Locked in & Locked Out:
Smallholder Farmers & the New Economy in Low Income Countries

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1 Introduction

In this paper we explore possible impacts of the 'new economy' on smallholder farmers in low income countries. Following a short discussion of what is meant by the 'new economy', we briefly consider the characteristics of smallholder farmers in low income countries, and suggest an analytical framework with which to examine ways in which the new economy may impact on them. This leads to a discussion of the particular threats and opportunities that the new economy presents to these farmers. We conclude by considering the implications of our analysis for smallholders' management choices and for others concerned both with their welfare and for their roles in national and global economies. The paper tries to address a large topic in a small time, and we are therefore very selective in the topics we focus on.

2 The New Economy

We could spend much time discussing what is meant by this term, what is particularly 'new' about it, and how its different elements interact. For the purposes of this paper, we pick out a limited set of key elements that are particularly relevant to developing countries and to their agriculture sectors.

- Increased international financial and capital flows;
- Increased trade and changes in its nature (commodities versus other goods and services);
- Increased importance of 'governance' on private and official financial flows;
- Increased importance of global institutions, such as trans-national corporations, international NGO's, and international government agreements and organisations (affecting, for example, trade, labour standards, food safety standards, environmental management, etc.); and
- Changes in culture and in consumption patterns and aspirations.

Underlying these are changes in

- Information and communications technologies;
- Bio-technology;
- 'Consensus' on national and international trade and economic management (although continuing protectionism by the north must be noted); and
- Recognition of environmental, market, health, crime, welfare and conflict 'externalities' linking countries'.

At the beginning of any discussion about the new economy it is important not just to recognise its extent and drivers, but also to recognise its limitations. Although the new economy may appear to be all embracing and

ubiquitous, in many ways the phenomenon of globalisation is far from truly global. Whether measured by increased investment or by greater trade openness, globalisation is restricted to a relatively small number of (admittedly highly populous) developing countries. According to a recent World Bank study (World Bank, 2002), about 2 billion people, one third of the world's population, live in non-globalising countries, a category which includes large parts of Africa, and many Muslim states. In contrast, the globalising group within the developing countries, comprises 3 billion people, including China, India, Brazil and the Philippines. While there is evidence suggesting that participation in globalisation reduces poverty, it should also be noted that globalising developing countries tend to be those that have already experienced rapid agricultural growth and transformation through the widespread uptake of green revolution technologies (with consequent growth in the number of more commercially oriented smallholders and decline in more subsistence oriented smallholders). It is likely that broad-based smallholder development and globalisation have played a mutually supportive role. Among other benefits, success in smallholder development expands domestic markets for consumer goods, stabilises food prices, gives government more confidence to open the economy, and provides the means for rural people to invest in schooling. This secures a platform from which to open up to international trade and investment.

Table 1 presents some indicators of the reach of different elements of the new economy, and clearly the spread of the new economy is patchy, with agricultural trade liberalisation lagging behind other sectors, and the poorest countries showing very limited participation in most elements of the new economy. It is important , therefore, that we consider who is directly affected by the spread of different elements, who has access to these different elements, and the effects of being excluded, considering both relative and absolute effects. It is also important to recognise that even for those parts of the world where the 'new economy' is taking root most rapidly, momentum for some elements may ebb and flow[1].

3 Impacts of the 'new economy' on smallholder farmers in low income countries: an analytical framework

Any attempt to categorise smallholder farmers in low income countries is fraught with difficulties. Probably the best definition to start from is a modification of Frank Ellis's definition of peasants as 'household units significantly dependent on small scale agricultural production, with access to this major means of livelihood through land, utilising mainly family labour for farm production (of which a significant proportion is normally used for subsistence consumption), and operating in a larger economic system but with only partial engagement in markets which tend to function with a high degree of imperfection' (adapted from Ellis, 1993 page 13).

This definition has to be modified to recognise that where processes of agricultural growth and development are active then markets tend to become more competitive and purchased inputs and marketed outputs become much more important, with increasing specialisation and growth of the non-farm economy pulling people out of agriculture into better remunerated non-farm activities. Where agricultural stagnation occurs, then paradoxically people may be forced to reduce their dependence on agriculture as they are pushed into greater reliance on poorly remunerated non-farm activities. To recognise this, we will consider two broad categories of smallholder farmer, those more integrated into local and national markets (we shall term these '*more commercially oriented smallholders*'), and those less integrated into these markets (we shall term these '*more subsistence oriented smallholders*'). The former tend to be found in East and South East Asia, and in the irrigated 'green revolution' areas of South Asia. The latter tend to be found in less favoured areas, often semi-arid areas of sub Saharan Africa and South Asia, and include most of the world's poor (as

[1] In the last four years (1998 to 2001) private capital flows to emerging economies have been running at only two-thirds of the level of the previous three years (1995 to 1997) (The Economist, 2nd February 2002).

Table 1: Global Changes in Trade and Investment by Region and Country Income Group

	Change in FDI (%)	Change in Trade:GDP ratio (%) (PPP current international $)		Change in Trade (%) (current $)		Change in Population (%)		% of World FDI		% of World Trade		% of World Population	
	1990-98	1980-98	1990-98	1980-98	1990-98	1980-98	1990-98	1990	1998	1990	1998	1990	1998
East Asia & Pacific	476%	-18%	5%	163%	123%	17%	11%	5.8%	10.4%	6.7%	8.9%	31.2%	30.8%
Latin America & Caribbean	747%	-22%	66%	31%	144%	22%	14%	4.2%	11.2%	4.1%	5.9%	8.4%	8.5%
Middle East & North Africa	106%	-58%	-27%	-16%	6%	37%	20%	1.3%	0.8%	3.5%	2.2%	4.5%	4.8%
South Asia	689%	-33%	8%	78%	85%	24%	16%	0.2%	0.6%	1.1%	1.2%	21.4%	22.1%
Sub-Saharan Africa	427%	-54%	-2%	-17%	29%	33%	24%	0.4%	0.7%	2.0%	1.5%	9.7%	10.6%
Least developed UN classification	2627%	-33%	4%	..	48%	29%	21%	0.0%	0.4%	0.8%	0.7%	9.7%	10.5%
Low income	834%	-47%	13%	51%	120%	22%	15%	3.0%	8.6%	4.7%	6.2%	58.7%	60.0%
Lower middle income	NA	-53%	57%	NA	55%	19%	10%	NA	NA	7.5%	6.8%	15.3%	15.0%
World	220%	-20%	22%	65%	69%	19%	12%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: calculated from World Bank, 2000

categorized by the US$1 per day income line)[2]. This distinction is in some ways a caricature, and hides many important differences (between larger and smaller scale farmers, between male and female farmers, and between livestock and crop farmers). No clear boundary can be drawn between the two groups, and the balance between subsistence and commercial activities will often vary from year to year. It also ignores the interests of landless labourers dependent on agriculture. Nevertheless, it provides a useful base for the purposes of the comparisons to be made in this paper.

It is also important to note that direct involvement in agriculture is only one of a number of economic or livelihood activities that people engage in within rural areas, and averages of 50% of income coming from non-farm and off-farm sources are common in rural Africa, for example. However, these bare figures tend to understate the importance of agriculture for the poor as (a) local non-agricultural activities often depend for their market on demand coming from a healthy local agricultural economy; (b) agriculture is generally the main (and often only) sector producing 'tradables' and bringing income into rural areas (apart, perhaps, from migrant labour and remittances); (c) there are often barriers to entry preventing the poor from engaging in the higher earning non-farm activities, and they often get stuck in crowded, low return non-farm activities; and (d) the poor spend a large proportion of their incomes on food (particularly staple foods). We therefore need to consider impacts of the new economy in terms of (1) direct impacts on different types of agricultural opportunities for smallholders (for example affecting technology or input, output and financial markets), (2) indirect impacts on employment opportunities in other sectors, and (3) direct impacts on their access as consumers to food and other markets. Looking beyond this, however (and here we go beyond the scope of this paper apart from arguing for the importance of the topic we are addressing), the importance of agriculture in rural economies and in the livelihoods of poor rural people (who make up approximately 75% of the world's poor) means that new economy impacts on smallholder agriculture in low income countries are critical for wider economic growth and poverty reduction. The new economy may also have important cultural, political and environmental impacts.

In teasing out these various interactions, we first suggest two axes by which interactions may vary. This is illustrated in Table 2, which allows us to identify eight broad categories of interaction and non-interaction.

Table 2. A conceptual framework for examining impacts of globalisation

<table>
<tr><th>National access to international markets</th><th>Local access to national markets</th><th>Consumers</th><th>Producers</th></tr>
<tr><td rowspan="2">Exclusion/ no access</td><td>Exclusion/ no access</td><td>Consumers with no market access facing local and national barriers to international markets</td><td>Producers with no market access facing local and national barriers to international markets</td></tr>
<tr><td>Access</td><td>Consumers with local market access facing national barriers to international markets</td><td>Producers with local market access facing national barriers to international markets</td></tr>
<tr><td rowspan="2">Access</td><td>Exclusion/ no access</td><td>Consumers with no market access facing local barriers to international markets</td><td>Producers with no market access facing local barriers to international markets</td></tr>
<tr><td>Access</td><td>Consumers linked to global markets</td><td>Producers linked to global markets</td></tr>
</table>

[2] Relatively small numbers of more commercial smallholders are also found in sub Saharan Africa as cash cropping farmers growing, for example, cotton or tobacco.

First we make a distinction between smallholders as producers and as consumers of goods and services. This is not a simple distinction, as people will be suppliers of some goods and services and consumers of others, and indeed for some commodities, some will be both producers and consumers, selling grain into markets at one time of year (for example) and buying grain at other times of year. Second, we consider market access (for both producers and consumers) and distinguish between involvement and non-involvement in markets by smallholders and by the (national) economies in which they are located [3]. We can then examine the effects of globalisation in terms of (a) changes in market access for producers or consumers of existing commodities or services (i.e. movements between cells), (b) changes in terms (and costs and benefits) of market access for existing commodities or services (i.e. within cells), and (c) entry into markets for new commodities or services (as a result either of opportunities for new markets and/or activities or of new constraints on existing markets and/or activities)[4]. We may also want to distinguish between direct impacts of globalisation on markets that the poor engage in themselves and indirect or secondary impacts of globalisation where changes in markets that the poor do not engage in lead to changes in markets that they do engage in. This is related to a distinction between the static and dynamic effects of globalisation.

4 Opportunities and threats for smallholder farmers

Biotechnology and globalisation often provoke heated debate between (at the extremes) supporters (who see them as a means of achieving global poverty reduction, development and food security) and opponents (who see them as evil and selfish agents of materialism, destroying local livelihoods, environments, bio-diversity and cultures in low income countries). We focus our attention more on the economic arguments, and on their implications for smallholders. We first consider specific opportunities and threats that the new economy poses for smallholders, before gathering these together in a review of the more general arguments supporting globalisation as a route for increased poverty reduction and material development. We restrict our discussion to opportunities and threats to smallholder farmers arising from the elements of the new economy described earlier. We do not consider the opportunities and threats to smallholder farmers posed by other factors affecting smallholder farmers at the beginning of the 21st century – such as the spread and impact of HIV/AIDS, global climate change, the 'demographic window', population growth, and conflict. These are important dimensions which are beyond the scope of this paper but which have very serious implications for smallholders (for further discussion of these issues see Dorward *et al.*, 2002).

4.1 New produce markets

An important potential benefit from the opening up of international trade is the opportunity for smallholder farmers to (a) access new markets for existing products, with higher prices, and (b) to produce new products to access new markets. Increased farmgate prices for traditional export crops, with increased smallholder earnings and exports following liberalisation of over-valued exchange rates, is a frequently cited example of the first of these benefits, while the growth of the Kenyan market for horticultural crops and flowers serving European markets is an example of the second. These are significant benefits. However, smallholders do not automatically and universally benefit: simply opening a non-globalised country to investment and trade may not mean that smallholders realise the benefits of a country's improved access to these markets. Smallholder development may be harder to achieve, for a number of reasons:

1. Smallholders often experience more difficult agro-climatic and/or political conditions;

[3] The distinction between market access and market exclusion is of course a matter of degree and is not a simple dichotomy as Table 2 may suggest. Nevertheless the table provides a useful framework for thinking through the effects of changes in market access.

[4] There is no simple mapping between the cells in Table 2 and our earlier classification of more commercial and more subsistence farmers. Although 'more subsistence' smallholders are more likely to face local exclusion from markets, this may not be the case with, for example, labour markets. Similarly 'more commercial' smallholders must, by definition, have access to some local markets, but there may be other local markets (for example financial markets or high quality perishable product markets) from which they are largely excluded.

2. Late entrants to competitive markets experience huge challenges in catching up, as early innovators have accumulated a base from which to continue to forge ahead with technological improvements, while prices for commodities (as opposed to differentiated improved products) are likely to suffer from over-supply. The evidence can be seen in long term trends towards declining world prices for agricultural commodities.

3. Globalisation depends critically on a 'transactions infrastructure', which comprises not only the more obvious aspects of roads, harbours, telecommunications etc., but also a basic understanding of the transactions supporting roles of government: in setting and maintaining (a) a minimally acceptable policy environment in terms of macroeconomic management, taxes and trade restrictions, and (b) an institutional infrastructure of acceptable legal codes and their enforcement. The reality is that in many of the non-globalising countries, the 'transactions infrastructure' is very weak and sometimes deteriorating further, often with particular problems in rural areas. Addressing this problem is a long-term challenge.

4. Trends in the development of supply chains based in international markets, are potentially highly exclusionary for the non-globalisers, as well as for those producers within the globalising poor countries whose footholds in world markets are not well established, and are perhaps based simply on commodities. Two thirds of trade is either within transnational corporations (TNCs) or associated with TNCs (United Nations, 1999, cited by Yusuf, 2001), involving both 'buyer driven commodity chains' (BDCCs) and 'producer driven commodity chains' (PDCCs). The former tend to be more important in agriculture, horticulture and floriculture (activities in which smallholders can engage), where the end markets are dominated by large retailing firms, which compete among themselves on continuing minor innovations in products and packaging, on maintaining strict quality criteria and on price [5]. These retailer-dominated supply chains require producers to be able to:

    - meet exacting quality criteria, covering such matters as size, colour, texture, pesticide residues and taste;
    - adjust production volumes to meet short-term market trends;
    - track minor product innovations by changing planting material, planting methods and packaging;
    - keep up with cost-reducing technical progress, in a context in which the partner retailer and its competitors have multiple sourcing.

5. These requirements are enormously demanding in terms of information flows, capital requirements and governance and management of the system. Dispersed smallholder suppliers are at an increasing disadvantage, as they have much greater difficulties in accessing and acting on rapidly evolving price and technical information. Furthermore, financing smallholder agriculture is difficult.

6. Another emerging trend, in which smallholders are likely to struggle to be included, is the 'de-commodification' of some traditional commodity industries. This can be seen in the production of, for example, maize and oil seeds bred to have high proportions of the component most valued by the processors, and also consistent quality in this respect. This trend is likely to be accelerated by technologies based on genetic modification (Kydd and Haddock, 2001). Although there is no reason in principle why GM technologies cannot be developed to be appropriate to the farming conditions and markets of poorer smallholders, bio-technology R&D investment in agriculture is dominated by TNCs (Pingali, 2001). Their interests lie primarily in technologies supporting PDCCs, with highly capitalised commercial farms supplying processors whose quality criteria are both exacting and different from those of traditional smallholder markets. Important questions then concern (a) the extent to which TNCs will invest in GM technology development for smallholder farmers, and (b) the extent to which GM technologies developed for large farmers will be able to spill across to smallholders with only modest modification costs. We discuss the first question later (in section 4.5) and our conclusions are not optimistic. With regard to GM spill over from large to small farms,

[5] Producer driven commodity chains may become increasingly important in more traditional export markets with GM technology allowing 'de-commodification', discussed below.

Kydd, 2002, suggests that many large farm GM technologies may not be particularly tolerant of smallholder conditions, where the full input package may not be affordable, ability to absorb detailed technical instructions may be less, and there is greater reliance on direct rainfall. Early work on cotton suggests that this may be too pessimistic a view (Pray and al., 2001), but it should be borne in mind that this concerns an early GM innovation, creating insecticidal properties in cotton plants, which are producing a standard commodity and GM technology is not being used in this case to enable de-commodification.

7. Even without the 'de-commodification' of traditional export crops, increasingly stringent food safety standards (which may involve not only the characteristics of the products but also, through ISOs, the processes for quality control) are likely to pose difficulties for developing country regulators, for their producers in general and for smallholders in particular (Unnevehr, 2001)

Another means by which globalisation may potentially expand markets for smallholder farmers is through growth in domestic markets as a result of 'new economy' induced growth in the domestic economy. We will discuss later the basis for expectations of such growth, and consider here how such growth, if it occurs, may affect smallholder farmers. A number of points need to be made:

1. If such growth does occur, it is almost certain to increase demand for certain non-staple agricultural products with high marginal budget shares, or high income elasticity of demand. Amongst 'low income' populations, livestock and horticultural (fruits and vegetables) products have this characteristic[6]. Rosegrant and Hazell, 2000, argue that this has been, and continues to be, a major source of growth in smallholder agriculture in many parts of Asia, and Delgado *et al.*, 1999, have proposed that rising incomes and rising demand for milk and meat in Latin America and Asia are leading to a 'livestock revolution' which smallholder farmers must be encouraged to cash in on.

2. However, as with access to international markets discussed earlier, there are concerns that many smallholders may not be well placed to benefit from these market opportunities. These products are perishable and quality characteristics are very important. They thus require 'information rich' market systems to enable rapid movements and sales and quality control and grading. As urban incomes rise, food safety concerns are also likely to rise, and the high value markets will increasingly have the characteristics of international markets discussed earlier. There are also concerns that international food safety standards may spillover into local markets, increasing costs for producers, especially for smallholders (Unnevehr, 2001)[7].

3. There may also be particular environmental difficulties with expanded smallholder livestock production, with regard to waste management (Delgado *et al.*, 2001). Waste management by smallholders may be more costly, and more difficult to monitor and enforce.

4. There is also the danger that opening up markets opens them up to competition from imports. Growing urban markets may find it easier and cheaper to import livestock and horticultural products (rather than access them from their own hinterlands), and smallholders may find that not only do they not benefit from growing urban demand for these products, but that they actually lose existing markets.

5. The effects of opening up domestic markets on price variation and volatility is an important issue. Both intra- and inter-seasonal price variation should be reduced with access to international markets, but the extent of this depends upon transport and other import and export costs and the price differential between import and export parity prices. There are also dangers of global price shocks increasing domestic markets' volatility.

With regard to the new economy and new market opportunities for smallholders, therefore, we conclude that although these opportunities should grow, many smallholders will be severely constrained in their ability to take advantage of these opportunities. There is a clear agenda here for all those engaged and concerned with

[6] Amongst very poor populations, staple foods may also have high income elasticity of demand, and growth in livestock production also has implications for cereal markets. However we will consider the special situation of staple foods later.

[7] Poor consumers may also be adversely affected if these higher costs lead to higher food prices.

smallholder farming in low income countries. Many of the potential constraints to smallholders accessing these potential market opportunities can be addressed, at least in part. With regard to farmers themselves, they need to access business, marketing and technical skills, they need to develop effective institutional arrangements with market agents, with strong farmer organisations to provide economies of scale and scope in marketing and coordination functions. Supporting agencies (governmental, non-governmental and commercial) need to assist farmers in these tasks, paying particular attention to the development of supply chains going back beyond the farm gate to include delivery systems for farm inputs and finance. There is also an important role for government and other agencies to develop compulsory and voluntary regulatory frameworks and standards with regard to quality and food safety standards and processes, and appropriate relations and balance in market power between small scale producers and their partners in commodity chains. Another important issue (which we discuss alter) is the need for increased investment in bio-technology R&D aimed at addressing the concerns of low income countries and particularly of smallholder farmers within those countries. These are major challenges, but there are examples of successful engagement with these opportunities (see for example Delgado, L.C. *et al.*, 2001). To be realistic, however, we must recognise that many of these opportunities are likely to remain out of reach for many smallholder farmers.

Relating this discussion back to the conceptual framework developed in section 3 and table 2, in this section we have concentrated on new economy effects on producers (i.e. the right hand column of table 2). What is the likelihood of different categories of smallholders moving into the bottom cell (with access to international markets), and what are the likely effects?

With regard to more subsistence oriented smallholders, the first point to make is that they are inherently less likely to be in countries that globalise with increasing national links to international markets. Even if they are, they are more likely to be excluded from local markets by virtue of physical isolation and remoteness, and/or by lack of physical, financial, natural, social and human capital necessary to engage in production and marketing of high value markets. They are often unlikely even to be able to respond to any increases in prices for staple crops, and indeed might benefit more as net consumers from falls in prices of tradable staples, (although transport costs to remote areas may dampen such benefits). They may benefit from increased labour demand by more commercially oriented smallholders, but this requires (a) that these more commercially oriented farmers are able to respond positively to new market opportunities, (b) that in order to respond they need more hired labour, and (c) that the more subsistence oriented farmers are able to supply labour (within the same locality or by seasonal migration) at reasonable opportunity cost to their own livelihoods.

With regard to more commercially oriented smallholders, these are more likely to be in countries that are engaging more with the global economy, and within those countries they are more likely to be in a position to access and benefit from new market opportunities. Nevertheless, as outlined above, they face significant risks and must overcome many serious challenges in engaging with these markets. Many are unlikely to succeed, and we can expect a significant 'shaking out' in this sector, with those that do not succeed moving back down the ladder to a more subsistence orientation and with large scale exits from agriculture. The latter process is an inevitable and beneficial part of economic development, provided that there is growth in other sectors pulling labour out of agriculture and that they are able to make a 'favourable exit' from agriculture, using agricultural (or agriculturally derived) assets to invest in their new non-agricultural livelihoods.

4.2 Food markets

In our discussion in the previous section we largely ignored the impact of globalisation on food markets. However, possible impacts on food markets are large, as global cereal prices have been falling steadily over the last two decades, and the opening up of domestic markets can allow cheaper food and more stable food prices (with falls in both intra and inter-seasonal price variation), particularly for increasing urban populations. There may also be gains for poorer and for more commercially oriented smallholders who are net grain purchasers, but these are likely to be diluted by higher transport and marketing costs in rural areas, as suggested above. Lower food prices may have an immediate negative impact on more commercially oriented smallholders producing a grain surplus. Second round effects of higher real urban incomes may increase urban demand for livestock and horticultural products, and again this may offer some opportunities for more accessible commercially oriented smallholders. More subsistence oriented smallholders are likely

to be largely bypassed by these developments, unless they are able to exit agriculture to more remunerative non-agricultural employment.

4.3 Financial markets

One of the major and often reported features of globalisation is increased global capital flows, and indeed aggregate figures are quite striking. Benefits of foreign direct investment (FDI) often go beyond improving simple access to capital, as it is often associated with transfers of technology and skills, more productive and better paid employment, improved access to international markets, integration into commodity chains, and strengthening of domestic financial institutions (Yusuf, 2001). However, as indicated earlier, these global capital flows are heavily concentrated in a small number of globalising countries: low income countries are largely excluded. Furthermore, even where there are flows of formal capital into a low income country, very little of this finds its way into agriculture, and even less into small-scale agriculture. The reasons for this are not difficult to identify: agriculture is a often a low return, high risk activity. This is even more true of smallholder agriculture, where loan sizes are small, transaction costs are very high, and the record of agricultural lending to smallholders very poor[8]. There is therefore, little hope that openness to international financial markets will make much impact on traditional smallholder agriculture, except perhaps indirectly through broader processes of (largely urban) economic growth.

There are, however, exceptions to these rather pessimistic conclusions. With some cash crops, interlocking and contract farming systems have developed because output buyers and processors gain significant advantages from using these systems to secure and expand purchases from smallholders. There are specific conditions under which buyers and processors are likely to face such incentives, and under which they are able to protect themselves from farmers' defaulting on loans (Dorward, A. *et al.*, 1998). Again, there is an agenda here for those engaged and concerned with smallholder farming in low income countries: we need to understand more about ways in which these or other similar systems might be encouraged and channels established to connect smallholder agriculture with foreign direct investment. This may involve development of new market information and regulation systems for farmers and traders, and of innovative arrangements linking smallholder farmers with traders and/or commercial farmers into longer term relationships combining cooperation, coordination, competition and trust.

4.4 Labour markets

Globalisation of labour markets involves international migration. Prospects for migration are mixed, some arguing that increased capital flows and communications and richer country resistance to immigration will increasingly constrain migration from poorer to richer countries, while others argue that low fertility in richer countries, growing populations in poorer countries, and improved communications (between emigrants and their home countries) will promote migration (Yusuf, 2001). Again, however, remoteness, poverty, more limited educational services, and lack of social and financial capital are likely to limit most rural people's opportunities for and benefits from international migration.

4.5 Technical change

Possible impacts of bio-technology on smallholder agriculture have been discussed above in the context of access to new markets. We now extend that discussion to consider wider opportunities and threats posed by GM for smallholder farmers in low income countries.

From the point of view of developing countries, there are some important downside risks of GM (Kydd, J. and Haddock, 2001). These include:

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[8] There are a small number of frequently cited exceptions to this, but closer examination shows that many of their achievements (although not all) are either in non-agricultural lending in rural areas or are with farmers growing significant areas of cash crops. These successes offer some valuable lessons, but they do not detract from the validity of conclusions that agricultural lending to poor smallholders is highly problematic (see Dorward *et al.*, 2001)

- Uneven adoption of GM technology into the exportables sector of developing country agriculture. Early adopters should be able to increase sharply both productivity and quality, and thereby cope with the decline in real prices on world markets that this generates. Non-adopters or late adopters may find it difficult to catch up, and may eventually have to exit the industry, after an extended phase of very low returns. As many livelihoods in developing countries are dependent directly or indirectly on production of exportables, this is a critical concern.
- Failure of regulation within developing countries to provide adequate protection against inappropriate introductions which could damage the environment and/or health.
- A highly concentrated industrial structure developing within global food systems, with a small number of corporations supplying seeds and inputs while also purchasing and processing output. The major players could have enormous pricing power, which might be used to ensure that they captured an undue proportion of the benefits of technical progress, to the disadvantage of farmers or consumers.

There are also upside opportunities from GM (Kydd and Haddock, 2001). These include:

- Increases in the productivity and sustainability of the staple food farming of the poor, through raising and/or stabilising yields while being able to limit increases in the use of fertiliser and/or reduce application of crop protection chemicals. This outcome would integrate well with ecological approaches.
- Potential for much more rapid development and multiplication of genetic material to combat pest and disease outbreaks resulting from evolution of new, more virulent pest or disease strains.
- Benefits to human health through reduced under-nutrition, and improved food safety through the reduction that may be possible in the production of toxins in storage.

To offer a forecast on the future course of development and commercialisation of GM is to risk appearing foolish within a few years! Accepting this risk, although we may currently be in a recession in the process of commercialisation of GM crops in developed countries, nevertheless research and adaption activity are continuing at a high level, and we anticipate that over time public concerns will be allayed as certain GMOs succeed in passing more rigorous testing procedures. "Second generation" GM crops will then be developed taking more account of health and environmental concerns. In time, therefore, GM crops and foods will become major features of the food systems of developed countries. The implications are critically important for developing countries and for their smallholder farmers: if low income countries and their smallholder farmers are left out of the GM revolution, then not only will they miss out on the benefits of possibly enormous increases in farm productivity and stability, but they may also be increasingly competed or even locked out of access to export markets, including those that they currently participate in.

What can be done to increase the rapid access of smallholders to appropriate GM technology? To answer this question we reiterate two points made earlier: first that global GM technology development is dominated by commercial investment by TNCs largely working to supply large commercial farms, and second that spill-overs of such technology to smallholders are likely to be limited. We therefore need to understand the weak incentives for private R&D companies to invest in technology development for smallholder farmers in low income countries. These weak incentives arise for a number of mutually reinforcing reasons.

First, smallholder agriculture (and especially poorer smallholder agriculture) tends to be spatially and temporally more variable as compared with commercial agriculture, and this effectively subdivides already small markets and raises technology development costs, as more fine-tuning and even different technologies are needed in different areas and for farmers with different characteristics in the same areas. Second, these technology development costs are often raised by greater difficulties and investment needs in getting smallholders to articulate their technology demands and in setting up dialogue and on-farm trials during technology development. Third, (and moving from considerations of technology development to those of developed technology and product demand and delivery) smallholders are by definition small scale firms, making small purchases, and the scale of their individual purchases are further reduced by capital constraints and risk and subsistence considerations. Fourth, small scale purchase transactions carry high transaction costs for the supply and delivery of new technology. Fifth, these extra costs are accompanied by lower benefits due to low smallholder demand for purchased inputs embodying new technology (as smallholders look more for technologies that have more public good characteristics, with low excludability characteristics). All of these conditions are reinforced by poorly developed institutions for markets for farm

inputs, farm finance, farm insurance, and farm outputs, affecting both farmer demand for purchased inputs embodying new technology, and private sector supply of these inputs.

These more micro- and meso- economic problems are mirrored at national level in many developing countries, particularly in Sub Saharan Africa. First, even large aggregations of poor farmers still amount to relatively minor markets for technology, and private companies can only justify the very high investments involved in developing new bio-technologies if new technologies generate large and reliable demand. This is a global problem (global demand for particular smallholder technologies is likely to be small) and also a national problem, as many developing countries have relatively small populations. These small markets are then a problem in terms of (a) low national sales volumes leading to high 'national' transaction costs for TNCs selling into them and (b) difficulties in capturing the benefits from initial investments in technology development where countries often have a poor record for enforcing intellectual property rights.

The main conclusion from this is that there are high technology development and delivery costs, high risks, and relatively small expected benefits for private companies developing biotechnologies for smallholder farmers in low income countries, particularly for more subsistence oriented farmers in less globalised, smaller countries. As a result there is little incentive for private companies to invest large sums in technology for these farmers. However, improved technologies for these farmers have important public good characteristics: the impediment to private sector investment is not so much that there are likely to be low benefits from such investment (on the contrary, despite the environmental dangers of these bio-technologies, potential benefits to smallholder farmers and to the economies in which they are located are very large) but that the benefits cannot be captured by those who make the investment. This is a major problem of market failure that needs to be addressed by national and international public sector financing of smallholder-focused R&D as a public good.

There is, however, a substantial degree of concern about the effectiveness of public sector research for developing countries, both by national and international organisations. This concern is causing some donor fatigue, and consequent difficulties in maintaining funding. Problems are identified as regards the needs for (a) more effective articulation by poor farmers of their technology needs, (b) more efficient research systems addressing those needs, and (c) greater concentrations of funding to allow the very large investments required for development of GM technologies. There is, however, some contradiction between the need for greater involvement of the poor in articulating research demand (implying more locally administered and targeted and hence smaller individual research investments) and the need for very large investments in GM technology development. Thus research articulation and efficiency problems are being addressed by the development and testing of a variety of different financing and institutional models in different parts of the world, most involving some degree and form of competitive bidding between different research organisations to address nationally and sub-nationally identified problems. It is unlikely, however, that these initiatives will be sufficiently resourced to support research of the type or scale needed for GM technology development. A recent contribution to address the problems posed by large scale GM technology has been made by Kremer and Zwane, 2001, with a proposal which has stimulated significant donor activity. This attempts to overcome market failures inhibiting the development of low income country smallholder technologies by providing public funds for private sector technology development, in the form of a commitment to purchase rights to technology meeting prior smallholder-targeted specifications.

Although this is a useful advance in this area, we argue that it does not go far enough, as Kremer and Zwane's work, and the policy and institutional development implications that follow from it, are narrowly focused on one (very important) market failure, that for technology development. Yet as we argue above, market failure issues surrounding smallholders are much broader than this, arising from weak institutions in agricultural input, finance and output markets. As long as these institutional problems constrain smallholder farmers' ability to enter commodity supply chains, they will also constrain them from taking up new technologies. Thus although it would be a great achievement to bring in policy and institutional changes which would stimulate the development of technology appropriate to smallholder farmers, the potential of this achievement will not be properly exploited unless these other equally important market failures are also addressed as a key part of GM technology development. We need a much broader view of how to act against market failure, as institutional development and technological development are both necessary for smallholder agriculture to play its strategic role in poverty reduction. The larger scale private sector has a very important role to pay in both these spheres, and subsidies (with safeguards) should be offered for a package of both institutional *and* technological developments.

4.6 New standards: costs, knock on effects, exclusion

The final set of specific opportunities and threats we consider concerns the effects of new standards and quality control processes required either by international agreements or by international markets. These may have a number of different effects. First, they are likely to raise costs for producers. These may inhibit access to all producers from low income countries, who may face particularly high costs due to difficulties with the institutional framework, due to transport and communication difficulties, or due to lack of access to skilled personnel and facilities necessary to maintain these processes and standards. As argued earlier, smallholder farmers are likely to face particular barriers to here as on the one hand their small marketed volumes incur very high unit costs, and on the other they face particular difficulties in compliance. The effects on consumers are more ambiguous, as they may benefit from improved quality and food safety. However, the extra costs of compliance with international standards may result in higher market prices which they are unable or unwilling to afford (Unnevehr, 2001).

4.7 More general arguments for globalisation

Earlier sections have suggested that one possible benefit from the new economy for smallholder agriculture may be that its stimulus to general economic growth may lead to increased demand for local farm products and/or increased non-farm employment opportunities. We now therefore consider more general arguments linking participation in the new economy (and particularly globalisation) to general economic growth. The basic economic arguments for globalisation rely on neoclassical theory (Hecksher-Ohlin or H-O theory), where there is a presumption that price changes caused by trade liberalisation will directly favour important sub-groups of the poor in developing countries, particularly farmers and agricultural labour, as developing countries have a relative abundance of unskilled labour, so that freer trade should increase global demand for their labour-intensive exports. Similarly, capital flows to capital starved countries, should put capital to work with abundant supplies of land and labour, giving higher returns than is available through investing in capital rich countries. As a result, it is argued that developing countries' labour markets will tighten, thereby raising wages (including the "implicit wages" of smallholder farmers) and this process can contribute powerfully to lifting people out of poverty.

Unfortunately, H-O theory is based on "stylised facts" which fail to capture key aspects of international trade and of the adjustments which are set off when economies integrate more deeply. Weaknesses include the assumptions that

- both rich and poor countries produce the same (homogenous) products and have access to the same technology;
- the transfer of factors of production between sectors, which is required by increased participation in trade and for significant labour tightening, is a fairly smooth process; and
- losers can be compensated by taxing and redistributing the absolutely larger benefits received by the gainers.

In many developing countries, and particularly in their rural areas, these H-O assumptions do not hold. First, as product specifications advance rapidly, mainly driven by the needs of richer country consumers and by the R&D outlays of large private corporations, poorer countries are unable to keep up and to benefit from their lower labour costs. Second, adjustment is not a smooth process, as much physical and human capital is "asset-specific", i.e. only utilisable in specific industries, some of which will be declining in the face of exposure to greater international competition. Third, for a "positive-sum result" to be achieved under which winners within a country compensate losers so that they are not absolutely worse off, there has to be fairly efficient tax and redistribution mechanisms, the political and administrative conditions for which are not present in many developing countries.

These criticisms of neo-classical theory are relevant to an examination of the benefits of globalisation and new technologies to smallholder farmers. The first criticism applies when alternative non-agricultural growth paths for rural poverty reduction are considered: poor smallholders do not produce the same (homogenous) products and have access to the same technology as producers into world markets in other, more advanced economies. With regard to the second criticism of H-O theory, poor smallholders face difficulties in transferring their productive assets either into internationally competitive non-agricultural industries or into more intensive agricultural commodity production. Third, the rural poor are often politically weak and poorly served by welfare support systems, and even where 'safety nets' can be financed, developed and

administered, they are generally very difficult to target, expensive, miss some vulnerable groups, and promote longer term economic and cultural dependency with associated adverse social and economic effects.

Underlying these weaknesses of orthodox theory is a more fundamental problem of neo-classical theory in general, that it ignores institutions and the way that economies are actually organised, with the costs of and constraints on economic activity under different institutional conditions, or with the need for and costs of institutional change. In particular, the constraints on and transaction costs of acquiring reliable information are ignored and, implicitly, assumed to be negligible. Hall and Soskice, 2001 have recently developed a framework that explains comparative advantage in rich countries not in terms of neoclassical analysis of factor endowments but in terms of the strengths and weakness of their different institutional infrastructures for coordination in different types of economic activity. This theory has profound implications for poorer countries, suggesting that weak institutions may deny poor countries comparative advantage where neoclassical logic suggests strongly that it should be present. The general implication is that a necessary condition for development is the building of transactions-enabling institutions. Within this, the challenge of building institutions to support smallholder development is critical for success in the earlier stages of development, and this seems to be a precondition for successful participation in globalisation.

These criticisms of neo-classical arguments for the poverty reducing growth impacts of globalisation also apply outside the agricultural sector, and thus weaken both the wider arguments for the general beneficial effects of globalisation, and the likely scale of 'second round' benefits for smallholder agriculture discussed earlier (whereby growing domestic incomes may stimulate demand from smallholder produce). They suggest that the relative extent of positive and negative impacts of globalisation will vary widely, with the technological, institutional and other characteristics of different sectors in different national and local situations.

5 Conclusions

Pulling these different threads together, it is clearly difficult to make generalisations about the overall benefits and costs of the new economy for smallholder farmers in low income countries. Rather we have been able to identify what the different opportunities and threats, advantages and disadvantages of the new economy are likely to be for different categories of smallholder farmers under different circumstances. The relative balance of outcomes will then vary according to specific characteristics and conditions, including those induced by policy action. We can, however, draw general conclusions about (a) broad patterns of effects of the new economy, and (b) different stakeholders' actions that may support favourable rather than unfavourable outcomes.

5.1 Broad patterns of new economy effects

Broad conclusions about new economy effects on smallholder farmers in low income countries are as follows:

- Smallholders' participation in the new economy is likely to be restricted, by slow processes of participation by the countries in which they are predominantly located, by slow progress in liberalisation of global agricultural markets, and by the physical and institutional isolation and poverty of poorer smallholders within their national and local economies;
- Both the general (economy wide) and specific benefits of the new economy for smallholders may be overstated by neo-classical theory, and the new economy effects are complex and sensitive to specific national, sectoral and household endowments and institutions:
- There are large potential benefits for smallholders from the new markets and new technologies of the new economy, but smallholders face particular challenges in accessing these, both in absolute terms and relative to larger, more commercial farmers in low income countries
- Poorer (subsistence oriented) smallholders in particular are more likely to be passed by as (a) countries in which they predominate have not (and will not?) participate, and (b) they tend to face particular difficulties in engaging with local and international markets.
- There is the possibility of smallholders not only missing out on the opportunities offered by the new economy (i.e. losing relative to other players in the agricultural sector and in the wider economy) but of them

losing in absolute terms if domestic prices for their outputs are depressed through opening up to international competition.

5.2 Practical implications

Our analysis has a number of practical implications for different players in the agricultural sectors of low income countries.

For smallholders themselves, it is important that they invest in and gain technical and organisation skills, that they consider how to reduce their own and their suppliers' and buyers' transaction costs. This is likely to require wider changes in property right regimes, in contracting systems and market structures. Working together in groups may be important when dealing with financial, input and output markets, and the establishment of trust and secure relationships with suppliers and traders, perhaps through formation of long term strategic alliances. Both competition and co-operation will be needed to achieve coordination and efficiency.

Those who aim to support smallholder farmers (for example NGOs, extension agencies, government policy makers), need to help smallholders adjust to the new economy, take advantage of its opportunities, and deal with its threats. Perhaps the first task is to identify with specific groups of smallholders the particular opportunities, threats, and constraints that are important, or are potentially important, for them. This may then lead onto action to support institutional, skills, and organisational innovation and development, and the development of 'voice'. Infrastructural development, with improved energy, transport and communication services will be critical (and the spread of mobile phone networks into rural areas may have a key role here), and politicians and policy makers have a particular responsibility to maintain macro-economic stability.

With regard to those involved and concerned with technology development there are a number of challenges. First, the importance of research directed at the needs and interests of smallholders needs to be recognised, together with its public good characteristics and hence need for public funding at both international and national scales. This requires continued innovation in a search for innovative mechanisms to link public funding with private sector resources at these different levels. It is critical, however, that such mechanisms address not only the narrower set of institutions involved in the development of new technologies, but also those affecting not only its dissemination but also the wider characteristics of commodity chains into which new technologies must fit. Here agricultural finance may be the most important and most intractable 'link' needing attention. Other constraints on private sector involvement in smallholder agriculture in low income countries also need to be addressed. There is a large and complex set of issues around intellectual property rights with the need for traditional farmers' rights to be protected while at the same time the private sector needs incentives to develop and expand access to new varieties and genotypes, with low transaction costs and risks. Just as collective action and strategic alliances may be an important way forward for smallholder farmers to reduce transaction costs in financial, input and output markets, so collective action and strategic alliances regarding intellectual property rights are important for low income countries acting to reduce transaction costs and attract the private sector to invest in technology development for their smallholder farmers.

Finally we present a challenge to commercial farmers, first those in low income countries, and then those northern countries.O our analysis has stressed the many barriers that may prevent smallholder farmers within low income countries from participating in the new economy, and that may not only result in the new economy passing them by, but even damaging their livelihoods. Given the importance of these farmers in national and global welfare, in economic development and in environmental change (by virtue of their large numbers, of their current poverty, of their potential to drag on or stimulate economic growth, and of the large stocks of natural resources that they manage), there are both strong moral and self-interest arguments for acting to help them participate positively in the new economy.

Commercial farmers in low income countries may have a unique opportunity here, as in many ways they stand at a junction between smallholders and the wider world of the new economy. Their economies of scale allow them to invest in new technology and to enter into commodity chains, while their involvement and location in low income country agricultural production and markets also allows them to understand and engage with smallholders and their activities. Contract farming schemes, and variations on this, whereby commercial farmers act as intermediaries between smallholder agriculture, may allow smallholders to take advantage of their 'theoretical' competitive advantages in the new economy (low land and labour costs)

while reducing the major disadvantages that otherwise render them un-competitive (high transaction costs in input, output and particularly financial markets). We suggest that there are important opportunities here that commercial and smallholder farmers should investigate together, and that policy makers should also seek ways of supporting 'win-win' commercial-smallholder cooperation.

For commercial farmers in northern countries, we would draw attention to the slow pace of agricultural liberalisation in word markets, caused largely, though not exclusively, by continuing protectionism that benefits relatively small numbers of large commercial farmers in the north. These are important political issues domestically, but the impacts of this protectionism on smallholder farmers in low income must also be recognised. If the new economy is to benefit smallholder farmers in low income countries, it is important that there are changes here.

We sum up our arguments in this paper with the observation that participation in the new economy poses at a national scale the dilemma that many smallholder farmers face as individuals and communities in normal processes of development and change: they are both 'locked in' and 'locked out' of markets. They are 'locked in' to markets because the only realistic option for increasing their incomes and material standard of living is to engage with markets, accessing new technologies (often embodied in capital) to increase their productivity, and selling new products into new and higher value markets. They are, however, also 'locked out' of the market, by the very characteristics of markets and of their own circumstances: isolation, vulnerability, and the gulf between their skills, resources and activities and those of the new economy. Unless action is taken to open up markets to them and to reduce the gulf between them and the new economy, that gulf is likely to widen for most smallholders in low income countries. Since global historical experience is that smallholder agricultural transformations have been the major drivers of broad based poverty reducing growth, it is important that these issues are addressed.

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