3. Why agriculture still matters

3.1. Introduction

In developing countries especially, the performance of the agricultural sector often depends on conditions outside policy-makers' reach. The weather, world prices (depending on how much the world demands of agricultural products and how much the rest of the world produces), external trade barriers and market access all play a role in determining agricultural outcomes. As a result, the agricultural sector is arguably more vulnerable and more dependent on a fair globalization[1] than any other sector. At the same time, most development economists and development agencies agree that neglecting the agricultural sector during the process of industrialization can constrain the development process. This view is supported both analytically and empirically. Economic development needs industrialization but, in many economies, industrialization also requires the development of the agricultural sector. This is certainly true for those developing economies in which agriculture is the main source of employment. The task of formulating sound policies is therefore to find the right balance in fostering the development process in all three sectors (agriculture, industry and services) at the same time.

Added to the importance of the development of the agricultural sector for the development of the economy as a whole is the sector's contribution to reducing poverty. Poverty is a multi-dimensional phenomenon, but with 75 per cent of the world's poor living in rural areas and given that the agricultural sector employs 40 per cent of developing countries' workers and contributes over 20 per cent of their GDP, there is convincing evidence as to why examining this sector is a good starting point for finding solutions to poverty. Moreover, agriculture has the greatest dominance of female employment in the poorest regions of the world. Therefore a focus on this sector can also contribute to greater gender equality in the world of work.

During the 1990s, researchers and policy-makers largely neglected the agricultural sector, while favouring modernization through the development of the manufacturing and service sectors. Declining official investment in agricultural development provides evidence for this trend.[2] Interestingly, this shift away from agriculture went hand in hand with a lower rate of poverty reduction. The main reasons why the sector's potential has been relatively ignored for a decade appear to be a steady decline in commodity prices, in tandem with the increased competition that developing economies face from large agricultural subsidies in the developed world and the related problems of market access. Conventional

[1] World Commission on the Social Dimension of Globalization, 2004.

[2] Dorward et al., 2001.

wisdom maintains that these factors make returns in agricultural investment unattractive compared with investment in more modern economic sectors. Yet the intensity with which developing countries have been fighting to persuade developed economies to reduce trade barriers is evidence that the high potential of this sector – particularly for poverty reduction – is once again attracting attention. This renewed awareness is also reflected by international agencies such as the World Bank (2003 and 2004), UNDP (2003) and the UN (2003).[3]

Indeed, agriculture is not only about decreasing commodity prices and subsidies. It is also about employment opportunities and chances for poor people to work themselves out of poverty. Beginning from this basic, human perspective, section 3.2 of this chapter analyses why growth in general matters for poverty reduction and why a focus on growth alone has its limits. Section 3.3 shows that poverty is predominantly a rural phenomenon (at least for the time being) and that the rural poor work mainly in agriculture and increasingly in non-farm activities such as agro-processing and input supply activities. If growth is important for poverty reduction and the poor are mainly in rural areas, it follows that growth in the agricultural sector should have a strong impact on poverty reduction. This argument is advanced in section 3.4. But if there are limitations to a growth focus in general, then agriculture will be similarly limited. By focusing on the two main components of growth, productivity and employment, these limitations can (to some extent) be overcome. Section 3.5 thus argues that productivity growth and employment growth must go hand in hand to maximize the impact on poverty reduction. Section 3.6 draws policy conclusions based on the results of the present analysis and section 3.7 offers some concluding remarks.

3.2. Growth matters for poverty reduction

One central finding established by many development institutions and researchers in the past two decades is that poverty is reduced primarily through economic growth – a finding that has elicited both well- and ill-informed policy prescriptions. Substantial primary research and international agency reports have been devoted to this topic.[4] Early ILO studies acknowledged the large role that economic growth plays in reducing poverty levels, but warned that other factors may intervene to reduce or reinforce the growth effects. While levels of per capita national income are good predictors of poverty in general, many countries have poverty levels that diverge from those predicted on this basis. Considerable scope thus remains for determining anti-poverty policy.[5] The divergence from the expected level of poverty reduction associated with national income attracts various explanations, ranging from the institutional to structural. Whether

[3] The UN Economic and Social Council recently called for a wide-ranging integrated approach to rural development. See ECOSOC: Draft Ministerial Declaration, E/2003/L.9. Besides this renewed interest in agriculture, the UN Food and Agriculture Organization (FAO), has for a long time been mandated to focus on the agricultural sector and provides – amongst others – fully detailed, comprehensive analyses of the agricultural sector (see http://www.fao.org).

[4] IFAD, 2001; World Bank, 2001; World Bank, 2002.

[5] Lipton, 1998.

Box 3.1 . The Millennium Development Goals

In September 2000, the United Nations' Member States unanimously adopted the Millennium Declaration. After consultations among international agencies including the World Bank, the International Monetary Fund, the Organisation for Economic Co-operation and Development, and the specialized agencies of the United Nations, the UN General Assembly recognized the Millennium Development Goals as part of the road map for implementing the Millennium Declaration.

The Goals, along with the specific targets set for each, commit the international community to an expanded plan of action aimed at encouraging sustainable and equitable development, one that promotes human development as the cornerstone for sustaining social and economic progress, and recognizes the importance of creating a global partnership for development. The goals and related targets, set out below, have been commonly accepted as a framework for measuring development progress.

Eradicate extreme poverty and hunger

Target 1: Halve, between 1990 and 2015, the proportion of people whose income is less than US$1 a day.

Target 2: Halve, between 1990 and 2015, the proportion of people who suffer from hunger.

Achieve universal primary education

Target 3: Ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling.

Promote gender equality and empower women

Target 4: Eliminate gender disparity in primary and secondary education, preferably by 2005, and at all levels of education no later than 2015.

Reduce child mortality

Target 5: Reduce by two-thirds, between 1990 and 2015, the under-five mortality rate.

Improve maternal health

Target 6: Reduce by three-quarters, between 1990 and 2015, the maternal mortality ratio.

Combat HIV/AIDS, malaria, and other diseases

Target 7: Have halted by 2015 and begun to reverse the spread of HIV/AIDS.

Target 8: Have halted by 2015 and begun to reverse the incidence of malaria and other major diseases.

Ensure environmental sustainability

Target 9: Integrate the principles of sustainable development into country policies and programmes and reverse the losses of environmental resources.

Target 10: Halve by 2015 the proportion of people without sustainable access to safe drinking water and basic sanitation.

Target 11: Have achieved by 2020 a significant improvement in the lives of at least 100 million slum dwellers.

Develop a global partnership for development

Target 12: Develop further an open, rule-based, predictable, non-discriminatory trading and financial system. Includes: a commitment to good governance, development, and poverty reduction – both nationally and internationally.

Target 13: Address the special needs of the least developed countries. Includes: tariff and quota-free access for least-developed countries' exports; enhanced programme of debt relief for HIPCs and cancellation of official bilateral debt; and more generous ODA for countries committed to poverty reduction.

Target 14: Address the special needs of landlocked countries and small-island developing states (through the Programme of Action for the Sustainable Development of Sm

all Island Developing States and the outcome of the twenty-second special session of the General Assembly).

Target 15: Deal comprehensively with the debt problems of developing countries through national and international measures.

Target 16: In cooperation with developing countries, develop and implement strategies for decent and productive work for youth.

Target 17: In cooperation with pharmaceutical companies, provide access to affordable essential drugs in developing countries.

Target 18: In cooperation with the private sector, make available the benefits of new technologies, especially information and communications.

Source: http://www.un.org/millenniumgoals/

growth is likely to be pro-poor is not seriously at issue: the question is, to what degree is it pro-poor and can its pro-poor effects be increased?[6]

The debate on how important growth is for poverty reduction has two opposing camps: those who contend that any kind of growth will help the poor and those who argue that growth is often accompanied by increasing inequality and that, despite growth, the poor may become even poorer.[7] This chapter takes the middle ground and reasons that growth will reduce poverty in most cases.

Poverty was the main theme when world leaders gathered at the Millennium Summit in 2000 to pledge their support for the Millennium Declaration. The first Goal adopted was to halve the share of extreme poor in the world by 2015 (see box 3.1). The underlying question with respect to the Millennium Development Goal on poverty is not whether growth reduces poverty but whether growth alone is sufficient to reach the goals. Two issues are at stake here. First, economic growth was slower in the 1990s compared to earlier decades in most developing economies so there is a need to enhance growth. Second, despite solid growth rates, some economies and regions have clearly performed below their potential in reducing poverty (see box 3.2). What occurred in

[6] See, for example, various works in http://www.worldbank.org/poverty/inequal/themgrp/index

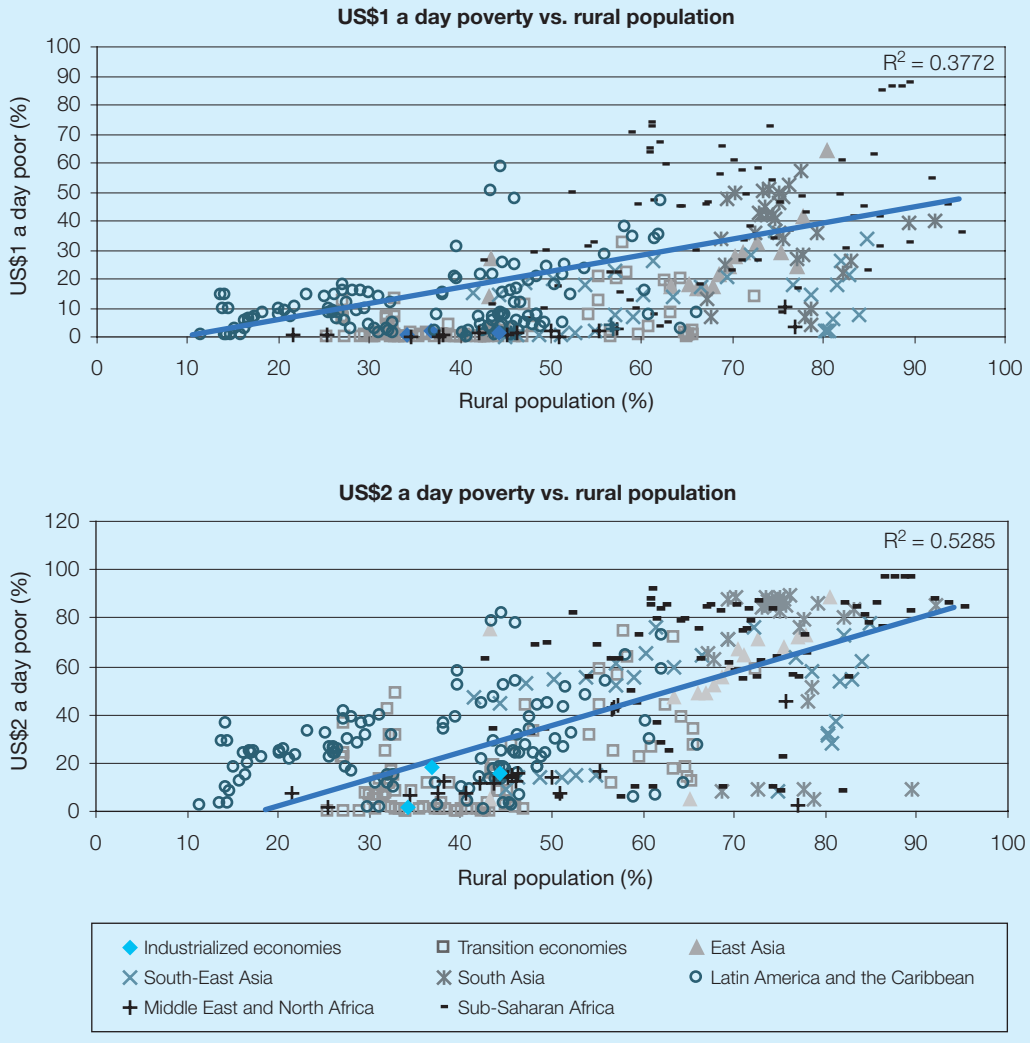
[7] See Ahluwalia (1976), for an early account of the second viewpoint and, more recently, Lübker (2002).

these areas and how can we ensure that future growth will be translated into poverty reduction?

3.3. Poverty is a predominantly rural phenomenon

Even though many developing economies are becoming more and more urbanized, according to the UN Population Division, the rural population still comprised 59.5 per cent of the total population in less developed regions in 2000 (with an estimate of 56.8 per cent for 2005) and in the least developed economies the share was even higher at 74.8 per cent in 2000 and 72.3 per cent in 2005. Despite ongoing structural transformations in many of these economies, around 75 per cent of the poor still live in rural areas (IFAD, 2001). Figure 3.1 shows the positive correlation between poverty rates and percentages of rural populations.

Figure 3.1. US$1 and US$2 a day poverty vs. rural population rates, 1978-2002



Sources: World Bank, 2004a; World Bank PovCal Database, 2004b.

Large shares of rural populations tend to be associated with higher poverty rates. While most of the rural poor (around 68 per cent) live in South and East Asia, sub-Saharan Africa is inhabited by 24 per cent of the world's rural poor. Locating where most of the poor live is the first step to finding solutions to reduce poverty.

In terms of employment, in 65 out of the 162 developing economies for which employment data are available by sector, the agricultural sector is still the main employer[8] (box 3.2 gives an empirical snapshot of the agricultural output and labour share by region over time). This is especially the case in sub-Saharan Africa, where on average more than six out of ten people work in this sector. In economies such as Gambia the agricultural share in employment is likely to be over 80 per cent. The share is also high in Asia where around five out of ten people work in agriculture. On the other hand, in the Middle East and North Africa only two out of ten people work in agriculture, and in Latin America and the Caribbean only between one and two out of ten people are employed in agriculture. In the Middle East and North Africa, this is mainly the result of the low share of agricultural employment in the oil-producing economies. In Latin America and the Caribbean, the figure masks a wide range of differently structured economies, but for many economies in the region agriculture still plays an important role in terms of employment. (For those economies with a share in agricultural employment larger than 40 per cent, see figure 3.2 and see also Chapter 1 of this Report.)

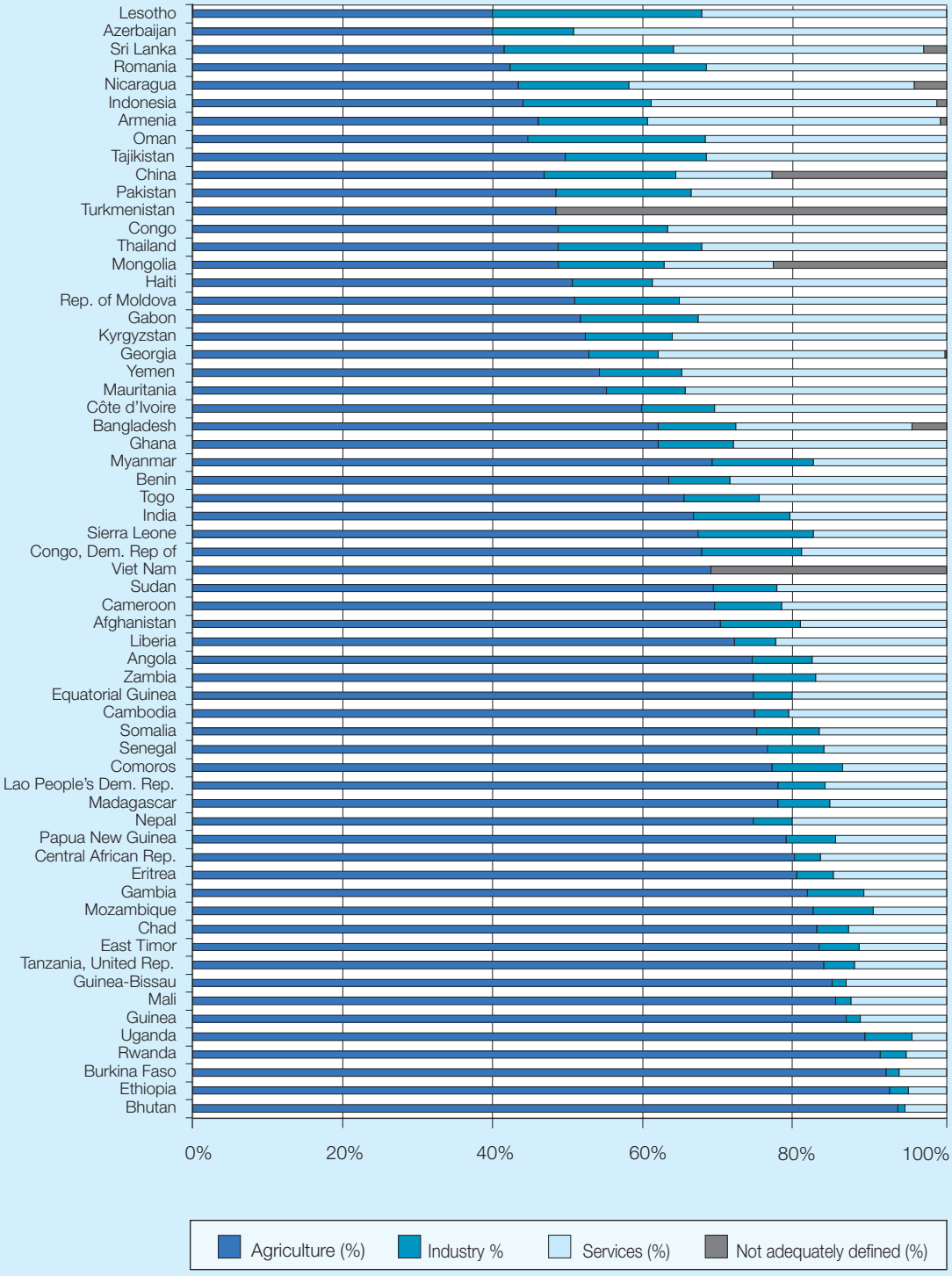
In addition to the fact that the poor live in rural areas and that agriculture is most likely the main source of employment in poor countries, it is obvious that jobs in rural areas are most likely in the agricultural sector. In India, for example, agriculture-related employment in the mid-1990s accounted for around 70 per cent of total rural employment (Fan et al., 1999; see also box 3.5 in section 3.4 of this chapter). Finally, although the available data are quite limited, there is some evidence that poor people living in rural areas are more likely to work in agriculture than non-poor people. In China, for example, 87 per cent of the poor in rural areas are employed in agriculture, whereas the share of the non-poor in rural areas working in agriculture is 72 per cent.[9] Another salient point is that women are typically more likely than men to work in the agricultural sector. For example, women in rural Africa produce, process and store up to 80 per cent of foodstuffs, while in South and South-East Asia they undertake 60 per cent of cultivation work and other food production (UNIFEM, 2000).[10] This might be one of the main reasons why poverty among women is higher than among men.

[8] There is a correlation between the availability of data and GDP per capita; the poorer an economy is, the less likely it is to report data. Given this fact, it is also likely that the share of agriculture-dominated economies would be much higher if data were available for all developing economies.

[9] Khan and Riskin, 1998.

[10] See ILO (2004) for more details on female employment in agriculture.

Figure 3.2. Sectoral distribution of employment, economies with a share in agricultural employment > 40 per cent, latest available year

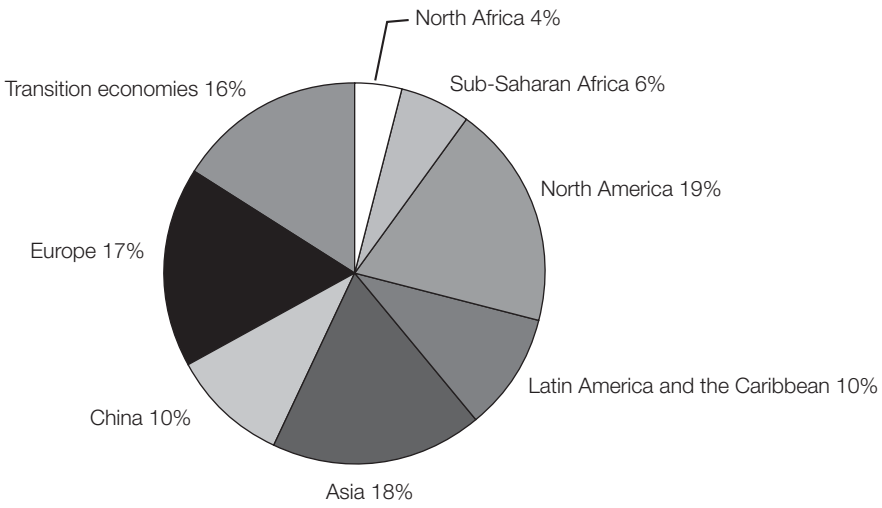


Source: ILO, 2003.

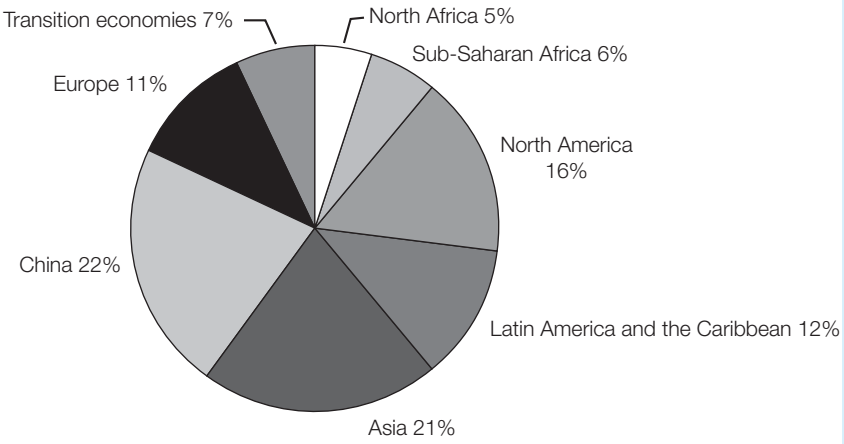
Box 3.2. Global shifts in levels and shares of agricultural output and labour, an empirical snapshot

What has happened to agriculture in the past three decades? An analysis of the state of global agricultural production and trends over time shows that from 1970 to 2000, agricultural output in the world doubled, from US$ 645.9 billion to US$ 1.3 trillion (in constant 1990 dollars). In the same period, labour input (as measured by the population of economically active persons in agriculture) increased by around 40 per cent – from 898 million to nearly 1.3 trillion persons in 2000. The agricultural output and labour shares of different regions in total agricultural world output and labour are shown in the graphs accompanying this box. The main feature of the pattern of change is the increase in the global share of agricultural output for Asia and China over the past three decades. At the same time, the shares of labour involved in agriculture in these areas have not increased by as much. Yet China and Asia account for a major share of the world's agricultural labour. Within the transition economies, the agricultural output share in the world has almost halved over the period and the labour share is down to one-third of its 1970 level. Even though the world share in agricultural output hasn't changed considerably for North America and accounted for 16 per cent of the world's output in 2000, it is interesting to note that the labour share in 2000 was below 1 per cent, indicating the high level of productivity in agriculture in North America. The same is obviously true for Europe. For all other regions no major changes in terms of world shares were observed during the past three decades, either in output shares or in labour shares.

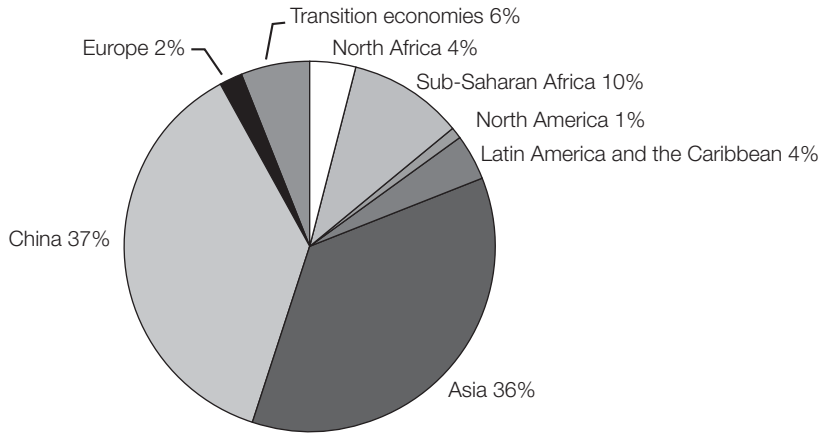
Agricultural output shares by region (1970)



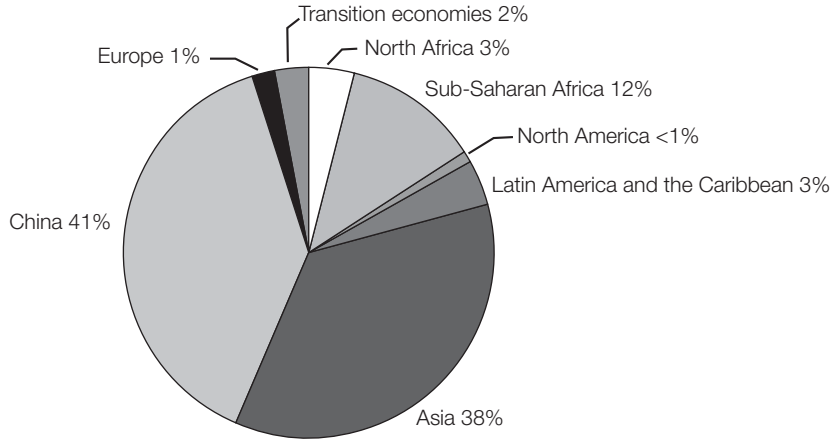
Agricultural output shares by region (2000)



Agricultural labour shares by region (1970)



Agricultural labour shares by region (2000)



Source: Rao et al., 2004

3.4. Growth in agriculture and poverty reduction

If poverty is largely rural and rural employment is mainly in agriculture, then it seems likely that the parts of the growth process that are linked to rural areas, and especially those related to agriculture, may have more immediate and direct effects on poverty reduction than would growth outside rural areas. Once this is established empirically – through a deconstruction of the growth process – it is

Box 3.3. Poverty measurements and the incidence of poverty around the world

World and regional poverty estimates vary greatly depending on the underlying methodologies employed in generating country-level poverty estimates. Three estimates of poverty are used throughout this chapter, each measuring US$1 and US$2 a day poverty rates and counts. The first set of estimates comes from the World Bank, as presented in Chen and Ravallion (2001). The second is an estimate done by the ILO that seeks to improve the former by detecting and correcting inconsistencies between survey and national accounts data (Karshenas, 2004). A third estimate based on work by Sala-i-Martin (2002) is also used in the analysis because it provides poverty figures for a wide selection of countries since the 1970s. Though the Sala-i-Martin data provide a longer period over which to measure trends in poverty, the methodology used to construct the data (which is exclusively national accounts-based) differs greatly from the methodology employed by the World Bank and ILO (which provide household survey-based estimates). This is the main reason why this box focuses on trends in poverty according to the World Bank and ILO figures. Whenever a longer-term perspective is needed for the analysis in this chapter, the Sala-i-Martin data are used.

There are differences between the ILO and World Bank estimates of overall poverty in the world. US$1 a day poverty was around 1.13 billion in 1987, which declined to 1.04 billion in 1998 based on ILO estimates. Comparative figures based on World Bank estimates are 1.18 billion in 1987 and 1.17 billion in 1998. So there has been weak decline in poverty on one estimate and a slightly more pronounced decline in the other. In terms of trends in poverty rates themselves, based on both data sets there has been a clear decline in the period from 1987 to 1998. The rate of decline has slowed in the more recent years.

While overall differences between the two estimates of poverty are not very large, regional estimates do vary. In this regard it is necessary to look at the distribution of the poor in the world. The salient difference between the regional distribution of the poor between the two sources is that in the ILO estimates the share of South Asia (29 per cent) in the global poor in 1998 is much lower compared to the World Bank estimates (44 per cent), while the share of China's poverty is higher in the ILO estimates (30 per cent) than in the World Bank estimates (18 per cent).

The ILO data suggest a decline in poverty rates in all regions except sub-Saharan Africa between 1987 and 1998. The South Asian sub-region however shows an increase in poverty rates between 1996 and 1998. In contrast the World Bank data show declining poverty rates in all regions except Latin America and sub-Saharan Africa over the period from 1987 to 1998. Overall both datasets are in agreement that, over the 1987 to 1998 period, poverty in sub-Saharan Africa has been increasing while China has realised the greatest amount of poverty reduction.

then essential to find out how to encourage growth in this sector and to identify the specific mechanisms through which growth can be linked to poverty reduction.

Deconstructing the growth process

Poverty rates, by and large, have fallen over the past three decades, though the decline in the 1990s has been more modest than in the two previous decades (see box 3.3 and Majid, 2004). It is clear that China is driving much of the poverty reduction in the developing world, while in sub-Saharan Africa poverty has increased. The overall slowdown in poverty reduction could jeopardize the poverty targets set forth in the Millennium Development Goals (see Chapter 1 of this Report). Moreover, although agricultural output growth was reasonably robust in the past three decades, it has been limited on a per capita basis in the developing world. As expected, the per capita output trends in China and sub-Saharan Africa are consistent with observed poverty trends: China's agricultural output per capita increased with decreasing poverty, while poverty in sub-Saharan Africa increased with decreasing agricultural output per capita.

There is clearly some evidence suggesting a linkage between poverty reduction and agricultural growth, but a further investigation is needed on the question of the relative importance of agricultural growth in comparison to other sectors in the economy for poverty reduction. Discussions on the importance of rural poverty and agricultural development are not new. These were preponderant in the development literature that emerged during and after the "green revolution" in the 1970s. The reason this primacy of agriculture argument is important to reiterate in the present policy environment of developing countries is precisely because agriculture has too often taken a secondary or tertiary role in development strategies. (For a summary of the arguments showing the linkages between agricultural development and development of the economy as a whole, see box 3.4.)

With increased data availability, some recent research[11] concentrates on the distributional effects of growth and shows fairly rigorously the immediate or short-run effects of growth on income distributions (which are not major) and the longer-run effect of growth on distribution, especially on the poor (which may be worsening) for developing countries. This research also shows that it is the structural features of an economy – and the importance of the agriculture sector in particular – which influence what happens to the poor in the long run. These findings have important implications for the sustainability of poverty-reducing growth strategies. In particular it has been shown that agricultural growth is more poverty-alleviating than non-agricultural growth in countries where the gap between the rich and poor is not extreme.[12]

[11] See Timmer, 1997.

[12] See Warr, 2002.

Box 3.4. The importance of the agricultural sector in the development process

For a long time, economists saw the main role of agriculture as the supply of labour for the industrialized sectors and, indeed, it is a necessary precondition for the development process. But by emphasizing this as the only important contribution, other significant functions of the agricultural sector tend to be overlooked.

Agriculture as provider of food

Just as important as providing the labour force for other sectors is that the agricultural sector has to be able to feed an expanding urban labour force. In other words, it must be capable of producing an agricultural surplus. This is only possible if productivity in the agricultural sector rises, as more food now needs to be produced by less people. In other words an "agrarian revolution" has to take place alongside the industrialization process. Developing countries cannot afford to become dependent on food imports (especially in early stages of development), as the imported goods are usually more expensive than those produced within the country (because of transportation costs and due to monopolistic market structures). The demand for agricultural goods increases with growing GDP per capita during the process of industrialization. Even if Engel's law (that the demand for agricultural commodities does not grow as fast as the demand for other goods with growing income) is taken into account, the demand does rise. The fast-growing population in most developing countries adds to the increasing demand for agricultural goods. If the agricultural sector is not capable of producing enough to meet rising demand, there is the risk of inflation, which can be a constraint for the development process itself (so-called structural inflation). Only if this risk is kept under control by supporting the agricultural sector as much as the modern sector can the process of industrialization be successful.

Agriculture as contributor to modern sector development or exporter

If the agricultural sector produces a commodity required as an input in other sectors, it should be supplied to these sectors when demand rises – which will be the case in the process of industrialization. If the agricultural sector produces an export commodity, its contribution to the development process is to provide the modern sectors with the imported capital goods that the agricultural sector receives for exporting its product.

Agriculture as demand sector

If one of the two above scenarios occurs, the agricultural sector also has the potential to become a market for goods produced in the modern sector. This is especially important for countries where the industrial sector does not (yet) produce for export markets. If the agricultural sector becomes a significant market for the modern sector, this guarantees that, further into the development process, the economy does not become as dependent on external markets as is the case for many developing countries. Such independence can protect an economy against vulnerabilities in the international environment.

Agriculture as contributor to financial sector

If the agricultural sector develops in parallel to the modern sector, it increases savings within this sector that can be offered to the industrial sector. It thereby contri-

butes to the necessary accumulation of capital in the modern sector, again making it less dependent on foreign capital. This point might not seem very realistic for most developing countries, as the saving quota of the agricultural sector is rather low. But that can change if policies focus on institutional monetary deficits.

Agriculture as a last resort in times of crisis

Finally, in many developing countries without social safety nets, the agricultural sector is a last resort for those who seek work in times of economic slowdown. Even though the jobs people find during periods of economic stagnation might not be well paid (mainly because of low productivity), this should not be used as an argument against the sector's contribution during difficult periods. But it should be made clear that this can only be a short-term solution. In the long run, the focus should be on increasing productivity and thereby wages in agriculture.

Sources: Irz et al., 2001; Hemmer, 2000.

This point will now be illustrated at a broad macro level. Looking at decadal changes in poverty rates and sector value added for the three sectors (controlling for change in GDP per capita), it is clear that changes in agricultural value added have generally been significantly associated with poverty reduction in the 1970s and 1980s, when the greatest poverty reduction took place. These effects are represented graphically in figure 3.3.[13] This does not imply that one should ignore the many other possible factors that contributed to poverty reduction over this period, but rather that growth in agriculture appears to have been systematically important.[14]

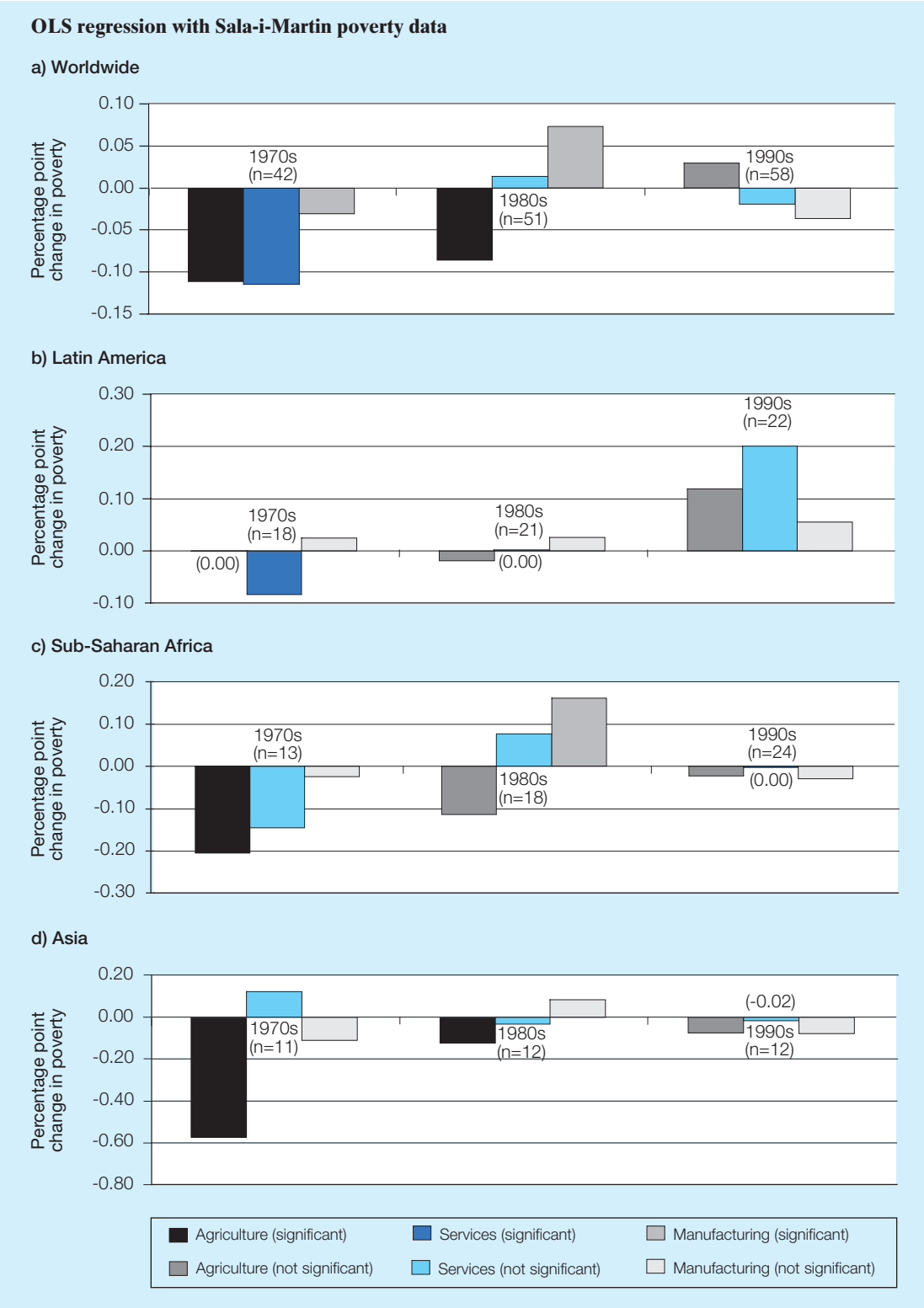
The simple illustration on a regional basis for the Sala-i-Martin poverty data shows the strength of the agricultural coefficient more in the Asian and sub-Saharan Africa cases. In sub-Saharan Africa, a 1 percentage point increase in agricultural output was associated with a reduction in poverty of 0.2 percentage points in the 1970s and 0.13 percentage points in the 1980s (figure 3.3c). In Asia, it was almost 0.6 percentage points in the 1970s and slightly over 0.1 percentage points in the 1980s (figure 3.3d). On the other hand, based on this empirical work, no conclusive case can be made for an agricultural growth and poverty reduction linkage in Latin America. Rather, in the Latin American case, growth in the service sector during the 1970s was most associated with poverty reduction (figure 3.3b). The large land distribution inequalities in Latin America could be the main reason for this result (see figure 3.4).

In no case does manufacturing growth show a direct, significant association with poverty reduction. This also makes sense: growth in manufacturing is more likely to be capital- and not labour-intensive. For this reason, manufacturing-led

[13] The same is also true of services growth in the 1970s.

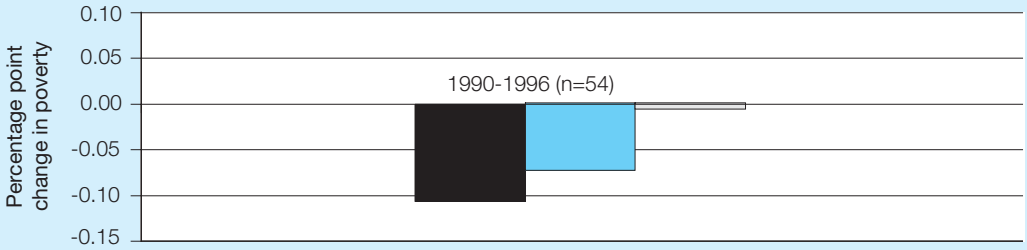
[14] The results of the following analysis differed depending on the poverty measure used but overall the results were consistent, whether Sali-i-Martin or the ILO or World Bank poverty data were used. The results for the estimates with World Bank poverty data are not shown in this chapter as they were very similar to those of the ILO poverty estimates.

Figure 3.3. Change in poverty associated with 1 percentage point increase in sector value added growth rate, selected years

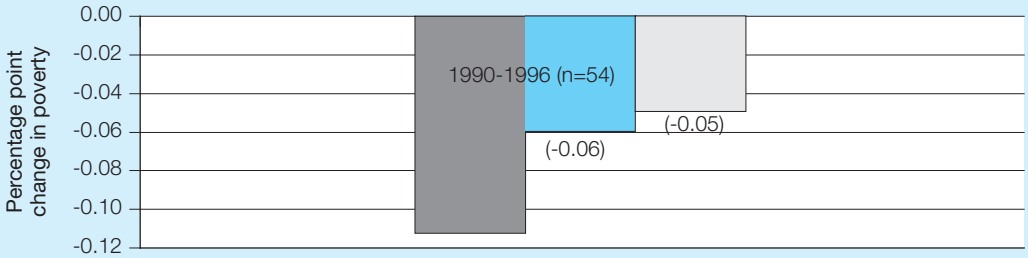


OLS regression with ILO poverty data

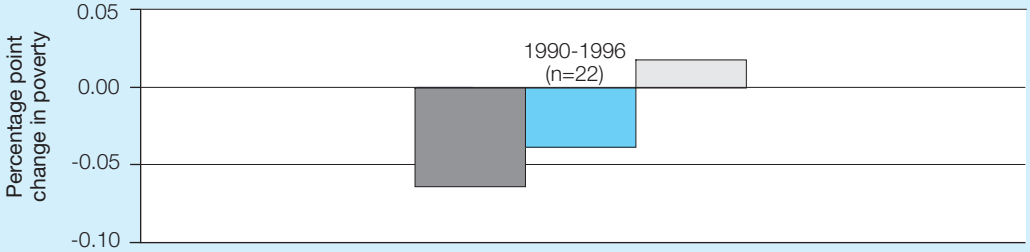
e) Worldwide



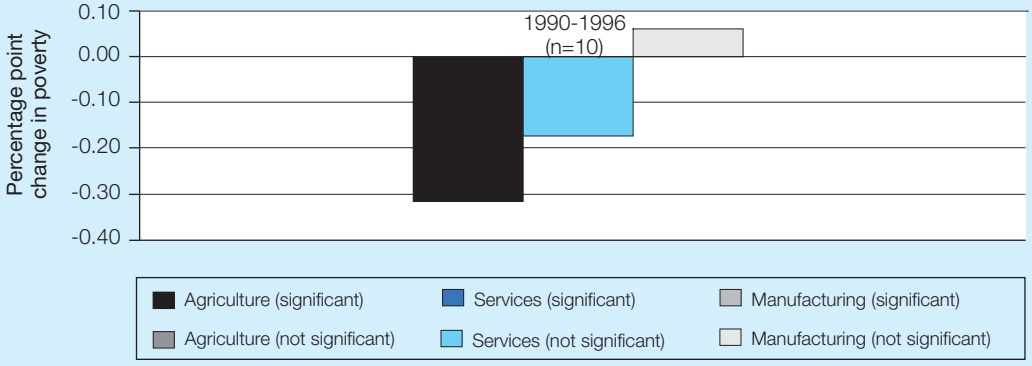
f) Latin America



g) Sub-Saharan Africa



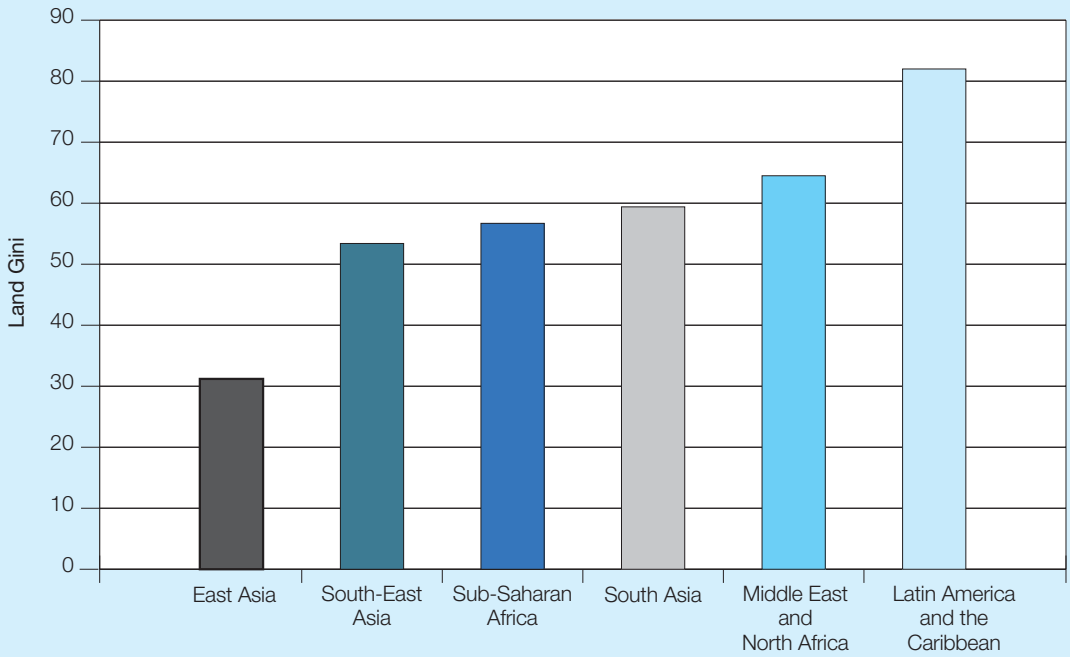
h) Asia



Note: Figures a) b) c) and d) are for various years in the 1970s, 1980s and 1990s. Figures e) f), g) and h) are for various years in the 1990s. Dark colours (as compared to light colours) represent statistically significant coefficients at less than 10 per cent. As an example of how to read these figures, figure a) shows that in the 1970s growth in both agriculture and services were negatively associated with poverty, that is, poverty tended to decrease with an increase in output in agriculture and services. The magnitude of the effect was slightly larger in the case of services than in agriculture. Manufacturing output growth was also negatively associated with poverty, but the result was not statistically significant. N is the number of countries for which data were available. All regressions use ordinary least squares (OLS) techniques, which are used in this case to provide the best "fit" to the data in determining the relationship between poverty and growth in different sectors.

Source: Majid, 2004.

Figure 3.4. Regional ownership distribution of land, 2000



Note: Aggregates are population-weighted.
Source: Rao et al., 2004.

growth is unlikely to have large first-order employment effects. If employment effects are indeed the most direct way to lift people out of poverty, the result is not surprising. This is not to say that manufacturing can or should be ignored, but rather that the direct effects of agricultural growth on poverty reduction deserve attention. These results also do not imply that there are no economies in which manufacturing growth contributed to employment growth and poverty reduction. This can and indeed does happen, especially at later stages in the development process when agriculture becomes less important for the economy as a whole. Nevertheless, taken together, the results shown in figures 3.3 and 3.4 demonstrate that growth in agriculture does indeed matter and that more equal initial distributional conditions make the impact of this growth on the poor more robust. [15] Moreover, the ILO poverty estimates suggest that even for the 1990s in which poverty reduction stagnated, a case can be made for poverty to have been reduced more by growth in agriculture in the developing world than through

[15] The land distribution inequality is most dramatically illustrated with the case of Brazil. Rural workers include independent small farmers, sharecroppers, tenant farmers and agricultural day labourers, who are the country's poorest and most vulnerable sector, depending on the land to produce the crops that are their livelihood. Yet, at last count, 40 per cent of farmers shared 1 per cent of the land, while the richest 20 per cent owned 88 per cent of the land. Despite an attempt at land reform during the 1990s, land tenure has not become more equitable over the last two decades. The Landless Workers' Movement (MST) estimates that there are 20 million landless people in Brazil (4 million families), while 7 million more barely survive as squatters, sharecroppers, and migrant workers (Cassel and Patel, 2003).

growth in other sectors. This result is driven by Asia and more specifically China (see also box 3.7). This chapter therefore suggests that if there is a specific type of sectoral growth that will best directly assist in the achievement of the Millennium Development Goals on poverty reduction, it is through the agricultural sector. [16]

Major factors determining agricultural output growth

The importance of land, labour and technical investment (such as fertilizers and tractors) for growth in agriculture is clear, and an empirical snapshot of what happened to these factors during the last decades is helpful in understanding overall trends in agriculture. Figures 3.5 to 3.9 show trends in output and factor use indices for the developing regions of the world, estimated on a five-year basis from 1970 to 2000. The input indices shown for land, labour, fertilizer and tractors display growth normalized to one in 1970, and do not reflect levels of factor use. Clearly, as these are technical factor indices, they also do not show the institutional and societal contexts of output growth.

For China, the results indicate a spectacular growth performance since 1980. Output grew more than 400 per cent over this period, or roughly twice the growth of the total world agriculture index. The rest of Asia also shows an increase, while a more modest increase took place in other regions (figure 3.5).

Breaking down output growth into the components in the Chinese case, it is clear that land, labour and fertilizer use have all shown marked, sustained growth (although the latter two showed slower rates of growth more recently) while growth in tractor use tapered off after the mid-1980s. Carefully interpreted, this might give an indication that China's agricultural development during the past two decades was not purely led by shedding labour and replacing it with machines. It is also interesting to look at sub-Saharan Africa, whose very modest growth in output was coupled with a clear stagnation or worsening in land, fertilizer and tractor use and a massive increase in labour use. The increase of labour in the context of stagnating complementary inputs and low output growth suggests a worsening employment situation for agricultural workers in the region.

From figures 3.5 to 3.9 it might appear that output growth in agriculture has been very large in the past three decades. However, in reality the growth in agricultural output and also in the value of crops measured per person has been rather modest in most parts of the developing world. It has stagnated in sub-Saharan Africa (figures 3.10 and 3.11).

[16] Importantly, this broad-level analysis does not directly address the key issue of the composition of agricultural growth – that is, whether it is productivity- or employment-led growth that matters most for poverty reduction. This is discussed in section 3.5.

Figure 3.5. Output by region, 1970-2000

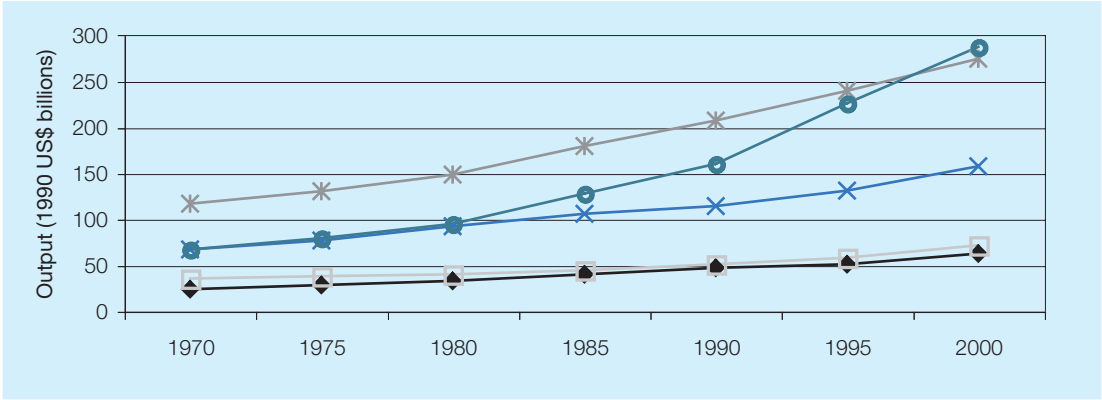


Figure 3.6. Land index by region, 1970-2000

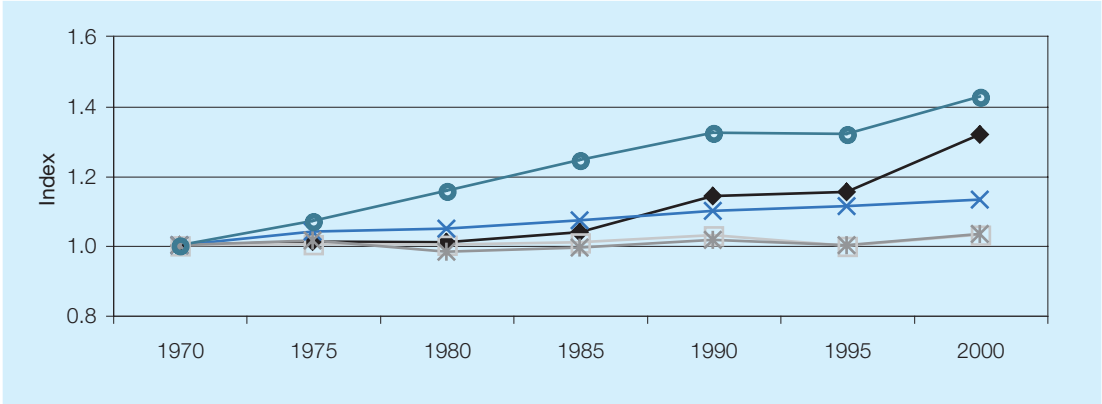
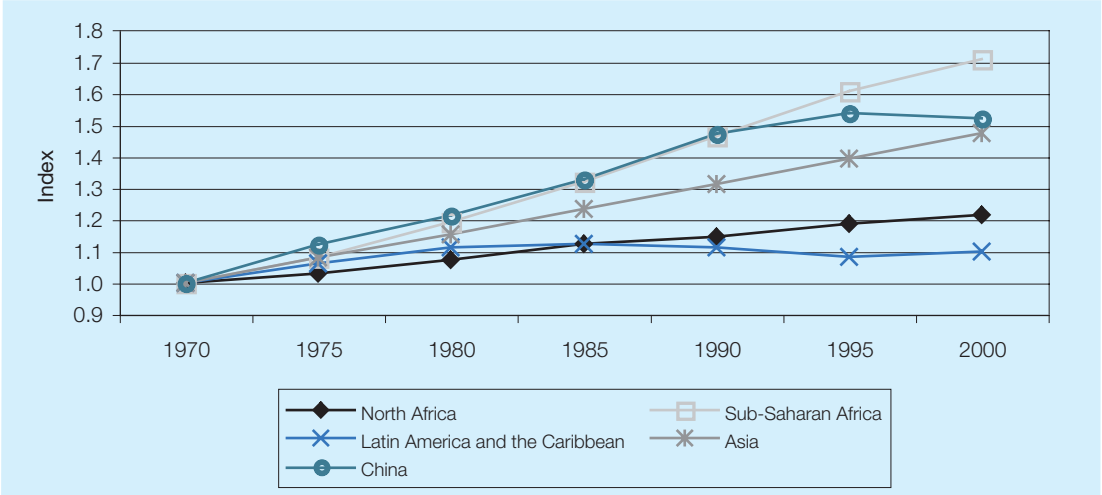


Figure 3.7. Labour index by region, 1970-2000



Source: Rao et al., 2004; Majid, 2004.

Figure 3.8. Fertilizer index by region, 1970-2000

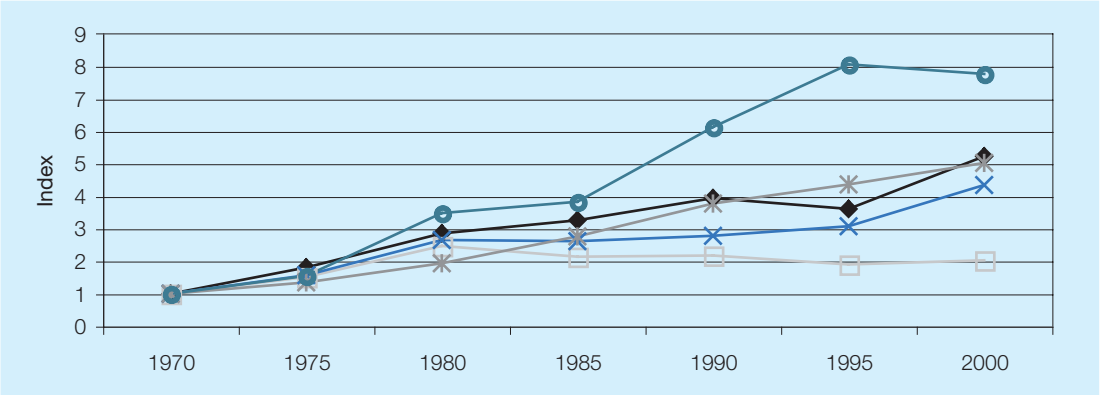
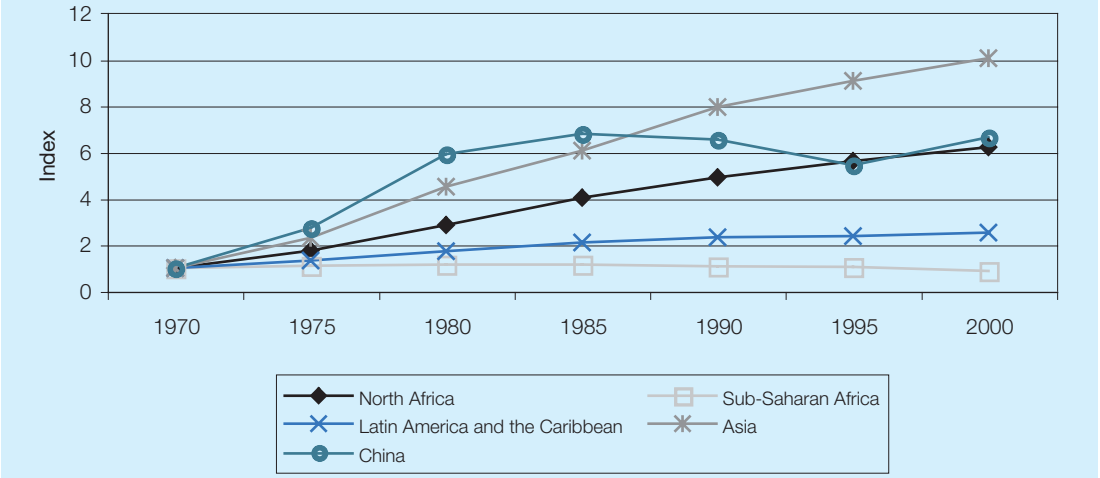


Figure 3.9. Tractor index by region, 1970-2000

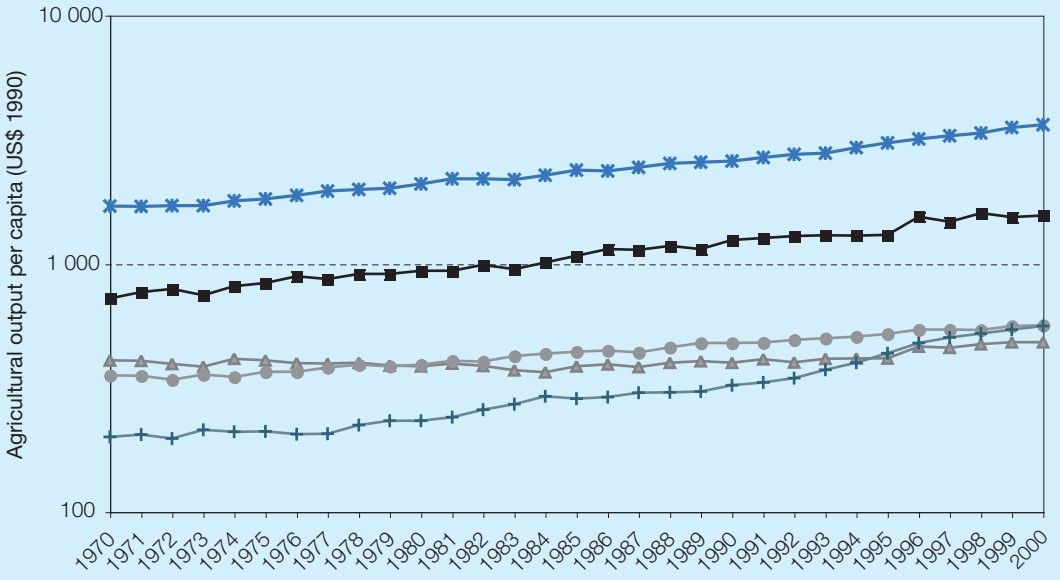


Source: Rao et al., 2004; Majid, 2004.

Some linkages between agricultural growth and poverty reduction: The availability of food and rural non-farm-activities

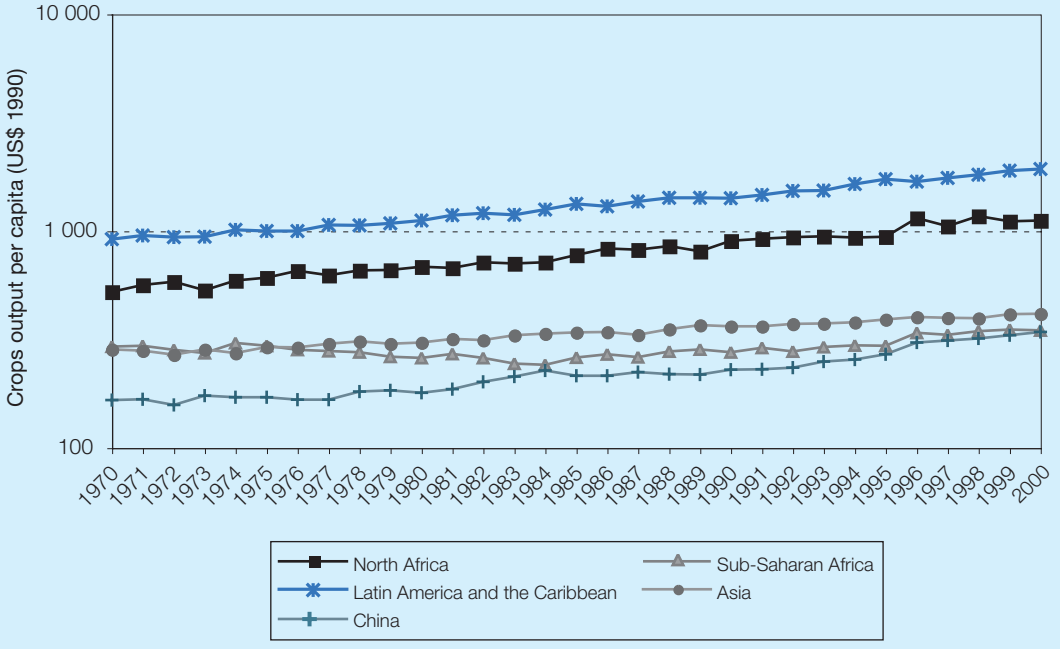
Whereas the previous section showed that growth in agriculture is the result of a combination of inputs – labour being one of them – this section now looks at two major links between growth and poverty reduction. For sound development strategies, it is important to understand precisely how growth in output can lead to improvements in living standards for the poor. There are both direct and indirect ways in which growth in agriculture can help reduce poverty. This section discusses the direct effects of increased food production and changes in food prices on poverty, as well as the poverty-reducing indirect effects that agricultural growth can potentiate, by stimulating the creation and expansion of new non-farm income-generating activities in rural areas.

Figure 3.10. Agricultural output per capita by region (log scale), 1970-2000



Source: Rao et al., 2004.

Figure 3.11. Crops output per capita by region (log scale), 1970-2000



Source: Rao et al., 2004.

Box 3.5. A favourable monsoon contributes to the economic boom in India

While the share of India's agricultural sector in total output has declined substantially over the past 30 years, agriculture still comprises over 20 per cent of GDP, compared with only around 2 per cent of output in the OECD countries. As a result, overall economic growth in the world's second most populous country is greatly influenced by the performance of its agricultural sector. India's current economic boom highlights this fact: the more than 10 per cent GDP growth rate the country is now experiencing comes on the heels of a record monsoon which has fuelled a substantial rise in agricultural output.

Given the structure of employment in the country, India's prospects for reducing poverty are directly linked to the performance of the agricultural sector: an estimated 70 per cent of the country's population, comprising mainly the lower range of the income spectrum, relies on agriculture for a living. Several studies have found that among a range of government expenditures which all had a positive impact on poverty reduction, productivity-enhancing investments in agriculture have had a particularly strong and significant impact on reducing extreme US$1 a day poverty in the country. Spending on agricultural research and development (R&D) designed to increase agricultural productivity has been 2.5 times more effective than spending on education, ten times more effective than spending on irrigation, and over 3 times more effective than general rural development expenditures in terms of reducing poverty. Overall in South Asia, the World Bank estimates that it costs on average about US$179 in additional agricultural R&D to raise yields sufficient to lift one person out of US$1 a day poverty. The only type of investment with greater overall poverty-reducing effects has been road infrastructure, which is also linked with productivity in the country's agricultural sector.

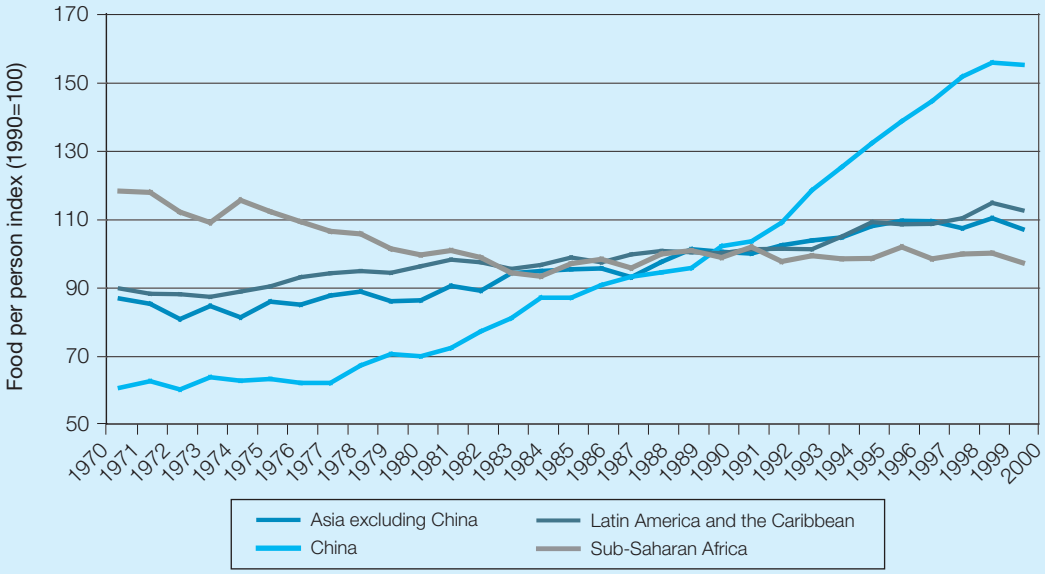
Productivity-enhancing investments have translated into income gains among the country's poor farmers. The World Bank estimates that average real incomes of small farmers and landless labourers in southern India increased by 90 per cent and 125 per cent respectively during 20 years of the "green revolution". The country's current monsoon-led agricultural boom is forecast to boost rural incomes further and aid in reducing poverty. For sustainable poverty reduction to continue in the long run, however, productivity in India's agricultural sector must continue to rise.

Sources: World Bank, 2000; Byerlee and Alex, 2002.

A central result of agricultural growth, namely the greater amount of food produced per person, is particularly relevant for poverty reduction. Because the rural poor have very few assets and usually work as casual labourers, sharecroppers or very small-scale operators, a greater availability of food output is indicative of a better potential position of the rural poor, particularly when the poor themselves have to purchase food.[17] Consequently the supply of food within a country, which admittedly reflects cropping patterns and price-driven incentive structures, can also be seen as a measure of greater proximity to food for the poor who work within the agricultural sector. To this end, there have been dramatically different regional trends in the index of food production per capita as

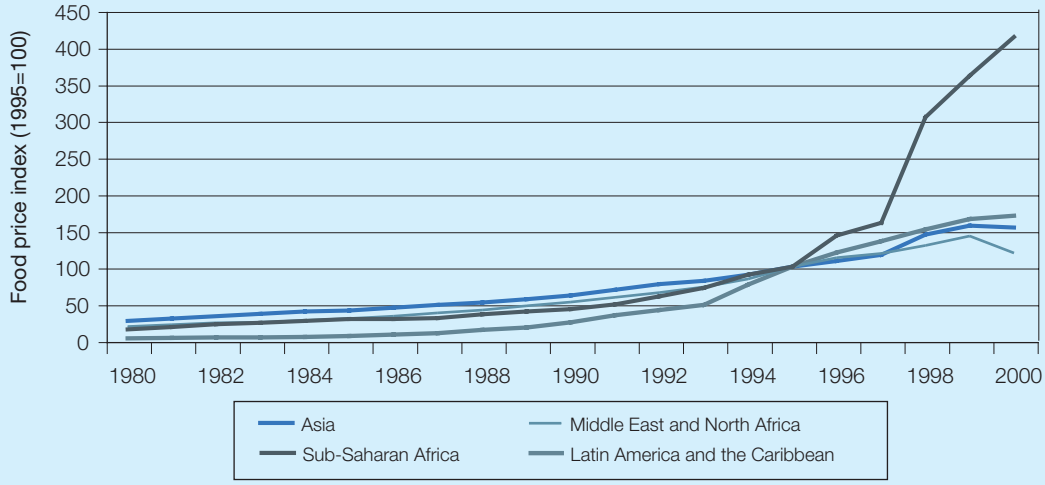
[17] IFAD, 2001.

Figure 3.12. Food per person index (1990=100), 1970-2000



Note: Generated using population-weighted, country-level average food per person.
Source: World Bank, 2003b.

Figure 3.13. Regional population-weighted food price index (1995=100), 1980-2000



Note: Generated using population-weighted, country-level average food prices.
Source: World Bank, 2003b.

figure 3.12 shows. Asia's position has continued to improve on this indicator and much of this improvement is based on results in East Asia, particularly in China. Moreover, given the worsening poverty trends in sub-Saharan Africa, the stagnation in food per person visible in this region suggests that food supply per capita is a reasonable indicator of vulnerability to poverty.

Looking in addition at the food price index across the regions in figure 3.13, important trends become clear. Asia has had a gradual increase in food prices yet these have not outstripped the per capita food supply trend. In this case (and particularly in China), rural income has steadily increased, pushing food prices upwards. There is a slightly greater rise in the food price index in the Latin American region. This could be due to the very high rural-to-urban migration, which has put pressure on the food supply for the increasingly urban population. In sub-Saharan Africa the food price increases in the 1990s have been extremely high. This fact, in conjunction with the deteriorating trends in food availability per capita, indicates the strong likelihood of anti-poor agricultural trends in the region. Finding the right balance between food price increases and food price stability has to be of concern for policy-makers. If prices grow too quickly, those poor people who consume these goods might suffer. If on the other hand prices do not rise, producers might have no incentive to invest, which can have negative impacts on employment creation. This is especially true for those who export their goods.

While food output and prices are special policy foci within a pro-poor agricultural growth strategy, the case for agricultural growth for poverty reduction also has some forceful supporting arguments. While poverty is largely rural, and agriculture is a major part of the rural economy, other activities within the rural economy can be stimulated by agricultural growth. Rural non-farm activities (NFA) are often included in the income-generating activities of households, and this is also true for poor households engaged in agriculture.[18] Examples of these activities include own-account (domestic) services, construction, education, food processing and sales, public administration and manufacturing, among others. It is estimated that non-farm sources account for 40 to 45 per cent of average rural household income in sub-Saharan Africa and Latin America, and 30 to 40 per cent in South Asia.[19] In India the range is from 25 to 35 per cent of rural income, according to IFAD (2001). Non-farm activities also account for a substantial share of employment among the rural population.[20] On average in developing countries, around 30 per cent of total rural employment is found in NFA. In Asia, NFA employment accounts for 44 per cent of rural employment and is growing twice as fast as farm employment in some countries, according to IFAD (2001). Non-farm activities represent at least 30 per cent of rural employment in Latin America. Looking at some economies also illustrates the importance of NFA employment in developing countries. For example, in China 34 per cent of the employment in rural areas was outside the agricultural sector in 2000.[21] In India, the share of employment in NFA has also increased

[18] Chuta and Liedholm, 1981; Saith, 1992; Lanjouw and Lanjouw, 1995.

[19] Start, 2001.

[20] Rural employment in NFA may be underestimated, since employment in most cases refers only to agricultural employment. In addition, jobs common among female labourers (clothing production, food processing, and education for the household) are not remunerated in most developing countries and therefore not included in employment figures.

[21] Johnson, 2002.

considerably, representing 29 per cent for males and 15 per cent for females in 2000.[22] In Viet Nam in 1993 the share was even higher, with 70 per cent of total rural employment being in NFA.[23]

The NFA sector can promote growth and improve rural welfare in several important ways. In a situation in which the rural workforce is increasing at a rate higher than employment in agriculture, non-farm activities can lower rural unemployment and underemployment and reduce pressures associated with rural-to-urban migration. Apart from the sector itself being a large market for agricultural output, growth in agriculture in the presence of a supported NFA sector can allow for the consumption of commodities and services produced in the NFA sector, thereby potentially providing important multiplier effects, both for rural employment and rural welfare overall.

Yet a survey of the issue done for the 1995 *World Development Report*[24] argued that support to this sector is undertaken largely within the context of an overall policy framework that is biased against the sector. Given the diversity of the rural non-farm sector, it is difficult to give a broad policy perspective. While independent efforts to support the sector may have dividends in themselves, it is important to recognize that the role of the sector in poverty reduction is likely to come into proper play when there is reasonable growth in agriculture. An important question when considering the potential contribution of NFA to development is whether such activities are efficient – in a local context – in terms of converting resources into output. Some non-farm activities may provide workers with low returns in relation to casual agricultural wage labour. Nevertheless, these new employment opportunities may be the starting point for people beginning to work themselves out of poverty and enhance their economic security.

3.5. The impact of productivity and employment on poverty reduction

The discussion so far has shown that agricultural development and growth is crucial for immediate and sustainable poverty reduction and that it is often even more important than growth in other sectors of the economy; that this growth also has supplementary multipliers within the rural areas; and that the role of food production and food price trends within agricultural development may be of particular focus within an agricultural growth-driven poverty reduction strategy.

Besides these factors, two other components contribute to growth: productivity and employment. It is often falsely argued that there is a negative trade-off between the two but, as shown in Chapter 2 of this Report, this is not necessarily the case. In fact, it is the complementary character of these two components on the aggregate level that drives growth in the long run. But is this also the case for

[22] Kundu et al., 2003.

[23] Lanjouw and Lanjouw, 2001.

[24] ibid.

the agricultural sector by itself? To answer this question, the focus now shifts to the relationships between productivity and employment creation in agriculture and poverty reduction.

Productivity in the agricultural sector: Is there a linkage with poverty?

Productivity – whether labour productivity or total factor productivity – is about how efficiently resources are used to generate economic growth. Given that growth reduces poverty and productivity contributes to growth, it is worthwhile to look closer at productivity in general and – for the specific focus of this chapter – at productivity in the agricultural sector and how it relates to poverty reduction.[25]

Figure 3.14 gives a systematic view of labour productivity in agriculture by region (see also Chapter 1 of this Report). The figure is not only informative with respect to growth trends in labour productivity but also with respect to labour productivity levels. Latin American levels of labour productivity are the highest in the developing world, followed by the Middle East and North Africa and the transition economies. East Asia, South Asia and sub-Saharan Africa all have considerably lower average labour productivity figures (for specific details on sub-Saharan Africa, see box 3.6). At the same time, these are the regions in which the largest number of the world's poor live.

Looking at the labour productivity trends from 1992 to 2001, there have been small increases in all regions, with Latin America and the Caribbean showing fairly sizeable gains in recent years. In terms of percentage gains, however, China leads these groups, as its agricultural labour productivity grew by over 36 per cent from 1992 to 2001 (although its overall labour productivity still remains quite low). China's growth is followed by Latin America (26.6 per cent), the Middle East and North Africa (20.7 per cent), South Asia (16.3 per cent) and sub-Saharan Africa (5.4 per cent).

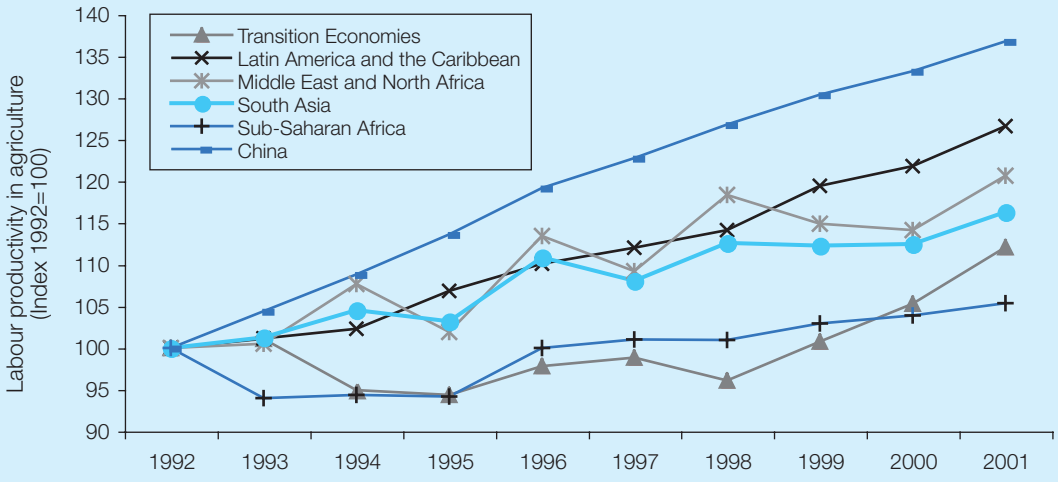
On the other hand, total factor productivity (TFP)[26] in agriculture shows consistent increases in all developing economy groups even after the early 1990s (figure 3.15). The regional differences in total factor productivity growth are also apparent in the developing world. It is noteworthy, however, that TFP growth has been somewhat more accentuated than labour productivity growth, especially in the 1990s.

In other words, while there is no evidence of enhanced regional labour productivity from the mid-1990s onward, when poverty reduction began slowing down, TFP still grew in each of these developing regions. The most impressive region was again China, and the region with the lowest TFP growth performance

[25] Despite the vast literature on the connection between agricultural growth and poverty reduction, much less has been written on the specific relationship between productivity and poverty reduction. When researchers have investigated this relationship it was often with a specific country focus: India by Ahluwalia (1978) and Datt and Ravallion (1996, 1998), Kenya by Rangarajan (1982) and Block and Timmer (1994), Philippines by Coxhead and Warr (1991), Bolivia by de Franco and Godoy (1993), and Bangladesh by Wodon (1999). These studies in general demonstrate that agricultural growth through productivity growth is important in reducing poverty.

[26] For a discussion on the different measurements of productivity see box 1.2 in Chapter 1 of this Report.

Figure 3.14. Labour productivity in agriculture by region, 1992-2001, and labour productivity levels in 1992 and 2001 (index 1992=100)

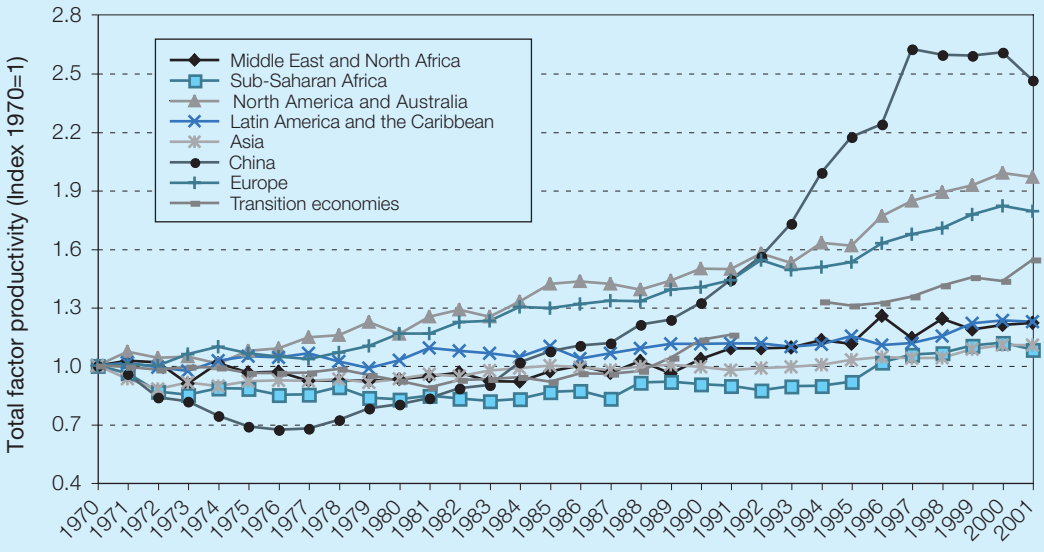


Labour productivity in agriculture in 1992 and 2001, (US$ 1995)

	1992	2001
Transition Economies	2165	2427
Latin America and the Caribbean	2874	3640
Middle East and North Africa	1993	2405
South Asia	360	418
Sub-Saharan Africa	344	362
China	250	342

Source: World Bank, 2004a.

Figure 3.15. Weighted average annual growth in total factor productivity in agriculture by region, 1970-2001 (index 1970=1)



Source: Rao et al., 2004.

was sub-Saharan Africa. It can also be seen that China, with an average TFP performance until the mid-1980s, suddenly gathered momentum, with TFP growth accelerating rapidly in the 1990s. The Chinese agricultural sector's performance appears to have matched the performance of its manufacturing sector and its overall GDP growth in the 1990s. This significant fact is not given sufficient attention. The dramatic declines in poverty in China are often related to its spectacular overall growth (especially in manufacturing). The point is that the country's general growth performance has been very balanced, with agriculture playing a key role in terms of both TFP and labour productivity growth.[27] The Chinese case[28] is probed further in box 3.7.

In terms of explicit linkages between agricultural productivity and poverty reduction, the empirical analysis conducted for this chapter (explained in detail in appendix 3.1) strongly supports the anecdotal evidence presented so far. In sum, it shows a strong and positive relationship between agricultural productivity growth and poverty reduction.[29] The results indicate that increases in agricultural labour productivity appear to have a more significant direct effect on poverty reduction than increases in TFP. One of the main reasons for this is most likely the relationship between higher labour productivity and higher wages. Thus, a relatively stronger case can be made for the importance of labour productivity growth in terms of directly reducing poverty versus the direct poverty-reducing effects of TFP growth. Yet, in all cases studied that were not characterized by extreme inequality, TFP and labour productivity were found to be complementary in terms of poverty reduction.[30]

The empirical analysis also highlights important indirect effects of agricultural productivity (both in terms of TFP and labour productivity) and poverty reduction. Since agricultural productivity impacts both on food production and food prices (as higher productivity allows for expanded food production and lower food prices), increases in agricultural productivity can also indirectly impact on poverty through these channels. The empirical analysis in appendix 3.1 points to a strong, negative relationship between food production per capita and poverty: as food production increases, poverty declines. The analysis also shows a positive, significant relationship between food prices and

[27] For a discussion of China's institutions and agriculture, see Hussain et al. (1999).

[28] In India, on the other hand, the cumulative growth factor in total factor productivity between 1970 and 2000 was fairly low, resulting in only a 0.3 per cent average annual growth. Partly, the low TFP growth appears to be due to the high base in 1970, which was followed by significant declines in TFP.

[29] One of the most recent works on this debate on agricultural productivity and poverty reduction was conducted by Thirtle et al. (2003). Via an econometric approach they first identify the importance of labour productivity in the agricultural sector for overall poverty reduction. In a further investigation they include and endogenize many of the relevant variables that affect poverty in a system of equations. The results show that investment in agricultural R&D raises agricultural value-added sufficiently to give very satisfactory rates of return within the agricultural sector, both in Africa (22 per cent) and Asia (31 per cent), but much less in Latin America (10 per cent). Thus agricultural productivity growth gives rise to sufficient growth to pay for R&D, with a substantial effect on poverty reduction. These authors find that a 1 per cent increase in yield reduces the numbers living in under US$1 a day poverty by over 6 million, 95 per cent of them being in Africa and Asia. They also find that the per capita cost of poverty reduction through agricultural productivity growth in Africa is US$144, for Asia US$180, but US$11,400 for Latin America.

[30] Earlier in this chapter, Latin America was identified as the one region where a high inequality was found to be the reason that high levels of labour productivity were not translated into poverty reduction.

Box 3.6. Challenges and potential in sub-Saharan Africa's agricultural sector

Sub-Saharan Africa has the highest regional poverty rate in the world, with over 45 per cent of its population living on less than US$1 a day. While this figure alone is alarming, more worrying still is that the share of the extreme poor in the region has actually been rising. Meanwhile, the number of people falling below the poverty line has climbed sharply to around 325 million, up nearly 65 per cent from two decades earlier.

The region is highly dependent on agriculture – two-thirds of its inhabitants live in rural areas, the majority of whom are engaged in small-scale, subsistence farming. Not surprisingly, there are clear and convincing indications that the region's poverty problems are strongly linked to the poor performance of its agricultural sector, which itself has declined primarily as a result of insufficient gains in productivity. Value added per worker in agriculture has actually declined over the past 25 years, from US$425 in 1980, to US$368 in 1990, to US$362 in 2001. (For more details, see Chapter 1 of this Report). This is partially the result of falling agricultural prices and also of low agricultural productivity. One clear cause of this low productivity is inadequate farming inputs; fertilizer use in the region in 2001 was 30 per cent less than in 1981, while the number of tractors per unit of land also declined over the period. One likely cause of the declines in these inputs is that the inputs themselves tend to have a smaller beneficial effect on productivity in sub-Saharan Africa than in most other parts of the world, largely because of the poor irrigation systems in the region.

Not surprisingly, agricultural output has not been sufficient to meet the needs of the region's growing population. The 1990s have witnessed a further increase in food production, yet population growth has also increased. As a result of these trends, the region is highly dependent on food imports, which were valued at US$18.7 billion (nearly 28 per cent of the value of the region's total agricultural output and 5.7 per cent of total GDP) in 2000. Even with these expensive imports, sub-Saharan Africa does not have enough food – over 200 million chronically hungry people live in the region, an increase of over 30 million in the past decade. This shapes the vicious cycle of hunger, low productivity and poverty: workers suffer from malnutrition and poor health, which leads to low productivity, which then results in low growth and continued poverty. In addition, workers have neither the strength nor the resources to invest in their human capital.

Yet despite sub-Saharan Africa's many poverty-related challenges and its history of agricultural stagnation, there are several reasons to remain hopeful that growth in the agricultural sector can be improved and used as a tool for poverty reduction, given the right mix of policies and donor support. The region has an abundance of land: sub-Saharan Africa has nearly 8 times as much land as India, yet only two-thirds the number of people to feed. The vast supply of land is also relatively equitably distributed and predominantly farmed by small shareholders. This implies that yield-enhancing productivity gains will have equitable growth consequences, and that growth in agriculture will likely reach those who need it most. Finally, contrary to general opinion, sub-Saharan Africa has enough water resources to increase agricultural output. The UN Food and Agriculture Organization estimates the amount of water withdrawn for agricultural irrigation as a percentage of all renewable water resources was only 3 per cent in 2000.

Yet in order for productivity improvements to take place, progress must be made in several areas. First, policy-makers need to encourage *appropriate* research and

development (R&D) initiatives in the region. Whereas much of the world's agricultural R&D is conducted with a focus on the needs of the developed world, in which large-scale production is the norm, agricultural R&D in sub-Saharan Africa must be locally relevant and therefore acknowledge the region's smallholder farming structure. Given sub-Saharan Africa's rapidly growing labour force, agricultural research should also explore the best ways to foster labour-intensive production methods. Second, governments and donors need to focus on raising agricultural yields in the region, particularly vis-à-vis food crops. This requires expanded use of irrigation and greater investment in inputs such as fertilizer. Governments in the region should also adopt more production-friendly policies. This includes removing taxes on agricultural production (again, particularly for food crops). Finally, rural infrastructure in sub-Saharan Africa needs substantial improvement. Without adequate roads and ports, there is little hope for the region to progress beyond agricultural subsistence. The challenges for improving agriculture and reducing poverty in sub-Saharan Africa remain considerable, but well-designed agricultural policies and greater and better-targeted assistance from donor countries could foster real poverty reduction in the region.

Sources: World Bank, 2004a; Hazell, 2002; Cleaver and Donovan, 1995.

poverty. In other words, if developing economies manage to increase the amount of food produced per person and thereby decrease the overall cost of food, poverty is expected to decline. Since agricultural productivity increases lead to greater food output and lower prices, the indirect effects of productivity gains vis-à-vis poverty reduction are clear. Taken together, these direct and indirect effects provide strong support for the notion that both labour productivity and TFP increases are needed to maximize the impact of agricultural growth on poverty reduction.

Determinants of productivity in the agricultural sector

Given the clear linkages between agricultural productivity growth and poverty reduction, devising how to increase both TFP and labour productivity is an essential first step in synthesizing a poverty-oriented development strategy in the agricultural sector. Appendix 3.2 provides the empirical results of an analysis of these determinants. In terms of the determinants of TFP in agriculture, several key relationships appear from the analysis. First, measures of economic openness, such as trade and foreign direct investment are consistently positively associated with higher levels of total factor productivity. Along similar lines, geographic isolation tends to negatively impact on TFP. Human capital appears important to TFP: as literacy rates improve, so does TFP. Next, adverse health conditions negatively affect TFP, as shown by the systematic negative relationship between malaria prevalence and total factor productivity. Inequality is also negatively related to TFP. Finally, the proportion of land under irrigation positively and significantly impacts TFP.

While there are many factors that determine TFP, given that the quantities of land and labour and geography are relatively fixed, these results imply that

Box 3.7. China's experience with agricultural productivity and poverty reduction

China is one of the few countries in the developing world to make substantial progress in reducing its total number of poor in the past two decades. Official documents indicate that the number of poor in China started declining from 1978 onwards. There were 250 million rural poor (33 per cent of the rural population) in 1978. This changed dramatically after the rural reforms, which started in the same year. By 1984 only 11 per cent of the rural population was living below the poverty line, decreasing to 8 per cent in 1994 and 3.7 per cent in 2000, representing only 30 million people. Even by taking the more conservative World Bank figures (which are generally higher), there was a reduction of rural poverty from 31 per cent in 1990 to 11.5 per cent in 1998. A reduction in poverty on this scale and within such a short time is unprecedented in history. Contributing to this success were policy and institutional reforms, promotion of equal access to social services and production assets, and public investment in rural areas.

Agricultural reforms were introduced by Deng Xiaoping in 1978 in order to raise the living standards of the people and to eliminate poverty by 2000. These reforms consisted in dismantling the commune system, granting farmers decision-making power, introducing the contract responsibility system, and raising producer prices. These reforms created a mixed economy where central planning coexisted with markets. The introduction of the "household production responsibility system", for example, allowed farmers to retain a certain proportion of outputs after fulfilling a production quota. Grain output increased dramatically as did per capita income, which increased on average at a rate of 15 per cent a year between 1978 and 1984, but at a much slower pace of 3 per cent between 1985 and 1989 (mainly because of stagnation in agricultural production after the reforms). Much of the success in raising per capita agricultural income – and thereby reducing poverty – was attributed to productivity improvements. With crop prices stagnating, rural income gains had to come from increased productivity in agriculture or from employment outside of agriculture.

Agricultural productivity grew rapidly between 1979 and 1984, the early stages of agricultural reform. Productivity growth continued but at a lower pace from 1984 onwards. This slow rate is mainly the result of opening up the rural industrial sector and the rapid growth of China's township-village enterprises, which drew higher quality labourers (over 28 per cent of the rural labour force in the 1990s in certain rural areas) away from traditional agriculture. In sum, growth in agricultural productivity came through:

- Improvements in technology (machines and fertilizer)
- Research and development
- Increased production (extension)
- Better infrastructure (irrigation, roads, etc.)
- Institutional reforms
- Better education

Other, parallel measures were also taken to reduce poverty, such as instituting higher agricultural wages, increasing non-farm employment opportunities, rural reforms, public investments, and targeted poverty investment programmes. It should also be mentioned that progress in reducing poverty has generally occurred during

periods of rising rural incomes in China. In the past twenty years, China showed a strong economic growth rate, averaging over 11 per cent a year in the 1990s, a phenomenal growth that would not have been possible without agricultural productivity growth. In sum, agricultural productivity increased, leading to higher rural incomes through changes in the marketing system and employment structure and encouraging the outflow of workers from agriculture into rural non-farm activities.

Sources: Fan et al., 2004; Mead, 2003.

sustainable rural development will arrive through increases in the quality of labour and land, and through decreasing transport costs through better infrastructure. In particular, the results suggest several avenues for developing countries to increase total factor productivity in the rural sector. Investment in human capital through education and health outlays is one avenue, improving physical infrastructure for the rural sector is another. Both ways are clearly dependent on the constraints and sector biases that a country faces with regard to public investment. While a more open trade regime appears to be associated with higher agricultural productivity, it is essential to examine more specifically what open trade regimes really mean in an agricultural policy context in a given economy. Land ownership distributions are relevant and better distributional conditions appear to have a beneficial impact on TFP. Improving institutional conditions such as the extent of democracy, political stability, and conflict reduction are important goals in themselves, but based on the empirical work done for this chapter, they cannot be proposed as factors that cause improvements in productivity in the agricultural sector. The reasons for this may indeed be that the quantitative notion of "institutional" improvement itself carries representational biases reflected in indicators, and more participatory agrarian environments may not be linked to the extent of political freedom, as is commonly understood.

In terms of the determinants of agricultural labour productivity, the vast majority of the results are consistent with many of the correlates of TFP. This implies that well-designed policies can positively impact both sources of productivity in agriculture at the same time. The empirical results show that using better quality fertilizers, more (or better) tractors, and widespread irrigation are good examples of technical-input quality improvements that have direct influences on labour productivity. Openness also appears to be favourable in the labour productivity context, offering some evidence of the benefits that global markets can provide to agricultural workers. As box 3.8 shows, it comes as little surprise that health status appears very important in determining labour productivity. A healthy agricultural workforce is crucial to expanding output on a sustainable basis. The data also show that income inequality is negatively related to labour productivity in agriculture. Thus, improving land ownership distributions in those countries that have not had proper land reform is a significant policy intervention to consider on grounds of poverty reduction as well as on grounds of equity.

Productivity and food prices: An important link to poverty reduction

Section 3.4 of this chapter argued that food price development provides an important linkage between growth and poverty reduction. A closer look shows that it is often productivity changes that drive changes in prices. Demand for most agricultural goods, particularly staple foods, is very inelastic (that is, consumers are not very responsive to changes in price). In the short run, the supply of agricultural goods is also highly inelastic (producers cannot and do not immediately change the amount of agricultural goods they supply because of changes in price). As a result, when technological improvements raise agricultural productivity and the supply curve shifts outward (the same amount of output can be produced with less input), the prices of goods typically fall considerably. In the developed world, where there are relatively fewer producers of agricultural goods, and where no single agricultural commodity typically makes up more than 5 to 10 per cent of consumer budgets, high variability in prices in agriculture does not seriously threaten society's overall welfare. In developing economies, however, in which large segments of the population typically rely on agricultural production for their income, and where budget shares of food staples are very large, high variation in agricultural products can have serious negative consequences on living standards (Gabre-Madhin et al., 2003).

The impact of productivity improvements in the agricultural sector on poverty can vary considerably. It depends on the structure of the market for the given commodity and also on the nature of production in terms of whether producers themselves rely on their product for consumption. The following points provide some examples of the different ways in which productivity improvements can impact on prices and poverty:

- In a closed economy, when demand for an agricultural product is highly insensitive to price changes and producers themselves do not consume a large portion of their product, the benefits of productivity improvements accrue to consumers through lower prices. The basic notion is that only the early adopters of a new agricultural technology will benefit from the increased revenues associated with more production. As more and more producers adopt the production-expanding technology, total production increases and prices drop, benefiting consumers but hurting producers. Because the poorest producers are also the least likely to be able to afford adopting the new technology, they will be most likely to face falling prices without production increases, and thus their overall welfare will fall.
- When the same conditions exist as in the previous point but producers themselves consume a large portion of their product, the benefits of productivity improvements accrue to both producers and consumers. The larger the quantity of home consumption, the higher the consumer surplus that accrues to producers. This is more the case of a closed developing economy.
- In a small open economy, in the case of export crops, the benefits of productivity improvements accrue primarily to producers. Here the assumption is

Box 3.8. The impact of HIV/AIDS on productivity in agriculture

'The family has been talking over their problems since the sun went down. The young ones move in and out of the hut, anxious but not able to sit still. The father lies on a string bed, coughing, unable to speak for long. Their oldest son moved to the city and helped by sending money home, but the payments stopped some weeks back. They are worried about him, and about how they will manage. John says they must stop cultivating the far field – it takes too much time. Young Thomas offers to take the goats there to graze, but Rose bursts out, "How can you do that, and weed the maize, and go to school? If you stop school, how will you make progress when you're an adult?" Then, more quietly, "Anyway, I think we have to sell the goats. We don't have Peter's money, and the medicine is so expensive". Mary suggests, "If we take in one of your brother's children, he can help work the middle field, and grandmother will have one less mouth to feed". "But we'll have one more. I don't know. We need help with caring for father, and with the farm, but if we take one of your cousins we may not have enough food. Whatever happens, Mary, you and I must keep tending the vegetables, and look after the chickens well. Without them we'll be eating only mealy porridge and that isn't good, especially for the young ones." But Rose was afraid that even this wouldn't be possible for long. She had started to feel sick and weak herself. She wouldn't tell them until she had to, but she knew that soon it would be up to Mary to look after all of them.' (Citation from Leather, 2003.)

This distressing story portrays the human impacts of HIV/AIDS. It also illustrates the economic impacts involved, not only for this family but for the economy overall. The epidemic mainly affects those between 15 and 45 years of age, the most productive workforce and the financial mainstay of families and communities. As a result, the more labour-intensive the economic activity, the more it is at risk in high-prevalence countries. And the more an activity depends on the labour of women, the more it is also at risk – over half of all new HIV infections are among women, and 60 per cent of those infected in Africa are women.

AIDS was long perceived as a largely urban, rather than rural, phenomenon. This view has now changed, given the complex pattern of dependency between rural and urban areas, the rural poverty that propounds lack of access to information and health services, and the greater hold of tradition and customary law in rural areas. Current statistics bear this out, with many countries reporting a more rapid increase in new cases in rural areas.

The only way poor households can react to the epidemic is to reduce their farming hours or switch to less labour-intensive – but probably also less productive or lucrative – crops. Tasks which yield more benefits in the long term tend to be neglected in favour of more immediate returns. A particular issue, which will have repercussions for generations to come, is that children are taken out of school to help with the jobs that need doing, or because school costs too much, or because they lose their parents. The next stages were described by UNAIDS Director, Peter Piot: "People are obliged to adopt survival strategies that may put their lives in danger. Some of them emigrate, often to shanty towns that lack health and education services; women and children may be forced to prostitute themselves in exchange for food, work or other essentials…." The HIV/AIDS epidemic thus has a negative impact on productivity – not only in the present but also for the future – making it almost impossible to use the potential of agriculture for the overall development of an economy.

Source: Leather, 2003; Dromeel, 2003.

that prices do not fall as a result of increased production, as export demand is growing as well, so producers benefit greatly from expanding production. The same case applies when producers consume a portion of their output.

Since the overall welfare effects of agricultural productivity improvements are typically positive (and are strictly so for consumers), and because welfare-reducing effects for agricultural producers stem from the price mechanism, policy-makers concerned with reducing poverty should pay close attention to agricultural pricing policies. There is no single way for governments to address the multitude of needs of the poor members of society. But those economies with large segments of the population involved in agriculture that have been successful in fostering sustained economic growth and reducing poverty have very often instituted policies that provided price supports to producers (for some examples, see box 3.12).

Wages and employment in agriculture and poverty reduction

As mentioned earlier and also discussed in other chapters of this Report, growth is not only a function of productivity but also of employment. This holds true for all sectors: if more people work, it is likely that more will be produced. At the same time, the more people earn (through their work), the more they can either save or consume – the former having an indirect effect on growth via interest rates and investment, the latter having a direct growth effect. As simple as this seems, many development initiatives fail to focus on employment, thereby reducing the likelihood of having a sustainable impact on poverty reduction.

Often, the only asset poor people have is their potential to work. The link between employment and poverty reduction is even more obvious than the link between growth and poverty reduction or productivity and poverty reduction. If people have a job in which they earn money, they have a chance to get out of poverty. It then becomes a question of how much they earn and whether they can lift themselves and their families above the poverty line. While this is certainly true for all sectors of the economy, since the poor are mainly found in rural, agriculture-producing areas, it is specifically true in the present context. The next question is, how can poor agricultural workers earn enough to escape poverty? This is where productivity enters the picture. Even if there are cases in which higher productivity does not automatically and immediately lead to higher wages, in the long run these two variables go hand in hand. This is true for the economy as a whole, but also for each sector. Therefore the policies to raise labour productivity in agriculture outlined in the previous section should also have positive impacts on wages and thereby on poverty reduction.

But there is also another, very human dimension to raising productivity. By not only giving people any kind of job – even if they are well paid – but rather decent jobs, productivity will rise in the long run. A healthy mother with a satisfying job where she can work in freedom and dignity, where she may voice her opinion and where she has some type of security if she becomes sick or loses her job, will be more able to work herself and her family out of poverty. She will also

make sure that her children will have the same chances later on in life. She will send them to school, provide them with health care, and be able to better tend to their other needs. As a result, expanding decent and productive work sets the stage for poverty reduction, and also for future growth in the economy as a whole. Box 3.9 offers an interesting example of employment creation and box 3.10 looks at the lack of decent jobs in agriculture. One argument is that the price paid for decent work for some people is that fewer people will be able to find a job, but this is very unlikely to happen. A person out of poverty will consume more goods and services and thereby contribute to growth, which creates further employment opportunities. Poor people without jobs or with low-paid jobs simply do not have this capacity. Poverty itself inhibits employment growth and, without growth in decent employment, one important source for overall growth and poverty reduction is neglected.

There is no doubt that some sources of labour productivity growth, especially capital-intensive technologies such as tractors, may increase productivity but could also be employment-reducing – especially in the short and medium run. Yet output growth is unlikely to be sustainable unless it is also underpinned by technological change. If this is not the case, agricultural labour productivity might not rise fast enough or may even stagnate, and employment will subsequently be less likely to make a significant dent in poverty. At the same time, employment reduction in agriculture can have serious, adverse implications for poverty in the short run. To minimize these effects, adequate social safety nets must be in place unless other sectors are able to absorb the surplus labour.

The empirical evidence underscores the fact that employment growth and productivity growth in the agricultural sector can go hand in hand. Figures 3.16 and 3.17 show that both labour productivity and employment in agriculture grew in many economies in the period from 1980 to 2001 and in the period from 1990 to 2001 (China is one of the economies in this quadrant). Figures 3.16 and 3.17 also show a large number of economies that have experienced declining employment coupled with increasing productivity. Even though on first sight this seems to emphasize the view that rising labour productivity means the loss of jobs, a careful examination reveals that in most cases these economies have gone a step further in the development process – in which structural change has started attracting labour away from the agricultural sector. This reinforces the argument advanced in this chapter: many economies have seen growth in agricultural output per person employed in parallel with structural change, making the point that the development process ideally has to be supported by a healthy agricultural sector.

Figure 3.18 adds to this argument. It shows the average change in poverty for all countries within each of the quadrants from figures 3.16 and 3.17. Whether taking the US$2 or US$1 a day poverty line and whether the past ten years or 20 years is the period chosen, the economies with increases in productivity and increases in employment in agriculture have had the highest decreases in poverty. Economies with an increase in productivity but a decrease in employment

Box 3.9. Women in agriculture: Fresh cut flowers in Colombia and Ecuador

The cut-flower industry

With an estimated value of US$30 billion, the global market for fresh flowers has rapidly become an important source of income for several developing economies, which now supply over 30 per cent of the world market. Favourable growing conditions in southern countries, cheaper labour and low relative transport costs of flowers are increasing developing economies' comparative advantages for production. In Colombia, the industry has grown from a mere US$20,000 in the 1970s to US$580 million in 2000, or over 3 per cent of total export earnings. At the present time, Colombia is the world's second largest producer of flowers after the Netherlands. In Ecuador, the industry is now the country's fourth largest in terms of exports. Together, these two economies currently achieve around US$775 million in export earnings annually from cut-flower sales. For developing countries participating in the industry, this new source of income is providing an increasingly important supplement to the often declining revenues earned from traditional commodities.

Industrialized countries consume the vast majority of cut flowers sold in the world, with consumers in the United States alone spending over US$16 billion each year. As the base of production in developing countries is typically found in rural areas, the cut-flower market provides a direct and important link between the rural poor and these global markets. This is particularly the case for poor women living in rural areas. In Colombia, some 70,000 to 75,000 people are employed in the cut-flower business, 60 to 80 per cent of whom are women, and another 50,000 people are employed in related industries. In Ecuador, around 50,000 people are employed in the industry, between 50 and 60 per cent of whom are women. The large and growing number of jobs it is providing to rural parts of developing countries raises hopes that this industry might serve as a force for poverty reduction, particularly among women, who bear a disproportionate share of the global poverty burden.

Profile of women cut-flower workers

Women workers in the cut-flower industry tend to be young. One study estimated that 86 per cent of women working in flower-packing operations in Ecuador were between 15 and 29 years of age. Many of the women workers are single and often have children. In Colombia, some 80 per cent of households that depend on the cut-flower industry are headed by women. Female workers in the industry tend to have very little education, few tangible assets, and little in the way of employment alternatives aside from domestic work and textiles, which typically pay lower wages. Taken together, the characteristics of women workers in the industry reveal a poor and vulnerable workforce, lacking alternative employment and educational opportunities and struggling to rise out of poverty.

While jobs in the cut-flower industry are providing women with new and often better income-generating options than those previously available to them, much work remains to be done to translate the industry's poverty-reducing potential for women into a reality. Most noticeably, the large gender disparities in employment positions clearly work against women workers. In Colombia, for example, women comprise only 5 per cent of top managers, 9 per cent of managers, 10 per cent of mid-professionals and 48 per cent of lower rank supervisors in the industry. In addition, the majority of the jobs women hold lack employment benefits such as health insurance and pensions. The widespread use of temporary, seasonal, and other insecure work

arrangements provides additional barriers to reducing poverty among workers in the industry.

In order for the cut-flower industry to become a sustainable poverty-reducing force in the developing world, the employment status of workers in the industry, particularly among women, needs to improve. Effective training programmes could raise worker productivity and foster greater tenure among workers. Companies should also strive for greater gender equality in management positions throughout the industry. Finally, enforcement of national and international labour protection and codes of conduct is needed to ensure that the most basic and essential labour standards are being met.

Sources: Dolan and Sorby, 2003; World Bank, 2003b.

also showed a reduction in poverty over the past 20 years, but less so than those economies in the northeast quadrant. Over the past ten years, the reduction in poverty has been higher on average in economies with productivity increases and employment decreases in agriculture – again as a result of the structural transition process.

Box 3.10. Decent work deficits in agriculture

Decent work for all is one of the principal goals of the ILO. Decent work reflects the aspiration of men and women everywhere to obtain productive work in conditions of freedom, equity, security and human dignity. Decent work encompasses respect for basic rights, access to employment, safe and healthy working conditions, and social security. Decent work comes about through social dialogue.

Unfortunately, decent work deficits are pervasive in the agricultural sector. They are expressed in the widespread denial of rights at work, in poor quality employment and high levels of unemployment, in unsafe working conditions and lack of income security, and finally in the inadequate representation of agricultural workers in the social dialogue which could improve their working lives.

The ten ambitious Millennium Development Goals set by the world community aim at reducing poverty and hunger, at increasing access to safe drinking water, to health care, to education and at implementing national strategies for sustainable development. All of these goals are of direct interest to those who live and work in rural areas. Indeed, ensuring rural workers' access to secure employment and decent working and living standards are critical steps in reducing poverty and achieving sustainable livelihoods.

Providing decent jobs for people in agriculture is not "doing them a favour". It is the only possible way to guarantee sustainable future development, because it gives these people the opportunity to work themselves out of poverty, not just in the immediate future but for the long run.

Source: http://www.ilo.org/public/english/dialogue/sector/sectors/agri.htm

Figure 3.16. Productivity vs. employment changes in agriculture, 1980-2001

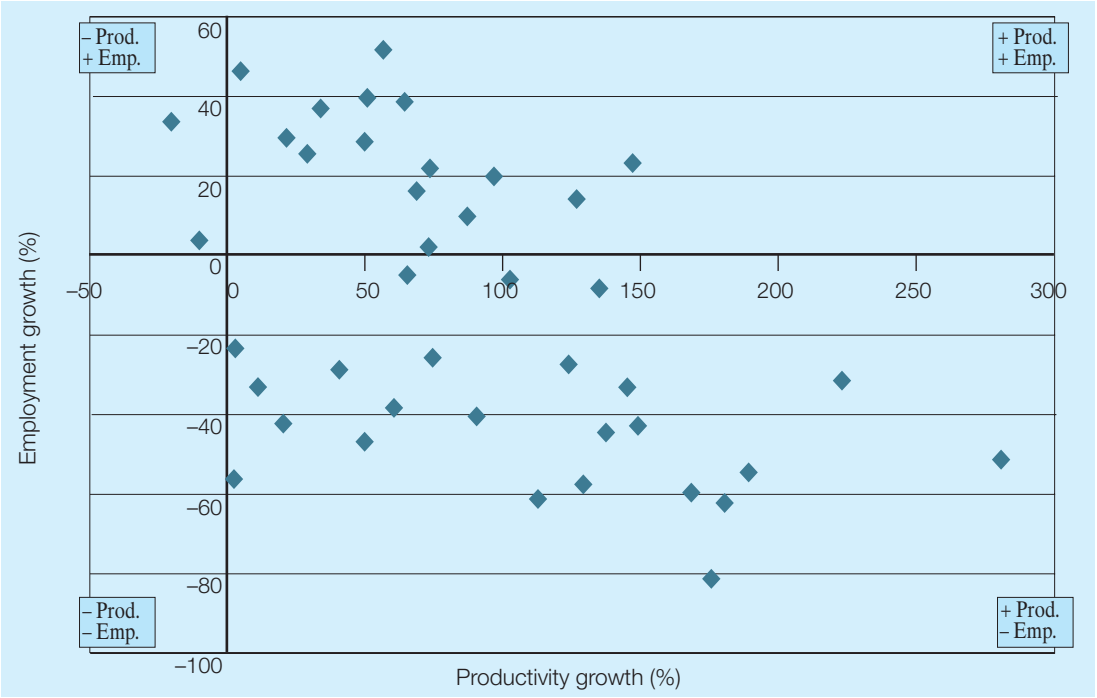
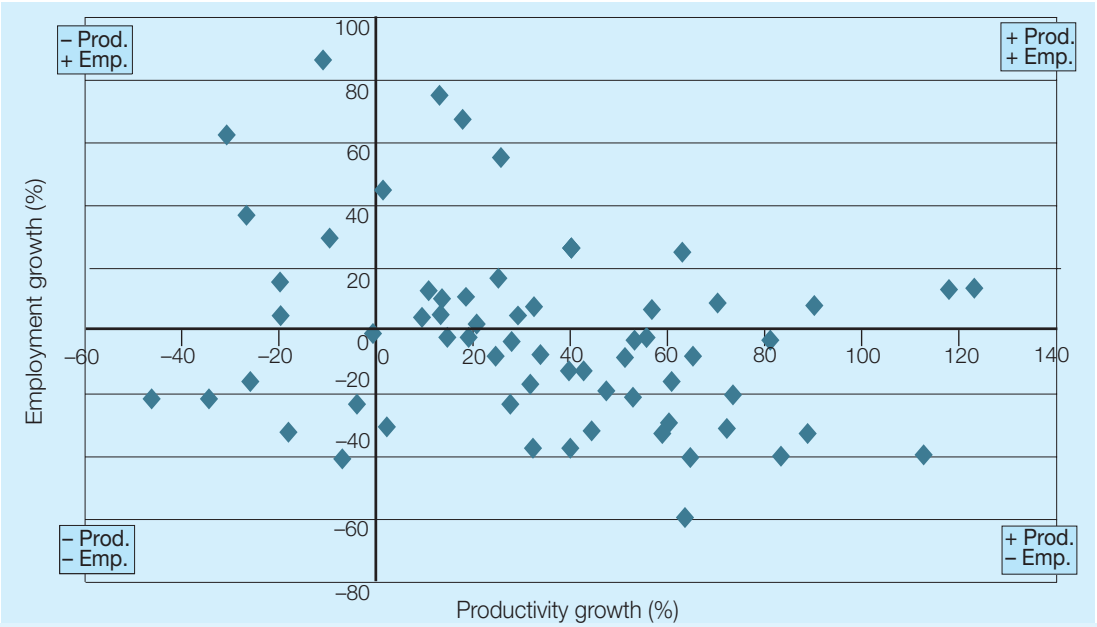
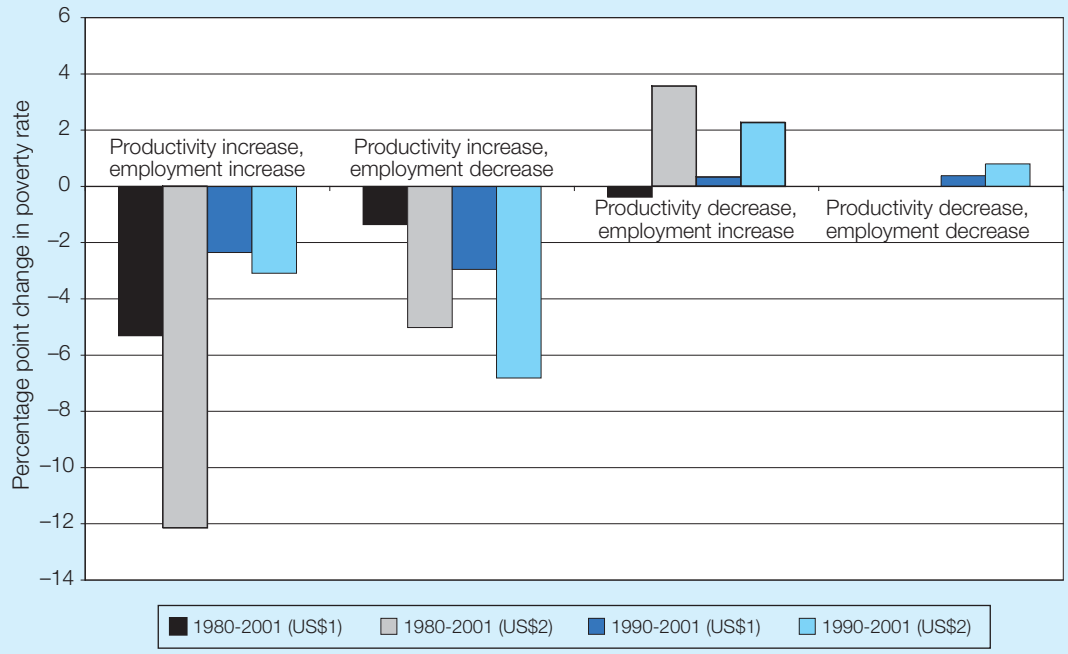


Figure 3.17. Productivity vs. employment changes in agriculture, 1990-2001



Source: Calculation based on ILO, 2003, series 4a: Employment by sector (percentages); series 18e: Labour productivity, agriculture. Figures 3.16 and 3.17 are interpreted as follows: economies in the upper left quadrant experienced a decline in agricultural productivity and an increase in agricultural employment over the period in question. Economies in the upper right quadrant experienced an increase in both agricultural productivity and agricultural employment over the period. Those in the lower right quadrant experienced an increase in agricultural productivity and a decrease in agricultural employment, and economies in the lower left quadrant experienced a decline in both agricultural productivity and agricultural employment over the period analysed.

Figure 3.18. Average percentage point change in poverty rates, different productivity and employment trend groups, 1980-2001 and 1990-2001



Note: Figure 3.18 is interpreted as follows: the first four bars from the left correspond to the upper-right quadrant in figures 3.16 and 3.17. The first of these bars shows that on average between 1980 and 2001, the economies in this quadrant reduced US$1 a day poverty by 5 per cent. The second of these bars shows that, on average, economies in this quadrant reduced US$2 a day working poverty by just over 12 per cent. The third and fourth bars show that between 1990 and 2001, economies in the upper-right quadrant of figures 3.16 and 3.17 reduced US$1 and US$2 a day poverty by between 2 per cent and 3 per cent, respectively.
Source: Estimates based on the Global Employment Trends model. For additional information on the model and sources, see the ILO Employment Trends web site for world and regional estimation on http://www.ilo.org/public/english/employment/strat/wrest

3.6. Policy recommendations

While poverty has been decreasing in the world, the rate of decline slowed in the 1990s – a trend that occurred in parallel with declining interest in the agricultural sector among policy-makers. There has also been a large divergence in global poverty trends, in particular with poverty rates falling throughout much of the world, but surging in sub-Saharan Africa. This is likely to seriously jeopardize the Millennium Development Goals on poverty. This chapter has shown that agricultural growth is critical for poverty reduction, largely because poverty has a very significant rural and often agricultural dimension. To attack poverty effectively in countries whose poor are largely dependent on agriculture, an explicit agricultural growth strategy is needed. To achieve the maximum impact of growth in agriculture for poverty reduction, the following points need to be emphasized in development strategies.

Focusing policies on labour productivity and decent employment creation

- Agricultural growth that is led by growth in labour productivity appears to have the maximum effect vis-à-vis poverty reduction. Particularly in countries with large segments of the population working in agriculture, policy-makers should avoid overemphasizing mechanization in agriculture. They should also exercise caution vis-à-vis granting subsidies that could result in over-generous credit policies and over-valued exchange rates, which can encourage sub-optimal use of labour-replacing technologies.[31]
- Poverty reduction is most likely to occur when employment is created. This is at least true for the period in the development process where other sectors do not yet have the capability to absorb surplus labour in rural areas. To this end, agricultural policies should be as employment-friendly as possible, particularly in countries with surplus labour in rural areas. To ensure that the overall gains from agricultural development are sustainable, the focus needs to be on the creation of decent jobs.

Laying the ground for poverty reduction by focusing on processes, institutions and infrastructure

- Food price development must become a specific policy focus nationally as well as internationally. It is important that food prices in the poorest parts of the world do not rise to levels that could harm the poor and thereby undermine poverty reduction. At the same time prices have to be high enough to ensure that food-exporting economies can earn enough to foster an attractive investment environment and earn enough foreign exchange to meet domestic development objectives.
- While a more equal income distribution is generally better for poverty reduction, in particular better distribution of land ownership in agriculture will facilitate both output growth and accelerate poverty reduction.
- Investments in water supply (see box 3.11), infrastructure and health not only have a positive impact on productivity growth but also on employment creation and poverty reduction.
- The same holds true for investment in education, agricultural research and development and other institutional reforms, even though the impacts on these kinds of investments might not immediately pay dividends.
- Non-farm activities should be fostered as an additional source of employment creation, adding further to the poverty reduction potential of the agricultural sector.

As with every set of policy recommendations, there is no "one size fits all" solution with regard to agricultural policies: advising developing countries to focus on agricultural development could potentially lead to the adoption of flawed and inappropriate policies. Whether a focus on agricultural productivity,

[31] ILO, 2002; Khan and Lee, 1995.

Box 3.11. Water as a source of success: How it can contribute to productivity growth, employment creation and poverty reduction

In many cases the supply of water and timely irrigation facilities is the most important starting point for productivity, output and employment growth, and thereby for poverty reduction in rural areas:

- In dry areas the supply of water raises output per hectare as well as the availability of fertile land.
- The use of fertilizers often only makes sense if there is enough water to keep the growing output per hectare alive.
- Healthy water is the precondition for healthy workers, and a healthy workforce can produce more. For example, by being able to wash one's hands with soap and water can reduce diarrhoea by 35 per cent in the world (2.2 million people die every year from diarrhoea.)
- Implementing and containing water supply systems and water management projects can be used as a means of employment creation.
- In many developing countries with a shortage of water, the task of collecting water often falls on women, who sometimes must walk long hours to fetch it. Their productive potential might be more profitably utilized.

A successful Food and Agriculture Organization (FAO) project provides one example of how easy and effective it can be to provide people with water. In the early 1980s, thousands of farmers in Bangladesh began using a revolutionary new device – a simple, inexpensive human-powered water pump to irrigate crops. The FAO was convinced that this technology would help African farmers if it could be adapted to local conditions and manufactured locally. In Zambia, a recent joint project of the FAO's Special Programme for Food Security and the International Fund for Agricultural Development demonstrated the benefits of the pump. Then, with assistance from International Development Enterprises, an NGO, local manufacturers were trained to produce and sell the pumps. Soon a network of retailers had spread across the country, and more than 1,000 pumps were sold at a cost of US$75 to 125. Instead of lugging heavy buckets of water to their small plots of beans, sweet potatoes and cassava, farmers pumped more water in less time with the treadle pump. Growers doubled their land area under crops and introduced new varieties such as tomatoes, cabbage, rapeseed and onions. Women in particular profited from the technology, being able to better feed their families while generating additional income. Similar ventures with local manufacturers have started in Burkina Faso, Malawi, Mali, Senegal and the United Republic of Tanzania.

Today, 70 per cent of water used in the world is in agriculture (with 22 per cent for industrial use and 8 per cent for domestic use). It is important to make sure that this scarce resource is not wasted. The success of sustainable water management should include the support of local people and their knowledge, effective information policies to raise awareness, and training on how to make the best use of water.

Given the advantages water brings to people's lives, investment in the water supply is one of the most effective ways to support productivity growth at the same time as employment growth.

Sources: Bowden, 2002; UNEP, 2002; FAO, 2003a.

Box 3.12. Some successful examples of agricultural policies

The following are some examples of ways in which agricultural policies have been fostered in some economies:

1) **Maintaining stable and profitable prices received by producers**
   - India established minimum agricultural support prices.
   - The Republic of Korea established a price stabilization fund for cash crops.
   - In Taiwan (China), the Government maintained stable rice prices by actively intervening in this economy's rice market.
2) **Delivering modern, productivity-enhancing inputs to small, poor farmers**
   - In India, the Government offered profitable prices for crops for which new technologies were available and announced their policies before the sowing season, in order to encourage production.
   - The Republic of Korea provided extensive subsidies to producers and established a nationwide campaign to distribute high-yield rice varieties among farmers.
3) **Strengthening and expanding rural credit institutions**
   - Taiwan (China) provided rent in kind for use of government-owned land for production.

employment and growth is appropriate for a country depends on its stage in the development process, and on the potential of the agricultural sector in terms of natural resources and human resources. It also depends on international commodity prices and the market situation for specific products. Economies have to find their niche in terms of where they can compete with other economies inside and outside the developing world. They also have to make sure that the path they choose is sustainable in terms of environmental constraints.

But success not only depends on the right choice of each individual country (for some successful examples of agricultural policies on the country level, see box 3.12). It depends on the behaviour of the world community as a whole. Without collective action taken to achieve a fair globalization, national activities in agriculture are bound to fail. Global rules and policies on trade and finance must allow more space for policy autonomy in developing countries. This is essential for the development of policies and institutional arrangements best suited to specific-country levels of development and specific circumstances. The policies of international organizations and donor countries must also shift more decisively away from external conditionality to national ownership of policies.[32]

Some region-specific issues must be taken into account when formulating development strategies for the agricultural sector. For example, in sub-Saharan Africa, the majority of agricultural output is from poor smallholders who consume a large portion of their output. Here, the direct effects of productivity

[32] World Commission on the Social Dimension of Globalization, 2004. The development of the agricultural sector in the light of trade barriers for many commodity goods is one of the key issues of the Commission's report.

improvements – such as greater production and revenues, increased home consumption and increased nutritional value of food – are very important in terms of poverty reduction. Encouraging technological innovations among these poor farmers will have direct benefits vis-à-vis reducing poverty. In much of Asia, to take another example, most of the poor are landless and live in rural areas. Here, the indirect effects of agricultural growth – reduced food prices and positive employment and wage effects – are most important for poverty reduction. The best mechanism in this case is targeting technological improvements towards employment creation for alleviating poverty.[33] A third example is Latin America, where poverty is mainly urban and large farmers own a majority of the land. Here, the best way to reduce poverty with productivity improvements is through reductions in the prices of the types of food that the poor most often consume. In all cases it is important to focus on a stabilization of the prices of export goods.

3.7. Concluding remarks

For too long policy-makers have ignored the agricultural sector's potential to foster poverty reduction and to promote economic development. The reasons for this neglect are manifold and should be addressed so that agriculture can resume its significant role. Some of the typical concerns and fears of policy-makers include:

- Many of the positive impacts of productivity and employment work best in a small-farm agricultural environment, whereas modern development (increased rural to urban migration and growing globalization) seems to call more for large farm structures. Even if this is the case in the longer run, for the time being there are many economies in which small farms are still dominant, especially in Asia and sub-Saharan Africa. These economies would still benefit from a sharpened focus on agriculture. In addition, the fact that small farms cannot always successfully compete with larger farms could often be overcome by coordination among farmers and by higher investment in human and social capital.
- The long-term fall in global agricultural commodity prices and declining terms of trade in economies in which agriculture has a large share in total output has undermined the profitability of agriculture as a business. Although this has been true, the picture can be improved. By reducing agricultural subsidies in developed economies and by fostering developing economies' access to the developed world's markets, agriculture can be profitable. In addition, public investment in rural areas can lower production costs in agriculture and make the sector more competitive (see box 3.13).
- Focusing on agriculture runs the risk of exacerbating problems related to natural resource constraints, particularly with regard to soil and water. But this limitation is not only true for agriculture and sustainable agricultural

[33] For a detailed analysis of the specifics of the Asian agricultural sector and its potential for productive employment, see Khan and Lee, 1995; Ishikawa, 1978.

Box 3.13. Risk and reward in agricultural trade

International trade in agricultural goods has received a great deal of attention from policy-makers, researchers and the media recently, particularly regarding the controversy surrounding the World Trade Organization's Fifth Ministerial Conference held in Cancún, Mexico in September 2003. The meeting in Cancún was set up with the goal of moving forward agriculture-related trade reforms proposed in the 2001 Doha Declaration. In general terms, this meant phasing out export subsidies and reducing other forms of domestic supports to agriculture. Most analysts have since declared the Conference a disappointment, as developing and industrialized economies ultimately failed to reach consensus as to how to move agricultural trade reforms forward. A July 2004 meeting at WTO headquarters in Geneva appears to have successfully restarted the debate, as broad consensus was reached on how to begin to move Doha forward again. This series of events begs the question as to what exactly makes trade in agriculture so controversial.

To start with, it is important to note that agriculture is one of the most heavily protected economic sectors in the world. Average agricultural tariffs in the OECD countries are around 40 per cent, and in the developing world tariffs average more than 20 per cent. As a result, tariffs on agricultural goods are as high today as industrial tariffs were in 1950. Many economists surmise that liberalization of these markets would have a large, positive impact on total output in the world. One study estimated that a decline in agricultural support of 50 per cent could add over US$50 billion in annual output by 2010. Yet the same study estimates that this reduction in agricultural support runs the risk of a negative impact on terms of trade (the ratio between export prices and import prices) throughout much of sub-Saharan Africa, China, India, the Philippines and elsewhere, as all of these economies are net-importers of food and import prices are likely to rise quicker than export prices in a liberalized world. Given that changes in the world's agricultural trade regime will inevitably leave both winners and losers, it is important to ensure that agricultural trade reforms – at the national as well as the international level – seek to maximize economic gains. It is also important that the policies are pro-poor. While the full scope of what is needed vis-à-vis trade reform in agriculture cannot be outlined here, some key points merit attention.

1) **Food security must be the first priority** – Ensuring that the world's poor receive adequate nutrition is absolutely essential in terms of promoting decent and productive work, fostering rural development and, ultimately, reducing poverty. To this end, policy-makers must be mindful of both prices and productivity. It is important that food prices in the poorest parts of the developing world do not rise to levels that could harm the poor. At the same time prices for export goods from developing countries need to have a certain level to make investment in the agricultural sector attractive. Continued agricultural productivity also needs to be fostered. Given scarce resources and rising populations, particularly in the developing world, agricultural productivity gains are needed to maintain adequate food supplies.

2) **Trade reforms must address commodity dependence in the developing world** – Many developing countries rely heavily on one or two agricultural commodities for export earnings, with sugar and coffee being the most commonly cited examples. Volatility in the prices of these commodities can translate into large swings in living conditions in developing countries, particularly for poor workers

engaged in the production of the commodities. Indeed, as coffee and sugar prices reached historically low levels between 1999 and 2001, rural wages declined and poverty rose sharply in countries dependent on these goods. Future trade reforms must address the potentially harmful effects of global markets on the world's poor agricultural workers.

3) **Developing economies need market access** – Market access is the only possibility for developing economies to ensure sustainable development and decent and productive employment in rural, agricultural-producing regions in the long run. This implies greater openness in the industrialized world, tariff reductions and lower subsidies so that agricultural workers will be able to benefit more fully from globalization.

Sources: FAO, 2003b; UNDP 2003.

development – it is a question of investing in the right environment-friendly technologies.

- Policy-makers often fear that concentrating on agriculture may slow down the structural transformation process. The present chapter has demonstrated that this is not the case. A balanced development of all sectors seems to be the most favourable for overall development and, for many of the least developed economies, a focus on the agricultural sector will be a step forward in the development process and the fastest and surest way out of poverty.

This chapter in no way denies that there are other ways to reduce poverty. Nor does it wish to argue against the process of structural change as the one and only long-run development path. But in the many cases in which the agricultural sector employs a large share of the population in developing economies – and more specifically in sub-Saharan Africa and much of Asia – it is essential to use this sector to support the development process and to make progress in terms of reducing poverty.

The international community can and should have an impact on helping the poorest countries find their way out of poverty. Each international agency must focus on their relevant mandate and field of expertise and, at the same time, exchange knowledge and experience to guarantee coherence in policies. In terms of the ILO's mandate, the Organization will focus on decent employment creation by concentrating on four key challenges: making decent work a global goal, making the ILO a global player in shaping globalization, mobilizing tripartism for global action and making the Organization as a whole a "truly global team" in the quest for fair globalization.[34] Overall, the report of the World Commission on the Social Dimension of Globalization can be taken as a guideline for new, more coherent policies on globalization.

[34] For details, see World Commission on the Social Dimension of Globalization (2004). See also ILO press release, 7 June 2004 (ILO/04/27). For a summary of selected ILO activities concerning the agricultural sector, see appendix 3.3.

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Appendix 3.1 [35]

In table A3.1, each of the two poverty data sets (Sala-i-Martin and ILO) for the selected years are pooled and the relationship between the two measures of productivity and poverty are examined in regressions 1 to 4. The standard variable of per capita income is excluded in the regressions because the productivity measures are themselves related to per capita national income.

Having established broad contours of the agricultural productivity and poverty relationship controlling for the distribution of populations and incomes, the exercise proceeds in models 5 to 8 by qualifying some of the poverty-relevant dimensions of agricultural growth. For this purpose the variable capturing food production per person (food production per capita index), as well as food price (food price index) is introduced. Since land ownership distribution may be particularly linked to rural dimensions of poverty, a variable on this (LANDGINI) is also introduced.

One important result is that the agricultural labour productivity indicator appears to be more strongly associated with poverty reduction than TFP. The agricultural labour productivity indicator is negatively and significantly related to poverty for both data sets. On the other hand, the TFP variable has a negative sign in the Sala-i-Martin data set and a positive sign in the ILO data in the one case in which it is statistically significant. The variable on rural population has a positive sign in the cases in which it is significant. While the income distribution is consistently positive and significant, land ownership distribution is always positive and in two cases also significant. This suggests that intervention in the distribution of land is still an important policy to consider today when the objective is the reduction of poverty, especially in rural settings. As far as the food production index is concerned, it is significant in three cases and in each of these it has a negative sign. Therefore, as a qualifier to the focus on agricultural growth itself, the results suggest that growth in agriculture would be better for poverty reduction if food production per capita also grows. The positive, significant coefficients on the food price index imply that higher food prices tend to hurt the extreme poor, a likely reflection of the very high proportions of income spent on food among these members of society.

[35] The analyses in appendices 3.1 and 3.2 are based on Rao et al., 2004, and Majid, 2004.

Table A3.1. Results based on regressions of poverty on labour productivity and TFP (US$1 a day poverty)

	Sala-i-Martin	ILO	Sala-i-Martin	ILO	Sala-i-Martin	ILO	Sala-i-Martin	ILO
	pooled 1970-2000	pooled 1987-2000	pooled 1970-2000	pooled 1987-2000	pooled 1970-2000	pooled 1987-2000	pooled 1970-2000	pooled 1987-2000
	1	2	3	4	5	6	7	8
Log of TFP	--	--	– NS	+ ***	--	--	– NS	+ NS
Log of agricultural output/labour	– ***	– ***	--	--	– ***	– ***	--	--
Log of rural population %	– NS	+ NS	+ ***	+ ***	– NS	– NS	+ ***	+ ***
Log Gini	+ *	+ ***	+ NS	+ ***	+ ***	+ ***	+ ***	+ ***
Food production per capita index	--	--	--	--	– NS	– ***	– **	– ***
Food price index	--	--	--	--	+ ***	+ NS	+ ***	+ **
Log of LANDGINI	--	--	--	--	+ **	+ ***	+ NS	+ NS
Constant	+ **	+ NS	– ***	– ***	+ NS	– NS	– ***	– ***
R^2 (adjusted)	0.36	0.49	0.24	0.41	0.55	0.64	0.42	0.53
N	195	180	200	185	97	124	101	129

Notes: – sign is negative, + sign is positive, -- not applicable, NS not significant, *significant at 10%, **significant at 5%, ***significant at 1%.

Appendix 3.2

This appendix provides the results of econometric models used to identify the determinants of total factor productivity and labour productivity across countries and over time. Independent variables used in the analysis include measures of non-labour agricultural inputs, such as irrigation prevalence, the number of tractors and quantity of fertilizer used; macroeconomic policies, such as government investment and consumption; economic openness, including trade policies and measures of foreign direct investment; education, as measured by literacy rates; quality of governance, as measured through polity and institutional quality variables; health status, for which a malaria-prevalence variable is used as a proxy; geography, which is measured by a tropics variable, rural population, an isolation indicator and through regional dummy variables; inequality, which is measured using a land Gini variable; and finally political stability, which is measured through a war indicator variable.

The results of this analysis are presented in a qualitative form. Table A3.2 reports the signs and significance of the coefficients. The research has used a general to specific modelling approach, in which the "general model" includes all of the independent variables. Regression 1 presents this general model, while regression 2 is the reduced or specific model in that it includes only those variables whose coefficients prove to be significant at the 10 per cent level or higher. In regression 3, a model is run in which continental dummy variables for sub-Saharan Africa (SSA), East Asia (EASIA), South Asia (SASIA) and Latin America and the Caribbean (LATAM) are included. In regressions 4 to 6 the approach of the previous three regressions is repeated, but with the inclusion of the Gini coefficient for the ownership distribution of land (LANDGINI). This model was run separately since the LANDGINI variable is only available for approximately 70 per cent of the countries in the sample; thus it significantly reduces the sample size. A comparable model is examined in regression 7 with the more standard labour productivity measure as the dependent variable. Additional explanatory variables used in regression 7 are tractors per thousand workers (TRACTORS) and fertilizers per million workers (FERTILIZERS).

1. Determinants of total factor productivity in agriculture

In general, the regressions perform quite well for yearly data of this nature, explaining 32 to 47 per cent of the variation in total factor productivity levels for agriculture. In regressions 1, 2 and 3 the variable indicating the proportion of land that is irrigated is positive and significant. TRADE and FDI, which can be said to constitute a proxy for openness, enhance TFP. This is a result, especially with respect to trade/GDP ratios, that is sometimes also found for poverty.[36] The signs on government investment (GDI) and government consumption as percentage of GDP (GOVCON) are negative. While at first sight this seems counter-intuitive, it might reflect urban biases in state allocation and funding agriculture.

[36] Dollar and Kraay, 2004; Majid, 2003.

Table A3.2. Results based on regressions of agricultural TFP and labour productivity

Dependent Variable	TFP	TFP	TFP	TFP	TFP	TFP	Labour Productivity
Regression No.	1	2	3	4	5	6	7
Observations	1450	1497	1497	1023	1023	1023	1023
R^2	0.33	0.32	0.35	0.36	0.36	0.47	0.91
R^2_a	0.33	0.31	0.35	0.3¬5	0.35	0.46	0.91
TRADE	+***	+***	+***	+*	+*	+***	+***
ILLITERACY	–***	–***	–***	–***	–***	–***	+ NS
ICRG3	–**	–***	– NS	– NS	--	– NS	– NS
GDI	–***	–***	–***	–***	–***	–***	+ NS
GOVCON	–***	–**	–***	–***	–***	–***	– NS
FDI	+***	+***	+***	+***	+***	+***	+***
TROPLAND	+***	+***	+ NS	+***	+***	–***	+***
DMALARIA	–***	–***	–**	–***	–***	–***	–***
RURAL	–***	–***	– NS	–***	–***	+ NS	– NS
DISTANCE	–***	–***	–***	–**	–***	–***	--
IRRIGATED	+***	+***	+***	+***	+***	+***	+***
POLITY	+ NS	--		–**	–***	–**	+***
WAR	– NS	--		+**	+***	+***	– NS
AGEDEPEND	+ NS	--		+***	+***	+**	+***
LANDGINI	--	--	--	–**	–**	–***	–**
TRACTORS							+***
FERTILIZERS							–***
SSA	--	--	+**	--	--	+***	
EASIA	--	--	+**	--	--	+***	+***
SASIA	--	--	– NS	--	--	+***	+****
LATAM	--	--	+***	--	--	+***	+***
CONSTANT	+***	+***	+***	+***	+***	+***	–***

Note: – sign is negative, + sign is positive, -- not applicable, NS not significant. *significant at 10%, **significant at 5%, ***significant at 1%.

On the other hand, this may also be reflective of fiscal constraints that developing countries face in the context of structural reforms.[37] While such discrimination can be traced to early development thinking, it is also a result of biases inherent in political systems as well as the fiscal straightjackets normally associated with reforms. The broad point is that government policy may discriminate against the rural sector both implicitly and explicitly. Human capital (ILLITERACY) and health (ΔMALARIA) indicators both show expected negative signs: a healthier and more educated workforce is associated with greater TFP. This is a policy area in which things can be done; it is also one that is directly related to poverty, since health and education are known correlates of poverty. Physical and geographical isolation (DISTANCE), also show a negative relationship with

[37] This correlation holds net of the effect of other variables in the model such as illiteracy rates, which are largely also a function of government expenditure.

TFP. The regression shows that the proportion of land in the tropics is positive and significant (TROPLAND). The positive coefficient on TROPLAND, though perhaps counter-intuitive in that tropical soils are generally less fertile, may be explained by perhaps beneficial effects of greater rainfall or other meteorological conditions.[38] The indicators of basic political participation (POLITY) or extent of political stability (WAR) do not show significant relationships to TFP. Moreover, regressions 4, 5 and 6 present several apparent anomalies. POLITY and WAR are, respectively, negatively and positively correlated with TFP levels, both of which can be construed as somewhat counter-intuitive results. In this context it needs to recognized that many of the best performers in terms of agricultural TFP do not perform well on these institutional and indices of political participation. Many countries that performed well in agricultural TFP have performed poorly in terms of increasing political freedom, corruption indices, and macroeconomic policy reform. The point, however, is that it is necessary to deconstruct democracy much more in order to meaningfully examine its relationship to agricultural growth.[39] Similarly the indicator of institutional quality (ICRG3) shows a negative sign in regressions 1 and 2. Once again, while the relationship may appear counter-intuitive, it is likely that this measure captures non-agrarian institutional conditions.[40] The variable that is likely to best capture "institutional conditions" in agriculture is probably the distribution of ownership holdings (LANDGINI) because it is the distribution of assets that reflect social relations and property rights best in an agrarian context. As expected, this variable is significantly and negatively correlated with TFP levels. The inclusion of LANDGINI renders the institutional quality variable insignificant (regression 4).

2. Determinants of labour productivity in agriculture

Regression 7 shows that the TRACTORS variable is highly significant but the FERTILIZERS variable has a negative sign, which is difficult to explain. The inclusion of these variables results in several changes to other non-technical coefficients in the model. In particular, the coefficients on illiteracy, GDI and GCON (which were negatively correlated with TFP) are no longer significant. This may suggest that urban biases in resource allocation may apply more to TFP-led growth. DISTANCE is no longer significant, POLITY has a positive sign and the institutional variable is not significant. LANDGINI is negative, suggesting that for both TFP and labour productivity more equal land distributions may be beneficial. The results on labour productivity suggest that the number of tractors per 1,000 workers appears to account for about 50 per cent of the variation in labour productivity observed across the developing countries in this

[38] Furthermore, when fixed effects are included in regression 6, the TROPLAND variable becomes negatively correlated with TFP levels.

[39] Bardhan et al., 1999.

[40] The addition of fixed effects (continental dummies; regression 3) appears to consistently render the coefficients on RURAL and ICRG3 insignificant.

data set. The remainder of the variation is largely explained by geographical and geological factors, as well as FDI flows. The overall fit of the regression on labour productivity is better than the TFP models.

Appendix 3.3

Selected ILO activities in the agricultural sector

The ILO has long recognized the potential of the agricultural sector to contribute to economic development and to alleviate decent work deficits (see also box 3.10). A selection of ILO activities in agriculture is listed below.

International labour Conventions related to agriculture

Many of the ILO's Conventions are directly or indirectly related to working conditions in the agricultural sector. These include:

- Convention No. 184 on Safety and Health in Agriculture (adopted in 2001 and so far ratified by three countries).
- Convention No. 182 on Worst Forms of Child Labour (147 ratifications).
- Convention No. 129 on Labour Inspection (Agriculture) (41 ratifications).
- Convention No. 141 on Rural Workers' Organisations.
- Conventions No. 97 and No. 143 on Migrant workers (42 and 18 ratifications, respectively).

(For a more complete list, see "Safety and health in agriculture", Report VI (1), International Labour Conference, 88th Session, 2000, http://www.ilo.org/public/english/standards/relm/ilc/ilc88/rep-vi-1.htm)

Clearly, there is no lack of instruments to tackle decent work deficits in agriculture; what are lacking are more ratifications and implementations.

"Jobs for Africa"

Jobs for Africa is an ILO flagship programme to support the creation of decent and productive employment for poverty reduction in Africa. The programme provides the framework for regionalizing the Global Employment Agenda in the context of the New Partnership for Africa's Development (NEPAD) and for supporting the formulation processes of the Poverty Reduction Strategy Papers (PRSPs) with the ultimate objective of reducing the decent work deficits in Africa. Recognizing the importance of a parallel development of all sectors, the idea is first to develop a conceptual framework for comprehensive and sectoral policies on employment creation for poverty reduction; second, to identify policy tools and operational systems to implement employment creation for poverty reduction; and third, to design a comprehensive regional programme to support country-level employment promotion programmes. The programme has two main parts: concentrating public investment on labour-intensive infrastructure projects that employ the poor and are located in poor areas, and reforming capital markets to provide sufficient credit to the poor to finance self-employment and micro-enterprises in both urban and rural informal sectors.

ILO's Global Campaign on Social Security and Coverage for All

Efforts by the ILO to help improve social protection for agricultural workers are placed within the broader framework of the ILO's Global Campaign on Social

Security and Coverage for All, which was launched in 2002 following the conclusion of the general discussion on social security at the 2001 International Labour Conference. The ILO global programme on Strategies and Tools against Social Exclusion (STEP) is a key operational instrument in this campaign. Among other activities, STEP seeks to develop innovative mechanisms for the inclusion of agricultural workers and farmers within social protection mechanisms.

Tripartite Meeting on Moving to Sustainable Agricultural Development through the Modernization of Agriculture and Employment in a Globalized Economy

The purpose of this meeting in September 2000 was to exchange views on the agricultural sector in the twenty-first century: to gauge its contribution to employment, incomes and prospects for productivity gains; to adopt conclusions that include proposals for action by governments, by employers' and workers' organizations at the national level and by the ILO; and to adopt a report on its discussion. (For more details see: http://www.ilo.org/public/english/dialogue/sector/techmeet/tmad00/tmadr.htm#_Toc488568316)

International Workers' Symposium on Decent Work in Agriculture:

In September 2003, the ILO Bureau for Worker's Activities organized an International Workers' Symposium on Decent Work in Agriculture. The goal was to raise awareness and to promote the ILO's mandate in the context of the rapid globalization of agriculture throughout the world. In particular, the Symposium addressed the problems workers in agriculture face, such as social exclusion, poverty, and lack of fundamental rights. It also focused on sustainable agriculture and development, food security and decent work in agriculture. The final conclusions summarizing the findings of the Symposium are available at: http://www.ilo.org/public/english/dialogue/actrav/new/agsymp03/concl.pdf For more details on this Symposium, see http://www.ilo.org/public/english/dialogue/actrav/new/agsymp03/ index.htm

Technical assistance

Advisory services and technical assistance are available and provided regularly to member States in the areas of rural farm and non-farm employment promotion, rural poverty alleviation, technology, training, wage policy, occupational safety and health, labour administration, social security, and rural workers' organizations.

Research in the area

The agricultural sector has long been a research focus in the ILO. Previous related ILO research topics range from detailed country analyses of specific agricultural products to regional analyses of the agricultural sector as a whole. For a selection of related ILO papers, see http://www.ilo.org/public/english/dialogue/sector/sectors/agri/publ.htm