Setting the Agenda for Agricultural Policy in LDCs

Chapter 3

A. Agriculture: The heart of the LDC development problem?

For many least developed countries (LDCs), food security[1] remains a major priority and policy objective. The global food crisis that erupted in the spring of 2008 served to highlight food insecurity as one of the most fundamental constraints on growth and development in LDCs. The United Nations World Food Programme estimates that the price hikes between late 2007 and the middle of 2008 resulted in an additional 100 million people having inadequate access to food. For LDCs, the impact of the food crisis has been exacerbated by the current global financial crisis and the damaging consequences of climate change, which, in turn, have led to a disturbing trend towards purchasing land for outsourced food production by non-LDC States. Most LDCs face multiple challenges, such as the global fragility of multilateral trade, volatility of growth, liquidity and credit shortages, and vulnerability to natural disasters.[2] Improved food security in LDCs could be realized through a combination of policies and measures, including the provision or enhancement of basic infrastructure, and the adoption of improved food production technologies and farming techniques.

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While agriculture is a major component of overall economic growth in most LDCs, the key policy challenge that most LDCs face is how to promote agricultural growth in a way that will enable a structural transformation, in which the relative importance of the agricultural sector declines as other sectors (particularly manufacturing) move onto a dynamic growth path. In order to enable this transition, policy issues in agriculture need to be addressed in terms of multiple intersectoral linkages, which often involve complex choices. Thus, the development of agriculture as the basis for a structural transformation of the national economy, leading to broad-based economic growth, food security and poverty reduction, requires extending the analytical and programmatic perspective beyond the narrow confines of farming. It requires a macroeconomic perspective that emphasizes the importance of generating an increasing agricultural surplus,[3] which requires agricultural labour productivity growth to exceed the growth of labour's own consumption requirements by an increasingly larger margin. Lack of agricultural surplus may constrain non-agricultural growth from the demand side (demand deficiency), but also from the supply side. In the latter case, missing agricultural surplus makes the system prone to food-price inflation, which: (a) erodes the real wages of non-agricultural workers and reduces their consumption; (b) erodes industrial profits, and hence investment; and (c) may lead to lower exports, due to loss of cost competitiveness. This chapter takes a view of the LDC food and agriculture system that encompasses an integrated approach to improving productivity and efficiency at every stage of the commodity chains, from research and development to input markets, and from farm-level production and distribution to the final consumer. The development of linkages among these stages and to other sectors is key to achieving an optimal contribution from the agricultural and food system to broad-based economic growth and transformation through increased value-added and employment linkages.

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Above and beyond its contribution to food security and farmers' incomes, agricultural growth can have significant leverage on the wider economy, provided that an integrated approach is adopted to rural development that includes not just the provision of public goods (infrastructure, especially water and sanitation in rural areas) and social development, but also enhanced environmental practices, income generation through local growth, and the participation of the rural poor. This will enable what can be described as the agricultural transformation of LDCs — a structural transformation that encompasses the mobilization of all local sources of capital (human, physical, social, natural and financial) and comprises mutually reinforcing policies that take account of gender, regional specificities, and rural institutions, as well as environmental and social considerations.

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The significant role of agriculture within the economy is more prominent and discernable in LDCs than in other developing countries (ODCs). Of total gross domestic product (GDP), 28 per cent is derived from the agricultural sector in LDCs, compared with 12.8 per cent in ODCs in 2006. A similar contrast also applies to the percentage of people employed in the agricultural sector. Agriculture employed 68.6 per cent of the economically active population in LDCs in 2006, compared with 53.1 per cent in ODCs (table 11). The agricultural sector is central to any development strategy for LDCs, because most of the population is linked to agriculture and dependent on it either directly or indirectly.

In 2006, 28 per cent of GDP in LDCs derived from the agricultural sector, compared with 12.8 per cent in ODCs.

Yet the agricultural sector in LDCs is faced with ever-mounting and interacting long-term challenges, which include globalization, climate change (box 7), depletion of natural resources, poverty, biofuels, and population pressures. In addition, LDCs face key structural constraints on agricultural growth which have been long-standing — declining agricultural productivity, missing and imperfect factor markets, and limited access to producer-risk mitigation tools, as well as poor infrastructure and declining investment in the sector. Although agriculture in most LDCs is becoming less labour-constrained, increasing scarcity of land and high rates of urbanization require a more active government role than has been the case over the past 30 years (box 8).

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Agricultural performance in LDCs has been very poor since 1970. Chart 13A shows that food production per capita in LDCs declined from 1970 to 2005. However, the level has stabilized since the first half of the 1990s. In general, food production has kept up with or very slightly exceeded population growth. However, there are significant regional variations in the trends. In many African LDCs, staple food production is largely rain fed and experiences large fluctuations caused by

Table 11

Agricultural employment and share of GDP in LDCs and ODCs, 1980–2006

	Agriculture employment as % total				Agricultural GDP as % of GDP			
	1980	*1990*	*2000*	*2006*	*1980*	*1990*	*2000*	*2006*
LDC real GDP > 6%	78.5	75.3	71.3	69.5	33.8	38.4	37.0	32.2
LDC real GDP 3 – 6%	80.6	77.5	73.4	71.7	38.5	33.4	31.1	29.9
LDC real GDP < 3%	71.5	69.0	67.2	65.6	37.2	38.7	27.9	22.0
LDC average	79.5	76.0	70.8	68.6	30.0	29.5	30.2	28.0
ODC average	66.4	61.6	55.5	53.1	20.3	19.1	13.6	12.8

Source: UNCTAD secretariat calculations, based on World Bank, *World Development Indicators 2008*, online.

Notes: LDCs are classified according to their real GDP growth rate in 2006 (UNCTAD, 2008b: 6), as follows: real GDP > 6% (Afghanistan, Angola, Bangladesh, Bhutan, Cambodia, Democratic Republic of the Congo, Ethiopia, Lao People's Democratic Republic, Malawi, Mauritania, Mozambique, Myanmar, Sierra Leone, Sudan, Uganda, Zambia); real GDP 3 – 6% (Burkina Faso, Central African Republic, Djibouti, Guinea, Guinea-Bissau, Madagascar, Mali, Rwanda, Samoa, Senegal, Tanzania, Vanuatu); real GDP < 6% (Chad, Comoros, Equatorial Guinea, Eritrea, Kiribati, Lesotho, Nepal, Timor-Leste).

The list of ODCs comprises: Argentina, Belize, Bolivia (Plurinational State of), Botswana, Brazil, Cameroon, Chile, China, Colombia, Costa Rica, Côte d'Ivoire, Dominican Republic, Ecuador, Egypt, El Salvador, Ghana, Guatemala, India, Indonesia, Kenya, Malaysia, Mexico, Morocco, Nigeria, Panama, Paraguay, Philippines, Republic of Korea, Sri Lanka, Thailand, Tunisia, Uruguay.

Box 7. Climate change, agricultural growth and diversification

Agricultural productivity is highly variable within LDCs — the result of a combination of natural and locational factors that determine crop suitability and the accessibility of markets. However, climate change has potentially significant impacts on LDC agriculture and food security. Climate change through global warming impacts on producers (i.e. on the demand side through a rise in food prices especially of cereals; and on the supply side through opportunities in the burgeoning bioenergy markets) and these effects vary according to farm size, location and agroecology.

Climate models differ, but according to the United Kingdom's Hadley Centre for Climate Change, temperature increases in parts of sub-Saharan Africa could be double the global average increase. Given sub-Saharan Africa's heavy dependence on agriculture, the effects of climate change could put millions of people there at greater risk of poverty and hunger (IFPRI, 2007). Preparation for the potentially negative impacts of climate change and the exploitation of sub-Saharan Africa's vast biofuels potential faces important hurdles: the lack of infrastructure, the lack of basic agricultural inputs and the lack of a supportive regulatory environment and of sector policies and institutional capacities. The Stern Review (Stern, 2007) shows that if the developed countries do not radically reduce greenhouse gas emissions, parts of Asia and sub-Saharan Africa may suffer under heavy rains and increased flooding. Some parts of sub-Saharan Africa will face droughts and rising sea levels. Stern (2007) maintains that a radical switch from fossil fuels to biofuels can be one of the most effective strategies to reduce the impact of climate change on sub-Saharan Africa. However, the net effect of biofuel production based on the clearing of carbon-rich habitats (e.g. rainforests, grasslands and peatlands) as practised, for example, in Brazil, Indonesia and Malaysia, may increase food insecurity and CO_2 emissions in the long run, relative to fossil fuel use (Fargione et al., 2008). Biofuels grown from perennials on degraded farmland and derived from waste products (e.g. straw, timber, manure, rice husks, sewage, etc.) would enhance their environmental sustainability, reduce competition with food production and indirectly reduce the incentive to clear carbon-rich habitat land for biofuel production (Fargione et al., 2008). However, as UNCTAD (2007a) notes, some biofuel sources, such as jatropha, grow on degraded and semi-arid land and so may increase green cover and capture more of the atmospheric carbon dioxide that contributes to global warming. There needs to be a careful examination of the food security implications of greater biofuel production in LDCs.

In some LDCs, agricultural growth may be directly jeopardized by climate change. The relationship between land and labour productivity is crucial. In the early stages of the rural growth process, both land and labour productivity must rise, but land productivity must rise faster than labour productivity, in order to absorb surplus labour, to create employment, and to stimulate demand for non-farm goods and services. In light of the projected fall in the availability of agricultural land, and increases in the availability of land with low potential, this trigger for the rural growth process is endangered in the context of climate change.

Climate change may weaken the "multipliers" arising from agricultural-led growth. Increases in farm-based income are closely linked to increases in non-farm income, e.g. from vending, petty trading, services, etc. This is especially pronounced in broad-based, smallholder-led agricultural growth, as local labour is hired and income is spent locally. A dynamic, non-farm rural economy requires a steady growth of agricultural incomes. Thus, diversification into non-farm activities will be significant when demand for goods and services at the end of agricultural cycles is regular and constant. However, climate change has increased variability. Prowse and Braunholtz-Speight (2007) consider the prospects for sustainable rural non-farm growth where agricultural incomes are increasingly unpredictable. They suggest that there might be a limited window of opportunity to trigger the rural growth processes necessary if current strategies for agricultural growth and poverty reduction in LDCs are to succeed. If climate change impacts are greater and occur sooner than previous models have suggested, it may be only two or three decades until this becomes much harder. This is an obvious reason to redouble efforts now to stimulate smallholder-driven rural growth processes, and to improve technological innovation and productivity.

Sources: Prowse and Braunholtz-Speight (2007); Davis (2004); IFPRI (2007); Stern (2007); Fargione et al. (2008); German Advisory Council on Global Change (2008); UNCTAD (2007a).

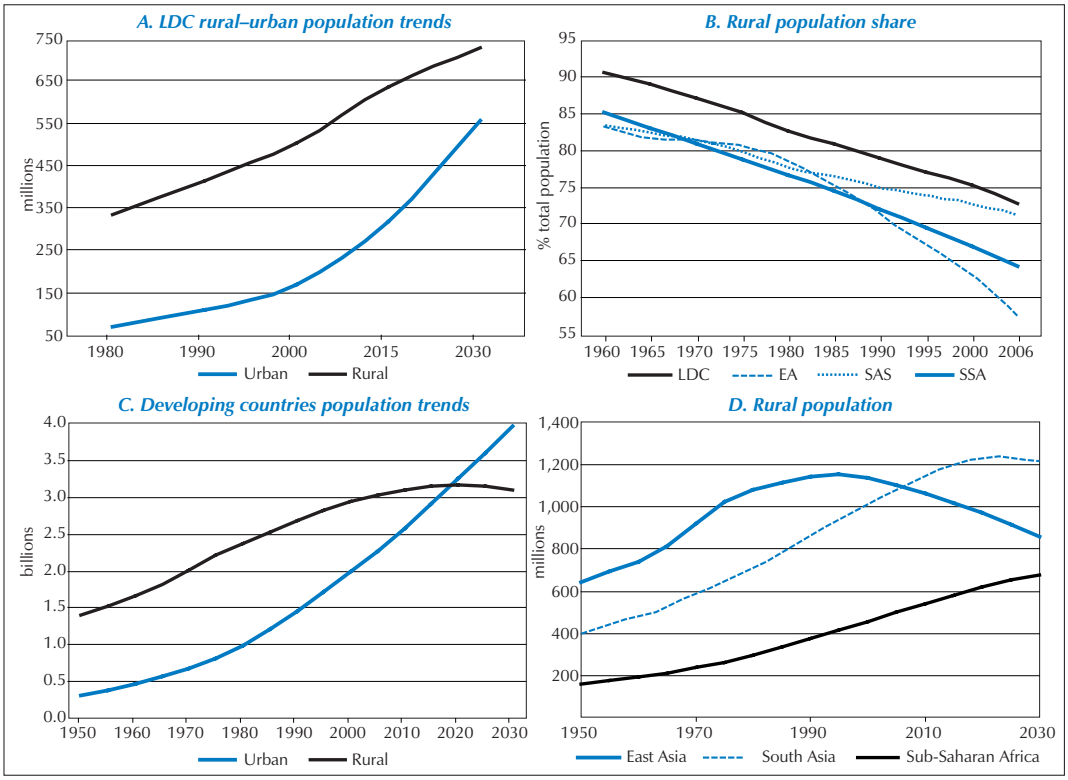
climatic variability, which has contributed to a decline in per capita staple food production.[4] Where rapid increases in food production per capita exist, most often the reason is the development of new agricultural technologies that have allowed food production to outstrip population growth (e.g. the Green Revolution in Asia). Since the 1970s, the dissemination of the high-yield varieties, fertilizers and pesticides that were necessary to maximize Asian crop yields — known as the Green Revolution — has resulted in substantial growth in productivity (World Bank, 2008b). While there is a consensus that Green Revolution technology increased crop yields, these increases were distributed unevenly among regions and social groups, and were highly dependent on irrigation, land quality, government support and infrastructure. Concerns over whether the benefits of higher yields outweigh the costs of uneven distribution and the exclusion of other approaches to agricultural development remain to be addressed in most LDCs. Clearly, any future innovations must be more consistent with regional agricultural traditions,

Rapid increases in food production per capita are mostly caused by the development of new agricultural technologies that have allowed food production to outstrip population growth.

Box 8. Rural–urban population trends in LDCs

Population dynamics are important determinants of future demand for agricultural commodities. Global population growth over the next decade (from 2008 to 2017) is forecast to decline relative to the last 10 years to an average of 1.1 per cent per annum and population is forecast to reach approximately 7.4 billion in 2017. The fastest population growth is expected in sub-Saharan Africa at around 2 per cent per annum (OECD and FAO, 2008). Box chart 2 shows LDC (panels A–B) and all developing countries' (panels C–D) rural-urban population trends. Although the size of rural population in LDCs is expected to continue growing (panel A), East Asia has seen a rapid decline in its rural population since 1995 (panels B and D). The LDC rural population as a share of the total population has also steadily declined since 1960 too, but it remains above the levels in sub-Saharan Africa, East Asia and the Pacific countries. Panel C shows that urban population growth in developing countries is forecast to continue over the next 20 years, reaching 4 billion by 2030. It also shows that the size of the rural population is forecast to grow until 2020 and to decline thereafter, primarily due to higher rates of urbanization. By 2030, more than half of sub-Saharan Africa's population will be urban. In 2000, 10 farm households in sub-Saharan Africa had the capacity to feed 7 non-farm households; by 2020, 10 farm households will need to feed 16 non-farm households (FAO, 2003). Demand for food is likely to rise rapidly in LDCs. Growing urbanization presents both opportunities and challenges for smallholder agriculture: in terms of potential markets in the newly urbanising centres; and integration into regional and international markets. However, unlike all other regions of the world, urbanization in sub-Saharan Africa has not contributed to the overall growth in GDP through economies of scale and specialized production chains.

Box chart 2
Rural–urban dynamics in LDCs, 1950–2030



Source: UNCTAD secretariat calculations, based on World Bank, *World Development Indicators 2008*; and *United Nations Population Prospects,* online (January 2009).
Notes: EA - East Asia; SAS - South Asia; SSA - sub-Saharan Africa. These regional groups include LDCs and ODCs.

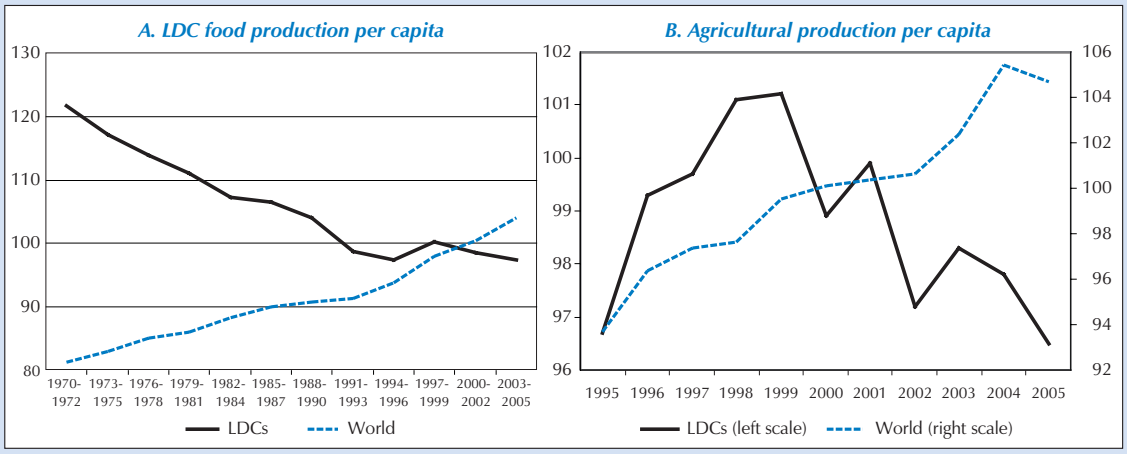
and must avoid the environmental and social costs associated with the agricultural technologies utilized during Asia's Green Revolution.[5]

In terms of agricultural production per capita, the LDCs' performance has been relatively poor, with a significant decline in 2001–2002 (chart 13B). In LDCs, one of the major constraints to increasing agricultural production and domestic food supply is slow agricultural productivity growth, as well as a limited availability

Chart 13

Food production per capita index[a] and agricultural production per capita in LDCs,[b] 1970–2005

(Index, 1999–2001=100)



Source: UNCTAD secretariat calculations, based on FAOSTAT, online (January 2009).

a The food production per capita index presents net food production (after deduction for feed and seed) of a country's agricultural sector per person relative to the base period 1999–2001. It covers all edible agricultural products that contain nutrients; coffee and tea are excluded. The production values show not only the relative ability of countries to produce food but also whether or not that ability has increased or decreased over the period.

b The agricultural production data are published by FAO for the period 1979–2005 as a volume index.

of water and arable land for food production. When the underlying data in chart 13B on agricultural production per capita for LDCs are disaggregated by export specialization, most LDC oil and mineral exporters are seen to have achieved steady rates of growth since 1999/2000. Among the oil exporters, Angola has achieved significant annual growth rates for its agricultural production since 1997. Among the mineral exporters, Sierra Leone — despite recently having been in a state of conflict — has rapidly increased its agricultural production per capita since the year 2000; by 2004 the country had reached its pre-conflict levels of 1995.

Food production per capita in LDCs declined from 1970 to 2005. However, the level has stabilized since the first half of the 1990s.

Access to water and food security in LDCs are increasingly interrelated. There are major challenges for sustainable food production in LDCs where water shortages affect both human and livestock consumption, and where potential for small-scale irrigation and water harvesting is limited. LDC farmers (especially in Africa) have the lowest rate of fertilizer use in the world. This needs to be improved, in order to raise soil fertility and productivity. Most of the fertilizer used in sub-Saharan Africa is currently imported, and bulk purchases could reduce the cost of fertilizer delivered to ports or entry points by about 15–20 per cent (Ngongi, 2008). Sub-Saharan Africa could also produce more of its own fertilizer, as it has large deposits of natural gas that can be harnessed to produce nitrogen fertilizer. International financial institutions and donors can assist in this endeavour. Some LDCs are now providing subsidies for seeds and fertilizers. Malawi, for example, provides a subsidy of up to 70 per cent of the cost of fertilizers (Ngongi, 2008). Subsidies alone may not be sufficient (box 9), but without some form of support, credit, or smart subsidies, the targets set by the African Union through the Comprehensive Africa Agriculture Development Programme (CAADP)[6] for progress in the agriculture sector and improved food security, especially in the production of staple foods, will not be achieved.

An appraisal of total and partial factor productivity[7] in LDCs and ODCs offers an insight into productivity (and hence development) trends within LDCs. Both total and partial factor productivity grew at a slower rate in LDCs than in

Box 9. Fertilizer subsidies in Zambia

From 2004 to 2008, the Government of Zambia distributed approximately 45,000 tons of fertilizer per annum at a 50 per cent subsidy, under its Fertilizer Support Programme for use by smallholders on maize. Minde et al. (2008) shows that these fertilizer subsidies have not been effective in achieving more than a 0.6 per cent growth rate in maize production. In fact, the fastest growth is being registered among crops that are handled exclusively by the private sector, and to which no fertilizer subsidies are directed.

ODCs between 1960 and 2006. Over this period, there was an average annual increase in total factor productivity of 0.19 per cent in LDCs, whereas in ODCs it rose by 1.27 per cent per annum. While technical efficiency contributes to productivity growth in developing countries as they "catch up" technologically, the main source of improvements in agricultural productivity is technical change, i.e. technological progress. Indeed, the adoption of advanced technologies and increased productivity in different parts of the world may explain, in large part, the regional differences in growth and poverty reduction in recent decades. For example, agricultural performance in Asia between 1961 and 2001 was positive, with cereal production outstripping population growth, and this was achieved with a modest expansion of cultivated land from 1.0 to 1.4 billion hectares. This suggests that increased productivity has largely been due to the application of technological innovations (e.g. the Green Revolution). Amongst the LDCs, Bangladesh is notable for some success in this regard (box 13). During the same period, the production of cereals in sub-Saharan Africa did not keep pace with population growth. Similarly, cereal productivity increases in sub-Saharan Africa have been small, rising from 0.8 to 1.2 tons per hectares. Most of the productivity gain has been due to the deployment of more labour and the expansion of cultivated land (UNCTAD, 2006).

In many LDCs agricultural productivity has been stagnant since the 1960s.

Between 1960 and 2006, total factor productivity in the agricultural sector rose by 0.19 per cent per annum in LDCs, compared with 1.27 per cent in ODCs.

In many LDCs, agricultural productivity has been stagnant since the 1960s. Promoting productivity growth in basic staples should be a major regional priority for policymakers in Africa, and to some extent this is reflected in recent African Union and New Partnership for Africa's Development (NEPAD) CAADP initiatives on fertilizer and productivity growth (African Union and NEPAD, 2006). To the extent that agricultural growth is best achieved through intensification, a greater focus on areas with the greatest potential could be a promising strategy. Moreover, given plausible assumptions about the potential of new technology development, farm sizes in most LDCs are too small for grain-based productivity growth to lift most rural households out of poverty (box 10). The role of the State in providing investment and credit and in productively mobilizing (surplus or unemployed) rural labour will be central to promoting the necessary diversification into higher-return activities. Critically, official development assistance (ODA) commitments to assist LDC agriculture in the medium to long term — especially within the context of the world economic crisis — must be maintained.

Repairing the broken links between agriculture and other sectors of the economy in the LDCs is essential, in order to meet the Millennium Development Goals (MDGs), ease the rural–urban transition, and support the rise of the rural non-farm economy.

There is a need to refocus attention on the structural transformation of LDC agriculture by instituting policies and incentives for food production, increasing agricultural research and technical assistance, and reforming global agricultural markets. There is also a need for more ODA to be allocated to food programmes. There may also be potential for enhanced South–South cooperation, as a means to encourage food production and increase LDC productivity. The potential value and effectiveness of regional responses to mitigate the impacts of multiple crises should be further explored. This chapter sets out the key steps for repairing the broken links between agriculture and other sectors of the economy in the LDCs, in order to meet the Millennium Development Goals (MDGs), ease the rural–urban transition, and support the rise of the rural non-farm economy (incorporating the informal sector). It also argues that productivity improvements in agriculture are

Productivity improvements in agriculture are critical for improved food security.

Box 10. Land governance in LDCs

The United Nations Human Settlements Programme (UN-HABITAT) (2008) defines land governance as "the process by which decisions are made regarding the access to and use of land, the manner in which those decisions are implemented and the way that conflicting interests in land are reconciled".

In addressing land and governance, it is necessary to recognize that although land tenure raises important technical and procedural questions, it is also a socio-political issue, since rights over land cannot be isolated from rights in general. LDC land governance is a mixed picture comprising a continuously changing relationship between the State and the population. The codification and legalization of LDC land ownership should offer security of tenure, the motive to invest and an asset against which it is possible to borrow. While codifying land-holdings is an important objective, it should reflect traditional styles of tenure that accord with traditional social structures.

Since the 1990s, many LDCs have re-examined their land tenure policies, and a variety of new tenure reforms are under way, aiming to recognize and formalize established customary rights. In most cases, efforts centre on the development of new, decentralized bodies that bring local communities and customary leaders together with government officials in the management of land, land rights, and land disputes. In some countries, this is complemented by the devolution to the community level of authority and responsibility for common property natural resources. This type of approach is being implemented in many LDCs.

Emerging land pressures are generating fundamental challenges for poverty reduction, agricultural growth and investment strategies in LDCs. For example, box table 1 shows that farm size has declined in LDCs in sub-Saharan Africa since the 1960s. Jayne, Mather and Mghenyi (2006) notes that between 1985 and 2003, a population increase of 63 per cent in sub-Saharan Africa brought about a reduction of arable land per capita from 0.33 hectares to 0.25 hectares. In some semi-arid areas, cultivation has expanded into marginal (less favourable) areas with poor soils and lower rainfall. In more favourable areas with good market access. increased population pressure has led to the intensification of production. Where policy reforms to land tenure, property rights (as in Niger), leasing systems, female empowerment over the control of productive resources, and agricultural taxation have been introduced, intensification of agricultural production has followed (Staatz and Dembéle, 2008). Farm sizes are declining, and there remain huge disparities in terms of the demographic profile of rural communities and new demands on domestic food marketing systems.

Box table 1
Availability of cultivated lands to agricultural populations in selected sub-Saharan African countries, 1960–2005
(Land to person ratio)

	1960–1969	1970–1979	1980–1989	1990–1999	2000–2005[a]
Ethiopia	0.508	0.450	0.363	0.252	0.197
Mozambique	0.389	0.367	0.298	0.249	0.277
Rwanda	0.215	0.211	0.197	0.161	0.202
Kenya	0.459	0.350	0.280	0.229	0.222

Source: Jayne, Mather and Mghenyi (2006); and FAOSTAT, online (February 2009).

Note: Land to person ratio = land cultivated to annual and permanent crops/population in agriculture.

a UNCTAD secretariat estimates (April 2009).

Jayne et al. (2006) rank the above smallholder farmers by household per capita land size, and divide them into four equal quartiles (box chart 3). Those households in the highest per capita land quartile controlled five times more land than households in the lowest quartile. An additional problem concerns the extremely low level of landholding per capita among the bottom 25 per cent of the sample. In Ethiopia and Rwanda, this quintile controls less than 0.20 and 0.32 hectares per capita, respectively. The range of computed Gini coefficients of rural household land per capita (0.50 to 0.56) from these surveys show land disparities within the smallholder sectors of these countries that are comparable to or higher than those estimated for much of Asia during the 1970s (Jayne, Mather and Mghenyi, 2006). If these countries' large-scale and/or state farming sectors were included, the inequality of landholdings would rise even further. Progressive agricultural change and development will be hindered until the State adequately addresses inequality in landholdings and access to basic health and education services.

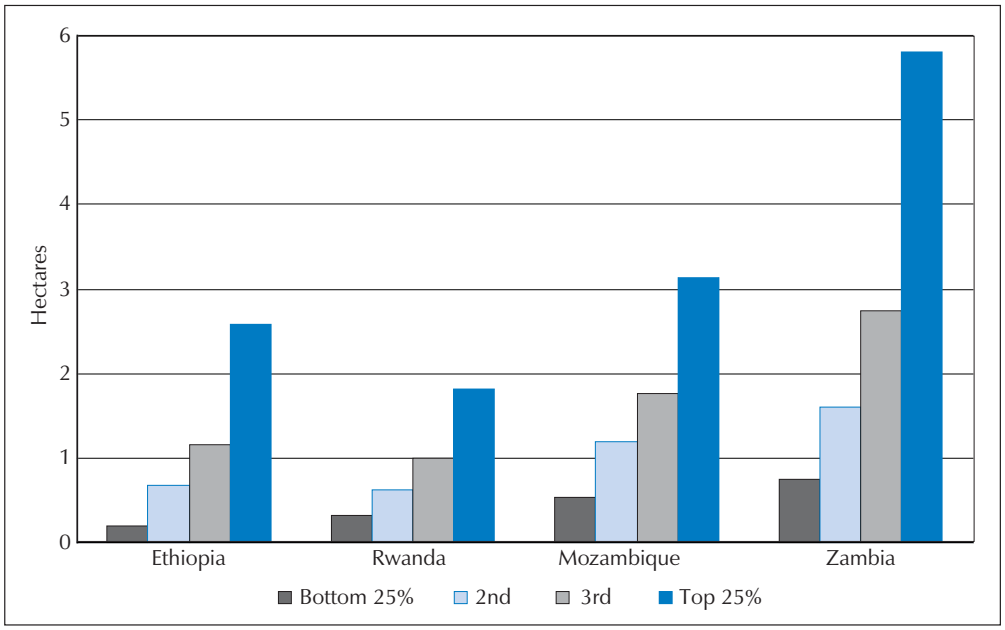
In many LDCs, the performance of the State as a landowner and in regulating land use, access and tenure is a critical governance matter. In practice, State-owned land is often managed in unaccountable ways, and is subject to appropriation by political or allied economic elites. Land tenure issues often contain political and socio-economic tensions that are not

Box 10 (contd.)

readily resolved simply as a matter of land rights. For example, rising inequity in landholding often becomes a source of conflict mediated through power, ethnic and class relations, which impact strongly on the negotiation of rights, on security of tenure, and on the accessibility of land. LDC governance paradigms that disregard or damage the socio-spatial context within which land is owned (registered or otherwise) may inadvertently foment discontent, leading to major and often ethnically defined territorial claims which obscure significant structural issues (such as the management of common property resources, pressures of land scarcity, legal aspects of indigenous land use and rights, etc.) (FAO, 2008).

Many empirical studies are unclear as to the direct impact of formal land titling on investment and agricultural productivity (Gavian and Ehui, 1999). Nonetheless, land rights and access in LDCs remain critical for development and food security. As long as the principle of divisible land inheritance is practised, the ensuing fragmentation may reinforce the need for an urban source of income. Population pressure on land is likely to increase the number of landless people who will have to become "urbanites", requiring high economic growth rates and attendant creation of employment. Significant government action in partnership with the private sector will be required, in order to generate the growth that can absorb this labour (Toulmin and Quan, 2006).

Box chart 3
Farm size distribution: small farm sector in selected African LDCs



Source: Jayne, Mather and Mghenyi (2006).

Notes: Samples include only agricultural households defined as households growing some crops or raising animals during the survey year. All numbers are weighted.

Land rights provide economic and social security as a safety net and as an asset to make human capital investments that otherwise would not be possible to make (Burns, 2007). Improved land policies are, de facto, an investment in people, and indirectly enhance their productive capacities. Similarly, improving land rights and access to land should strengthen the value of land as an economic asset, either for productive purposes (farming, collateral, etc.) or non-economic purposes (helping guarantee basic rights for home ownership, etc.). With transparent and enforceable legal rights governing land ownership, access and use, the economic value of land should rise over time and should encourage the sustainable use of land as a natural resource. Land is often overexploited when tenure rights have a short duration (e.g. in Brazil's Amazon rainforests), so that users have an incentive to exhaust all the economic value quickly. In the context of governance, increased food security in LDCs should result from improved productivity, especially where land rights and access are enhanced (Burns, 2007).

The recent food and economic crises may also have created new problems in land governance for LDCs. Wealthy, food-insecure countries such as China, Japan, Kuwait, the Republic of Korea, Saudi Arabia and others have been purchasing and leasing large tracts of LDC arable land for the production of crops for food or biofuels. This land is not intended to

Box 10 (contd.)

produce crops to sell on the world market or to feed the local population, but rather to meet domestic food and biofuel demand in the country that acquired the land. Many of these countries face significant freshwater shortages (for agricultural production) and have large populations relative to available arable land. Similarly, given the current global financial crisis, commodity traders, agri-food corporations and private investors increasingly see investment in LDC farmland as an important new source of revenue. Although estimates are difficult to verify, recent evidence published by Von Braun and Meinzen-Dick (2009) and Grain (2008) suggests significant levels of activity and upward trends over the past five years in foreign investors acquiring large tracts of arable land in LDCs. Von Braun and Meinzen-Dick (2009) note that in four sub-Saharan African countries alone (Ethiopia, Ghana, Madagascar, Mali), land allocations to foreign investors since 2004 amounted to over 1.4 million hectares of land; this excludes allocations below 1,000 hectares. Since 2006 foreign investors have acquired or sought some 15–20 million hectares of farmland in developing countries (Von Braun and Meinzen-Dick, 2009).

LDC Governments should note, however, that if fertile farmland is increasingly privatized and concentrated in the hands of a few large firms, it could increase medium- to longer-term food insecurity as smallholder farmers are pushed out of business. Should current land practices continue, land will be restructured from smallholdings and forests into large corporate farms and plantations servicing external demand. Perhaps more positively, if most of the investment in LDC agriculture — which is desperately needed — were to promote greater South–South cooperation, it may help to generate mutual benefits for LDCs in terms of improved market access and trade.

Most LDCs are net food importers, and the land concessions increasingly granted to foreign countries may exacerbate food insecurity, create conflict, and undermine ongoing efforts at improved land governance through agrarian reform and the strengthening of indigenous land rights. Most LDCs remain agricultural economies with limited capacity to mobilize domestic resources or provide people with adequate means for their survival; more and more people are seeking work outside of agriculture, but employment opportunities are not being generated fast enough to meet the growing demand (UNCTAD, 2006). The food crisis in many LDCs is, in part, a result of this imbalanced development pattern. Thus, significant improvements in agricultural performance and productivity are central to long-term food security in LDCs.

There needs to be a careful examination of the terms of the agreements made between foreign investors and host countries, to help ensure that the promised technology transfers can be fulfilled, or that food production on local farms will also benefit.

critical for improved food security, and discusses policies to foster agriculture's linkages with other sectors to enhance food security and economic growth.

B. Addressing the food crisis and food security in LDCs

1. The current food security situation

Although global food prices have declined since early 2008, this has not ended the food crisis in many LDCs.

At the beginning of this decade (2001–2003), there were 854 million people suffering from chronic hunger worldwide (FAO, 2008). However, in LDCs the proportion of undernourished people declined from 39 per cent in 1990–1992 to 34 per cent in 2003–2005 (box 11). That progress is seriously imperiled by the latest food crisis, which threatens to undermine the successes attained in the fight against hunger (especially in sub-Saharan Africa)[8] since 1990 (UNCTAD, 2008a). Since 2007, a further 40 million people have been pushed into hunger, primarily due to higher food prices, which brings the overall number of undernourished people in the world to 963 million, compared with 923 million in 2007 (FAO, 2008). The ongoing financial and economic crisis could push more people into hunger and poverty. Although global food prices have declined since early 2008, lower prices have not ended the food crisis in many LDCs.

There are several dimensions of food insecurity, reflecting a wide range of factors that contribute to its prevalence in the poorest developing countries. LDCs face

serious challenges related to food price inflation, climate change, conflict, market access constraints and natural disasters — factors that reduce both availability of and access to adequate food supplies. For LDCs, the multiple sources of food insecurity include climate-related factors (such as floods and drought) that make countries highly vulnerable to climate change (e.g. Bangladesh and Myanmar). In addition, a key element of food security in LDCs is the stability of domestic food production, which, as has already been noted, is influenced by many factors, including supply and demand, price variability, climate, soil degradation, and depleted water resources. An indication of the importance of this is the agricultural production instability index (UNCTAD, 2004). This is a measure which estimates annual fluctuations of agricultural output in relation to its trend value in a given country. In 1996–2001, the estimated instability index was high, at 11.7; in 2006, it was down to 8.1. This suggests that LDC domestic food production has been, on average, less variable since 1996–2001 (UNCTAD, 2008b).

Of the 31 countries listed by the FAO as being in substantial need of external food assistance, 21 are LDCs.

The Food and Agriculture Organization of the United Nations (FAO) listed 31 countries in substantial need of food assistance in 2009. Of the 31 countries, 21 are LDCs. Most of the food-insecure LDCs (15) are in Africa, five are in Asia, and one is in the Caribbean (Haiti). It is noteworthy that 11 of the food-insecure LDCs are in the high-growth group (with GDP growth of 6 per cent and above), namely Afghanistan, Bangladesh, Burundi, Democratic Republic of the Congo, Ethiopia, Liberia, Mauritania, Myanmar, Sierra Leone, Sudan and Uganda; seven LDCs are in the low-growth cluster, and three are in the medium-growth category (FAO, 2009). The distributional impact of growth is thus an issue of concern: by implication, high GDP growth in these countries did not result in a reduction of hunger or in increased food security.

Given that most LDCs are net importers of cereals, they were hit hard by rising prices, as were the majority of LDC households, which are net food purchasers. LDC households, where food accounts for 40–80 per cent of consumer spending, are probably suffering the most from domestic food inflation.

(a) Poverty and food security

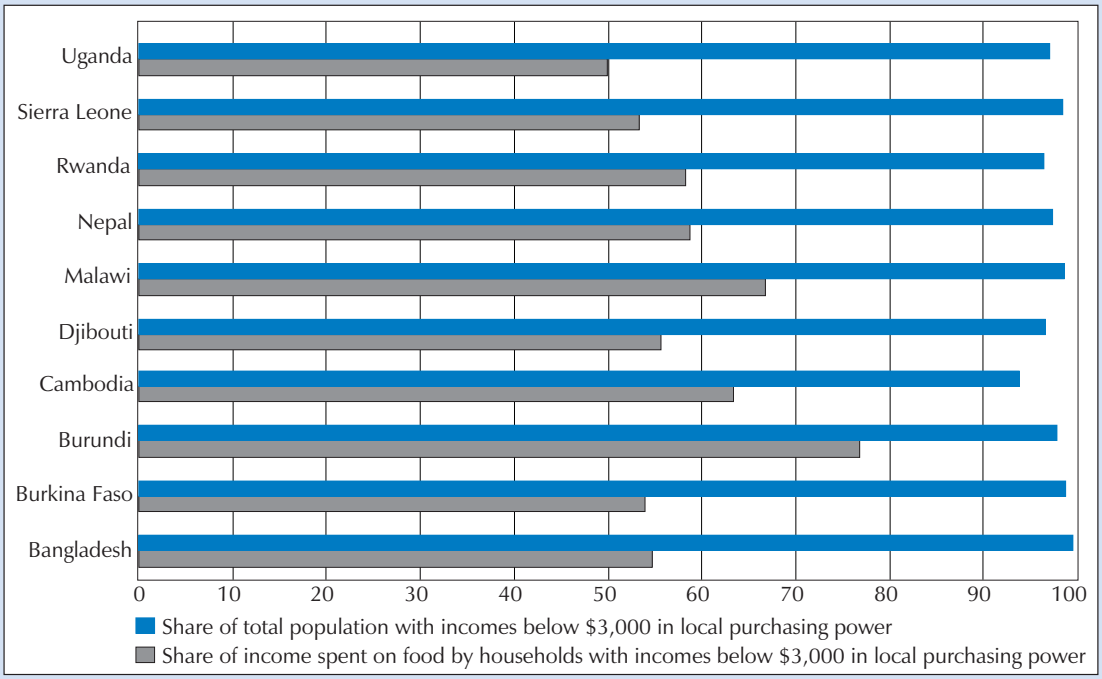
Determining the impact of the recent food price volatility in LDCs on food security and poverty indicators in a given developing country is problematic, given the array of country-specific conditions. Thus, net food exporters benefited from improved terms of trade, although some of them are missing out on this opportunity by banning exports to protect consumers. Net food importers, however, struggled to meet domestic demand. Given that most LDCs are net importers of cereals, they were hit hard by rising prices, as were the majority of LDC households, which are net food purchasers. LDC households, where food accounts for 40–80 per cent of consumer spending, are probably suffering the most from domestic food inflation. In Burundi, for example, around 97 per cent of the population have annual incomes of less than $3,000 (in local purchasing power). Food expenditure for these households accounts for 78 per cent of household income (chart 14). Policy interventions have varied, but they include export bans on cereals and food subsidies targeted at the poorest consumers (e.g. in Ethiopia); the suspension and lowering of taxes on grains and basic foods (in Burkina Faso, Cameroon, Senegal and Uganda); soft loans from State banks to public and private grain-milling and storage firms (in Cambodia); and the promotion of production through the adaptation of high-yielding varieties (e.g. New Rice for Africa (NERICA) rice in Uganda and the United Republic of Tanzania).

(b) Food price trends

Both food and oil prices peaked in early 2008, and have declined sharply since June 2008 (chart 15). From January to December 2008, world grain prices declined by 50 per cent. Although still above their longer-term trends, international prices for vegetable oils, oilseeds and dairy products were also declining. The

Chart 14

Food expenditure shares of low-income households in selected LDCs
(Per cent)



Source: Hammond et al. (2008)

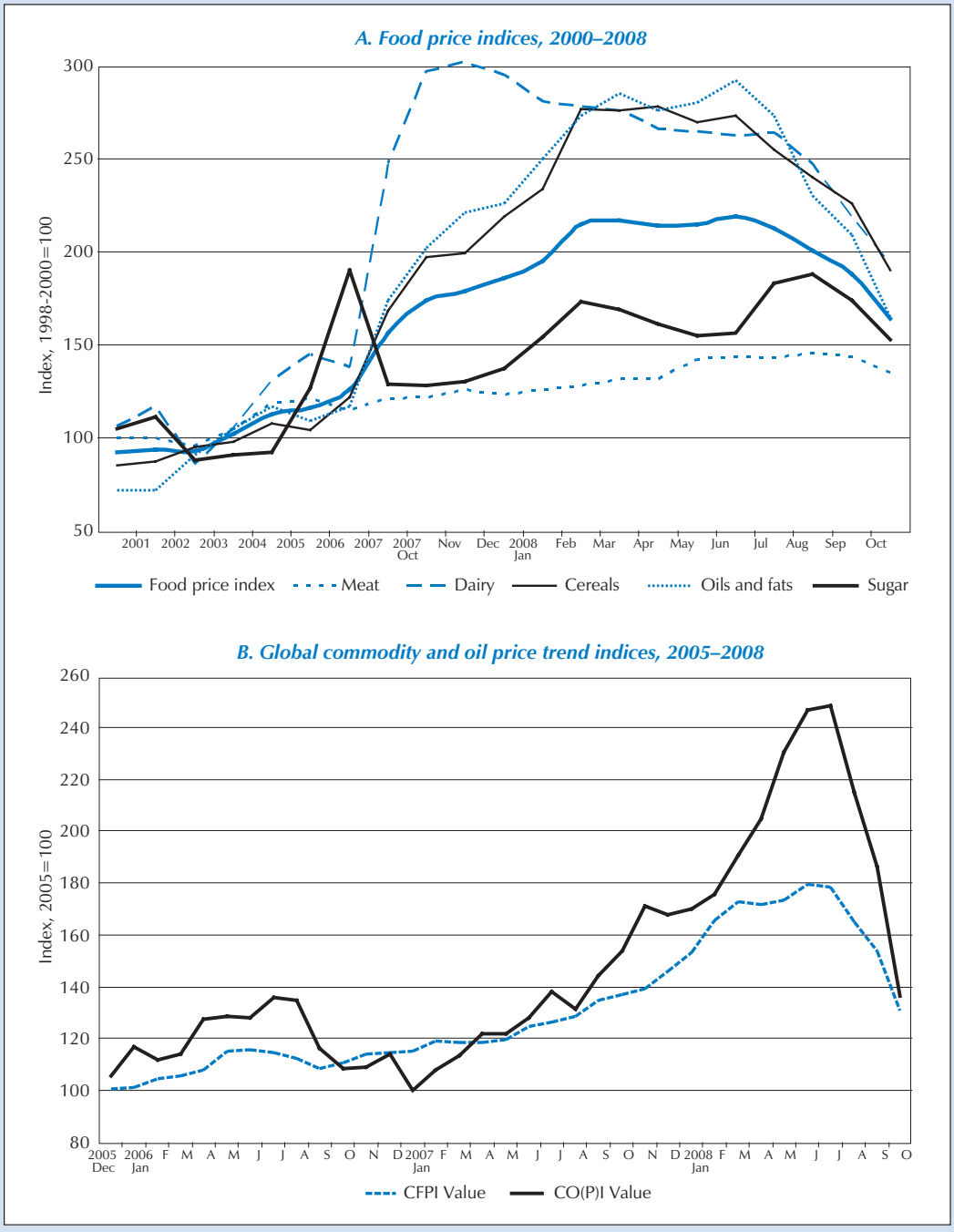
steady fall in food prices, although welcome, is not necessarily a portent of greater stability and food security into the medium term. The global stocks-to-use ratio for cereals in 2008–2009 remains low, and lower prices may divert more supply from food to biofuel production. In the future, higher fossil-energy prices may lead to agriculture becoming increasingly important as a supplier to the energy market.

The potential benefits of recent higher prices have not accrued to producers in many LDCs. Their supply response was small in 2007 and virtually zero in 2008, due to higher prices on key agricultural inputs such as fertilizers, seeds and energy (UNCTAD, 2008a). Furthermore, export taxes and other restrictions limited the transmission of international prices to domestic markets, burdening producers with higher costs and stagnant output prices. In addition, producer proximity to markets (which is often infrastructure-constrained) and the structure of the market (i.e. the role of traders, processors, etc., who captured the bulk of the price gains) contributed to the reduced supply response from LDC farmers. The gradual decline in prices was also due to slowing international demand arising from the current global recession, and reduced speculation, as almost all commodity prices were falling in unison towards the end of 2008 (chart 15).[9] Although international prices for most agricultural commodities declined during the second half of 2008, in most cases in LDCs, domestic food prices declined far less than international food commodity prices did (this is termed "price stickiness"). LDC domestic food prices remained on average 24 per cent higher in real terms by December 2008 than in 2006. For many of the poorest LDC staple food consumers (chart 14), this represents a significant reduction in purchasing power. As most LDCs are low-income, net food-importing countries, clearly the food crisis is continuing unabated. However, as discussed earlier, significant constraints on future production and productivity remain.

The potential benefits of the recent increase in prices have not accrued to producers in many LDCs.

Chart 15

Food and global commodity and oil price trend indices, 2000–2008



Source: UNCTAD secretariat calculations; for Panel A based on FAOSTAT, online (December 2008), and for Panel B based on IMF, *Commodity Food Price Index Monthly Price*, and *Crude Oil (petroleum) Monthly Price*, online (December 2008).

Notes: FAO Food Price Index: Consists of the average of six commodity group price indices, weighted by the average export shares of each of the groups for 1998–2000.
CFPI (Commodity Food Price Index): Includes cereals, vegetable oils, meat, seafood, sugar, bananas and oranges price indices.
CO(P)I (Crude Oil (petroleum) Price Index): Simple average of three spot prices — Dated Brent, West Texas Intermediate and Dubai Fateh.

Recent price increases during 2009 are a part of a wider range of forces affecting commodities in general, including rapid economic growth in the emerging world, strains on world energy supplies, the weakness of the United States dollar, and reduced inflationary pressures culminating in the weak growth of global supply and a strong increase in demand. High food prices have powerful distributional effects, especially by squeezing the poorest the most. The consequence is already visible in increased levels of malnutrition and undernourishment in many LDCs (Box 11). Chart 16 shows recent forecasts, which suggest that food prices will remain at higher average levels over the medium-term than in the past decade (OECD and FAO, 2008). The factors underlying these trends until 2017 include: continued strong growth in food demand from ODCs and LDCs, growing feedstock demand from the biofuel industry, historically low global cereal stocks, and greater climate change risks in major cereal-producing areas prone to drought and/or flooding. These trends — combined with long-term natural resource constraints, increased contestation of land rights and access, and high rates of food demand and population growth — will remain major challenges to LDC food security.

LDC domestic food prices in December 2008 remained on average 24 per cent higher in real terms by than in 2006.

The usual explanations (e.g. those provided by the International Food Policy Research Institute (IFPRI) (2008a) and the World Bank (2008a)) for higher prices are population growth, the diversion of food crops (such as maize and soybean) to biofuel production, growing Asian and Middle Eastern demand for high-value foods (cereals, dairy products and meat), higher transport costs and climate change (resulting in droughts and crop failures). To these can be added the role that speculation plays in commodity (especially food) markets. For example, on Chicago's CME Group[10] market, which deals in some 25 agricultural commodities, the volume of contracts during the period January–September 2008 increased by 20 per cent, and numbered a million per day. Similarly, hedge funds were active in commodities futures contracts and were also buying companies that stock grains and purchase prime agricultural land in developing countries. Futures purchases of agricultural commodities have traditionally been the means by which a limited number of traders have stabilized future commodity prices and enabled farmers to finance themselves through future sales. Speculators who hold their contracts to drive up current prices, with the intention not of selling the commodities

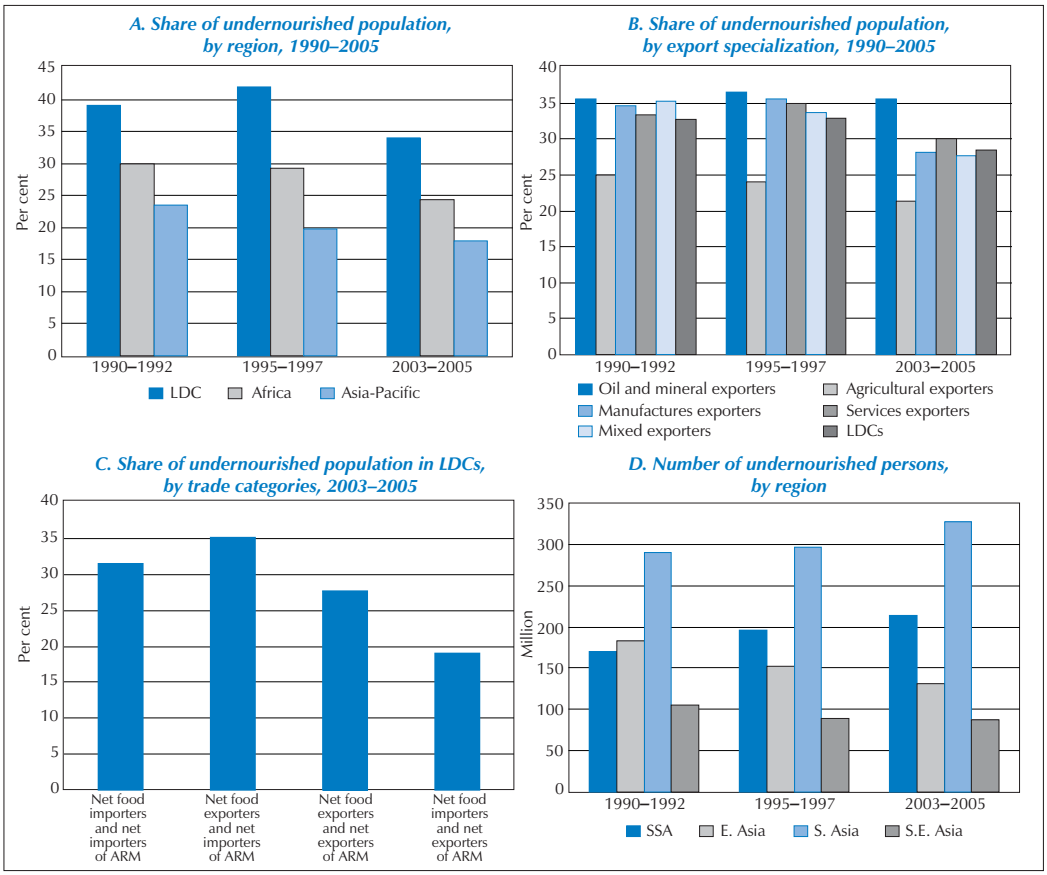
Box 11. LDC undernourishment trends

The term undernourishment is adopted by the FAO to refer to their indicator of progress towards the Millennium Development Goal for Hunger which aims to reduce by half the proportion of hungry people in the world by 2015. This indicator is based on national food production figures, and is basically a measure of food availability.[11] It should not be confused with undernutrition or malnutrition, both of which are a result of food intake of inadequate quantity and quality, poor health and sanitation. However, malnutrition in LDCs has increased since 2000. Food consumption per capita, measured as average calories per capita per day, decreased from 2,390 in 2004 to 2,215 in 2006 (UNCTAD, 2008b). Box chart 4 shows the number and share of the undernourished in LDC populations, by region and export specialization. Box chart 4A shows that the average share of the undernourished in the total LDC population, although declining since 1990, is still higher than the shares in sub-Saharan Africa and in the Asia-Pacific region. Box chart 4B shows that within the LDC group, mineral exporters, which are growing at the fastest rate, also have the highest proportion of undernourished people. Due to the capital-intensive nature of the extractive industries and their limited multipliers and linkages, these economies tend to be more dependent on food imports, and are therefore more vulnerable to food price inflation and food insecurity. The lowest undernourishment rates are in the "mixed" and agricultural exporter groups, comprising many LDCs which have improved productivity in agriculture (Nin Pratt and Diao, 2008). While agriculture remains a principal source of livelihood for the LDC poor, the worst performers (e.g. Haiti) failed to prevent a decline in capital stock per agricultural worker. This has been exacerbated by the financial crisis and a steep decline in the flow of ODA to the agricultural sector.

Box chart 4C shows that considering LDC agriculture as whole, import-dependent countries have the highest rates of undernourishment. During the period 1996–2001, all except seven of the LDCs were net food importers (UNCTAD, 2004). Major food- importing LDCs typically include oil-producing countries, and States where conflict has hindered the production of food and increased vulnerability to higher food prices. Similarly, small island developing States (such as Comoros, Maldives, Samoa and Sao Tome and Principe) tend to be major food importers, as they mainly export services (e.g. tourism) and import most of their needs, including food (chart 17B).

Box 11 (contd.)

Box chart 4
Number and share of undernourished LDC population, by region and export specialization
(Per cent, million)



Source: UNCTAD secretariat calculations, based on data from the United Nations/DESA Statistics Division (November 2008).
Notes: See p. xii for the country group classification.
SSA - sub-Saharan Africa.

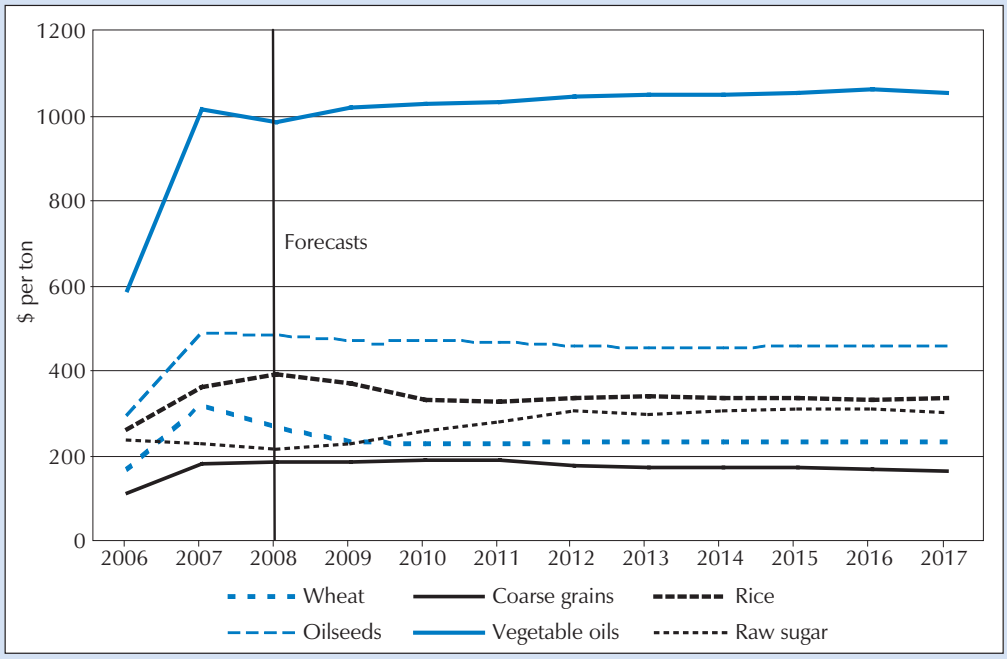
on the real futures market, but of unloading their holdings onto an artificially inflated market, at the expense of the ultimate consumer, destabilize both the market and production. This practice may grow, as many banks offer investment funds specializing in commodities, and increasingly, food products. Given the current financial crisis and the deepening world recession, international financial institutions, donors and LDC Governments will need to improve the regulation of these activities (UNCTAD, 2009a).

2. Foreign trade in agricultural products

Long-standing agricultural export subsidies and domestic support policies in developed countries remain a critical obstacle to agricultural development in LDCs. LDCs that were encouraged to liberalize trade too quickly have struggled under the pressure of low-price, subsidized food exports being dumped by developed countries. This situation has undermined production for both export and domestic

Chart 16

Global long-term food price forecasts to 2017



Source: OECD-FAO (2008).

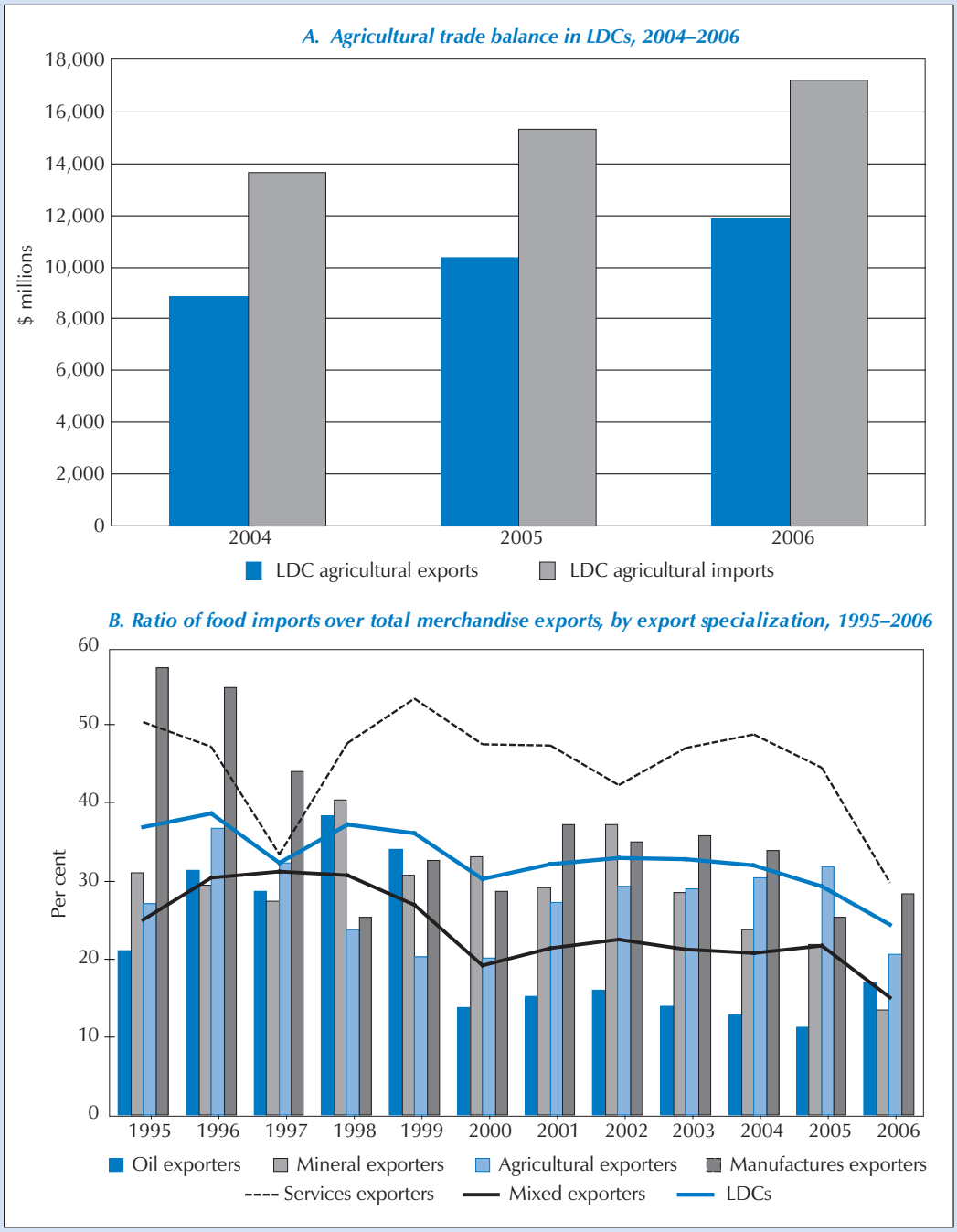
markets, and it therefore retarded the ability of farmers to generate the supply response that the food crisis required. Agricultural subsidies in developed countries are associated with rapidly increasing food imports in LDCs, alongside declines in agricultural production (chart 17A and chart 13B). Thus, many LDCs, which were traditionally food exporters, have become net food importers over the past 20 years. On average, 20 per cent of LDCs' food consumption was imported, and in some countries the share was much higher (for example, in Lesotho, 67 per cent; in the Gambia, 82 per cent; in Mauritania, 32 per cent; and in Malawi, 31 per cent). In 2006, 35 LDCs were net food importers, and in 19 of these countries, more than 30 per cent of the total merchandise export earnings was spent on food imports. As chart 17B shows, food imports as a share of total merchandise exports has tended to be highest in LDCs which export manufactures and services. Although during 2004–2006 the position marginally improved, LDCs remain major net importers of agricultural products (chart 17A). The situation is likely to have worsened since the 2007–2008 food price crisis. The macroeconomic impact of the $23 billion food import bill in 2008 for these countries — which are also net importers of energy — has been further exacerbated by volatile oil prices.

Many LDCs, which were traditionally food exporters, have become net food importers over the past 20 years.

Following trade liberalization, major food import surges into LDCs occurred regularly — throughout the 1970s, 1980s, 1990s and early 2000s (UNCTAD, 2006). These were particularly acute in the case of African LDCs. Import surges have been increasing over time, largely owing to the inability of domestic producers to compete with cheaper imported food (UNCTAD, 2006: 271). Consequently, food imports have grown rapidly, but they now help to meet the nutritional requirements of the local populations. According to the World Bank (2008b), the demand for food in sub-Saharan Africa is expected to reach $100 billion by 2015 — twice the level of 2000.

Chart 17

Agricultural trade in LDCs, 1995–2006



Source: UNCTAD secretariat calculations, based on FAOSTAT, online (October 2008).
Note: See p. xii for the country group classification.

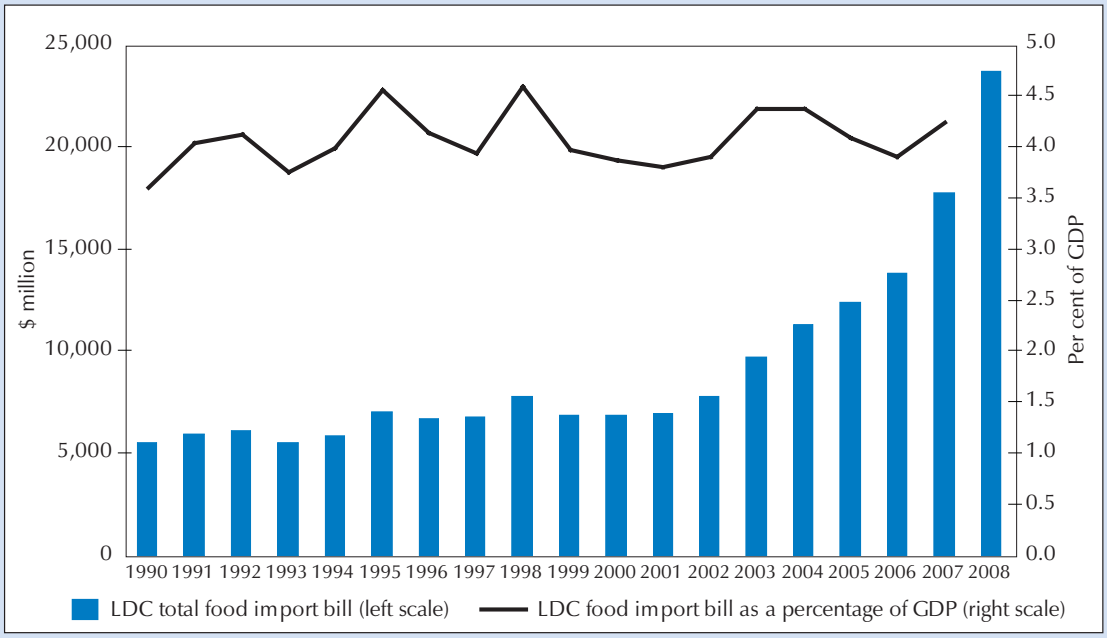
Paying for food imports can place a tremendous strain on the resources of the poorest LDCs, where foreign exchange earnings are limited and economic growth rates may be low. Currently, it is likely that for some LDCs, higher prices will reduce the demand for imported foods, or, if import demand is inelastic, lead to higher import bills. This could have a negative effect on short- to medium-term food security and on economic stability, and could increase the demand for emergency food aid. The LDC food import bill has grown from 3.5 per cent of GDP in 1990 to 4.4 per cent in 2007 (chart 18). In 2000, the food import bill totalled $6.9 billion; in 2008, it reached $23 billion (chart 18). Finding the resources to pay an import bill of this size is a major challenge for LDCs. Commercial food imports accounted for over 20 per cent of total merchandise imports in 19 LDCs in 2004–2006 (up from 13 LDCs in the period 1996–2001). Given declining food production per capita and low or declining growth in agricultural labour productivity, a reduction in food imports would have a negative impact on food security.

The LDC food import bill increased from $6.9 billion in 2000 to $23 billion in 2008.

Food-insecure LDCs spend a far higher proportion than the average of their export earnings on food imports; and this is covering a diminishing share of their food consumption needs. This suggests that food-insecure LDCs would import even more food to cover shortfalls in domestic production and to ensure food security, if they were not constrained by their limited export earnings. Moreover, the need to spend such a high proportion of their foreign exchange earnings on food imports has reduced the ability of food-insecure countries to invest in areas that would stimulate development and reduce their long-term vulnerability.

Chart 18

LDC food import bill, 1990–2008
($ million, per cent of GDP)



Source: UNCTAD secretariat calculations, based on data from FAOSTAT, online (January 2009) and from the United Nations/DESA Statistics Division (for GDP data).

In addition to increased spending on food imports as a share of GDP, LDCs are also major recipients of food aid. Between 2000 and 2006, there was a notable decline in food aid as a share of total aid to LDCs, but it then rose sharply in response to the onset of the global food crisis (chart 19A). Net food importers and net agricultural importers as a group have a higher share of food aid in total aid than the LDCs as a group. This is to be expected, as these are the most food-insecure LDCs (chart 19B).

In 2008, at least 16 LDCs received of international emergency food assistance.

The emerging implications of the economic crisis, combined with the recent food crisis, have added to the nearly one billion people who live with chronic poverty and hunger world-wide. In 2008, at least 16 LDCs were in receipt of international emergency food assistance (FAO, 2009). In Ethiopia, Nepal and Somalia, the emergency assistance was designated for purchasing food locally, which reduces shipping costs and stimulates local food production. LDCs will require further assistance to raise investment in staple food production for the most food-insecure countries. To facilitate access to finance to ensure food security, the creation of an international borrowing mechanism for food (food import financing facility) could ease the liquidity constraints on net food-importing developing countries and facilitate emergency imports of food.

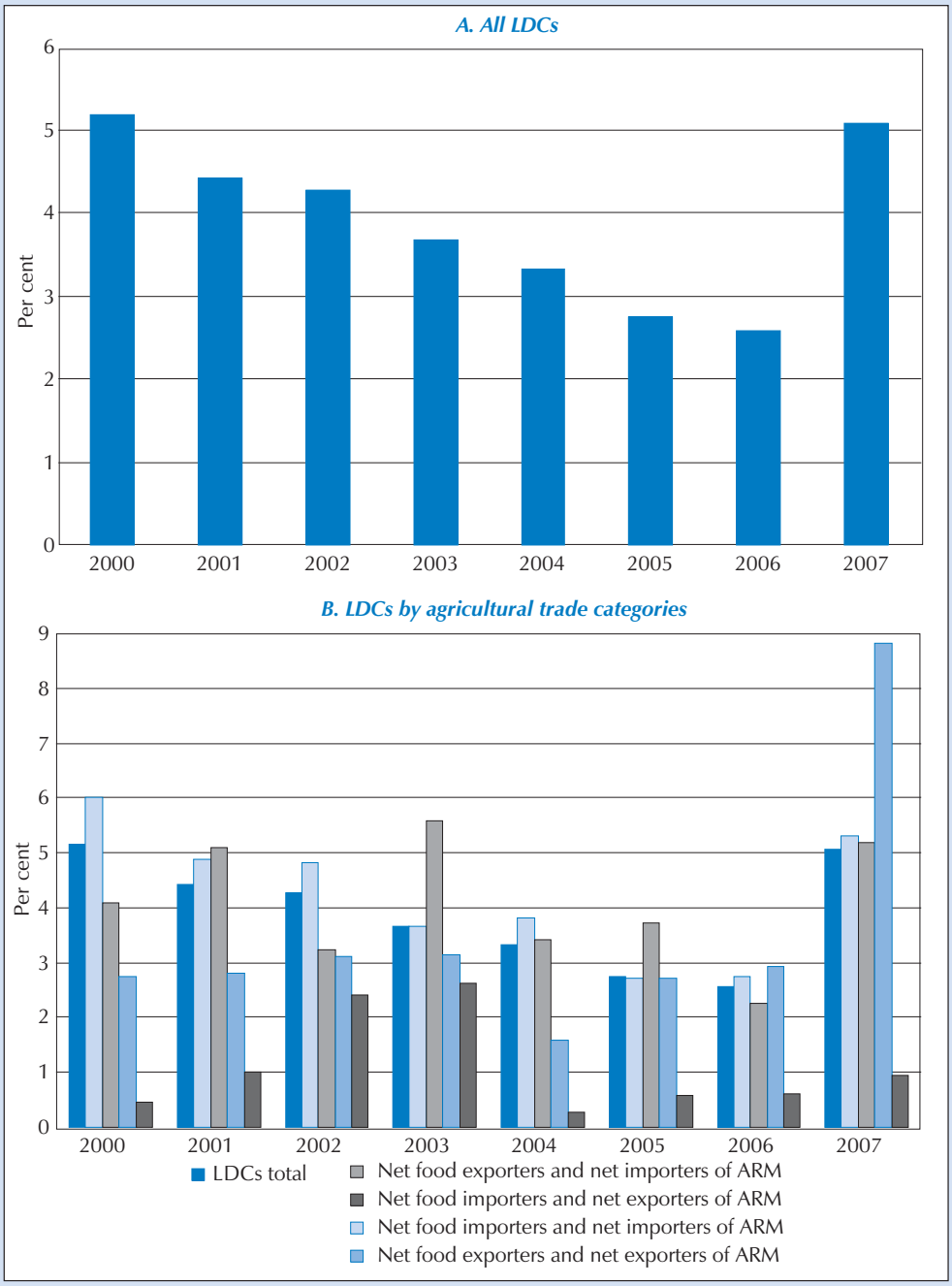
Given the financial crisis, much more attention should be paid to developing LDC agriculture, in order to increase food security. This requires a comprehensive elimination of all trade-distorting subsidies and support measures in developed countries, complemented by aid for low-income net food-importing LDCs. An increase in ODA for agricultural development is urgently needed to support the development and implementation of agricultural policies, to build and strengthen institutions (e.g. agricultural development banks providing rural financing for food production), and to expand agricultural research and development (R&D) through support for local institutions to enhance their impact and reach.[12] LDCs also need assistance with information on food supplies and commodity markets, and through building better infrastructure, especially transport and logistics networks. This will help countries cope with the short- and medium-term adjustment costs associated with efforts to lower their food import bill. This type of aid should continue to be in the form of grants or concessional loans, provided that it is targeted at generating future streams of income from agriculture.

The agricultural sector needs structural transformation if long-term food security is to improve. Public investments have a crucial role to play in this process. A key starting point is to raise farm productivity.

The agricultural sector needs structural transformation if the prospects for long-term food security are to improve. Public investments — especially in agriculture and infrastructure — have a crucial role to play in creating the basis for future food security. A key starting point is to raise farm productivity. LDC farmers need the benefits of fertilizer, irrigation and high-yield seeds, all of which were core ingredients of China's economic take-off. Investments are also required in roads and the energy sector: without these, the extent of the market for agricultural producers will remain limited. The rest of this chapter sets out how improved food security and structural transformation can be supported by the promotion of linkages between agriculture and the non-agricultural sectors.

Chart 19

Food aid as a share of total aid in LDCs, 2000–2007



Source: UNCTAD secretariat calculations, based on OECD/DAC, online (November 2008).
Note: See p. xii for the country group classification.
ARM - agricultural raw materials.

C. Intersectoral linkages and the rural non-farm economy

The study of economic development has long been dominated by what may be labelled the agriculture–industry conversion paradigm (Lewis, 1954; Schultz, 1964). This view is informed by the theoretical and empirical evidence that economic development is predicated on diversification of the national economy (Chenery, Robinson and Syrquin, 1986; Imbs and Wacziarg, 2003). On a sectoral level, the agriculture–industry conversion view suggests that development occurs if technical progress enables agriculture to become more efficient and to reallocate labour to industry, and, at a later stage, to services. This assumes that industry grows at a higher rate than the agricultural sector and is capable of absorbing excess agricultural labour. Customarily, "agriculture" used to be equated to rural areas, and "industry" and "services" to urban areas. One implication of this paradigm would be that rural development is best served by increasing farm incomes through efficiency gains. Indeed, the urban–rural wage gap was long referred to as the "farm problem". A great deal of evidence exists to support the view that this would imply that economic growth, through diversification on the national level, is best served by specialization on the microeconomic and the regional (urban/rural) levels (Start, 2001; Balcombe et al., 2005).

The rural non-farm economy is of great importance to the LDC rural economy because of its production linkages and employment effects.

Recently, the attention in rural development economics has shifted to the concept of the non-agricultural, or non-farm, rural economy. The rural non-farm (RNF) economy may be defined as all the non-agricultural activities that generate income for rural households (including remittances), either through work for wages or self-employment. In some contexts, rural non-farm activities are also important sources of local economic growth (e.g. mining and timber processing). It is of great importance to the LDC rural economy because of its production linkages and employment effects, and the income it provides to rural households represents a substantial and sometimes growing share of their total incomes.

A classification of the RNF economy should capture some or all of the following distinctions:

- Activities closely linked to farming and the food chain, and those not part of that chain, since agricultural linkages are often important determinants of the RNF economy's potential for employment, income and growth;
- Activities producing goods and services for the local market, and those producing for distant markets (tradables) — since the latter are able to create jobs and incomes independently of the rural economy; and
- Those activities that are sufficiently large, productive, and capitalized to generate incomes above the returns obtainable in farming, and those that offer only marginal returns — since this reflects the RNF economy's capacity to generate local economic growth.

The income that the RNF economy provides to rural households represents a substantial and sometimes growing share of their total incomes.

Equating rural areas with farming is — and probably always was — restrictive (Smith et al., 2001). Rural households in Africa derive up to between 40 and 45 per cent of their income from non-agricultural sources; in developing Asia the rate is about 30 per cent, and in Latin America 40 per cent (Barrett, Reardon and Webb, 2001: 2; Deininger and Olinte, 2001: 455). There is also evidence that this share has been increasing in recent decades in the same regions (Ferreira and Lanjouw, 2001: 30; Start, 2001; Haggblade, Hazell and Reardon, 2002: 6). Table 12 summarizes the findings from detailed studies on linkages from agriculture to the RNF economy in selected LDCs, as well as in developing regions. It shows that

Table 12

Selected case studies of the LDC rural non-farm economy

Study	Activity reported: Size, extent (jobs, incomes) [Origins, Technology, Scale]	Making RNF activities work			Effects of RNF activity	Policy issues raised
		Supply side: Access, Resources required	*Demand side: Market conditions*	*Transactions: supply chains and sub-sectors*	*Linkages: Production, fiscal, consumption, social*	
Bangladesh: Mandal and Asaduzzaman (2000); Toufique and Turton (2003); Chatterjee et al. (2006); Davis et al. (2007).	37% of rural labour force in the RNF economy, more than half of rural household incomes from RNF sources. Activities include: fish and food processing, labouring, textiles manufacturing, light manufacturing (furniture, repair shops etc.), taxis and rickshaws. Landless turning to the RNF economy rather than farm labouring. Seasonal migration to urban centres is still growing to smooth annual rural income.	Dual structure: poor, lacking skills and education, crowd into poorly rewarded work; Better off with secondary education go into services. Credit a key limitation for rural population. Rural electrification and road building have helped.	The rural prosperous tend to import their consumption needs; the poor tend to spend any earnings locally.	No information.	Mandal sees the RNF as closely linked to upstream and downstream demands of farming. Toufique sees drive coming from elsewhere - remittances, urbanisation.	Importance of improving rural to urban infrastructure provision.
Malawi: Ellis, Kutengule and Nyasulu (2002); Sen and Chinkunda (2002); Orr and Orr (2002); Davis et al. (2007); McDonagh and Bahiigwa (2002).	Malawi National Gemini MSME Baseline Survey, 2000, reports decline in rural employment in MSME from 932,000 in 1992 to 774,000 in 2000. But in previous decade very large increases in RNF reported for Mchinji and Salima. About half of incomes come from off the farm (or fishing); but wages and transfers main sources for poor; self-employment for rich. 2/3rds of MSMEs owned by females.	Access to assets allows trading up and acquisition of assets for other activities. Much RNF is micro, seasonal, and has to fit with maize cropping. Chronic lack of capital, inability to sustain risks.	Implicit that market is small, growing slowly. Market opportunities seen in niches for particular farm products - vegetables, tobacco, beans, dairy products.	Village heads and other local traditional leaders valued for helping social cohesion and resolving conflicts. Decentralised control of fishing beaches creates rental opportunities.	Most RNF activities involve processing and trading of produce from land, forests and water.	Major questions over how to remedy market failures. Debates over farm strategy and the degree of public support needed.
Senegal: Faye and Fall (2001); Faye et al. (2001).	Mainly account of change and adaptation in farming systems. Non-farm incomes have made up 50% of rural incomes since the 1960s. Non-agricultural income worth 35-40% income in all villages in 1999. Proportions much larger for poorer households at 67%. Includes migrant income: share of all non-farm income varied from 40% to 60% as wealth increases -although the household average in absolute terms is very similar. Of the local non-farm work, most is self-employment, in small trading, processing farm produce and selling cooked food (females), livestock trading (males), transport, building, and equipment repair.	Most non-farm work is self-employment, requires no formal education.	No information	Few supply chains to mention.	Most activities linked into farming and natural resources, being collection, processing, equipment repair - or is simple, local services. Remittance income to consumption and ceremonies	

Table 12 (contd.)

Study	Activity reported: Size, extent (jobs, incomes) [Origins, Technology, Scale]	Making RNF activities work			Effects of RNF activity	Policy issues raised
		Supply Side: Access, Resources required	*Demand side: Market conditions*	*Transactions: supply chains and sub-sectors*	*Linkages: Production, fiscal, consumption, social*	
Uganda: Ellis and Bahiigwa (2001); McDonagh and Bahiigwa (2002); Balihuta and Sen (2001); Smith et al. (2001); Canagarajah, Newman and Bhattamishra (2001); Deininger and Okidi (2001).	Crop and livestock income make up over 60% of incomes of most households in Mbale, but only 38% for the richest quartile. Poorer groups tend to have labouring income, rich tend to have self-employment. Similar trends for Mubende, although rich-poor differences less marked. National data suggest that during 1990s there were major falls in share of rural income from crops and above all from farm labouring; correspondingly off-farm self-employment rose. But households tended to have less diverse income portfolios. Remittances have also risen, especially for the poorest households. Women RNF firms in selling food and drinks.	Those with physical assets in land, livestock, fishing equipment find it easier to diversify. Access to credit - despite micro-credit schemes - and technical assistance are obstacles. Credit goes first to RNF. Improved rural infrastructure counts.	Economy recovering from chaos in new-found peace. Queries over decentralisation and the impact on local business conditions e.g. local taxation. Groups form around those with experience of work in private or public sector.	Decentralisation increases uncertainties of business, adds to actors involved in transactions. Traditional local leadership valued: local government much less so.	Growth in the rural economy in the 1990s based on the recovery of the farm economy. Many RNF activities added value to farm output. But equally, many depended on imports of fuel, cement, diverse goods.	The importance of creating an enabling environment with fair taxes and equitable collection.
United Rep. of Tanzania: Ellis and Mdoe (2002); Lyimo-Macha and Mdoe (2002); Jin and Deininger (2009).	Overall 50% of income comes from non-farm sources, but this varies from 32% for the poorest quartile to 57% for the richest quartile. Most of RNF income of poor comes from (farm) labouring; whereas most of non-farm earnings of rich comes from businesses. Most rich salaried work in the public sector. Non-farm business is thus a way out of poverty. Women were engaged in non-farm activities such as farm labouring, making and selling mats, local brewing, selling buns, food crop marketing, running shops and small restaurants.	Few details, but capital matters to set up businesses. Infrastructure and public services provision are critical to RNF enterprise growth.	Context of decentralisation, raising issues of preventing this becoming an opportunity for local level rent-seeking.	Local leadership appreciated for solving local disputes.	Not known	Importance of creating a local business environment that does not obstruct trade, investment and risk-taking.
Source: Adapted from Wiggins and Davis (2003).						

the poorest households are engaged in wage labouring for others in the community, in farming and construction, or in self-employment in petty enterprises, such as:

- Manufacture of baskets, mats, carpets, clothes (tailoring) and pottery, processing of food and drink (including milling and brewing), tools (including blacksmithery), charcoal etc.; and
- Service provision in small-scale trading of cooked foods, farm produce, livestock, woodfuels, running small shops (including slaughtering and butchery), repairing vehicles and farm equipment, transporting goods locally, pumping or fetching water and hairdressing.

Almost all these activities are rewarded at rates similar to or below the average returns in farming (Haggblade, Hazell and Reardon, 2002; Wiggins and Davis, 2003). The other general point about these occupations is that they barely involve a supply chain (for example, labouring or trading cooked food). With few exceptions, the goods and services produced are consumed locally, with direct exchange of the output from producer to consumer. There is limited mention in the cases cited in table 12 of production of manufactures (or services) for urban markets, other than the processing of farm output or the trading and transport of livestock. The market for this work is almost entirely in the village, or at most, at a local rural market for sale to villagers from the neighbouring communities. Issues of transactions scarcely arise, and when they do, there are usually well-established institutions devised to deal with the issues (for example, forms of labour hire). In marked contrast to the activities undertaken by the poor are those practised by the better-off. These include larger-scale businesses and salaried employment. Larger businesses include:

As has already been noted, for many of the products and services of the rural non-farm economy, demand arises locally.

- Trading with capital, stores, cafes, restaurants, and bars of substantial size;[13]
- Transport services, usually involving a motor vehicle, and repair workshops; and
- Manufacturing, involving some capital, and usually employing a few full-time workers beyond the immediate household in: carpentry, specialized processing of farm produce on a medium-to-large scale (e.g. coffee, grain milling).

Although there is little direct observation of money-lending and deposit-taking in the cited accounts, the existence of local, informal financial services is implicit when sources of capital and debt are described. In rural areas, salaried employment is overwhelmingly in public services (e.g. in administration and school teaching, and as nurses and health assistants). One point that arises within this set of activities is that many are similar to the earlier list, except that they are carried out on a larger scale, with more capital and equipment, which allows higher productivity and some economies of scale. In some cases, the activities may cross capital thresholds that confer a local natural monopoly on the business.[14]

Typically, the rural non-farm economy is more active when and where the local farm economy is prosperous.

The export of goods and services from village economies to the wider and urban economy is mainly confined to primary produce — crops, livestock, fish and forest products — and to labour services. Migration is not strictly part of the RNF economy, but accounts of widespread migration appear in roughly half of these studies, and for some villages, and some households within these villages, remittances are an inescapably important part of the local economy (Wiggins and Davis, 2003).

Demand makes RNF activity possible, and greatly influences the returns obtained. So what of demand? For many of the products and services of the RNF economy, demand arises locally, as has already been noted. This makes the growth of the RNF economy largely dependent on the incomes generated by those sectors that constitute the "economic base" — that is, those that produce tradable goods and services. Typically, the base is made up of sales of agricultural and other primary goods, and payments for labour services in the form of remittances. It follows that the RNF economy is more active when and where the local farm economy is prosperous. These areas tend either to have good natural resources or to be well connected to urban markets, or both. Closeness to urban markets may create opportunities for RNF activities. This applies particularly in peri-urban areas, where possibilities exist for commuting and for the provision of leisure, amenity and residential services to those working and living in the cities.

Closeness to cities is not always an advantage. Some RNF manufactures, usually those produced within the household, are highly vulnerable to competition from factory-made substitutes sold in rural market centres and villages.

One point of debate concerns the nature of local rural demand for the outputs of the RNF economy. In some cases, it is stated that most of the spending on these outputs comes from the wealthier households. In other cases, these households may see local goods and services as relatively inferior, and may spend most of their income on products brought in from urban areas. One RNF activity that has location advantages that could attract the demand of urban consumers and resist urban competition is tourism. Local linkage effects are weak where tourism develops as an enclave, with urban firms organizing facilities and importing goods and services from the urban economy or from abroad. For example, in the case of trekking in the Himalayas, above Pokhara in Nepal, tourism has not been particularly successful at creating local jobs. It may be that the supply of sufficiently attractive locations for international tourists is limited, and for the time being, given the current global recession, domestic demand for leisure may be limited.[15] However, Cernat and Gourdon (2007) cite examples in Indonesia and Malaysia where tourism has been generating the main source of RNF income, noting that the role of the State is a critical factor in boosting potential RNF linkages.

Understanding the key linkages between agriculture and the other non-agricultural activities in the economic system is crucial to the formulation of an agricultural development strategy aiming to contribute to broad-based economic growth and transformation, through increased value-added and employment linkages.

The RNF economy is of great importance to the rural economy for its productive and employment effects: it offers services and products upstream and downstream from agriculture, which are critical to the dynamism of agriculture; and the income it provides to farm households represents a substantial and growing share of rural incomes, including those of the rural poor. These sectoral contributions will become increasingly significant for food security, poverty alleviation, and farm sector competitiveness and productivity.

1. Promoting intersectoral linkages

Traditional theories of structural transformation provide a useful framework for understanding the development and promotion of farm to non-farm intersectoral linkages.[16] For example, Kaldor (1966) emphasized the importance of generating an increasing agricultural surplus, which requires that agricultural labour productivity growth exceed the growth of labour's own consumption requirements by an increasingly larger margin. Therefore, building productive capacity in LDC agriculture to generate a growing agricultural surplus is critical to agricultural and non-agricultural development. Understanding the key linkages between agriculture and the other non-agricultural activities in the economic system is crucial to the formulation of an agricultural development strategy aiming to contribute to broad-based economic growth and transformation, through increased value-added and employment linkages. Linkages from agriculture to the wider economy may be illustrated as follows:

- Production linkages, both "upstream" from the farm via its demand for inputs and services for agriculture, and "downstream" from the farm via its demand for the processing, storage, and transport of produce;
- Consumption links, as farmers spend their increased income on goods and services, thus enlarging the market for domestic industrial output;
- Gains to rural human capital, as increased food production allows better nutrition of rural workers and investment in education;
- The release of rural labour for industrial employment; and

- Earning foreign exchange and increasing the supply of domestic savings (Johnston and Mellor, 1961).

Advocates of regional growth linkage theory, such as Haggblade, Hazell and Brown (1989) and Delgado et al. (1998),[17] show how an agriculturally-driven non-farm sector can develop in relatively isolated rural areas, due to the protection that market imperfections in rural areas (i.e acute information asymmetries and a proliferation of only partially tradable products — usually perishables — and services) provide, together with low purchasing power for urban imports. Such linkages between agriculture and the local RNF economy take many forms. Typical consumption and production linkages are outlined in table 13.

Consumption linkages are thought to be particularly significant, due to the propensity of small-scale producers to spend on rurally produced goods. In addition, there are a range of less direct linkages between sectors mediated via investments, infrastructure, skills and networks (Start, 2001). Indirect linkages occur across different sectors, however conventional consumption and production multipliers are particularly relevant to agriculture. These linkages are often lower in modern, non-traditional non-agricultural "growth engines" such as mining, as the skills and inputs for extraction and processing are not available within the local economy or are externally sourced (Davis, 2004; Start, 2001).

In the context of promoting intersectoral linkages, the difference between LDCs that produce cash crops and LDCs that produce food crops is important. The adoption of cash crops rather than food crops modifies the depth of linkages between agriculture and the rest of the economy.

In the context of promoting intersectoral linkages, the difference between LDCs that produce cash crops and LDCs that produce food crops is important. The adoption of cash crops rather than food crops modifies the depth of linkages between agriculture and the rest of the economy. Thus, while rising productivity in food crops typically entails a greater food surplus, and therefore reduces the upward pressure on real wages, a growing surplus in cash crops may be highly beneficial for the rest of the economy, but only in so far as food can be imported at non-increasing prices (termed the "wage–good constraint"). However, for most agrarian-based LDCs, in practice this means that the resources for increased imports must come from the agriculture sector — which does not preclude establishing strong intersectoral linkages with industries engaged in food-crop or cash-crop transformation.

Growth multiplier effects from agricultural in LDCs are often weaker than in ODCs, because of the low use of purchased inputs, more poorly developed rural towns, limited agro-industry and higher transport costs.

Table 14 presents evidence of strong agricultural growth multiplier effects in the non-farm economy. This shows that a $1 increase in African rural income translates into a $1.30–$1.50 increase in income for other sectors through production and consumption linkages from agriculture to non-agricultural employment and growth in the RNF economy. Delgado et al. (1998) and Block and Timmer (1994) show that in developing countries, the growth multipliers from agriculture exceed those from non-agriculture. Most of these studies show that some 70 to 80 per cent of the total effect derives from consumption linkages. Rural services and commerce

Table 13
Agricultural growth-linked RNF activities, by sector

Linkage to agriculture	Secondary sector (Construction and manufacturing)	Tertiary sector (Trading and services)
Production: forward	Processing and packaging industries. Construction of storage and marketing facilities	Transportation and trade
Production: backward	Agricultural tools and equipment	Agricultural and veterinary services; input supply
Consumption	Household items; home improvements	Domestic services; Transportation; sale of consumer goods

Source: Start (2001).

Table 14

Agricultural sector multipliers: From increases in farm output to RNF sectors

Location and period	Estimated multiplier
Sierra Leone, 1974–1975	1.35
Burkina Faso, 1984–1985	1.31 – 4.62
Niger, 1989–1990	1.31 – 4.62
Senegal, 1989–1990	1.31 – 4.62
Zambia, 1985–1986	1.31 – 4.62
Asia	1.6 – 1.9
Africa	1.3 – 1.5
Latin America	1.4 – 1.6

Source: Haggblade, Hazell and Reardon, 2002; Haggblade, Hazell and Brown, 1989; Delgado et al., 1998.
Note: For the concept of the agricultural sector multiplier, see the main text.

account for the majority of rural non-farm linkages. Multipliers in LDCs are often weaker than in ODCs, because of the low use of purchased inputs, more poorly developed rural towns, limited agro-industry and higher transport costs. Also, in many LDCs, discrimination against small, rural, non-farm firms reduces the size of these multipliers (Hazell and Haggblade, 1993; Hazell, 1998). Park and Johnson (1995) note that during the early stages of development in Taiwan Province of China, small and medium-sized enterprises (SMEs) responded positively to rural demand particularly when it was related to rural consumption (e.g. textiles, light manufactures, furniture, beverages and food).

The diversification of agriculture and the transfer of excess labour to other sectors are central to raising long-term growth. Agricultural growth is a vital step in reaching this target.

The diversification of agriculture and the transfer of excess labour to other sectors are central to raising long-term growth. Agricultural growth is a vital step in reaching this juncture, but very few empirical studies have considered linkages in LDCs systematically, if at all. In some studies, RNF earnings and remittances are key sources of finance for investment in farming, or at least for underwriting risks in new agricultural ventures (Haggblade, Hazell and Reardon, 2002; Hazell, 1998). A key element on which little has been reported is the extent to which RNF activity involves either hiring labour and tightening rural labour markets, or further rounds of consumption spending in the local economy. Bah et al. (2006), in their case studies on rural–urban linkages in Mali, Nigeria and the United Republic of Tanzania, note that only two urban centres — Aba, in south-eastern Nigeria, and Himo, in the north of the United Republic of Tanzania — seem to play a role in the economic development of their region. Both appear to confirm the "virtuous circle" model of regional development, as they serve as markets for goods produced in rural areas, and as destinations for migrants and consumers engaged in non-agricultural employment (Quan, Davis and Proctor, 2006).

In rural areas, agricultural growth and development is often constrained by limited physical access to markets and processing. These factors are also critical to the development of broader intersectoral linkages.

Factor markets (land, labour and capital) are often missing or inefficient due to market failure, based on distortions and asymmetric information. There are also — among other things — major structural constraints, including inadequate investment in public goods (e.g. infrastructure, roads, power and education), especially in remote rural areas, as well as high barriers for the entry of the poor to various dynamic markets, and high transaction costs for access to existing markets. To address these constraints, new effective organizational forms have to be devised, in order to create access to inputs such as fertilizers, electricity, irrigation and new seeds, for as large a group of farmers as possible, and in order to productively absorb rural (surplus) labour (box 12). Similarly, greater efficiency could be realized by land reform or tenancy rights reform, in conjunction with large-scale rural public works programmes (creating productive assets), which would also help the diffusion of major agricultural innovations to smallholdings and would make small farms viable farms. This will not happen automatically – the State has to initiate the changes.

Box 12. Institutional and organizational dimensions of farm to non-farm linkages

Several institutions and organizations help facilitate the development of intersectoral linkages. They establish linkages and cooperation, and contribute to growth. For example, sharecropping institutions enable those who decide not to farm to obtain income from their land and allow others to use it productively.

Contract farming is an important mechanism fostering linkages. There are problems with contract enforcement, which undermines institutional confidence among farmers, who need greater access both to information on their rights and to professional services, in order to defend their interests. Forming producer groups of contract farming participants can also help to shift bargaining power from firms to producers.

Cooperative farming can also be a powerful force for greater efficiency in resource use, because highly complementary inputs can now be used on a pool of productive assets.

Machinery rental is another important local farm-linked market, as it enables access to tractors and farm equipment. Without this, many producers could not utilize these capital goods, because they do not have the financial resources to purchase them. Policies that can facilitate the development of this market would assist both owners of machinery and lessees.

Integrating organizations are important, because they create new linkages between farmers, businesses and public institutions. These organizations have the potential to continue to grow and function as intermediaries, by linking technical assistance to financial and commercial services. The State can facilitate the expansion of these services.

Rural producer organizations, farmers groups and cooperatives etc. are important because they facilitate economic activity by establishing linkages, disseminate productivity-enhancing technologies, and provide for economies of scale. For example, in Malawi, NASFAM — a rural producer organization — has worked to distribute fertilizers and negotiate agricultural insurance schemes for members. It also helps members to negotiate contracts with input and processing firms, and facilitates contractual relationships. Although these organizations have the potential to play this role, they have tended to be weak and underdeveloped. Strengthening these organizations is ultimately the task of the producers themselves, but the process could be facilitated by the State.

The State plays a central role in fostering farm to non-farm linkages, because it sets the rules of the game that govern market institutions and actors. In many LDCs, the State is ineffective in this arena. Institutional reform is therefore a central requirement of public policy towards the agricultural sector.

Source: Onumah et al. (2007); Bijman, Ton and Meijerink (2007).

In rural areas, agricultural growth and development is often constrained by limited physical access to markets and processing. These factors are also critical to the development of broader intersectoral linkages, as illustrated by the case of Bangladesh (box 13), and are discussed further in the following sections.

The Bangladeshi case study (box 13) emphasizes that LDC economies need to improve agricultural productivity and diversify their economies to create non-agricultural employment opportunities and generate intersectoral linkages. This will require a new development model focused on building productive capacities, enhancing rural–urban intersectoral linkages, and shifting from commodity-price-led growth to "catch up" growth. This implies a change from static to dynamic comparative advantage, and the active application of science and technology to all economic activities (UNCTAD, 2006; 2007b; 2008b). However, if there is no mechanism to ensure that the increases in agricultural surpluses and rural incomes through enhanced intersectoral linkages — as illustrated in box 13 — are used for the purposes of productive investment in agriculture and/or industry, they will not promote broad-based development. The market mechanism may not do this effectively, as (rural) savers may find it more profitable to invest in functionally unproductive assets (gold, land etc.), particularly when the distribution of land and other assets is already unequal. Alternatively, farmers may spend their higher incomes on (imported luxury) consumption. Therefore, the State has to step in and provide the mechanism to channel the agricultural surplus into productive investment. This can be done through measures such as a suitable price for agricultural produce, a price policy for principal inputs, and a policy of direct taxation on agriculture which does not destroy farmers' incentives to produce, as well as fiscal and monetary policies that are conducive to private investment.

If there is no mechanism to ensure that the increases in agricultural surpluses and rural incomes through enhanced intersectoral linkages are used for the purposes of productive investment in agriculture and/or industry, they will not promote broad-based development.

Box 13. Bangladesh: a case of improving rural non-farm linkages

The major impulses for change in the rural economy of Bangladesh are the transformation within agriculture, the increased linkages between rural and urban areas (improved transportation and communications), electrification, growing market linkages and access (demand/supply), the development of skills, the availability of financial services, and remittances from urban workers and — not least — from international emigrants. Bangladesh has seen a steady transformation of agricultural production during the last twenty years. The major reasons for this have been the use of high-yielding varieties of rice and other cereals[18] — which includes the increased use of chemical fertilizers and pesticides — and a rapid increase in irrigation through both deep- and shallow-tube wells. Most of the supply system is today privatized.[19] The total effect is that new technology and market systems are spread across the country, and double cropping (sometimes triple) has become typical in many areas of Bangladesh.

From a household perspective, increased production (several crop seasons) has meant that seasonal vulnerability and dependency on one major crop have been reduced. Furthermore, some of the negative effects from the continuous and steady decline in average farm size have, to some degree, been offset by the average production gains for rural households. Increased production has also increased the demand for local labour, which has resulted in real wage increases for the landless poor and seasonal migration within the country. At the national level, the outcome is that Bangladesh has, in recent years, become self-sufficient in food grains. However, the value added of crop types and processing is very low.

A potential source of productive employment and, consequently, poverty reduction is the growing RNF economy. This includes rural manufacturing, agribusiness, livestock, fisheries, cottage industries, trade and marketing services, rural construction, transport, infrastructure and various other services. In Bangladesh, the RNF economy constitutes around 36 per cent of the total economy (GDP) and provides over 40 per cent of rural employment. However, the non-farm economy is basically divided into a high-productive dynamic sector, catering mainly for urban demand, and a low-productive, mainly traditional, sector, which is in the hands of the rural poor. The latter is essential to many households' livelihoods and it constitutes a safety net option for the poorest, as an income of the last resort. The "dynamic rural economy" is dominated by more specialized businesses, run by entrepreneurs with better skills. These businesses tend to be referred to as small and medium-sized enterprises (SMEs), which are larger in scope and scale than traditional household (or micro) enterprises.

Sources: Chatterjee et al. (2006); Toufique and Turton (2003).

The resources thus obtained could be used for an expanded programme of public investment in productive capital and social overhead capital to transform agriculture and diversify the industrial production base. In agriculture, public investment is likely to crowd in private investment, thus creating a self-sustaining economic expansion (Belloc and Vertova, 2006). In this regard, this chapter focuses largely on the role of both public and private investment and finance in promoting intersectoral linkages and agricultural development in LDCs.

The State has to channel the agricultural surplus into an expanded programme of public investment in productive capital and social overhead capital to transform agriculture and diversify the industrial production base.

Improving LDC livelihoods and the quality of life for their growing populations will require substantial state investments in education to create a more skilled labour force, the development of productive capacities to employ the growing labour force, and improved infrastructure and housing to accommodate the service and amenity needs of the new firms and households (UNCTAD, 2006). If large proportions of the population remain outside the mainstream of development, they will have no alternative but to farm marginal lands, with consequent pressures on fragile ecosystems.

2. Investment in agriculture and infrastructure supporting farm to non-farm linkages

Structural adjustment programmes that encouraged fiscal austerity and trade liberalization, and abandoned marketing boards and commodity stabilization funds, contributed to a decline of public and private investment in LDC agriculture (Staatz and Dembélé, 2008).[20] LDCs (especially those in Africa) lost considerable ground, where per capita research expenditure (in terms of both total population and agricultural workers) declined. Introducing policies and practices to endogenize innovation and increase the stock of knowledge is as important as adequate research funding, and there are some good LDC examples

of this, such as New Rice for Africa (NERICA) (Ngongi, 2008). However, UNCTAD (2007b) notes that in most cases of technological absorption and learning in LDCs, imitation or some kind of "reverse engineering" will be essential, based on a variety of skills and activities that would support a purposive search for relevant information, and its development through effective interactions within and among firms and other institutions familiar with knowledge acquired from abroad. In that respect, strong protection of intellectual property rights is likely to hinder rather than to facilitate technology transfer and indigenous learning activities (Kim and Nelson, 2000).

The recent food crisis has prompted LDC Governments to consider seriously their food security in the context of technological change and rural transformation.

The recent food crisis has prompted LDC Governments to consider seriously their food security in the context of technological change and rural transformation. Agricultural research — for example, on rice — must be restructured, so that farmers are at the centre of the system, rather than at the periphery merely piloting modern varieties for agribusiness.[21] Some farmers' organizations and non-governmental organizations (NGOs) have the potential to develop grassroots movements for food sovereignty that challenge the NERICA and agribusiness models in LDCs.

Agricultural research must be restructured, so that farmers are at the centre of the system, rather than at the periphery merely piloting modern varieties for agribusiness.

The agricultural production activities that create the most employment and sustainable livelihoods in LDCs are often based on traditional or indigenous knowledge systems (Akullo et al., 2008). Traditional knowledge systems tend to employ more environmentally benign cultivation techniques — such as the use of endemic varieties, which are typically more adaptive to local climatic conditions; improved crop rotation systems; and terracing — which in the long run may help to reduce land degradation. These have great potential as a reservoir of creativity, but they are largely de-linked from the modern knowledge systems (UNCTAD, 2007b). At the global level, the Consultative Group on International Agricultural Research remains the fulcrum around which most international public R&D for the agricultural sector in LDCs (and ODCs) is organized and financed. Public extension in LDCs is shifting away from a traditional mode of hierarchical (usually State) organizations tasked with transferring technology to farmers, to a more decentralized model encouraging greater accountability and diversified service provision. Among LDCs, Malawi (box 14), Benin and Uganda have developed innovative models of demand-led extension.

The agricultural production activities that create the most employment and sustainable livelihoods in LDCs are often based on traditional or indigenous knowledge systems.

LDCs also need to promote technological capabilities in terms of enterprise-specific learning, which may be the basis for a successful process of industrialization. A key priority for LDCs (especially those in Africa) is to rehabilitate the R&D apparatus to the levels prevalent in East Asia, particularly in the area of export crops, which in recent years has attracted only low levels of R&D investment (Greenhalgh et al., 2006). LDC Governments could broker cost-effective arrangements between, for example, private biotechnology firms and national research bodies, to address these problems. The R&D priorities of

Box 14. Lessons from the application of smallholder farm technology packages in Malawi

In the late 1990s, the Malawian Government tried to tackle extensive, chronic food insecurity by increasing agricultural productivity. The Starter Packs Programme (SPP) was an initiative that provided free packs of seeds, legumes and fertilizer to farmers. Every smallholder household (nearly 85 per cent of Malawi's population) received free packs of seed, fertilizer and legumes. Distributing food- crop seeds and fertilizers had been tried before, but this time the SPP aimed for universal coverage, distributing 2.8 million packs. The SPP made a clear contribution to increased food availability and access to food. The inclusion of legumes in the pack contributed to increased soil fertility and diversified sources of food. The approach aimed to build household self-sufficiency and strengthen the domestic capacity to produce food, instead of using resources to buy imported food. But this approach went against the views of many donors on food security policy. A universal SPP can alleviate one key symptom of poverty — food insecurity — but it does not have a direct, lasting impact on poverty reduction. To be successful, a universal SPP needs to be part of a larger national food security strategy.

Sources: Harrigan (2008); Madola (2006).

LDCs, while focusing on high-potential crops, should also include livestock as part of any long-term technology strategy, and should be smallholder-friendly. This means that R&D technological packages, where appropriate, should be divisible (e.g. seed-fertilizer and credit combinations) to enhance smallholder uptake and effectiveness (box 14).

For LDCs, technology remains a key constraint on agricultural production, domestic food security, export growth and competitiveness. Public investment is needed in the generation and diffusion of research and technology, in order to encourage broad-based adoption of available technologies and to strengthen indigenous capacities to develop and/or adapt and diffuse the kinds of technologies needed to compete effectively in domestic, regional and global markets. This will require strengthening of LDC research capabilities. In some LDCs, given the generally small national budgets for R&D in the agricultural sector, the establishment and/or strengthening of regional centres of excellence for agricultural research would help build critical research capacity, and also the financial resource mass required to achieve economies of scale.

Public investment is needed in the generation and diffusion of research and technology and to strengthen indigenous capacities to develop and adapt the technologies needed to compete effectively in domestic, regional and global markets.

However, it should be noted that Green Revolution growth in Asia has generally been conditioned by the availability of a managed water supply — mostly irrigation. Thus, new agricultural technologies will be ineffective without appropriate irrigation, and these facilities are very often: (a) provided by the State; (b) dependent on electricity, which depends on public investment; and (c) dependent on credit, which, again, may be available only as priority (State-mandated) credit. Therefore, while it is useful to invest in R&D to develop new varieties etc., a critical constraint on agricultural productive capacity may be the availability of irrigation — which requires alternative public investments and interventions. Green Revolution growth in India has largely been dependent on irrigation, and the macroeconomic benefits to public investment in expanding irrigation and electricity are often far larger than the benefits of public spending on fertilizer use or price support (Storm, 1994).

New agricultural technologies will be ineffective without appropriate irrigation. These facilities are often: (a) provided by the State; (b) dependent on electricity, which hinges on public investment; and (c) dependent on credit, which may be available only as priority (State-mandated) credit.

(a) Public sector investment in agricultural infrastructure

Investment in economic infrastructure shapes the development of the RNF economy by influencing the scope for developing certain economic activities, the operational costs faced by enterprises, and the conditions for accessing outside markets. As has previously been noted, the recent food and financial crises have exacerbated food insecurity, unemployment and problems of inadequate infrastructure in many LDCs. If agriculture in the LDCs is to grow, it is essential to enlarge productive capacities, and this will require the State to play a key role, in partnership with the private sector and NGOs. Public sector investment in agriculture tends to crowd in private investment (enhancing the multiplier effect on productive capacity). New effective organizational forms have to be devised to mobilize rural investment resources, including public works programmes, farmers' organizations, cooperatives, etc., in order to build up productive capacity.

Government spending on rural infrastructure (e.g. roads, irrigation, power, and information and communications technology (ICT)) and on promoting institutional change aimed at raising investment is critical to addressing the challenges that the sector faces. The institutional issue that LDC Governments face is how to raise the finance required to make the necessary investments, especially in infrastructure. In many LDCs, the mass mobilization of labour through intensive public works schemes (e.g. the rehabilitation of infrastructure through food-for-work schemes) — together with targeted food, income and health interventions — has been

developed to improve food availability, economic growth and sources of income (Eichengreen, 2002).

The current world economic crisis has resulted in a decline in external sources of finance and may also result in a decline in ODA. Therefore LDCs will need to encourage public investment through, for example, public works schemes to help create productive assets and to generate private savings and investment. Typically, these schemes generate public goods (e.g. infrastructure), and although publicly financed, they may not necessarily be implemented by the public sector. Thus, while the structural transformation and growth of LDC agriculture is important for food security through its potential employment and income multiplier effects, the State response to food security problems must include the development of domestic productive capacities. From the experience of large rural employment-generation schemes in India (e.g. the National Rural Employment Guarantee scheme) and in Southeast Asia (e.g. International Labour Organization's (ILO) Advisory Support, Information Services and Training (ASIST AP) programme), it is clear that their potential for use is considerable in the presence of poor infrastructure and given the desire to tackle critical resource degradation, especially where population growth is high and the absorptive capacity of secondary or tertiary sector industries is relatively low. In the context of a global economic recession, rising unemployment and low labour productivity in LDC agriculture, these large rural employment-generation schemes could play an even greater role in counteracting the negative impacts of food insecurity and declining incomes. Bangladesh has implemented similar programmes, although they have been limited by inadequate levels of donor finance (Chatterjee et al., 2006; Toufique and Turton, 2003). In many LDCs, the changing capital/labour price ratio, which has increased in recent years, should encourage more labour-intensive investment in both the public and private sectors. However, these schemes are not without problems: the assets created are often of poor quality and maintenance is often inadequate, gender disparities in pay are often pronounced, and the schemes are not always well targeted.

Government spending on rural infrastructure and on promoting institutional change aimed at raising investment is critical to addressing the challenges that the sector faces.

The quality and availability of transport infrastructure (and services) is especially important. Local physical infrastructure, including the density of the road and telephone networks and household services, is an important aspect of the RNF economy, and is important for fostering both growth and intersectoral linkages (Lanjouw and Feder, 2001; UNCTAD, 2006).

The quality and availability of transport infrastructure (and services) is especially important for fostering both growth and intersectoral linkages.

Rural roads that allow reliable and regular motor vehicle access serve both the farm and non-farm economies. Rural electrification is particularly important for manufacturing activities (including agro-processing). For example, studies by Söderbom and Teal (2002) of food processing firms in Nigeria found that because of high losses of product associated with power cuts, most companies had to install their own generators, which raised their costs by at least 20 per cent compared to what they would have been with a reliable power supply from the grid. At the higher costs, many firms could not compete against imports without tariff protection. Most energy sector investments in LDCs (especially in Africa) are very low and are geared to exports (e.g. oil). In rural areas there is a heavy dependency on traditional biomass (e.g. wood and dung) and human energy. There is very little use of and/or access to modern forms of energy in rural areas (Davidson and Sokona, 2001). Rural areas are thus characterized by decentralized and dispersed energy requirements and a lack of basic energy infrastructure (UNCTAD, 2006).

In most LDCs there is a lack of strategic vision linking agricultural water development to poverty reduction and growth.

In most LDCs there is a lack of strategic vision linking agricultural water development to poverty reduction and growth. Even though most poverty reduction strategies include some focus on agricultural growth, agricultural water development has generally not been seen as a vehicle for achieving this (World

Investment in agricultural water can contribute to agricultural growth, improve food security through higher rates of agricultural productivity, and reduce poverty.

Bank, 2008b). Investment in agricultural water can contribute to agricultural growth, improve food security through higher rates of agricultural productivity, and reduce poverty directly by: (a) permitting intensification and diversification, and hence increased farm outputs and incomes; (b) increasing agricultural wage employment; (c) reducing local food prices and hence improving real net incomes; and (d) improving the health and productivity of workers. It can also reduce poverty indirectly, via increased rural and urban employment as a result of the multiplier effect on growth in rural and urban non-farm economies.

The ineffective integration of rural and urban economies that exists in many LDCs impedes the positive feedback between the agricultural and non-agricultural sectors.

A key component in lowering marketing costs for farmers is to reduce the cost of transportation. An efficient and competitive transportation sector is important, because it lowers marketing costs for both agricultural and non-agricultural products that are domestically or internationally traded. The high impact on GDP growth of productivity growth in agriculture is due to intersectoral linkages and sustained demand increases for agricultural products. Furthermore, improvements in the transportation sector have a positive impact not only on the country where they take place, but also on neighbouring countries (Diao, Dorosh and Rahman, 2007: 54–56; Diao and Yanoma, 2003: 32–34). Studies from China show that investment in rural roads generates a return of national income of 600 per cent, as compared with 155 per cent for urban roads (Von Braun, 2008).

The single most commonly reported obstacle to investment and entrepreneurship in the non-farm rural economy is inadequate access to capital.

The ineffective integration of rural and urban economies that exists in many LDCs impedes the positive feedback between the agricultural and non-agricultural sectors described above. It is a key feature of low growth, or growth with a weak impact on rural poverty. Such integration can only be achieved with sound and supportive policies for the rural sector, and adequate infrastructure in rural areas. Growing LDC urbanization — coupled with deagrarianization and deindustrialization — will only exacerbate the food crisis, which cannot be resolved through emergency measures alone, but will require long-term economic development.

3. Finance to support farm to non-farm linkages

The single most commonly reported obstacle to investment and entrepreneurship in the non-farm rural economy is inadequate access to capital (Reardon et al., 1998; Haggblade, Hazell and Reardon, 2002). It is not that would-be rural investors lack access altogether, but for the most part, the best that is available is small loans for short periods. Given the lack of credit, the main source of funds is often the savings and assets of the (extended) household. In this regard, evidence from Uganda and the United Republic of Tanzania shows that households with assets can find ways to convert one asset or another to investment capital (an example of this would be cattle) (Ellis, 2001). Initiatives by NGOs and LDC Governments to promote micro-finance have improved access in some cases, but coverage is still slight (Haggblade, Hazell and Reardon, 2002; Ellis, 2001). Moreover, micro-finance groups may exclude the poor as uncreditworthy and too risky to form part of their groups. Micro-finance agencies, seeking institutional sustainability, are tempted to move upmarket and abandon provision to the poor, the marginalized, and the remote. The importance of savings services is now self-evident, but it is far from clear that promotion of savings alone will enable the majority of smallholder farmers to intensify their agricultural production.

The expansion of access to finance is of critical importance in LDCs, as it raises agricultural investment. The role of the State in creating smallholder access to formal credit is critical.

The expansion of access to finance (both seasonal and longer-term) is of critical importance in LDCs, as it raises agricultural investment. However, there are few successful models of large-scale credit provision to smallholder farmers where output markets are highly competitive. Again, the role of the State in creating smallholder access to formal credit is critical. In India, for example, this is done by

means of a system of priority credit, within which commercial banks are obliged to provide a sizeable part of their resources as loans to farmers and small-scale rural firms. In fact, it is only by the provision of cheap and adequate (priority) credit and a package of agricultural extension services to small farm holdings that technological progress in farming can be made scale-neutral. Scale-neutral technological progress is essential to equitable growth, because no sustainable improvement in the distribution of incomes is possible without reducing the effective "scarcity of land" (Naastepad, 2001).

LDCs could also make greater use of existing institutional infrastructure, including State banks, post offices, agricultural development banks and commercial banks. These may have extensive rural branch networks that could increase access to financial services.

LDCs could also make greater use of existing institutional infrastructure, including banks. State banks, post offices, agricultural development banks (box 15) and commercial banks may have extensive rural branch networks that could increase access to financial services. There are several options for encouraging such entities, such as: (a) restructuring the management and corporate governance structure of a failing State bank (e.g. the Agricultural Development Bank of Nepal); (b) creating specialized rural/micro-finance units that operate independently through bank branches and systems (e.g. Banco do Nordeste in Brazil); and (c) partnership arrangements between micro-finance institutions and such entities (Pearce, Goodland and Mulder, 2004). These models are relatively new, and need further government support to improve and extend their use.

Innovative financial institutions — including micro-finance institutions, banks and cooperatives — have shown that it is possible to provide viable financial services to smallholder agriculture and rural non-farm enterprises in rural areas.

Innovative financial institutions — including micro-finance institutions, banks and cooperatives — have shown that it is possible to provide viable financial services to smallholder agriculture and RNF enterprises in rural areas. They have done this by adapting financial products, making creative use of delivery mechanisms to reduce costs, and adopting new technologies. Further innovation is needed to extend the benefits of financial services to wider LDC rural areas. LDC Governments and donors could support such innovation by conducting research to identify promising new approaches, and by funding, for example, mechanisms along the lines of the Africa Enterprise Challenge Fund, and country-level financial sector programmes. Support is also needed to roll out and replicate proven innovations (Pearce et al., 2004). For example, there are a number of initiatives aimed at making formal risk-management instruments accessible to LDC smallholders (box 16).

There are also other initiatives, which although not directly involved in improving the management of farm risks and increasing access to finance, aim to enhance service delivery to smallholder farmers and/or improve production and marketing. The International Fund for Agricultural Development (IFAD, 2003), notes that credit provided by agrimarketing companies (suppliers, processors and

Box 15. What role for agricultural development banks?

In many LDCs, the lack of a specialized agricultural development bank that deals exclusively with agribusiness is one of the major hindrances to the development of agriculture. Agricultural development banks could provide alternative arrangements to the lending practised by mainstream commercial banks and other financial institutions. This could also encourage farmers to organize themselves into groups in order to get access to credit (Onumah et al., 2007). As part of structural adjustment policy reforms implemented during the 1980s, many LDC agricultural development banks closed. However, experience shows that reform is possible for failing agricultural development banks (Seibel, 2001). Among the prominent cases are Bank Rakyat Indonesia, the Bank for Agriculture and Agricultural Cooperatives (Thailand) and the Agricultural Development Bank of Nepal, which has been transforming its small farmer credit programme into financially self-reliant local financial intermediaries owned and managed by the poor. In sub-Saharan Africa, many agricultural development banks have gone into liquidation; but there have been some cases of reform, among them Banque Nationale de Développement Agricole, of Mali. If the political will for reform exists, LDC agricultural development banks have the potential to contribute to the sustainable provision of rural financial services. The successfully reformed institutions cited, have increased their saver and borrower outreach and the quality of their services to all segments of the rural population (Pearce et al., 2004; Seibel, 2001).

Box 16. Initiatives to promote risk management and access to finance for LDC farmers

1. The World Bank is piloting weather-indexed insurance covering yield losses from bad weather. Index-based insurance products involve compensation payments based on indexes measured by third parties (e.g. government organizations such as the meteorological services department) and not on actual measures of farm yields.
2. Since 2000, the International Task Force on Commodity Risk Management in developing countries has been piloting the use by farmers in LDCs of market-based instruments (such as futures, options and swaps) offered by advanced commodity exchanges to hedge price risks.
3. Since the 1990s, the Natural Resources Institute has piloted various financial solutions to smallholder farmer risk management in several LDCs, such as a regulated warehouse receipts system.
4. Calamity funds or similar programmes are commonly used in Europe to compensate farmers for losses that occur due to systemic risks. India has a similar programme, but it mainly provides support for yield losses arising from weather-related events such as floods.
5. The European Union, the World Bank, UNCTAD and the Common Fund for Commodities are supporting the development of commodity exchanges in ODCs.

traders) is an important source of funding for both large-scale and smallholder producers in LDCs. This includes interlocking arrangements, such as contract farming and outgrower schemes (IFAD, 2003). In contract farming, the processing or marketing company provides inputs on credit, tied to a product purchase agreement. The initial repayment for the inputs is by means of produce supplied by the farmer at a predetermined price, with the rest being sold in the market or as specified in the contract. Outgrower schemes are a more integrated form of contract farming whereby the agribusiness has greater control. The farmers generally offer their land and labour in return for a package of inputs, extension services and an assured market. Crucially, interlocking arrangements reduce the risk of default to the credit provider, as farmers receive a range of non-credit inputs, advice, and in many cases, markets for their produce, thus reducing price and production risk (Pearce et al., 2004).

The policy and operating environment surrounding financial institutions in rural areas needs improvement. Rural households generally have no formal mechanisms to insure against risk, so lenders can be subject to acute credit risk in such areas.

While acknowledging that credit delivery by suppliers and traders is no substitute for formal financial services, this service has been a lifeline for some LDCs. There is significant potential for financial institutions to build on the client (farmer) knowledge held by agribusiness companies and traders, and on the risk-reduction effects produced when farmers receive a range of services and inputs from agribusiness credit suppliers (Pearce et al., 2004).

The policy and operating environment surrounding financial institutions in rural areas also needs improvement. Rural households generally have no formal mechanisms to insure against risk, so lenders can be subject to acute credit risk in such areas. In addition, borrowers are often unable to offer suitable collateral, and even if they can, weak contract enforcement makes it difficult to enforce loan covenants when borrowers default. Better mechanisms to manage agriculture-related risk are needed. Improved client and asset registries and stronger judicial capacity to register and enforce claims on collateral are needed too.

Insurance and warehouse receipt schemes appear to offer good potential. For example, micro-insurance allows borrowers to access finance for agriculture by reducing the risk of default arising from adverse weather. Warehouse receipt systems (when accessible to smallholder farmers) provide a way of turning agricultural produce into collateral. Warehouse receipt schemes reduce smallholder farmer transaction costs by independent enforcement of commodity standards and allowing trade by description to occur with minimum risk of counterparty non-performance. Under the warehouse receipt scheme, a reputable third party (the warehouse operator) guarantees delivery of the commodities deposited by a named holder of a warehouse receipt, specifying the quality and quantity of the

commodity deposited/stored, as well as the delivery location. Where the system is regulated, if parties so wish, receipting can be subject to compliance with specified commodity standards. The guarantee of delivery is usually backed by insurance and performance bonds. In Zambia, recent pilot schemes explored the feasibility of financial products that combine input credit with weather-indexed insurance and produce marketing using warehouse receipts systems (Onumah et al., 2007). At the same time, donors need to work with governments and private sector players to integrate interventions that reduce rural credit risk with mainstream rural financial development programmes and policies.

Agribusinesses have an important role in providing credit for inputs and for financing commodity trade in rural areas, and links with financial institutions offer a promising way forward in extending agricultural finance. Efforts to promote competitive and reliable fund transfer services, and to adopt technology that lowers the cost and improves the efficiency of financial services delivery to the rural population, have been constrained by a lack of infrastructure and supportive legal frameworks. The rural poor would benefit directly from regulatory systems that raise confidence in the role of micro-finance institutions and other non-bank financial institutions in rural savings mobilization. They would also benefit if micro-finance institutions and banks acted as channels for rural payments and for the transfer of remittances. Efforts to promote partnerships between the private sector and governments (in the North and the South), and to remove barriers to the flow of remittances, also have potential for improving access to finance for the rural poor.

Efforts to promote partnerships between the private sector and governments (in the North and the South), and to remove barriers to the flow of remittances, have potential for improving access to finance for the rural poor.

4. Encouraging market access linkages

The structural transformation of agriculture requires a broader view of the sector, which encompasses an integrated approach to investing in the improvement of productivity and efficiency at all stages of the commodity chains, from input markets, to farm-level production, and all the way to the final consumer. Strengthening the linkages of the various stages is key to achieving an optimal contribution from the agriculture and food system to broad-based economic growth and structural transformation. At the regional level, there is a need to exploit the diversity of resource endowments on the basis of the principles of comparative and competitive advantage among regional LDC groupings (e.g. in Africa and Asia). Regional economic integration and cooperation should therefore be guided in the first instance by efficiency and comparative advantage rules. This could be facilitated by using agro-ecological zoning as a framework for identifying agricultural production potential and for planning infrastructure development across national boundaries.

The food and agricultural market in the LDCs is characterized by extreme fragmentation along subregional, national and even subnational boundaries, resulting in segmented markets too small to ensure the profitability of sizeable private investments in the different stages of a modern commodity chain.

The food and agricultural market in the LDCs (especially in Africa) is characterized by extreme fragmentation along subregional, national and even subnational boundaries, resulting in segmented markets too small to ensure the profitability of sizeable private investments in the different stages of a modern commodity chain. Paradoxically, while being largely closed to each other, the fragmented national and subregional markets of the African LDCs are increasingly open to imports from outside the region (Dorward et al., 2004). As a result, the gap between national/subregional domestic production and increasing regional demand tends to be filled by imports from non-LDC sources.

The creation of an optimal economic space for agricultural transformation requires a broadening and strengthening of the integration of regional food and agricultural chains.

A practical way to achieve significant economies of vertical coordination and scale in LDC agriculture might be to work at the subregional/regional level around a limited number of strategic food and agricultural commodity chains (UNECA and African Union, 2009). Indeed, the creation of an optimal economic

space for agricultural transformation requires a broadening and strengthening of the integration of regional food and agricultural chains. For selected strategic commodities, a common regional market (for example, in Africa, which might be based on existing regional economic communities) could offer sufficient economic space to allow private or public investments to achieve the economies of scale that would reduce costs and improve profitability. In other words, for strategic food and/or agricultural commodity chains, there is a need for market integration to move beyond the national and subregional levels and to encompass a larger regional market. For LDCs, such strategic commodities would be those that both carry an important weight in a given LDC food basket and have an important weight in the trade balance of the region, either through their contribution to foreign exchange earnings or because of large imports to meet the gap between regional production and demand. These strategic commodities may also constitute a source of production potential that is unexploited due to internal supply-side constraints or to external impediments imposed by regional trading partners. For example, in a sub-Saharan African context, commodities such as rice, maize, wheat, sugar, meat and dairy products, cotton, coffee and cocoa would all meet these criteria of unexploited production, but with the potential to respond to increasing regional demand.

For strategic food and/or agricultural commodity chains, market integration should move beyond the national and subregional levels and to encompass a larger regional market.

Developing vertically coordinated regional chains (of production, processing and marketing) for such commodities would require public–private partnerships to create an environment conducive both to profitability and to security of private investment. More explicitly, the creation of such an environment could proceed from the opening of free subregional or regional investment zones in those areas where the greatest unexploited production potential for selected strategic agricultural commodities lies, so as to stimulate the mobilization of private investment into agriculture on a regional scale.

Developing vertically coordinated regional chains for agricultural commodities would require public–private partnerships to create an environment conducive both to profitability and to security of private investment.

In such zones, the creation of an institutional and legal framework for the development and management of land and water resources, and the provision of the necessary public infrastructure and services, would increase the incentives and security for private investment and for the establishment of transnational agribusiness companies. This would be conducive to the mobilization of pooled investment through regional agricultural companies (joint ventures), with a view to developing — in a vertically coordinated manner — the different stages of the strategic food commodity chains. Such a strategy could be further strengthened by the development of local capital markets. Nonetheless, in the medium term, the performance of traditional food systems will remain a greater determinant of LDC farmer welfare and domestic food security than the growth of supermarket chains. Therefore, Governments should also focus investment priorities on improving the performance of traditional food marketing, by linking these with new agribusiness systems and the development of new effective organizational forms to mobilize rural investment resources and build up productive capacities.

Governments should also focus investment priorities on improving the performance of traditional food marketing, by linking these with new agribusiness systems and the development of new effective organizational forms to mobilize rural investment resources and build up productive capacities.

Integrating the commodity chain and encouraging productive relationships between farmers and private processors will also require the strengthening of rural producer organizations (e.g. farmers' groups, crop associations and cooperatives). Such organizations are particularly important for facilitating changes in policy, which require broad, popular support (Onumah et al., 2007; Bijman, Ton and Meijerink, 2007).

UNCTAD (2007b) maintains that efforts should also be made to develop production clusters based on natural resources, by adding value to natural resources and exploring the possibilities for import substitution with local production of some inputs and equipment, and by the development of engineering capabilities for domestic production (Ramos, 1998: 124–125).

In recent years, farmers' organizations have been promoted (by NGOs, donors and the private sector) to take over some former State functions in linking farmers to markets, providing extension services and so on. The future prosperity of LDC smallholder farmers depends on whether their organizations can meet these challenges, especially when they operate in difficult environments with poor infrastructure and weak or absent market-supporting institutions. However, the pressures leading to change in the markets are also changing the form and functions of farmers' organizations. A range of new marketing arrangements — most of which link primary (grassroots) producer groups to specific uptakers or identified niche markets — have developed in LDCs in recent years (Onumah et al., 2007). Most of these tend to be mutually beneficial to the participants in the chain. However, the specificity of many of these linkages tends to limit participation by farmers; the implicit self-selection means large sections of the farming population are effectively excluded from such arrangements.

Integrating the commodity chain and encouraging productive relationships between farmers and private processors will also require strengthening rural producer organizations (e.g. farmers' groups, crop associations and cooperatives).

D. Conclusions and ways forward

Agricultural governance at the national level does not develop in isolation — it is influenced by different global actors, issues and institutions, often with action at the global level being essential to the successful realization of national agendas. Alternatively, the opposite may apply — the global sphere can hinder local development through multinational rules that limit policy space. Most notably, global public goods (such as the environment), global food and financial crises, and transboundary issues (such as pandemic animal and plant diseases) require regional and/or global solutions. They also require development cooperation to carry these solutions out, as LDCs cannot do this alone. Consequently, the LDC agricultural governance agenda must include activities that can be most effectively addressed at the global level: (a) establishing fair rules for international trade; (b) agreeing on product standards and intellectual property rights; (c) providing new technologies for the benefit of the poor; (d) avoiding negative externalities such as livestock diseases; (e) conserving the world's biodiversity; and (f) mitigating and adapting to climate change. Several high-profile initiatives have been undertaken by international organizations in recent years to support agricultural development in LDCs. The following are a few examples:

Given the financial crisis, LDCs must develop their productive capacities, diversify towards a fuller range of more sophisticated agricultural products, and integrate into the global economy at a higher level of value addition in global market chains.

- The United Nations Millennium Project report *Halving Hunger: It Can Be Done* (Sanchez et al., 2005) laid out a plan for reaching the Millennium Development Goals, and called for a major increase in ODA and an increase in rural productivity through a renewed Green Revolution to raise food output;
- *World Development Report 2008: Agriculture and Rural Development* (World Bank, 2008b) places great emphasis on the role and the potential of smallholder farmers in low-income countries; and
- The Strategic Framework of the International Fund for Agricultural Development (IFAD) (2007–2010) articulates how IFAD can act to reduce rural poverty. There is explicit recognition of the need to tackle poverty in rural areas and to focus on agriculture as the basis of improving the economic livelihoods of poor rural people.

This renewed attention to agriculture has not been restricted to international development organizations. As has already been noted, the Comprehensive Africa Agriculture Development Programme, led by NEPAD, has agreed targets of 10 per cent of government budgets should be allocated to agriculture.[22] These targets include a 6 per cent per annum growth rate for domestic agriculture. In order to

escape the current trap of poverty and underdevelopment, LDC Governments and their development partners will need to redefine the terms of development partnerships (UNCTAD, 2008b). Given the financial crisis, LDCs must develop their productive capacities, diversify towards a fuller range of more sophisticated agricultural products, and integrate into the global economy at a higher level of value addition in global market chains.

A sustained increase in agricultural productivity is a precondition for development and the reduction of poverty in many LDCs. What is less straightforward is how to establish that necessary precondition.

There is now a consensus that a sustained increase in agricultural productivity is a precondition for development and the reduction of poverty in many LDCs. What is less straightforward is how to establish that necessary precondition. The argument developed in this chapter is that the lack of government investment in productive capacity and weak State institutions are among the most important reasons for low productivity growth in agriculture and chronic food insecurity in many LDCs.

The evidence shows that LDCs have reduced their budgetary support for agriculture, both in terms of its share in the national budget and as a percentage of agricultural GDP. To promote higher rates of output and productivity growth in agriculture, LDCs have to reverse these trends. Setting the right priorities for productive spending is also important: in general, investment in agricultural R&D, rural infrastructure, and education have the largest impact on productivity and growth. Government subsidies on output prices, and for inputs such as fertilizer, machinery and seeds, among others, may help smallholder farmers to access technology and markets, but they need to be well targeted, and phased out according to clear timetables. The challenges that LDC agriculture faces are stark: climate change, global economic recession, chronic poverty, dilapidated productive infrastructure and massive rural to urban migration. In LDCs in sub-Saharan Africa, over 50 per cent of rural farm households live on less than 1 hectares of land and are extremely poor (box 10). Over 50 per cent of rural farm households are net purchasers of staple food (Jayne, Mather and Mghenyi, 2006) and most of these people, without access to basic health care and education, lack the necessary human capital to contribute productively to society. The State in LDCs will have to play a major role in addressing these challenges. In LDCs, there are at least three dominant policy narratives regarding the role of the State in agriculture, which are as follows:

The lack of government investment in productive capacity and weak State institutions are among the most important reasons for low productivity growth in agriculture and chronic food insecurity in many LDCs.

(a) A free-market "old style" and "Washington consensus" narrative, which places emphasis on complete liberalization, structural adjustment reforms, and reliance on the private sector. In this narrative, there is a very limited role for ministries of agriculture;

(b) A coordinated market narrative, which advocates targeted and sequenced State intervention that is justified in order to kick-start markets, address market failures, and assist in the coordination and provision of services; and

(c) An embedded-market narrative, which emphasizes the role of NGOs and farmer organizations in providing services as a complement to market or State institutions. The role of the State here is to support the development of these institutions.

In general, investment in agricultural R&D, rural infrastructure, and education have the largest impact on productivity and growth.

There remains some debate among economists regarding future policy emphasis on the role of the State in LDC agriculture, in the light of the weaknesses of the "Washington Consensus". There are broadly two schools of thought: the first maintains that the failure of structural adjustment programmes is due to implementation failures (e.g. in input market reform), rather than the inappropriateness of the reform package proposed (Jayne, Mather and Mghenyi, 2006). This concurs with narrative (a) outlined above. On the other hand, it could be argued that the proposed structural adjustment programmes for many LDCs

were inappropriate, and that government failures to implement liberalization and privatization reforms were justified, because pervasive market failures would not have incentivized an often small private sector to enter the market for service provision. Where these failures are deep, the role of State intervention becomes both important and necessary for the provision of public goods, R&D, investment and market coordination. This concurs with narrative (b) outlined above. Under this approach, the State should, under specific conditions, become involved in seasonal finance, infrastructure provision, input supply and subsidies (to cover transaction costs), land reform, and extension services, to promote the growth of the sector. These interventions would be phased out, to let in private sector actors over time. These are key elements of the role of the LDC State in creating progressive (growth-stimulating) institutional change. Nonetheless, it remains broadly the case that narrative (c) is becoming the dominant paradigm regarding the role of the State in agriculture. One of the main reasons for this concerns remaining doubts on the part of international financial institutions and donors about the capacity of LDC Governments to deliver services efficiently. However, it is not clear that this is the optimal rural development path for LDCs.

Institutional and governance reforms are necessary to address the lack of support for productive investment in agriculture and the lack of State capacity in implementing programmes.

Institutional and governance reforms are necessary in order to ensure that policymaking adequately addresses the lack of support for productive investment in agriculture and the lack of State capacity in implementing programmes. Such reforms include creating an appropriate institutional and policy infrastructure that supports local feedback, learning and adopting alongside global cooperation and knowledge transfers. Moreover, given the multisectoral nature of agricultural development, ministries of agriculture need new mechanisms and skills for regulatory activities and for cross-sectoral coordination and cooperation with a range of stakeholders, including other ministries, the private sector, civil society, and farmer organizations, in the formulation of integrated strategies.

As LDC national budgets for R&D in agriculture are small, the establishment and/or strengthening of regional centres of excellence of agricultural research would help build critical research and financial resources to achieve economies of scale. These could be created along the lines of agro-ecological zones or strategic food commodities.

For the LDCs, the global food crisis is of major proportions, and it must not be seen as a short-term phenomenon. It has not been caused simply by the rise in oil prices or the expansion of biofuel production, as is sometimes suggested. Rather, it is a consequence of decades of agricultural neglect. This relates to trade, to investment, to technology, to demographic patterns, and to commodity and agricultural policies. Failures have occurred at the level of national development policy, but there have also been important shortcomings at the international and multilateral levels. Unless the underlying structural factors behind the global food crisis are adequately and comprehensively addressed now — by focusing policy attention on the more complex and interlinked series of issues — the crisis will recur, most probably with increased intensity. Among the strategies that need to be undertaken, the following are particularly important:

- Proactive government policies to boost agricultural production in LDCs are needed to ensure food security. Renewed public sector support services and public investment are essential;
- Agrarian development and related reform programmes are essential in order to raise investment and productivity in food production. Such programmes should focus on smallholder, poor farmers, since they are the most vulnerable group in rural areas; on investing in rural infrastructure; and on providing access to credit. South Asia and sub-Saharan Africa are most in need of such programmes, which should also include improving access to affordable, modern farm inputs, and also to land, through land redistribution;
- The development of partnership arrangements between the State and the private sector, in order to perform some of the functions which in the past were associated with marketing boards and cooperative arrangements; and

- As LDC national budgets for R&D in agriculture are small, the establishment and/or strengthening of regional centres of excellence of agricultural research would help build critical research and financial resources to achieve economies of scale. These could be created along the lines of agro-ecological zones or strategic food commodities. Such centres would give special attention not only to farm-level technologies, but also to post-harvest technologies (i.e. storage, processing and transport) and appropriate biotechnologies for food and cash crops.

The scope for tariff policies to foster sectoral development is somewhat constrained.

Regarding trade policy, the tariff regime is an important tool for raising government revenue and fostering agricultural development and industrialization. Tariffs in LDCs, however, have been declining as a result of multilateral, regional and bilateral agreements, structural adjustment programmes, and through autonomous reform efforts (UNCTAD, 2004). The scope for tariff policies to foster sectoral development is thus somewhat constrained. In view of the negative effects of the food and financial crises, trade policies and associated export taxes could be rationalized and reviewed to ensure availability of imported food staples at affordable prices and to promote agricultural production. For example, tariffs on agricultural inputs (seeds, fertilizers and transport equipment such as tractors) could be periodically lowered.

Financial speculation in commodities has contributed to the recent spike in global food prices. Thus, there is a need to align financial policies and commodity markets with the principles of an efficient marketing system, fair and orderly price discovery, and good market surveillance, in order to reduce the risk of destabilizing speculation in commodity markets (UNCTAD, 2009a).

Policymakers should focus on helping participants in the rural non-farm economy to respond to new opportunities by lowering barriers to entry.

A related challenge is the tendency to produce cash crops for export, and to minimize the production of food crops for the domestic market and especially for local urban centres. Governments in developed and developing countries will have to resolve the tension between the need to stock and supply food at acceptable prices for domestic consumers and the desire of food producers to take advantage of higher food prices.

Although much of the activity in the RNF economy is stimulated by growth in the primary sector, the secondary and tertiary sectors (e.g. local service provision and retail enterprise) are becoming increasingly important. This suggests that policymakers should focus on helping participants in the RNF economy to respond to new opportunities by lowering barriers to entry. The regulatory environment also has an important role to play in promoting intersectoral linkages through the RNF economy, as does taxation policy (the two will need to be carefully designed to prevent exit from the formal to the informal sector). Policies for those RNF activities that have the potential to drive growth in the economy may differ from those that are pulled along by growth in other sectors. When devising appropriate policy responses for the RNF economy, it is important to consider whether the subsector in question is a driver of growth.

Local authorities and civil society need to develop their capacities in the planning, design and implementation of a local development policy.

It is also important to strike the right balance of power and responsibility between national and local Government. If strong powers to tax and regulate local businesses go unchecked in rural areas, there is an increased likelihood of predatory taxation and regulation, and other forms of rent-seeking behaviour. In some LDCs, a long tradition of centralized governance by the State has weakened regional and local authorities. A renewed emphasis, where appropriate, on regional decentralization to establish or strengthen local institutions is required. Local authorities and civil society need to develop their capacities in the planning, design and implementation of a local development policy. A further step might be to design investment programmes and projects addressing non-farm activities,

perhaps beginning with agriculture-related activities (natural resource processing and services for farmers).

As the RNF economy in LDCs covers a lot of ground, the above is inevitably somewhat general. Few, if any, expected points are omitted. But a policymaker might wish for more guidance in prioritizing among the many useful things that might be done. How should one prioritize? What is needed is to be able to classify sets of policies by some criterion, such as phase of development, or geographical characteristics of the RNF economy: remote areas, middle countryside, peri-urban areas.

For prioritization, sets of policies need to be classified according to criteria such as a country's phase of development or geographical location.

The typology in table 15 is expressed as phases, although the three phases could be characterized as remote, middle and peri-urban areas with relatively few adjustments. It provides a stylized illustration of RNF long-term priorities. Table 16 provides a summary of potential RNF economy interventions, highlighting key principles, strategies, activities and rationales for Governments and/or donors to promote the development of the sector and inter-linkages:

Table 15

A stylized illustration of long-term priorities for the RNF economy in LDCs

Phase and context	The agricultural and food chain	RNF economy	Policy implications
I. Isolated rural economy, little development	Production to cover local subsistence. Processing takes place within the village.	Highly diverse, since it needs to produce for most of the village. Main products: construction materials, utensils, tools, furniture, clothing. Services: repairs, construction, transport, trading. Education; health care. Migration may be an important source of funds.	Investments in basic physical infrastructure, especially roads. Education and primary health care, including vaccination campaigns. Improved drinking water and sanitation. Extension services for farmers.
II. Rural economy becomes more closely connected with urban economy	Production rises, with an increasing fraction of farm output destined for the market. More specialisation. Some processing may now shift to cities. Inputs — fertiliser, chemicals, tools and machinery — are bought in from urban industry. Some food products are brought in from other regions.	Imports from urban industry replace some local (artisan) manufacturing — e.g. textiles, plastic goods and ironmongery. Increased local purchasing power stimulates some parts of the RNF economy, above all retailing, construction, transport and entertainment. Increasing government spending on formal education, health services, physical infrastructure and utilities.	Supply-side policies: technology extension. Remedying market failures, above all in financial markets. Possible input supply and marketing. Formal institutions: property rights, weights and measures Expanded and improved physical infrastructure — including telecommunications and electrification, processing facilities and social investments.
III. Rural economy well integrated into national economy	As above, only more so. Farming may find itself facing higher land costs in competition with housing and industry in peri-urban zones. Access to water may be contested in such areas: pollution may become a charge on farming.	RNF economy becomes larger, driven by increased local and government spending, but becomes more specialized as goods and services are brought into the village or else villagers travel to urban centres to seek goods and services. RNF economy thus focuses on non-tradables: retailing, transport, education and health, construction. Emergence of new opportunities in leisure and tourism. In peri-urban areas, provision of urban services in housing. In some cases, decentralized manufacturing sets up in rural areas - seeking lower labour and land costs. Operates on sub-contract to urban firms. Government spending may become a significant fraction of rural incomes, if policy is to provide comparable services in rural areas to those in urban areas.	Maintenance of physical infrastructure and supply of social investments. Facilitating private investment and information flows and generally trying to reduce transaction costs. Elaborated technology and R&D policies. Development of R&D capacities to raise productivity and competitiveness levels. Land use planning and regulation in peri-urban zones.

Source: Adapted from Davis (2004).

Table 16

A guide to potential policy interventions in the rural economy

Key principles	Strategy	Activities	Rationale	Comments
1. Prioritize activities targeting attractive markets	• Identify remunerative markets.	Formal and informal market appraisals	• Capitalizing on activities with good growth prospects to achieve impact and contribute to local economic development	Most higher potential activities will cater for non-local markets
2. Support producers to meet market requirements	• Improve production, marketing and managerial skills. • Promote access to credit. • Ensure access to intermediate inputs and technology.	• Providing on-the-job and formal training and/or linking producers to training providers • Promoting exposure visits • Developing business advisory services and/or linking producers to providers of business advisory service • Delivering credit and/or linking producers to credit suppliers • Developing savings and loan groups and credit co-operatives • Supporting input production and/or linking producers to input suppliers • Promoting effective subcontracting systems	• Producing what the market wants — whether locally or regionally — at competitive prices • Targeting markets where product demand is sustainable beyond village level	
3. Improve market access	• Develop market linkages. • Stimulate demand. • Improve the transport infrastructure. • Develop producer organizations.	• Organizing visits to markets and trade fairs • Organizing visits to production sites by buyers • Facilitating contacts between producers and buyers • Providing information on buyers • Advising producers on product labelling and certification and advertising and selling strategies • Engaging in dialogue with relevant public stakeholders to develop critical public infrastructure and market promotion efforts • Assisting formation and development of producer groups	• Enabling producers to access non-local markets through a reduction in transaction costs, the development of customer loyalty, and/or an increase in scale • Stimulating effective demand through a Green New Deal, innovative products and services such as e-commerce and the promotion of learning and technical change	Linkage promotion is most effective when producers reach some minimal scale. Infrastructure development is often beyond the scope of RNF economy projects, and normally requires government action.
4. Whenever relevant and feasible, promote the development of common interest producer associations and co-operatives		• Providing training and advice on group leadership and management, marketing strategies, etc. • Providing business advisory services • Promoting market linkages	Reducing service delivery costs, fostering scale economies, and improving the bargaining position and lobbying capacity of small-scale producers	The success of past experiences in group formation and development has been mixed.
5. Develop flexible and innovative institution coalitions	• Sensitize and mobilize a wide range of relevant players and supportive institutions. • Support capacity-building within relevant public and private organizations. • Engage with producer groups and NGOs.	• Forming multi-stakeholder local consultative forums • Developing dialogue with local, regional and national governments, etc.	Attracting funding for projects and programmes, building on the strengths of different institutions and service providers, attracting government investment in critical public goods, promoting key policy reforms, ensuring the continuity of service provision after project lifetime, etc.	Need for a selective and strategic approach to institutional partnerships to reduce the complexity of co-ordinating project execution and stakeholder dialogue.
6. Adopt a subsector approach	Promote strategic food and commodity value-chains within a regional framework.	• Market appraisal • Supply chain analysis • Institutional analysis • Identification of leveraged interventions	Intervening taking into account the whole supply chain and the sub-sector environment (e.g. market players, support institutions, policies, constraints, opportunities, etc)	This also encourages the development of intra-regional trade linkages.
7. Develop sustainability strategies from the start	• Support financially viable economic activities. • Strengthen the capacity of project participants. • Promote effective linkages to service providers and buyers. • Lobby for supportive public investment and policies. • Develop appropriate time frame for implementation. • Use subsidies strategically, emphasizing. innovation and services with a public good component.	The State can help develop sustainable community infrastructure programs (providing finance) by utilising voluntary labour from the local beneficiaries. Common-place in South America (especially in the Andean countries e.g. MINGA schemes).	Ensuring that critical support services and promoted economic activities continue beyond the project lifetime.	Lack of sustainability is often the weakest element of RNF economy project interventions.

Source: Adapted from Davis (2004).

1. Prioritize activities that are targeted at local and regional markets;
2. Support producers to meet market requirements;
3. Improve access to product and factor markets for the rural population;
4. Whenever relevant and feasible, encourage the development of common-interest producer associations and cooperatives;
5. Develop flexible and innovative cross-sectoral institutional arrangements;
6. Recognize the diversity of agricultural production and adopt a subsector approach to the policy intervention, investment or development programme; and
7. Develop sustainability strategies from the start of any investment or development programme.

Clearly, the key priorities highlighted in tables 15 and 16 focus on the provision of economic infrastructure in rural areas (such as roads, electricity and water resources) and greater levels of investment in productive capacities for the agricultural sector.

Although the economic and food crises have separate origins, they have interrelated and mutually reinforcing impacts, especially for the most vulnerable countries.

Although the economic and food crises have separate origins, they have interrelated and mutually reinforcing impacts, especially for the most vulnerable countries. The links between the crises persist, in that for most LDCs, the food crisis has added to macroeconomic imbalances, large fiscal deficits, and general inflation. Similarly, the financial crisis and the concomitant global economic recession have decreased demand for agricultural commodities, resulting in lower food and input prices. Also, investment in the agricultural sector has become difficult, with greater capital scarcity and potentially declining levels of ODA. Rates of malnutrition and poverty have risen, reversing positive trends in some LDCs towards the achievement of the MDG for hunger (UNCTAD, 2008b).

The post–financial crisis food security agenda for LDCs should not only aim to address the short-term humanitarian consequences of the food crisis, but also to reverse the decline of investment and productivity in the agricultural sector.

The post–financial crisis food security agenda for LDCs should not only aim to address the short-term humanitarian consequences of the food crisis, but also to reverse the decline of investment and productivity in the agricultural sector, which, in turn, has undermined the agricultural sector's contribution to overall economic growth. It should also generate the additional investment needed to foster growth in the RNF sector. Key structural constraints in the agricultural sector which contributed to the food crisis in the LDCs will need to be addressed. The response should include:

- Improving agricultural productivity and access to extension services;
- Improving access to financial resources (e.g. micro-finance, subsidized credit, etc.);
- Sustainably developing natural resources;
- Developing financial innovations directly targeted at producers, whilst raising investment in rural infrastructure;
- Establishing food procurement mechanisms, at national and regional levels, to arrange the purchase and trade of food in large quantities in a timely fashion;
- Widening market and extension services access for rural producers;
- Ensuring that emergency supplies of food and food aid take place in a manner that does not undermine local food production by causing market disincentives;

Effective government investment policies will play an important role in improving food security and agricultural growth in LDCs.

- Developing regional markets for strategic food and agricultural commodities (including products critical to regional food security);
- Enhancing LDC knowledge-generation and dissemination capacities;
- Creating employment and training opportunities in rural areas through public works schemes;
- Improving food security for the poorest groups by means of safety nets and the expansion of child nutrition programmes and social protection programmes; and
- Supporting LDC adaptation to sanitary and phytosanitary standards.

Effective government investment policies will play an important role in improving food security and agricultural growth in LDCs.

Notes

1 "Food security" refers to a situation where all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO, 2003).
2 Any analysis of this period is difficult, as there have been large fluctuations in the prices of food, agricultural inputs and energy prices (particularly oil).
3 The chapter has not provided strong statistical evidence on the growth of "agricultural surplus" in LDCs, due to a lack of reliable data
4 For example, Burundi, Ethiopia, Sudan, United Republic of Tanzania and Zambia all had negative per capita annual growth rates in staple food production of 1.0 to 1.7 per cent from 1995 to 2004 (World Bank, 2008b).
5 Critics of the Asian Green Revolution have also noted that it was not sufficiently sustainable because it depended on petrochemical, fertilizer and pesticide imports (UNCTAD, 2009b).
6 CAADP, which is endorsed by African Heads of State, provides a strategic framework for boosting growth in agricultural production on the continent by 6 per cent per annum, thereby enabling income growth and wealth creation sufficient to cut poverty in half by 2015.
7 The partial productivity measure compares a single type of input (e.g. land, labour or capital) to total output. Total factor productivity, on the other hand, shows the relationship between an output and total inputs. In both cases, productivity is raised when growth in output is greater than growth in inputs.
8 The overall number of undernourished people in the world is forecast to rise to one billion in 2009. See FAO (2009) *The State of Food Insecurity in the World 2009 (*forthcoming). Food and Agriculture Organization of the United Nations, Rome.
9 On the global financial crisis and speculation in commodity markets, see UNCTAD (2009a).
10 The CME Group market is a merger of the former Chicago Mercantile Exchange and the Chicago Board of Trade and is the world's largest and most diverse derivatives exchange.
11 The measurement of hunger utilizing the undernourishment indicator may need to be refined. The indicator is limited because it measures food production, modified by distribution data. Empirically this is different from a conception of food security, which incorporates availability, access and the ability to utilize available food. In an LDC context a refined measure would incorporate "underweight" indicators and other data which better reflect access to food.
12 The United Nations Millennium Development Goal (MDG) Africa Steering Group's Thematic Group on Food Security and Agriculture estimates that to achieve MDG 1c (a reduction by half of the proportion of people who suffer from hunger) in sub-Saharan Africa alone will require increased investments for agriculture of approximately $ 8 billion per annum (Africa Steering Group, 2008).
13 Distinguished from petty versions by having dedicated premises and inventories.
14 This point should not to be exaggerated. Village monopolists who exploit their position are likely to face competition from businesses based in rural market centres (as in the case of taxi and bus operators), and possibly, social opprobrium in small communities.
15 For most LDCs, the market for tourism is largely made up of foreign, long-haul tourists. The domestic market is small, and in some cases it is made all the smaller by the preference of the local affluent populace for taking any vacations in cities rather than in rural areas.
16 For example, Chenery, Robinson and Syrquin (1986) and Kaldor (1966).
17 National growth linkage models, a precursor to regional models, explained national industrialization also in terms of national intersectoral resource transfers, particularly from agriculture to industry. Inspiration for these models came from the (rather untypical) case of Taiwan Province of China (e.g. Lee, 1971).
18 From international research centres and delivered by BADC (Bangladesh Agricultural Development Corporation) and, increasingly the private sector.
19 Irrigated "boro" rice has become more important than traditional "amon" as the primary crop.
20 The share of agriculture in ODA for all developing countries declined from 18 per cent in 1980 to 4 per cent in 2007 (Organization for Economic Cooperation and Development – Development Assistance Committee database, accessed in November 2008).
21 Modern biotechnologies provide a potential means of improving agricultural productivity and food security. Although considerable potential exists in traditional approaches to selection and improvement, LDCs need to retain and enhance their capacity to adopt and safely manage modern technologies (e.g. genetically modified organisms (GMOs)) if selected.
22 Since the introduction of this target in the African Union Maputo Declaration of 2003, fewer than 10 countries have achieved it (IFPRI, 2008b).

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