about consolidation to 5 to 10 hectares, so that the annual family product may be a few thousand dollars a year. That's when you can really start to make a difference in people's capacity to change their lives.' For this reason, off-farm employment is a critical part of developing smallholder agriculture; a diversity of opportunities relieves the pressure forcing farm sizes to get smaller and smaller.

Collaborative Farming Clusters

While the crucial role that smallholder farmers will play in achieving global food security was recognised, our participants agreed that slightly larger farm units can better reap the benefits of technological change and can integrate better into markets. Peter Batt explained that many of the benefits of physical consolidation can be achieved through the implementation of public-private partnerships (PPP) and contract farming. 'Government funding for technological development and extension services is limited, thus we are increasingly seeing PPPs become the norm. PPPs are working throughout the developed world to integrate smallhold farmers into supply chains, by organising smallholder farmers at a grassroots level into "clusters" or collaborative marketing groups. This allows technology to be disseminated to farmers in a far more efficient manner and for farmers to gain easier access to inputs.' By creating more uniformity in supply chains and practices, farmers can improve their access to larger, more stable markets.

Contract farming operates in a similar way; by bringing together small plots of land, delivering technologies and providing guaranteed payments, risk levels are reduced and systems can become self-sustaining. Batt emphasised that risk reduction is of particular importance, because in traditional smallholder marketing systems prices are too volatile and this can be a disincentive to the introduction of technologies involving more than a minimal level of upfront investment. There are a number of mechanisms available that work on multiple levels to assist smallhold farmers to become active participants in modern food systems.

The sustainable intensification of smallholder farming practices can greatly contribute to future food security, by increasing food supplies and the incomes of those who are highly vulnerable to food insecurity. For these farming systems to maximise their potential, they must not only be environmentally sustainable, but must also be profitably integrated into global food systems to guarantee their survival.

Sustainability in the Australian Agriculture Sector

At the roundtable, profitability was also identified as one of the primary threats to the sustainability of the Australian agricultural sector. Peter Nixon advanced the view that while Australia has sufficient land and resources, declining profitability and a consequent loss of human capital, are creating deep concern for the future of the industry.

The Cost Price Squeeze

Nixon believes that agriculture in the Western world is not getting high enough returns from the food supply chain to give it the strength to develop new technology. Agriculture is being starved for funds. To survive, farmers have been deferring costs of production, such as environmental and nutritional issues, seriously undermining the system's sustainability. The primary causes of declining profit margins identified in the workshop, were social and political demands for low food prices and the concentration of market power in supply chains.

A serious issue facing Western agriculture generally, and Australian agriculture specifically, is the concentration and aggregation of market power at opposite ends of the supply chain. Globally, this is seen in the vertical integration of input supply chains by agribusiness companies, such as Monsanto, whose expansion has led to significant private ownership of seed and fertiliser stocks. In Australia, the supermarket duopoly has seen farmers lose price negotiating power, as the supermarkets have pushed to rationalise product lines and decrease prices. In Australian agriculture this has had a direct impact, causing rising input costs and diminishing returns. Farmers have to deal with a double-edged sword.

This situation is exacerbated by the considerable pressure from consumers and politicians for food prices (and the consumer price index) to remain low. After decades of food overproduction in the Western world, leading to low food prices, Nixon claims that 'politicians and the community are not willing to spend more money on food. Everyone likes cheap food. But the reality is, what we're doing is completely unsustainable. We've got to break the cycle somehow, otherwise Australian agriculture will be hollowed out to the extent that we won't be able to meet the challenges of the future.'

The Real Cost of Dinner

Shashi Sharma raised the valuable point that the real cost of food, in terms of environmental and social sustainability, is not reflected in the prices paid at the supermarket. It takes one litre of water to produce a single calorie of food energy. Very few studies or public awareness programs have tried to calculate and convey the social and environmental costs of food production. Sharma said, 'We don't really have a good idea of how expensive food should be in order for us to be able to maintain the environment as well as feed people.' In the developed world, we don't put a high enough value on food. We're not recovering the full cost of the effects of production on the environment and communities.

The pressure to maintain low prices requires farmers to unsustainably defer costs and is causing profit levels to fall. Declining profitability has, in turn, resulted in a collapse in the farming population; over half of the farmers interviewed in a recent survey could not identify a successor. Nixon believes that 'we are reaching a critical point in our ability to sustain current levels of production, because of what's happening to the human side within agriculture... If this is allowed to happen for another ten or fifteen years, I think Western agriculture is going to have some serious problems. The global impact of a collapse in Western agriculture would be dramatic, because a large part of the traded surplus agricultural production in the world comes from the West.'

Bell summed up the dilemma when he stated: ‘We need to pay more for our food so that important ideas about environmental sustainability can be affordably implemented, but if the price of food goes up world-wide, how do the people already experiencing food insecurity afford to eat?’

Attendees (Perth)

- Peter Batt, Professor Food and Agribusiness Marketing, *Curtin Business School*.
- Richard Bell, Professor Sustainable Land Management, *Murdoch University*.
- Sashi Sharma, Chair Biosecurity and Food Security, *Murdoch University*.
- Peter Nixon, *Nuffield Farming Scholars*.
- John Hartley, CEO, *Future Directions International*.
- Lauren Power, Acting Research Manager, *FDI Global Food and Water Crises Research Programme*.
- Sinéad Lehane, Research Analyst, *FDI Global Food and Water Crises Research Programme*.

Any opinions or views expressed in this paper are those of the individual author, unless stated to be those of Future Directions International.

Published by Future Directions International Pty Ltd.
80 Birdwood Parade, Dalkeith WA 6009, Australia.
Tel: +61 8 9389 9831 Fax: +61 8 9389 8803
E-mail: lpower@futuresdirections.org.au Web: www.futuresdirections.org.au

