

A Policy Agenda for Pro-Poor Agricultural Growth ¹

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March 2002

Executive Summary

This working paper is an input to stimulate discussion in the DFID funded research project on 'Institutions and Economic Policies for Pro-Poor Agricultural Growth'. The paper begins with a brief review of changes in poverty incidence over the last thirty years and notes that although there have been major advances in economic growth and in poverty reduction in some parts of the world (notably East and South East Asia), in South Asia and Sub Saharan Africa economic growth has been low and the incidence and numbers of poor people remain very high. In these regions poverty is predominantly a rural phenomenon and current projections for poverty reduction suggest that these regions are likely to continue to hold very large numbers of very poor people in the foreseeable future

In considering how rural poverty may be attacked in Sub Saharan Africa and in South Asia, the paper examines the processes which were important in poverty reduction in East and South East Asia. Theoretical arguments and empirical evidence suggest that in poor agrarian economies both the processes of structural change within national economies and micro-economic relations within rural economies give agriculture a pre-eminent and unique role in economic development and in poverty reduction. Rural growth is seen to be most effective in simulating sustained poverty reduction where there are strong consumption linkages between the sector 'driving' growth and other sectors. As compared with non-farm activities, farm activities tend to possess a variety of features

¹ This paper is written as part of a research project on *Institutions and Economic Policies for Pro-poor Agricultural Growth* funded by the Department for International Development of the United Kingdom (ESCOR Project R7989). The findings, interpretations and conclusions expressed in this paper are entirely those of the authors and should not be attributed to the Department for International Development, which does not guarantee their accuracy and can accept no responsibility for any consequences of their use. This paper has benefited from helpful comments from colleagues in the research project (see <http://www.wye.ac.uk/AgEcon/ADU/research/projects/ppag/index.html>) and from Stephen Devereux, Karam Singh, Martin Greeley, Hemasiri Kotagama, and Stephen Carr.

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that can make them ‘linkage rich’ drivers of economic growth: high average budget shares; access to urban and export markets; lower requirements for scarce capital, knowledge, infrastructure and institutions; relatively high demands for unskilled labour; relatively low barriers to entry; and large numbers of agricultural labourers. Historically there are few examples of rapid and large scale reductions in severe poverty which have not been associated with significant increases in agricultural productivity. ‘Linkage rich’ development is also encouraged by more equitable distribution of income and by local consumption patterns favouring local rather than imported goods and services.

The paper then identifies three different patterns of agricultural growth in developing countries: extensive export based growth; intensive export based growth; and intensive cereal based growth. It is argued that the last has the strongest poverty reducing linkage characteristics and has been most effective in driving poverty reduction in the 20th century (in the Asian green revolutions). The conditions necessary for such growth to occur are discussed and include large (international or national) output markets, stable macroeconomic and sectoral policy, a conducive institutional environment, supportive context specific institutional arrangements, dynamic technological and market opportunities, access to seasonal crop finance, good physical infrastructure, appropriate technologies, and dynamic local institutions and processes supporting technological and institutional change.

However, reliance on pro-poor agricultural growth as the main weapon against rural poverty today may not work if today’s rural poor face more difficult conditions than those faced in the green revolution areas in the latter part of the 20th century. Agricultural led poverty reducing growth faces greater challenges in today’s poor rural areas, due to:

- less productive and more risky agro-ecological conditions;
- a more limited range of less productive and more risky technologies;
- lower stocks of and/or access to physical and financial capital, with increasing uncertainty and loss of assets as a result of HIV/AIDS;
- greater costs in developing, delivering and accessing services (for input or output markets, or research, extension, health or education services)
- greater competition in output markets
- poorer access to input and financial services
- more rapidly changing and hence less stable and more uncertain institutions

These features together increase risk and uncertainty and raise costs and/or lower returns to agricultural investment. Many of these difficulties are endogenous, the result of agro-ecological, locational, demographic and socio-economic conditions in these areas. An already difficult task has unfortunately been made harder by broader processes of change (for example HIV/AIDS and some aspects of globalisation and of the biotechnology revolution). However, it is argued that some of the difficulties faced in today’s poorer rural areas are the direct result of current policies supporting liberalisation and withdrawal of the state. These policies, implemented because government interventions in agricultural markets became both increasingly ineffective (indeed damaging) and

fiscally unsustainable, have also removed from the policy toolkit critical tools for addressing problems of high transaction costs and risks inducing market failures. A review of the Asian green revolutions and the short lived maize based African green revolutions of the 80s and early 90s suggests that these tools were widely used and important in supporting sometimes short periods of critical market and technological development in the process of rural growth.

This leaves policy makers with a major challenge: external action to reduce transaction costs and raise the profitability of agricultural intensification is both more important in today's poor rural areas (as compared with earlier green revolution areas) and more difficult and costly. New thinking is needed to develop policy measures that learn from both the failures and successes of past interventions. Such measures must deliver reduced transaction costs and increased profitability to farmers and traders where high transaction costs and low profits are constraining pro-poor market development. They must, however, also avoid the high fiscal costs, unsustainability, inefficiency and ineffectiveness of many of the market interventionist policies of the past.

It is possible that the conditions faced in many of today's poorer areas are too difficult and challenging for agriculture to be a viable driver for pro-poor economic growth. However, before a conclusion is reached on where they will and will not work, it is important to either identify a viable alternative strategy for achieving such growth, or to recognise the social, economic and fiscal costs implicit in a strategy that fails to deliver growth to support the livelihoods of large numbers of poor people.

If pro-poor agricultural growth is to be promoted, some policy options are not controversial: the benefits of education, health, improved governance, communications infrastructure, and macro-economic stability are widely recognised, and their benefits spread beyond agriculture. There is less agreement about the benefits of agricultural research and extension, despite numerous studies showing high returns to investment in research and extension. Improvements in these areas, however, although perhaps sufficient for operation of already developed markets are not sufficient for the development of new markets in poor rural areas. To get markets going in poor rural areas, more specific interventions are needed to reduce farmers' and traders' transaction costs and increase their profits in rapid entry to new markets.

A number of pointers are put forward as regards policy development to address these issues:

- Policy analysis should recognise and address the problems of transaction costs and risks in inhibiting competitive private sector market activities at critical stages in agricultural transformations.
- Policy instruments should not be founded on the simplistic presumption that pure competition is always the most satisfactory way of ensuring market access by smallholder farmers to finance and inputs, and hence to output markets.
- Policy analysis should consider the costs, benefits and difficulties of market interventions together with those of welfare interventions: both face inherent problems of 'state failure' and they frequently compete for resources, but they are not often explicitly examined as alternative means of achieving the same goals.

- Much greater emphasis should be placed on targeted and time-bound institutional development, with emphasis on the development of market structures and systems that will encourage rapid withdrawal of state support as market systems become self sustainable.
- Policy formulation must be innovative and imaginative, learning from and building on historical and current institutional innovations, whether in national or local government policies and actions, or by farmers and traders.
- Pro-poor agricultural growth must not be seen as a solution on its own – it will only generate significant poverty reduction gains if it is complemented by growth in the non-farm sector, and policy must also support such non-farm growth.

This ambitious policy agenda demands support from an equally ambitious research agenda. Further work is needed to:

- investigate the importance and mechanisms of state actions to reduce transaction costs in the green revolutions of the 20th century
- explore the mix of necessary conditions for agricultural transformations in today's poor rural areas, and changes needed to achieve these
- determine the costs and benefits and hence viability of agricultural growth strategies as means of reducing poverty in the difficult circumstances facing today's poor rural areas, comparing them with other possible strategies for poverty reduction
- understand the critical transaction cost problems inhibiting agricultural and other market development and possible mechanisms for addressing these
- review former state interventions to identify critical elements of success and failure and match these with more recent experience of private sector involvement to develop new institutional models.
- develop, try out, and evaluate different innovative institutional arrangements addressing these problems

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ABBREVIATIONS

ADB	Asian Development Bank	EU	European Union
FAO	Food and Agriculture Organisation	FDI	Foreign direct investment
GDP	Gross Domestic product	GM	Genetically Modified
GR	Green Revolution		
IFAD	International Fund for Agricultural Development		
IFPRI	International Food Policy Research Institute		
LDC	Less developed country	NFIDC	Net food import dependent countries
NGO	Non-Governmental Organisation	NR	Natural Resource
OECD	Organisation for Economic Cooperation and Development		
SSA	Sub-Saharan Africa	UNDP	United Nations Development Programme

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1 Introduction

Poverty may be characterised as low and vulnerable streams of income and of other social and material benefits accruing to individuals as an immediate result of lack of access to assets and of low and uncertain productivity of the assets that they do control. Widespread and sustained poverty reduction needs to involve some combination of (a) improved access for the poor to a balanced set of assets, (b) increased productivity of the assets that they hold, and (c) reduced vulnerability to shocks. Key and complementary components of this include improving health and education services to expand human capital, increasing the social capital of disadvantaged and marginalised groups, expanding income opportunities, and reducing vulnerability to seasonal and other variation and shocks.

There are a number of contributory factors to the high levels of rural poverty in different parts of the world. These include low savings and investment rates; poor health, education and infrastructure; high dependency ratios; poor management of and access to public services; the spread of HIV/AIDS; poor economic and policy management; worsening terms of trade and continuing dependence on primary exports; poor agricultural performance; erratic rainfall and limited irrigation potential; ethnic conflicts and poor governance. This paper focuses specifically on the role of agriculture in improving income opportunities for the rural poor and in reducing vulnerability, recognising that effective income gains and vulnerability reduction both require and are needed for wider gains in secure access to physical, financial, human and social capital.

Agriculture remains an important part of the livelihoods of many poor people, and it is frequently argued that agricultural growth is a fundamental pre-requisite for widespread poverty reduction. Paradoxically, however, economic growth and poverty reduction lead to declining importance of the agricultural sector relative to other sectors. This, together, with difficulties in 'getting agriculture moving' in areas where today most poor rural people live, has led some to question both the importance of agriculture for rural economic growth and poverty reduction and the benefits of attempts to directly promote agricultural growth and development.

This paper examines these arguments by drawing on global experience with pro-poor agricultural growth. It seeks to identify the characteristics of pro-poor agricultural growth, the conditions that are necessary for it to occur, the difficulties faced in getting agriculture moving in areas where today's rural poor are concentrated, and policies for addressing these difficulties. Together with three case study country reviews being written at the same time, on India, Malawi and Zimbabwe, it is intended to (a) draw out lessons about pro-poor agricultural growth, as outlined above, and (b) guide the planning and implementation of empirical investigation in these three countries on the effects of different institutional and policy scenarios on agricultural growth and poverty reduction.

The paper is divided into six parts. Following this introduction we briefly examine the main characteristics and extent of global and regional rural poverty, and the way it has changed over the last 30 years or so. We then examine the theoretical and empirical arguments relying on agricultural growth as an engine for poverty reduction. Section 4 considers the difficulties facing agricultural growth in today's poor rural areas, before sections 5 and 6 draw together initial conclusions for policies to support pro-poor agricultural growth and for issues to be addressed in subsequent empirical work in India, Malawi and Zimbabwe.

The core issues addressed in this paper are not new: they have been the subject of a large literature. However, they need to be reassessed to take account of: (a) continuing difficulties with getting agriculture moving in areas where rural poverty is most intractable (parts of South Asia and much of Sub Saharan Africa); (b) increasing recognition of rural livelihood diversification; (c) the processes of globalisation; (d) changing policy environments; and (e) new understanding of the roles of institutions in promoting or inhibiting economic activity and access to economic opportunity.

2 World Poverty: Mixed Success in Poverty Reduction

2.1 Trends in global and regional poverty

Examination of changes in poverty incidence over the last 30 years and of projections over the next 20 years or so reveal both considerable progress in reducing poverty incidence (using income measures) globally and in some parts of the world, but shocking persistence and growth in other parts of the world in the numbers of people living in poverty. Between 1990 and 1998 the proportion and number of the poor (under \$US 1 per day) in developing countries declined but whereas the proportion of those with less than \$US 2 per day fell, the absolute number rose slightly (see table A2.1, appended). Poverty incidence figures prior to 1990 are difficult to come by, but most indicators of welfare (for example access to clean water sources, child mortality, literacy rates) show an increase in the proportion of people with improved indicators, while absolute numbers of those with indicators associated with poverty have fallen much more slowly or have increased (see for example UNDP Human Development Reports, and table A2.4). Looking to the future, under all scenarios in table A2.1 the proportion of world's population in poverty is predicted to decline. However, the absolute numbers could rise for the \$US 2 per day cut off, if growth rates for the 1990's continue into the 21st century.

This global picture, however, masks wide divergences in regional experience (see tables A2.2 and A2.3). The problem of poverty is highly regionalised and this concentration is intensifying. South Asia and Sub-Saharan Africa are becoming the core areas for absolute poverty (see Table A2.2). These two areas now contain 70% of the world's poor. South Asia is home to over 40% of the people categorised as poor under the \$US1 per day line³. Although the share of population living in poverty declined moderately in South Asia from 1987 to 1998, it was not

³ Figures presented in tables A2.2 and A2.3 measure poverty solely in terms of the \$US 1 per day metric, and the apparent low levels of poverty in some areas, and its decline in most, should not disguise the reality of many people continuing to live in severe poverty although they may earn incomes above \$US 1 per day. Nevertheless, the figures do present the broad pattern of *relative* incidence and changes in poverty between regions.

enough to reduce the absolute number of people living in poverty. The depth and severity of poverty is at its worst in Sub-Saharan Africa, where slow rates of economic growth over the same period dramatically increased the number of people living in poverty while leaving the share of those in poverty largely unchanged.

Table A2.3 presents forecasts of the incidence of poverty for developing regions under a number of scenarios. Scenario A assumes that countries do not change the main conditions for growth and economic growth rates remain the same as they were between 1965 and 1997. Scenario B assumes higher growth rates but no other changes. Scenario C or “pro poor” scenario assumes higher growth rates and also that three pro poor conditions are met: capital stock grows as fast as the labour force; capital is used more efficiently; and that economies become more open to trade, between now and 2015 (Hanmer *et al.*, 2000).

Relating the data to the international development target of halving US\$1 per day poverty by 2015, Sub-Saharan Africa fails to reach the target under any of the scenarios. The “pro poor” scenario would see all other regions reaching the target. Whilst poverty reduction scenarios for the future vary greatly depending upon the rate and nature of growth and the poverty focus of policies, actual evidence suggests that in the 1990's poverty reduction was less than half the rate needed to meet the commitment to halve poverty by 2015. In Sub-Saharan Africa, it was too low by factor of 6 (Hanmer *et al.*, 2000).

2.2 Characteristics of the poor

2.2.1 Urban/Rural poverty

Although long-term predictions are for poverty to exhibit a more urban focus, currently poverty is predominantly a rural concern. Estimates of the proportion of the world's poor that live in rural areas range from 62% (Pinstup-Andersen *et al.*, 2001) to 75% (IFAD, 2001). IFAD predict that rural and urban poverty will not be at the same level until 2035. Rural poverty also tends to be deeper than urban poverty (see for example Bird *et al.*, 2001). There are, however, close links between urban and rural poverty. Many poor urban people have strong links with rural areas, and cyclical transfers between urban and rural people are increasingly important (Bryceson, 1999).

A further disaggregation shows the rural poor are closely correlated with “functionally vulnerable groups”. Jazairy *et al.*, 1992, found that for a sample of 64 developing countries, 64% of the functionally vulnerable were smallholders and 29% were landless. In SSA, smallholders accounted for 77% and the landless for 11%, whereas in Asia 49% were smallholders and 26% landless (Cox *et al.*, 1998). Lipton, 2001, quotes IFPRI as noting that increasingly, the rural poor are concentrated in arid, semi-arid and unreliably watered areas

2.2.2 Food insecurity

The trends evident in the analysis of poverty are reflected in statistics on global food security. In 1997, 820 million people were estimated by the FAO to be undernourished, with 790 million living in developing countries. Although the number fell by 40 million between 1980-82 and 1995-97, this improvement was uneven, being attributable to a 100 million reduction in 37 countries, whilst in the remaining countries the numbers increased by 60 million. Although food

availability for direct human consumption grew by 19 per cent between 1960 and 1994/96, it is still very uneven. LDCs and NFIDCs are distinguishable from the remaining developing countries in that not only is their food supply low, but production variability tends to be high (Konandreas and Sharma, 2000). Per capita agricultural production in LDCs has been on a downward trend over the past 40 years whereas it has increased by 40 per cent in the set comprising all developing countries (OECD, 2000). Between 1980 and 1996, negative growth was observed in 29 of the 42 cereal producing LDCs.

The poverty focus of many development agencies has reopened the debates on past failures and successes in the agricultural sector and ways forward. Statistics such as those reported above have led FAO to state that “significant progress in promoting economic growth, reducing poverty and enhancing food security cannot be achieved in most of these countries without developing more fully the potential capacity of the agricultural sector and its contribution to overall economic development” (FAO, 1999).

2.3 Global and regional poverty: conclusions

Key points that emerge from this brief review may be summarised as follows:

- Over the last thirty years there have been major advances in economic growth and in poverty reduction in some parts of the world, notably East and South East Asia;
- In South Asia and Sub Saharan Africa, however, economic growth has been low and the incidence and numbers of poor people remain very high, although there have been significant advances in some areas of South Asia
- In these regions poverty is predominantly a rural phenomenon
- Current projections for poverty reduction in South Asia and (particularly) Sub Saharan Africa suggest that these regions are likely to continue to hold very large numbers of very poor people in the foreseeable future

In considering how rural poverty may be attacked in Sub Saharan Africa and in South Asia, an important starting point is to learn from the lessons of success in East and South East Asia, to see what processes were important in poverty reduction. A key issue here is the role of agriculture. We now turn, therefore, to consider theoretical arguments and empirical evidence about the role of agriculture in economic growth and development and in poverty reduction.

3 Agricultural growth and poverty reduction: lessons from the past?

In considering the contribution of agricultural growth to poverty reduction in the past and its potential for reducing poverty in the future, we need to consider three related questions: what is the effectiveness of agricultural growth in reducing poverty (relative to non-agricultural growth), what are the specific characteristics of pro-poor agricultural growth, and, finally, if agricultural growth can be pro-poor, what conditions are necessary for agricultural growth, and specifically pro-poor agricultural growth, to occur. These questions are addressed in a large theoretical and empirical literature that examines the relationships between agricultural growth, wider economic growth, and poverty reduction. We begin this section by briefly presenting broad regional patterns of agricultural growth and development to compare with the patterns of poverty presented in the previous section. We then present a brief summary of two important strands of

literature addressing the first two questions before considering the conditions needed for agricultural growth to occur.

3.1 Patterns in global and regional agricultural productivity

Considering the performance of the agricultural sector in middle and low income countries in different continents over the last thirty years or so, the broad picture for low income countries is of growth in agricultural productivity increasing over the first half of this period and then dropping back somewhat (see table A3.1). The lower growth is not initially sufficient to keep up with national population growth, and hence agricultural value added per capita actually falls at first, before higher growth overtakes population growth later.

Growth in productivity of agricultural labour lies between absolute and per capita growth as the agricultural population increases over the period, but increases at a slower rate than total population as labour moves out of agriculture (within rural areas) and migrates to urban areas. The performance of agriculture in LDCs, however, shows much lower rates of growth in the 1980s and 90s, and indeed negative rates are recorded for value added per capita over most of the period (not shown in table A3.1). This difference between the low income and LDC groups of countries is largely explained by differences in performance between Sub-Saharan African countries (which are preponderant in the LDC group) and Asian (particularly South Asian) countries which are more predominant in the low income group. These differences are illustrated in the lower part of Table A3.1 for low and middle income countries in five different regions⁴.

Comparing these regions in Table A3.1, the East Asia and Pacific and Middle East and North Africa regions show a broadly similar pattern of agricultural growth advancing well ahead of population growth, peaking in the 1980s, but maintaining continuing increases in labour productivity in agriculture. South Asia shows continuing increases in growth over the period, again well ahead of population growth and with continuing increases in labour productivity in agriculture. The Latin America and Caribbean region experienced lower agricultural growth after the 1970s but as this was offset by a declining rural population, again there is evidence of increasing agricultural labour productivity. In three of these regions growth in agriculture has been accompanied by a dramatic decline in agriculture's share of the economy from 1970 to 1998—by more than 35%⁵.

The pattern of agricultural change in Sub Saharan Africa appears to be rather different, although growth rates in the different regions appear to have converged somewhat in the 1990s. In Sub Saharan Africa very low rates of growth in the 1970s were followed by increases in the 1980s and 1990s, but per capita growth has been very low or negative over much of the period: thus Sub Saharan Africa is the only region with agriculture growing at a rate below overall population growth from 1965-1998, and at a lower rate than growth in the agricultural labour force from 1980-1998. The data on which these low estimated agricultural growth rates for SSA are calculated, however, contain a number of inconsistencies (for example estimates of agriculture's shares of GDP have varied and tend to be (implausibly?) low, as shown in table 3.1) and have been criticised as not reflecting dynamic growth that exists in Sub Saharan African agriculture

⁴ Data for Eastern Europe and Central Asia are omitted

⁵ The Middle East and North Africa is an exception to this, as agriculture marginally increased its share of the economy: this is due in part to a massive increase in land under irrigation (see table 2.2).

(for example Wiggins, 1995), and of being over sensitive to the effects of price changes and currency devaluations (for example Block, 1995). Nevertheless, the general picture of low or negative per capita growth in agriculture in much of Sub Saharan Africa over the last 30 years is supported by the high incidence and severity of rural poverty in Sub Saharan Africa as compared with other regions (as discussed earlier), widespread reports of agricultural stagnation (for example Bryceson, 2000), and data on fertiliser use and yields (see for example Dorward *et al.*, 2001, p18-19).

Table A3.2 presents information on various elements of agricultural productivity that suggest that Sub-Saharan Africa is achieving its agricultural growth largely through a different process from that found in other regions. While South Asia is unique in not increasing total cultivated area in the 1980s and 90s, and hence suffering a large reduction in area per capita, the East Asia and Pacific region maintains its average area cultivated per capita. Sub Saharan Africa, however, stands out for increasing its area under cereals dramatically at the expense of other crops, whereas in other regions the area under cereals has either declined or increased only slightly. Sub Saharan Africa's increased cereal area is accompanied by a slight fall in overall fertiliser consumption⁶, a larger fall in rate of fertiliser use, and only a small rise in cereal yields. The area of irrigated land also shows only a small percentage rise, and although this is similar to the percentage increase in irrigated land in the East Asia and Pacific region, Sub-Saharan Africa's increase is from a very low base (only 4% of crop land being irrigated, compared with 36% in the East Asia and Pacific region). As a result, whereas other regions have achieved 80% or more of their increased cereal production from yield increases, in Sub-Saharan Africa more than 70% of increased cereal production is from area increases.

Despite the heterogeneity within each region, there is a striking correspondence between the patterns of agricultural growth reported in this section and the patterns of poverty reduction (or of persistence) reported in the previous section.

3.2 Agricultural growth and poverty reduction: theory and evidence

We identify two main strands of (related) theory regarding the role of agriculture in economic growth and development and in poverty reduction. The first examines the role of the agricultural sector in wider economic development, the second examines at a more micro-economic level the role of agricultural growth in the rural economy.

3.2.1 Sectoral theories

Early in the 1960s, Johnston and Mellor, 1961, noted that certain aspects of agriculture's role in economic development have a high degree of generality. They made 5 propositions:

1. Economic development is characterised by an increased demand for agricultural products (due to population growth and high elasticity of demand for food from the poor). They also note that the increased demand for marketed goods is far greater than the overall increase in demand. Failure to expand food supplies in pace with growth will impede development.

⁶ These figures for fertiliser consumption need to be treated with caution as national estimates sometimes contradict data on fertiliser imports (Dorward and Morrison, 2000).

2. Increased export growth is one of the most promising means of increasing incomes and foreign exchange earnings.
3. The labour force for the manufacturing sector comes mainly from the agricultural sector.
4. Agriculture can and should make a contribution to the capital required for the expansion of secondary industry (this is based upon the assumption that agriculture only requires a moderate capital investment to increase productivity and therefore a net contribution to industry is possible)
5. An increased net cash income of the farm population maybe important as a stimulus to industrial expansion.

Although the relative importance and nature of these contributions varies with different situations and as the importance of the agricultural sector declines within the economy as a whole (Mellor, 1986; Timmer, 1988), a similar pattern of development has been observed across countries. In the Least Developed Countries where the agricultural sector accounts for a large proportion of GDP and an even larger proportion of employment, increasing agricultural productivity is essential first for capital investment in agriculture itself and then for the steady release of surplus capital and labour to other sectors of the economy. It is also the major source of export earnings and of food, plays a major role in keeping food prices down for the urban poor, and is the major source of domestic income and hence stimulus for demand for local goods and services. As development proceeds the agricultural sector becomes more commercialised. Its role as an engine of growth for the overall economy then becomes less important, but it still retains importance as a major employer in the rural economy (ADB, 2000). At the same time increasing agricultural commercialisation leads to increased purchases of farm inputs, increasing scale and specialisation in farm enterprises, and changes in the role and nature of farm labour inputs (Pingali, 1997).

In a recent article, Mellor, 2000 (p3) argues that “it is clear that high rates of economic growth may rapidly reduce the proportion of the population in absolute poverty. However, there has been a tendency to generalise that economic growth reduces poverty, when in fact it is the direct and indirect effects of the agricultural growth that accounts for virtually all the poverty decline”. Thus Mellor attributes the recent slowdown in poverty reduction in Asia and the poverty increases in Africa as a consequence of the neglect of agriculture by governments and donor agencies.

Empirical evidence from the sectoral productivity literature strongly supports the Mellor view that agriculture drives pro-poor growth in poorer rural areas.

- Hanmer and Nashchold, 2000, (cited in Thirtle *et al.*, 2001) find that the higher the ratio of agricultural labour productivity to labour productivity in the modern sector the greater the poverty reduction⁷.
- Ravallion and Datt, 1999, consider the variance in the poverty reducing impact of a given rate of growth across states in India. They relate poverty reduction to crop yields, and demonstrate that poverty reduction is a result of growth within sectors and not transfers

⁷ This finding is valid for sub Saharan Africa and South Asia but not for other, more developed regions

between low and high-income sectors. They provide evidence that growth within the agricultural and service sectors have had a poverty reducing effect but that growth in the manufacturing sector has not. They also find a significant difference across states in the extent to which the poor have benefited from non-farm economic growth, with greater poverty elasticity in states with higher initial farm yields, higher levels of urbanisation, lower disparities between urban and rural average consumption levels and higher levels of literacy. Where levels of inequality are low, the poor obtain a higher share of the gains from growth than when inequality is high and it is likely that low levels of farm productivity inhibit the prospects for the poor to participate in the non-farm sector. By contrast, the elasticities of poverty with respect to increased farm yield do not differ significantly across states, leading the authors to conclude that it is differences in agricultural growth rates rather than initial conditions that matter. These results are also borne out by Timmer, 1997, who has shown that “a one percent growth in agricultural GDP per capita leads to a 1.61 per cent increase in per capita incomes of the bottom quintile of the population”.

- These findings add weight to an approach to reducing poverty which focuses on growth rather than simply on redistribution, and is supported by Dollar and Kraay, 2000, who demonstrate that distributional changes are too slow to help reduce the poverty levels and therefore the main driving force must be growth. Datt and Ravallion, 1996, show that poverty measures respond more to rural economic growth than to urban economic growth. They conclude that a focus on rural economies as opposed to urban economies is also crucial to reduce poverty levels. They also suggest that the non-farm component of the rural economy is most dynamic and productive when farming is thriving.
- Thirtle *et al.*, 2001, provide a comprehensive recent review of the empirical evidence for the role that agriculture has played in stimulating economic growth. They cite work using
 - endogenous growth theory: Stern, 1996, estimated cross-country regressions and found a significant relationship between non-agriculture and agriculture growth rates over 1965-1980;
 - sectoral growth models: Matsuyama, 1992, Kogel and Furnkranz-Prskawetz, 2000, and Irz and Roe, 2000, are cited as showing (i) that in a largely agrarian economy agricultural growth is needed to balance population growth and avoid the Malthusian trap and (ii) that relatively small changes in agricultural productivity can have critical effects on industrialisation and on overall development.
 - time series techniques: Kanwar, 2000, and Rangarajan, 1982, for example, show that agricultural growth is causally prior to growth in manufacturing.
- Thirtle *et al.*, 2001, also identify a number of dynamic effects through which agricultural productivity can impact poverty: Irz and Roe, 2000, for example, show that a decrease in the relative price of food (resulting from technological change in agriculture) can lead to a substantial rise in the saving rate of households and thus help them to rise out of poverty, while Wichmann, 1997, demonstrates that increases in agricultural productivity can significantly increase the poor’s household consumption. At the same time Dasgupta,

1988, shows how nutritional status and labour productivity of the poor are positively correlated.

In a paper based on observations of Indonesian agriculture, Martin and Warr, 1993, extend the Johnston and Mellor propositions relating to the relative decline of agriculture. They argue that there are three proximate causes of the decline in the share of agriculture in the course of economic growth: (i) changing relative prices (i.e. declining terms of trade as between agriculture and the rest of the economy); (ii) differential rates of technical change (i.e. agriculture lagging behind the rest of the economy); and (iii) the effects of changes in relative factor supplies on the composition of output at given relative commodity prices (known in trade theory as the *Rybczynski* effect). The *Rybczynski* theorem implies that for a two sector model (agriculture and the rest of the economy, with the former being the less capital-intensive sector), assuming unchanged relative commodity prices and full employment, then the accumulation of proportionately more capital than labour in the economy will lead to an absolute decline in the labour-intensive sector (agriculture). Martin and Warr's empirical work came to three important conclusions: (i) relative price effects are much less important than is suggested by the weight of existing literature on the subject; (ii) slower rates of technological progress in agriculture did not play a role in the Indonesian case (Indonesian agriculture was technologically dynamic); (iii) the factor accumulation (*Rybczynski*) effects were overwhelmingly important.

A number of insights are generated by more detailed consideration of the *Rybczynski* effect. If we consider a two sector model as being rural agricultural and rural non-agricultural, with the latter being the more capital intensive, the accumulation of capital (assuming that capital is fungible) in rural areas should, in theory, result in increased levels of diversification into non agricultural activities in response to the changes in factor proportions.

Under a strict interpretation of these neoclassical results, labour productivity would increase in agriculture as labour is "pulled" into the more capital intensive sector. Labour productivity is therefore a key measure of the degree of both wider economic growth and the associated accumulation of capital and of 'agricultural success', as it measures the contribution that agriculture makes in development (releasing labour to other uses while maintaining agricultural production and agricultural income and demand).

However, increases in labour productivity may also be achieved by changes in technology, increased capital inputs, increased prices, or changes in product mixture (to higher value products). These are often related, as most technical change (but not all) requires increased capital inputs, price changes may induce changes in technology or product mix, and changes in product mix may also be stimulated by technical change.

On the other hand, however, capital starvation may be a feature of many poor countries where there have been very low levels of FDI (particularly in Sub Saharan Africa) and in poor rural and agricultural economies (as is discussed later in section 4.3). Under these circumstances labour becomes the relatively more abundant resource and thus the labour intensive sector expands (agriculture, and particularly low return labour intensive agricultural activities), together with low return labour intensive non-farm activities. In addition to capital starvation, the increasing size of the labour force as a result of population growth may act as an equally strong force in shifting the balance of relative factor proportions over the longer term. The relative growth of the two sectors may also, however, be influenced by changing output prices associated either with changes in international prices (and increasing openness to world markets) or with changes in

local demand associated with stagnant or falling incomes. Relative scarcity of capital in different sectors and for different activities is also affected by problems associated with the segmentation of the financial market, such that access to seasonal finance for staple crop production is often a major problem (see section 4.3 and Dorward *et al.*, 2001) whereas access to seasonal finance for cash crop production may be easier. Similarly different activities and areas face differences in ease of access to micro finance (with easier access in urban areas and in more densely populated and developed rural areas as compared with more sparsely populated and less developed areas) and to formal financial markets (with easier access for formal as compared with informal businesses).

3.2.2 Linkages in the rural economy

Key to understanding exactly how agricultural growth can stimulate/enhance economic growth are the linkages between agriculture and other sectors in the economy. A long-standing theoretical and empirical literature has examined the linkages between different activities within rural economies (for a recent review see for example (Delgado *et al.*, 1998). Four types of linkage are commonly identified: direct upstream and downstream production linkages; investment linkages; and indirect consumption (or expenditure) linkages. Examination of linkages allows exploration of the effects of exogenous change as they work through different elements of the rural economy, with two key distinctions being made: (a) between the effects of changes in productivity and prices of tradables and non-tradables⁸, and (b) between the effects on and responses of (poor) rural consumers and producers (the latter including employed labour).

Productivity increases in tradable activities should lead to a production response (unless there are labour, capital or institutional constraints) which then lead to higher production and incomes for producers. This may also stimulate demand for upstream and downstream inputs and services. Higher tradable prices have similar effects on producers but may be counterbalanced by negative effects on consumers' real incomes. Productivity increases in non-tradable activities normally lead to a price fall, as local demand will be constrained by local incomes. This price fall will lead to an increase in consumers' real incomes if the good or service commands a high average budget share (e.g. staple foods in poor communities). The effects on producers are more mixed. Lower prices may largely off-set producers' gains from higher productivity⁹, unless demand is relatively elastic or cost reductions or changes in technology are sufficient to allow significant expansion of supply with expanded labour demands and/or entry of new (perhaps poorer) producers into the market.

⁸ Tradables are goods and services that may be imported or exported to or from the area. In practice the distinction between tradables and non-tradables is often not distinct, varying with (a) the scale or the boundaries of an area (the larger the area the greater the proportion of non-tradables), (b) its accessibility (the less accessible the greater the proportion of non-tradables) and (c) the comparative production costs inside and outside the area. These factors together determine the relationship between local costs on the one hand and the spread between 'import' and 'export' parity prices on the other. Although these terms are often associated with international trade, they are equally applicable to *intranational* trade between different districts or between rural and urban areas.

⁹ Where productivity increases result from some form of innovation, early adopters are likely to gain from higher productivity before more widespread adoption lowers prices.

Changes in the incomes of large numbers of producers (as a result of increases in tradables' productivity or prices) or in the real incomes of large numbers of consumers (as a result of decreases in prices of tradable or non-tradable commodities with a large average budget share) lead to a consumption (or expenditure) 'multiplier' or linkage as increased real incomes lead to increased demand for local (non-tradable) goods and services and this expanded demand generates local employment opportunities. This further raises incomes, contributing to a virtuous circle multiplying the benefits from the original gains in real consumer incomes.

These gains, however, are limited by 'leakages'. If local consumers use their extra income to buy tradables then this reduces local demand. Even with increased demand, if local producers cannot respond to it (due to limited labour or capital supplies, or to poor markets and high transaction costs), there will be inflationary pressure on prices, off-setting consumers' increased incomes. Finally, even with a local supply response, there will be reduced gains from increased local employment and earnings if production systems are capital intensive, import intensive, or provide inequitably distributed returns to limited numbers of local people.

Finally, savings and investment linkages may arise where increased real incomes (for consumers or producers) allow increased savings and investment in capital, reducing vulnerability and increasing both the productivity of local activities and the potential elasticity of supply responses crucial to consumption linkages. 'Leakages' arise if the returns to local savings and investment are very low (due to lack of secure investment opportunities or of local financial markets linking savers with investment opportunities) or if there are effective financial markets linking the local economy with other economies (so that local activities are already able to access outside sources of capital or locally generated capital is invested outside the area¹⁰).

Two further types of linkage may arise from growth in production of tradables (Govere *et al.*, 1999). Economies of scope within the local economy may allow increasing trade flows to lead to improvements in a range of services, particularly in communications with investment in improved infrastructure, greater demand for and frequency of services, and lower unit costs¹¹. There may also be economies of scope within particular livelihoods, with, for example, farm equipment purchased for tradable production also being used in non-tradable production.

A variety of studies estimating agricultural growth multipliers in different parts of the world have shown that multipliers generally vary from around 1.5 to over 2.0 (Reardon, 1998; Delgado *et al.*, 1998)¹², with consumption linkages generally more important than production linkages.

¹⁰ Under these latter circumstances finance is 'tradable'.

¹¹ These greater trade and information flows will also increase the proportion of tradables in the economy. This will increase the consumption leakages and reduce consumption linkages, and may also cause previous producers of non-tradables (for example traditional goods) to lose market share to manufactured items imported into the area. These negative effects should be offset by consumer gains from cheaper goods and by new opportunities for expanded tradable production where the area has competitive advantage.

¹² A multiplier of 1.5 indicates that \$1.00 of extra income from production of agricultural tradables stimulates further income growth of \$0.5. These estimates are subject to error due to implicit assumptions in the estimation methods that the supply of non-tradables is elastic (leading to an overestimate of the multiplier), and due to failure to allow for the dynamic effects of savings and investment (leading to an underestimate of the multiplier). Allowing for the effects of supply inelasticity in production of non-tradables may reduce estimates of multipliers by around 10% in Asia and by 30% in Africa (Haggblade *et al.*, 1991).

Some authors, however, are sceptical of the scale of these multipliers or of the relationships postulated between farm and non-farm activities (see for example comments by Harriss, 1987, and reply by Hazell and Slade, 1987, and a summary by Ellis, 2000). Wobst, 2000, argues that partial equilibrium and multiplier models tend to over-estimate multiplier effects and benefits to rural farmers because they operate on fixed price assumptions whereas increases in agricultural productivity change the terms of trade for agriculture. His CGE model for Tanzania finds that although net gains for farmers are much lower than in a partial equilibrium model, estimated gains for non-farm households are higher. These findings depend upon the balance between tradables and non-tradables and the operation of non-agricultural labour markets.

Bautista and Thomas, 1999, show that different patterns of agricultural growth in Zimbabwe will have different multiplier effects on different categories of poor people. They simulate different patterns of growth and find that although productivity growth in smallholder agriculture produces the greatest benefits for the large numbers of poor people working in smallholder agriculture and in communal rural areas and generates the highest multiplier effects (1.9 as compared with 1.5 to 1.6 from growth in large scale commercial farms and 1.5 from labour intensive light manufacturing) poor workers on large scale commercial farms and the urban poor benefit least from this pattern.

An important conclusion from the linkage literature is that the effects of particular changes on a rural economy and on poor people within it depend crucially upon the nature of the change, on the structure of the local economy, and on different poor peoples' places within it. Regard must be given to the local demand characteristics of goods affected by price or productivity change (their average budget shares for different income groups), tradability, and local production characteristics (supply elasticities, labour and tradable input demand, upstream and downstream linkages) as well as the operation of factor markets that affect both elasticity of supply and the distribution of income within the rural economy. It is also helpful to distinguish between three different processes by which productivity changes, in particular, may impact on poverty: by initially stimulating basic (poverty reducing) growth; by support to (particularly consumption) linkages that providing the poor with second round benefits from basic growth; and by redistribution of market and income shares between income groups. All three processes, and particularly the first two, are important for sustained poverty reduction¹³.

How do growth in the farm and non-farm sectors compare with regard to these characteristics and hence their likely poverty reducing benefits?

For *tradables* with a high local labour input, there are unlikely to be many tradable non-farm activities apart from mining that offer broadly based employment opportunities in the poorest (relatively low income and isolated) rural areas¹⁴. Only as links with urban areas develop will

¹³ It is widely recognised that more equitable income distribution is critically important for poverty reduction (see earlier discussion of Ravallion and Datt, 1999 in section 3.2.1) but for the process of poverty reduction it is *levels* not *continuing processes* of income distribution that are important. Poverty reduction processes are, however, dependent upon continuing *processes* of basic and supporting growth, with the latter dependent on the former.

¹⁴ Tourism and crafts may also offer opportunities for non-farm tradable activities, but, as with mining, areas with these opportunities are likely to be the exception rather than the rule. Migrant labour and remittances may also be considered a form of tradable, exporting labour to bring extra income into an area.

opportunities for non-farm tradable activities develop, but these will often be ‘high barrier to entry’ activities, limiting the benefits to the poor (Barrett *et al.*, 2000). Farm activities, on the other hand, offer opportunities for broadly based expansion in tradable activities (whether cash crops or tradable food crops), with direct and indirect employment and income opportunities for the poor, again depending upon barriers to entry associated with, for example, the nature of the crop, marketing systems, access to land, etc.. Even here the poor are unlikely to gain much directly as self-employed producers of tradable agricultural commodities, with limited access to land and capital and relatively low on-farm incomes. However, there is often considerable potential for them to benefit directly (from increased labour demand from significant numbers of less poor farmers producing tradables) and indirectly (through increased demand for non-tradables from these farmers). The challenge is then to improve the access of less poor farmers to the skills, capital, inputs and output markets to allow them to respond to opportunities in production of farm tradables, and to improve access by the poor to linkage benefits.

Growth and poverty reduction through increased productivity of *non-tradables* will be effective as a basic source of poverty reducing growth and where the non-tradable is widely consumed (i.e. has a high *average* budget share), either by the poor themselves or by a large non-poor population.(with consumption linkage benefits for the poor) High average budget shares for food crops in rural areas in Africa (Delgado *et al.*, 1998) suggest that farm activities are more likely to meet these criteria than non-farm activities. Growth and poverty reduction through increased productivity of non-farm non-tradables is more likely to be important as a secondary growth process, supporting consumption linkages. Institutional or technological change in non-tradable production may also have important redistributive effects by bringing down barriers to entry for poor producers and allowing them to market and income shares from less poor producers, as well as lowering prices to poor consumers.

These arguments are summarised in Table 3.1. A broad conclusion, to which there will be significant exceptions, is that in many poorer rural areas increasing productivity of farm activities will have greater potential for stimulating poverty reducing growth. Increased productivity of non-farm activities is likely to have greater poverty reducing benefits in supporting secondary, linkage dependent poverty reducing growth, again particularly if the activities have low barriers to entry and high labour demands.

The conclusions from consideration of micro-economic linkages about the importance and role of agricultural growth tie in well with conclusions from the wider econometric studies reviewed earlier in section 3.2.1. They also agree with conclusions in a recent review of poverty reducing growth strategies for Africa (Fafchamps *et al.*, 2001) who argue that while higher rates of growth achievable in export manufacturing make it theoretically the best sector to support poverty reducing growth, in practice ‘only a handful’ of African countries will be able to achieve this, so that ‘the 45 or so other African countries that do not become export platforms must rely on other engines of growth: agriculture, mining tourism or a combination of them’ (Fafchamps *et al.*, 2001, p13). The problem here is that many countries do not have very good prospects in mining and tourism, and these activities often have weak linkages and high leakages in supporting secondary growth processes.

Table 3.1: Potential of Farm and Non-farm Productivity Growth in Reducing Rural Poverty

	Tradable	Non tradable
Farm activities	Direct gains if high labour content by poor producers or large upstream / downstream linkages have high labour content by poor producers	Direct gains if high average budget share for poor consumers Indirect gains if high average budget share for non-poor consumers and the poor benefit from expenditure linkages
	Indirect gains if high labour content by non-poor and poor benefit from expenditure linkages	Important in expenditure linkages for activities with elasticity of supply and low barriers to entry producing goods and services with high marginal budget shares (e.g. horticulture, livestock)
Non farm activities	Apart from mining, other NR activities and migrant labour/remittances, unlikely without good communications and strong urban or export markets, features generally absent from poorer rural areas.	Unlikely to have high average budget shares for poor or less poor consumers in poorer rural areas
		Important in expenditure linkages for activities with elasticity of supply and low barriers to entry producing goods and services with high marginal budget shares (e.g. services)

3.3 Characteristics of pro-poor agricultural growth

The theories developed above allow us to draw a number of conclusions about the characteristics of agricultural growth that are necessary for it to be pro-poor and support widespread poverty reduction. Many of these conclusions are not specific to agriculture but specify general conditions for economic growth to benefit the poor. Conditions that are likely to promote pro-poor growth arise where there are:

- (a) price or productivity increases in tradable products with a direct high labour input by the poor or with upstream or downstream linkages with high unskilled labour demand;
- (b) changes in technology, reduced barriers to entry, or access to assets which allow the poor to engage in production of tradables which they could not previously engage in;
- (c) productivity increases in non-tradable products (or falls in price of tradable products) which have a high average budget share in the poor's expenditure;

- (d) changes in technology, reduced barriers to entry, or access to assets which allow the poor to engage in production of high average budget share non-tradables which they could not previously engage in; or
- (e) gains to significant numbers of non-poor (as in processes described in (a) or (c)) leading to expanded demand for goods and services produced by the poor as a result of consumption linkages.

Consumption linkages will be increased where non-tradables with a high labour content and low barriers to entry have a high marginal budget share in expenditure by groups benefiting from initial productivity or price benefits. The benefits to the poor of such growth will, however, be constrained by income and asset inequality¹⁵.

Such 'linkage rich' development will generally be encouraged by labour rather than capital and specialist knowledge intensive methods of production and processing, by more equitable distribution of income, by local consumption patterns favouring local rather than imported goods and services, and by links to wider produce markets that can absorb continuing production increases without large falls in produce prices.

3.4 Necessary conditions for agricultural growth

There have, therefore, been outstanding examples of agricultural growth transforming poor agrarian economies over the last forty years, and the mechanisms by which these have impacted on rural poverty are well documented. We now turn to consider the final question posed at the beginning of section 3: what conditions are necessary for agricultural growth, and specifically pro-poor agricultural growth, to occur?

A large and diverse literature addresses this question from many different angles, for example exploring reasons for and drawing lessons from successes and failures in different countries and regions at different times, and prescribing specific economy wide and sectoral policies for agricultural growth. In this section we summarise lessons drawn by Dorward and Morrison, 2000, from an examination of countries, and of sub-sectors within countries, where above average growth in agricultural labour productivity was experienced in the 1990's. This work itself built on earlier work in Mellor, 1995, drawing lessons from success prior to the 1990s.

Dorward and Morrison suggest a categorisation of three broad patterns of growth, based on the components of growth and on the economic characteristics of the sub-sectors experiencing growth.

- *Extensive exporters* rely on non-staple tradable crops and on area expansion for the major part of agricultural growth. In some, non-tradable staple food crops have also been an important component of agricultural growth, again due largely to area expansion.

¹⁵Deininger and Olinto, 2000 suggest that asset distribution could matter more than income distribution in this respect. High land ownership inequality is suggested to have a negative incentive effect that goes beyond the traditional association with credit market imperfections and reduced levels of investment, for example, such inequality may limit the effectiveness of education policy in contributing to growth. Ravallion, 1998 also finds a significant negative effect of asset distribution on individual consumption growth.

- *Intensive exporters* also rely on growth in non-staple tradables as the major source of growth in agriculture but there is more reliance on increased yields (as opposed to area) and more diversification in export commodities and in intensive staple crop production.
- *Intensive cereal based* countries' agricultural growth includes major productivity gains in the production of staple, tradable crops. This grouping includes countries not only of widely differing size, but also with widely differing per capita incomes and with differing current structural roles for agriculture in the broader economy. It may therefore be viewed as a pathway for structural transformation (rather than a particular stage on a pathway), with continuing agricultural growth linking into non-agricultural growth and itself becoming increasingly diversified and dynamic.

The last pattern of growth has in the past provided the most potential for sustained pro-poor agricultural growth. In the long run it is more sustainable than the extensive exports pattern, which is already beyond the reach of many countries where the land frontier has already been reached. As compared with the intensive exports pattern of growth, on the other hand, it has tended to offer more labour intensive and linkage rich opportunities for poorer rural people¹⁶.

Dorward and Morrison identify a number of common elements that appear to have been critical to above average agricultural growth and suggest that policy makers need to promote these in economies seeking dynamic agricultural growth:

- Large output markets (international or national)
- Stable macroeconomic and sectoral policy
- Conducive institutional environment
- Context specific institutional arrangements
- Dynamic technological and market opportunities
- Access to seasonal crop finance
- Good physical infrastructure
- Appropriate technology
- Dynamic local institutions and processes supporting technological and institutional change

The last point recognises that growth associated with a particular reform or change in circumstances tends to run into other constraints and reaches a plateau when another series of reforms is required to release further potential. Sustained growth is only possible if new constraints are addressed by new reforms, and these often require local solutions, and hence local institutions and processes supporting change.

¹⁶ The importance of oilseeds in India's second (rainfed) green revolution challenges to some extent Dorward and Morrison's conclusions that intensive cereal based transformations have historically provided the most sustainable and pro-poor pattern of growth.. This needs to be recognised, but in the Indian context oilseed crops may have many characteristics of cereals as regards their linkages within a large domestic market, and oilseed growth has been associated with growth in cereals. This is a topic that needs further examination.

3.5 *Agricultural growth and poverty reduction: conclusions*

This section has argued that in poor agrarian economies both the processes of structural change within national economies and micro-economic relations within rural economies give agriculture a pre-eminent and unique role in economic development and in poverty reduction. This results from a variety of features of farm activities as compared with the non-farm sector: high average budget shares; easier access to urban and export markets; lower requirements for scarce capital, knowledge, infrastructure and institutions; relatively high demands for unskilled labour; relatively low barriers to entry; and large numbers of agricultural labourers. Indeed, it is difficult to find many historical examples of large scale reductions in severe poverty which have not been associated with significant increases in agricultural productivity.

Three broad patterns of agricultural growth and development were identified, with critical conditions required for agricultural growth.

Understanding the characteristics of the agricultural sector that give it this pre-eminent and unique role, and the conditions required for agricultural growth is important

- for the identification of and support to sub-sectors and activities that will have the greatest impact on economic growth and poverty reduction.
- to understand the way that agriculture declines in importance and the increasing contribution of non-farm activities to economic growth and poverty reduction in developing national and local economies.
- to understand some of the difficulties that agrarian economies currently face in agricultural development and particularly pro-poor agricultural development

It is to consider these difficulties that we now turn.

4 Difficulties facing agriculture in today's poor agrarian economies

Despite the strong arguments presented above for agriculture (and particularly intensive cereal based agriculture) having provided the main engine of growth for rural poverty reduction in the past, reliance on pro-poor agricultural growth as the main weapon against rural poverty today may not be appropriate if the areas where today's rural poor are concentrated (sub Saharan Africa and parts of South Asia) face more difficult conditions than those that faced the green revolution areas in the latter part of the 20th century. Conditions within present poor rural areas differ from those of the green revolution areas at the start of the green revolution in terms of agro-climatic conditions and potential, irrigation potential, population density, human capital, infrastructure, and the presence and intensity of conflicts. These then interact with processes of change that have operated more widely across developing countries: falling commodity prices (including grains), urbanisation, the spread of HIV/AIDS, changing population structures, changing expectations among young rural people, the advent of information technology and biotechnology, and globalisation. Layered on top of this are the effects of changes in policy amongst donors and governments, notably emphasis on market liberalisation, on a less interventionist role for the state, on complementary roles and partnerships for the private sector and NGOs, and on tighter fiscal regimes. We consider these in turn.

4.1 *Local differences in conditions*

4.1.1 Agro-climatic conditions

Agro-climatic conditions include temperature, rainfall, slopes, soil depth, soil texture, soil fertility, drainage, and salinity. It is difficult to make simple but meaningful comparisons on the relative productivity and potential of land in the different regions, as data comparing East Asia, South Asia and Sub Saharan Africa are not only difficult to obtain but mask important differences between green revolution and poorer, less favoured or marginal areas in South Asia. Data presented by Kydd *et al.*, 2001a, suggest that agro-ecosystems in sub Saharan Africa tend to have more varied, more complex and more site specific constraints than those in South Asia, and a greater proportion of cultivated land is subject to soil fertility constraints to agricultural production. The proportion of land with irrigation potential is much lower in Sub Saharan Africa and in less favoured areas in South Asia as compared with East Asia, and the proportion of crop land under irrigation is still much lower now than it was in Asia at the onset of the green revolution (see Table A4.1). Furthermore, unlike Asia, which has predictable stores of water as snow and groundwater, Africa derives its irrigation supplies primarily from local rainfall. As a result, the irrigation potential is unevenly distributed between regions, and irrigation is less capable of functioning as a drought proofing investment in much of Africa.

A varied agro-ecology in a region with limited irrigation and more inter-year variation implies that a wider range of technological solutions is necessary. Taken together with lower population densities (discussed later), this raises unit costs (per hectare and per capita) of agricultural research, information and other service delivery. Farmers in semi arid rain-fed systems face a particular constraint in that as the average seasonal rainfall decreases, year to year variation also tends to increase. This constrains their crop choice¹⁷ in favour of crops that even in erratic rainfall areas still produce a minimum yield, and both lowers returns to investment in agricultural intensification and makes such investments much more risky¹⁸.

Many poorer rural areas are dependent on grains as food staple: maize, rice, sorghum, wheat, millets and teff. This is a positive factor as the first four crops (if not the specific types) are widely grown elsewhere in the world and thus there is the potential to benefit from R&D on these crops undertaken elsewhere. However, marginal conditions and low cultivation intensity often demand different technological solutions from those being developed elsewhere. There are also large areas where roots, tubers and bananas/plantains are the staple crops. Roots and tubers can achieve high yields, but there are concerns about rapid soil mining, vulnerability to diseases and challenges to intensification. Tradability is limited by a high bulk/nutrient ratio and (for

¹⁷ Sorghum and millet are crops which with minimal fertiliser will, in good rainfall years, yield 2t/ha falling to 500kg /ha in low rainfall years. Where rainfall is erratic, these may compare favourably with maize which can achieve 8t/ha with optimal inputs and water, but is very sensitive to water shortages (FAO, 1995). However, these more drought tolerant crops often have lower grain indices and thus lower fertiliser responses, further reducing returns to rain fed agricultural intensification.

¹⁸ As an alternative to larger scale irrigation systems, water harvesting techniques can generate a 3 to 4 fold increase over dryland farming. Whilst these can be costly in terms of labour requirement (100 to 150 work days per ha) they may have greater potential. *Ibid.*.

some crops) rapid post-harvest deterioration. R&D in disease resistance, human nutrition quality, storage performance, palatability and response to higher soil fertility requires substantial increases in resources and management and will be less able to draw on work performed elsewhere.

4.1.2 Population Density

Table A4.2 shows that aggregate rural population density in Sub Saharan Africa has now caught up with densities in South Asia in the early 1960's, but is still some way behind East Asian densities at that time. Rural population densities aggregated to this level can be misleading, hiding important local variations, and population densities in some parts of Africa are very high. Paradoxically these high densities in some areas mean that a large proportion of the population in other poor rural areas are still low, resulting in high costs in infrastructural development, service provision and trade, and inhibiting the evolving intensification of farming systems as postulated by authors such as Boserup, 1965, Ruthenberg, 1980, Pingali *et al.*, 1987, and Binswanger and McIntire, 1987. Whereas some of the high population density areas do support processes of intensification, others are too crowded and poor, and suffer more from involution (Turner *et al.*, 1993; Tiffen and Mortimore, 1994). Goldman and Smith, 1995, suggest that provided road infrastructure is good, population densities may not be a critical constraint to agricultural intensification, although extremely low or high population density may be a constraint.

4.1.3 Human Capital

As discussed above, in some ways poorer rural areas may face quantitative shortages of human capital. However literacy rates in South Asia and Sub Saharan Africa are now comparable with those in East Asia in 1970 (Table A4.3) although South Asian female literacy rates remain very low. A similar pattern exists with regard to some measures of human health, with current figures for South Asia and Sub Saharan Africa matching those in East Asia in the 1960s. However the prevalence of malnourished children is very high in South Asia but declining faster than in Sub Saharan Africa, with the result that the number of malnourished children declined 7% in South Asia between 1970 and 1995, but increased by 68% in Sub Saharan Africa (see table A2.4). The impact of HIV/AIDS will be discussed later.

4.1.4 Communications Infrastructure

A number of authors (for example Turner *et al.*, 1993; Goldman and Smith, 1995) suggest that good road access is critical for agricultural intensification. The density of paved roads varies between Africa countries and is very low in 1990 as compared with India in 1960, although comparable with some other Asian green revolution countries in 1960 and 1970 (see Table A4.4). However, only 10% of roads in Africa are paved, compared with 35% in Asia (Platteau, 1996) and average road density in SSA is 34 m/km² (with individual states' values ranging from 30 to 490 m/km²) compared with 500m/km² in India (Riverson *et al.*, 1991; Doyen, 1993). When measured per km² of agricultural land, Africa stands at 160 m/km² compared with 380 m/km² in South America, 450 m/km² in Asia and 520 m/km² for the world as a whole (Hine, 1993). Furthermore, during the 1980s, roads in Africa deteriorated to such an extent that more than half of paved roads and 80% of main and local unpaved roads were in poor to fair condition (Riverson *et al.*, 1991). Poor management by government road departments led to a huge

backlog of roads needing rehabilitation or reconstruction. Heggie, 1995, estimated that restoring only roads that are economically justified would require \$ 1.5 billion a year from 1995 to 2005, approximately 1% of the region's GDP.

However, infrastructure is only one element of transport and communication services. More important may be consideration of transport costs. A number of studies have compared estimates of transport costs in Asia and Africa (for example Doyen, 1993; Platteau, 1996; Hine *et al.*, 1997) with the general finding that transport costs (using trucks) are higher in Africa than in Asia. Thus Hine and Rizet, 1991 (cited in Hine *et al.*, 1997) concluded that freight transport costs in Francophone West African countries (Cote D'Ivoire, Cameroun and Mali) were four to five times the costs in Pakistan. Doyen, 1993, comes to similar conclusions, that trucking costs in West Africa are five times higher than in Pakistan. Hine *et al.*, 1997, found that long distance freight transport tariff rates in Tanzania were between two and five times higher than those in Indonesia. These cost differences are due only in part to differences in the density and quality of the road network: differences in operational management and efficiency, the effects of differing tariff, tax and subsidy regimes on the costs of vehicles and spare parts, and lower competition in trucking services all raise the costs of transport in Africa.

Figures presented in table A4.5 suggest that today's densities of telephone lines per person are not low in Africa or South Asia as compared with East Asia prior to 1990. These may be misleading, however, as they ignore differences between density in rural and urban areas, and they also provide little indication of relative access to telephones: in areas of low population density a high density of lines per person may not result in higher access as compared with a high population density area with a lower density of lines. A better measure of access would be the proportion of the rural population living within, say, 5 km of a phone line. However, the rapid spread of cell phone systems offers the potential for dramatic and low cost access to phone services in rural areas.

4.2 Global trends

4.2.1 Falling world commodity prices

There is a clear downward trend in real prices for primary agricultural commodities, as agricultural prices have trended downwards since the 1960s (see table A4.6 and graphs in Annex 2). Although the overall decline was greater than 50%, it occurred mainly in the 1980's. During the 1990's the decline has been more gradual, reflecting an initial increase in prices. The pattern for the three sub groups (food, beverages and raw materials) have been similar to that of total agriculture with the exception of the 1970s, where a sharp rise in food prices was mirrored by a sharp decline in the price of beverages.

Within the food subgroup, grains and fats/oils can be separated out.

- For grains, there was an initial sharp increase in prices in the early 1960s, particularly for maize and sorghum and then again for all grains in the early 1970s. There was a rapid decline during the 1980's followed by a much more gradual decline during the 1990s.
- Although the general picture was similar for fats and oils, prices appeared to change more erratically. Prices for all oils with the exception of groundnut rose in the early

1960's, before beginning a downward trend until the late 1980s. The groundnut price fell initially before rising in the 1970s and then declining rapidly.

- Movements in the price of sugar have been erratic, reflecting the fact that the world market is very much residual and subject to EU and US policy. The graph demonstrates that the price in the EU and to a lesser degree, the US has been more stable.

The decline in the price of raw materials was greater than that for total agriculture during the 1960's to 1990's. Within the group, the decline in the price of rubber and of cotton was much greater than that for cotton during the 1960s and early 1970s. Observing the trends in fertiliser prices, a cost-price squeeze occurred in the 1970s during the oil crisis, but since then, the price of fertiliser has been on a downward trend

The IFPRI IMPACT model predicts continued (modest) falls in prices up to 2020, while World Bank projections over the period 2000 to 2005 are for a gradual increase in the real price of grains, but a continuing decline in the real prices of fats and oils and of beverages (<http://www.worldbank.org/prospects/gcmonline/subscriber/0002/appendix.pdf>). However, even with this gradual increase predicted for grains, real prices are likely to be lower than in the 1970s and 80s. This affects both the intensive cereal based and the intensive export based patterns of growth identified earlier. Today's poor farmers therefore tend to face more adverse terms of trade than their green revolution predecessors, reducing both the incentives to engage in the production of tradables and the gains and economic stimulus from such production. This may be partly envisaged as a 'late adopters' problem and it is exacerbated by the globalisation of markets within the world economy as semi-tradables become tradables and local prices fall towards world market prices – further reducing the terms of trade for poor farmers and also potentially weakening local demand for non-tradeables and its positive effects on consumption linkages and growth. It is also unlikely that these effects may be offset by less protectionist policies and lower exchange rates in today's more liberalised economies, as a recent review of the impact of exchange rate overvaluation by Shatz and Tarr, 2000, argues that successful Asian countries kept their nominal rates close to market-clearing levels.

Low food prices may benefit large numbers of poor rural food deficit households and the urban poor. It is not clear what the overall relative balance will be for poor rural households between the direct benefits of low food prices and the (indirect) effects of low product prices on employment and growth in the agricultural sector.

4.2.2 Population structure

High rates of population growth due to declining child mortality rates in developing countries have led to increasingly young populations. This initially results in high dependency ratios but then declining child mortality later leads to a fall in fertility and then a period of falling dependency ratios, a 'demographic window of opportunity' (IFAD, 2001). Current dependency ratios in Sub Saharan Africa countries tend to be higher than ratios in green revolution countries in the 1960s and 70s but in many countries are predicted to fall to similar levels over the next 15 years or so (IFAD, 2001). This is expected to occur despite the counteractive effect of HIV/AIDS, which will increase the number of orphans and reduce the economically active population, with deaths particularly affecting women in the 15 to 30 year age group in Africa. The HIV/AIDS tragedy will, however, have other serious effects, undermining savings and attacking the social, human and financial capital of the rural poor.

4.2.3 Urbanisation and non-farm incomes

Urbanisation has proceeded rapidly throughout the developing world. Table A4.5 compares rates of urbanisation over time in different regions, and predictions are for 50% of the population of developing countries to be living in urban areas by 2020 (Garrett, 2000). Regional rates of urbanisation are broadly equivalent, thus urban influences tend to be much greater on today's poor rural areas than they were in green revolution areas 30 years ago.

Rapidly growing urban areas need supplying with food and this may change the focus of agricultural policy aims away from income generation and poverty alleviation for the rural poor to the need to deliver cheap food for the urban areas. However, this may not benefit poor farmers if low world food prices and poor rural transport systems make it cheaper and easier to provision major cities from international markets rather than by investing in rural infrastructure and services to promote domestic production.

Related to this is the question of the relative importance of the farm and non-farm economies in poor rural areas. Recent literature has stressed the importance of livelihood diversification amongst the rural poor, particularly in Africa. It is not clear how much of this is a result of increased recognition of this by researchers and analysts, although there is evidence that the non-farm income share has been increasing in both Asia and Africa (Reardon *et al.*, 2000; Bryceson, 1999) although the causes and processes of such diversification are likely to be different in different areas (Reardon *et al.*, 2000). Bryceson suggests that much of the non-farm diversification in Africa in the late 80s and 90s has been the result of a 'push' out of agriculture, as smallholders have been caught between the scissors of declining profitability of and support for commercial smallholder agriculture on the one hand, and increasing needs for cash to pay for school and health fees and for increasingly expensive consumer goods on the other. Rosegrant and Hazell 2000, on the other hand, suggest that increasing non farm income shares in most Asian countries have occurred as part of the process of agricultural growth and structural transformation described earlier – with more healthy 'pull' factors predominating. Reardon, 1998, identifies different 'stages of rural non-farm transformation' and characterises Africa and South Asia as being predominantly in stage 1, with much non-farm income being dependent on agricultural activities and most farm: non-farm links being located within rural areas themselves and involving direct (upstream and downstream) production linkages and expenditure linkages.

Reardon's 'first stage of rural non-farm transformation' can be contrasted with the second and third stages, which predominate in Latin America and South East Asia respectively. These show increasing formal involvement in manufacturing and non-agricultural services and in medium and larger scale agro-industrial activities, with increasing links to urban activities (with commuting to urban areas and sub-contracting of rural businesses by urban or foreign businesses). Reardon *et al.*, 2000, also note that there appear to be differences between regions in the relationship between household incomes on the one hand and the share and level of non-farm income on the other. They postulate that in Africa, where a positive or U shaped relationship between total incomes and non-farm income share predominates, this arises as a result of a lack of 'low barrier to entry' labour intensive earning opportunities, with consequent crowding and low returns as discussed earlier in the context of 'push' factors in diversification.

Bryceson, 1999, develops a related categorisation of three broad diversification 'complexes' within SSA. 'Complex A, local services' describes diversification in remoter areas, where non-farm activities tend to be the supply of local services and local handicrafts. Remoteness restricts

access to a wider market for sale of local goods and services, but also restricts competition from import of goods and services from urban areas. ‘Complex B – trade’ involves significant non-farm income from trading activities and labour migration linking rural and urban areas. In ‘complex C – transfer payments’ these rural-urban links are taken further in areas with historical traditions of labour out-migration and highly mobile populations, to the extent that pensions and remittances become a major source of rural income. Bryceson stresses the importance of investment and consumption linkages. The latter are of particular importance for ‘complex A’ diversification as well as for complex B, where agricultural income is an important determinant of demand for local services and for local purchase of traded goods. Investment linkages are often more important for complex B and, to a lesser extent, complex C, and work the other way, with higher non-farm earnings supporting investment in agriculture where this can offer high or secure returns to larger investments.

4.2.4 Technology

The last few years have seen a revolution in bio-technology, with major advances in molecular biology and the advent of GM crops. This has been associated with a decline in public funded research and increasing activity by multinational corporations, with research resources concentrated on problems facing large numbers of commercial farmers: specific, applied research on problems facing poor farmers in less favoured areas is largely ignored (Pingali, 2001) and there are concerns that small farmers are also likely to lose out in cash crop production although there are also potential benefits of developing new varieties more quickly and cheaply to better address poor farmers’ problems (Kydd *et al.*, 2000). This scenario contrasts with the major emphasis on food grain varietal development that underpinned the green revolution.

4.2.5 Globalisation

By globalisation we refer to the growing interdependence of the world’s economies, particularly the huge increases in capital movements; rapid increase in world trade; and increasing internationalisation of production, often organised within or between multinational corporations. These processes have been aided by falling information and communications costs and by convergence in governments’ economic policies towards liberalised, market-led development. The impact of globalisation on the rural poor can be examined in terms of its effects on them as producers and consumers, and in terms of the effects of inclusion in and exclusion from the global economy.

Globalisation should pose opportunities for producers through wider access to output markets, technology, ‘know how’, finance and inputs, but there are questions as to how far this will support agricultural growth in poor agrarian economies, and where it does, if this will be pro-poor. As discussed earlier, expanded market access to output markets is not likely to favour food grain producers and thus will not support the intensive cereal based pattern of growth that has driven broad-based rural poverty reduction in green revolution areas, and indeed in these markets globalisation may pose more of a threat. There is more optimism that globalisation poses more opportunities for intensive export based patterns of growth, particularly opening export markets for non-traditional crops, for example in fresh horticultural produce (World Bank, 2000a). However, many of today’s’ poorer areas are characterised by poor transport infrastructure and even where such infrastructure exists there are increasing concerns that such growth may be

concentrated in enclaves of larger commercial farms with limited poverty reducing upstream, downstream and expenditure linkages: its potential poverty reducing benefits may thus be over-emphasised (e.g. Kydd and Dorward, 2001; Kaplinsky, 2000). There is also little evidence that globalisation of financial markets will expand the supply of capital to smallholder agriculture in poorer areas.

Kaplinsky, 2000, uses value chain analysis to make a more general argument that for suppliers of goods and services the long run benefits of globalisation are concentrated in intellectual property rights, knowledge and governance, where barriers to entry allow firms to retain rents in otherwise competitive markets. This ties up with arguments that the transaction costs of coordinating and ensuring timely delivery of quality assured products militate against small producers (Kydd and Poulton 2000). This suggests that the processes of globalisation may have little to offer the majority of the rural poor in terms of higher tradable production, higher produce prices, or linkage effects¹⁹.

As consumers the rural poor may have more to gain from lower food prices, but here too the benefits may be limited by high transport costs into rural areas and by high average budget shares for food, and therefore limited benefits from reduced prices for imported manufactures.

4.2.6 Conflict.

South East Asia was by no means free from conflict before or during the Green Revolution period. However, the green revolution occurred most dramatically in politically stable situations, often involving physical and social reconstruction following conflict, and often supported by global political interests which saw such reconstruction as well as the green revolution as an important weapon against the red revolution. Although it is too early to say how the global political environment has changed following the events of September 11th this year, global political interests in the 1990s did not place such emphasis on agricultural growth in developing countries. Meanwhile internal conflicts have become increasingly concentrated in Africa, with nearly 40% of internal conflicts found in Sub-Saharan Africa (UNHCR, 2000) while of the 41 countries in Sub-Saharan Africa, 17 are currently or have recently been categorised as “chronically political instable” (World Bank quoted by Farrington and Lomax, 2000)

4.3 *Policy differences*

Over the last twenty years or so there has been a major shift in dominant policy thinking, with increasing recognition of state failure and a move away from direct state intervention towards a role of the state in providing an enabling environment for private sector and civil society, with stable macro-economic environment, liberalised markets, tighter fiscal regimes, and a more developed institutional environment. This is closely associated with the process of globalisation discussed earlier and contributes to major differences in the institutional and economic environment facing agriculture in poor rural areas.

¹⁹ There may be market opportunities for organic, non-GM and ethical products, but these markets are likely to be limited and themselves involve information costs in assuring compliance with standards and are unlikely to drive large scale rural poverty reduction processes.

There has also been a large reduction in official investment in agricultural development. Many policy makers do not currently consider investment in agricultural development the best bet for poverty reduction for a number of reasons (Kydd and Dorward, 2001):

1. there is increasing recognition of the importance of non-farm incomes and activities in the livelihoods of the rural poor, and calls for more support for small and medium non-farm rural enterprises ;
2. there is disillusionment with the lack of agricultural growth in areas where today's rural poor are concentrated (sub Saharan Africa and parts of South Asia), despite heavy investments in agricultural development in the past, together with recognition that agricultural development in these more marginal areas may be more difficult;
3. many of agriculture's problems are seen as lying outside the agricultural sector, in roads and telecommunications infrastructure, in health and education, and in governance, for example.
4. there are limited prescriptions for investment in agriculture, and the direct agricultural sector investments called for tend to focus on research and extension, but policy makers have doubts about their effectiveness, are concerned about recurrent costs and fiscal commitments, and are still experimenting with private/public models for finance and delivery

These latter points, together with the overall policy paradigm, lead to what Kydd and Dorward, 2001 term the 'agricultural investment dilemma': even where the importance of agriculture is recognised it is difficult for donors and governments to design and gain approval for specific agricultural investment programmes.

4.3.1 The liberalisation agenda

A fundamental question here concerns the ways in which the liberalisation policies of the last 20 years or so have changed access to market services (for finance, inputs and outputs) in poorer rural areas. The main arguments for liberalisation rest upon the ineffectiveness and inefficiency of monopolistic and monopsonistic state service provision. Extensive evidence exists of parastatals' many failures, including

- Late delivery of services to smallholder farmers,
- Large margins, increasing input prices and decreasing output prices,
- Late and non-payments to producers due to cash shortages and corruption
- Large fiscal drains on government budgets
- Rationing of services to exclude the poor
- Delivery of inappropriate services as regards input quality and packaging
- Failure to innovate and develop markets

The roots of these problems are also well known:

- Monopolistic and monopsonistic positions protected by government regulations
- Lack of incentives to individuals and to the organisation to perform

- Overstaffing and patronage in staff appointments
- Political interference in business operations and multiple, contradictory objectives
- Lack of capital for investment
- Poor staff management and training, and lack of business skills
- Corruption

The policy agenda to address these problems has been to recognise the intrinsic problems of state failure and to call upon the discipline, incentives, and resources of private market systems and players to more effectively and efficiently perform these functions and respond to service demand from smallholder farmers. Action then involved removal of regulatory controls in agricultural input and output markets, eliminating subsidies and tariffs, and reforming and in some cases privatising agricultural parastatals. These policy changes have delivered positive impacts in many fields, for example in the supply chain systems for some cash crops in Africa, and in reduced food prices to poor rural and urban consumers (Jayne and Jones, 1997). However, in many situations, and particularly in the critical functions needed to kick-start cereal based intensive growth in poorer rural areas, there has been a notable lack of success, as the private sector has not moved in to provide farmers with input, output and financial market services that are attractively priced, timely and reliable. Whether the situation is worse or better than it was in the immediate pre-liberalisation period is debatable, and few would argue that the pre-liberalisation situation could or should have been sustained. However, a lack of substantial improvement and continuing difficulties is widely recognised, particularly with input financial service delivery and with output marketing in remoter areas. The reasons for this lack of success, however, and consequent prescriptions to address it are debated.

One view is to argue that failure is not the result of the liberalisation agenda, but of failure to implement it thoroughly, for example, (Kherallah *et al.*, 2000a; Jayne *et al.*, 2001). The main thrust of the ‘too little liberalisation’ argument is that partial rather than complete withdrawal of the state together with policy reversals have meant that continued price controls and competitive advantages for parastatals (or even the threat of policy reversals) have depressed returns to private sector investment and created risks that have inhibited their investment. Given this analysis, the solution to continuing failure is to complete the market liberalisation process²⁰. This should then be accompanied by other, often unspecified or general, measures to address problems in financial markets and affecting remote producers: for example institutional innovations for input credit (such as contract farming and group approaches); increased investment in infrastructure, legal and market institutions, and agricultural support organisations (research and extension); promotion of smallholder production of export crops; short term targeted support to vulnerable groups in remote areas (presumably safety net transfers); and credible sustainable macro-economic policies.

²⁰ Jayne (pers.comm.), for example, argues that greater reform of food grain markets in West Africa as compared to East and Southern Africa, has been associated with greater agricultural growth rates (although it may also be relevant that there is greater urbanisation and also more millet and sorghum, and less maize, in West Africa).

4.3.2 'New institutional' arguments

Another 'new institutional' view (see for example Dorward *et al.*, 1998, Kydd *et al.*, 2001b) argues that one important reason for states' often half hearted commitment to liberalisation, particularly in food crop markets, is their recognition that pervasive market failures prevent the private sector from delivering the necessary services, and policy makers' consequently continue to attempt to intervene to remedy these failures. This view does not deny that continued intervention or threat of intervention is also the result of short term political economy considerations and further impedes private sector investment, nor that the pre-liberalisation situation was unsustainable and needed drastic reform. However, it does suggest a different emphasis in the continuing search for more successful agricultural market and supply chain development to support food crop production in poorer rural areas.

The essence of the 'new institutional' argument is that the very low level of development in the institutional environment of poor rural areas, together with a low density of transactions, leads to very high transaction risks and costs²¹ in financial, input, and output markets. This is particularly the case with financial markets and to a lesser extent with input markets. Transaction costs should be lower for output markets (unless output is perishable, there are other important reasons for timely delivery, or the product has important quality characteristics). High transaction costs, exacerbated by low population densities and poor communications, lead to market failures, and as these market failures depress the level of economic activity, a vicious cycle of under-development results.

In this analysis a key ingredient in agricultural development is institutional development. Here the focus is not so much on institutions as organisations but on institutions as the 'rules of the game' (North, 1990), and in particular on both the 'institutional environment' (governing for example property rights and general relations between economic agents) and 'institutional arrangements' (the specific rules governing specific transactions) (Davis and North, 1971). Key functions of the state and of other actors promoting development are then to support institutional development that will reduce the transaction costs of critical transactions: we focus here on financial, input and output transactions in the smallholder agriculture sector.

Thus far these arguments can be seen as supportive of the 'too little liberalisation' arguments and their policy recommendations as outlined earlier (institutional innovations for input credit; investment in infrastructure, legal and market institutions, and support organisations; and credible macro-economic policies). However, new institutional arguments place a stronger emphasis on the importance of understanding the extent of transaction costs and on the importance of institutional arrangements in reducing these. It is argued that particular attention must be paid to finding institutional arrangements that overcome the transaction problems inherent in agricultural finance, as increased investment in seasonal inputs is a critical requirement for agricultural intensification and growth. Again, there are parallels with the 'too little liberalisation' calls for institutional innovations for input credit.

²¹ In the remainder of the paper the term 'transaction costs' will include what Dorward, 1999 defines as pure transaction costs, associated transaction costs, and associated risks.

More fundamental institutional analysis, however, goes much further, questioning how far such calls are compatible with increasingly competitive input and output markets. We focus on three issues here.

First, analysis of transaction costs and contractual arrangements questions the fundamental advantages of competitive market systems in situations of high transaction costs and risks, high exposure to risk from asset specificity, and repeat transactions (Williamson, 1985). There are strong theoretical arguments explaining the existence of firms and of bilateral contracts, and these may also be applied to defend support for non-competitive contractual relations in the early stages of agricultural development (Coase, 1992). Dorward *et al.*, 1998 argue that ‘interlocking transactions’ are a widespread contractual form that addresses some of the transaction cost problems of input credit, but that there may be incompatibilities between interlocking arrangements and competitive input and output markets. They argue that there may indeed be benefits from monopsonistic crop marketing systems in supporting interlocking arrangements for seasonal input finance, although safeguards are needed to avoid abuse of market power and to provide incentives for firms to continually look for technical and managerial advances and efficiency gains (Kydd *et al.*, 2001b). These arguments, with theories of endogenous institutional innovation, provide some explanation for the development of interlocking systems by both cash and food crop marketing parastatals in Africa prior to liberalisation, and for development of these systems by some private companies engaged in marketing export crops (see for example Dorward *et al.*, 1998; Gordon and Goodland, 2000). They also explain the failure of such systems to develop or function in other situations, most notably in liberalised food crop production systems.

Second, where countries’ staple crop is either non-tradable (for example a perishable or bulky root crop or plantain) or semi-tradable (for example a grain crop in a land locked country, such as Malawi, with very high internal and/or external transport costs placing a large wedge between import and export parity prices) then natural, climatic variation between seasons may cause production to fluctuate above and below domestic requirements, causing large fluctuations in market prices, between import and export parity prices. If these price variations cross thresholds that significantly affect the profitability of investment in agricultural intensification, such as fertiliser application, then such investment may be severely curtailed by both lowered average returns to investment, and risk considerations. This then feeds into uncertainty for input and output traders, adding a further dimension to the vicious circle of high transaction costs, low institutional development, poor infrastructure and low levels of economic activity described above.

Third, recognition of this vicious circle leads to serious questions about the extent to which development of infrastructure and the institutional environment will be sufficient on their own to enable private sector investment necessary for a cycle of increasing economic activity and lower unit transaction costs at a rate that will achieve significant poverty reduction. A critical role of government may be to intervene in financial, input and output markets, not necessarily to participate directly in these markets itself, but to reduce the transaction risks and costs facing private agents engaging in these markets. This point is not a new one, for example Rosegrant and Siamwalla, 1988, argue that governments should intervene in low volume seasonal finance markets to reduce transaction costs (but not to subsidise interest rates) only until volumes and institutional arrangements are built up and costs reduced. The bright side of this analysis is that if economic activity can be stimulated past a critical point, then high density of economic activity

and development of institutions can lead to dramatic falls in transaction risks and costs. It is then important that governments quickly withdraw subsidies that are no longer needed to overcome expensive and distortionary transaction cost induced market failures in basic agricultural markets.

How then does this analysis compare with government policies and interventions historically in areas that have successfully followed a path of intensive cereal based growth, and how do current policies in today's poor rural areas compare? To address this question Table 4.1 summarises some of the information needed for an initial analysis of policies in successful green revolution areas *at the time of transformation*. The columns of the table may need some explanation.

- 'Price stabilisation' refers loosely to mechanisms reducing the impact of world price fluctuations or national production fluctuations on prices, whereas 'price support' refers to mechanisms that maintain prices above some guaranteed level – the two are often closely related.
- 'Dispersed guaranteed output markets', again related to price stabilisation and support, describes particularly active systems which provide farmers with access to local outlets for their produce at guaranteed prices (these prices possibly being lower than those that could be obtained in open markets).
- 'Interlocking' refers to provision of seasonal inputs on credit against guarantees of repayment through marketing of the crop output (Poulton *et al.*, 1998).
- Land reform refers to both redistribution of access to land and changes in tenurial relations for land users.

'Green revolutions' are presented in the table in a sequence that distinguishes between irrigated and rain fed systems.

Table 4.1 Government Policies and Interventions in Green Revolution areas at the time of transformation

Irrigated systems

Country	System	Years	Price stabilisation	Price support	Dispersed guaranteed output markets	Input subsidies	Seasonal finance delivery	Inter-locking	Infra-structure	Institutions, Services
Bangladesh	Rice (mainly)	1970s	Yes	X+, M-	Yes, & private markets	Yes	Yes	Some private arrangements	I,R.	R,E.
China	Rice (mainly)	1978-84	Yes	Yes	Yes	Yes	Yes	Yes	R,I	L, R, E, F.
Egypt	Wheat & rice	1990s	Yes	Yes		Removed in 90's			I	F, R, E.
India (1): Punjab	Rice & wheat	Early 1970s	Yes	X+, M-	Yes & private markets	Yes	Yes	Some private arrangements	I, R.	L,R,E,F.
Indonesia	Rice	1970s	Yes	X+, M-	Yes	Yes	Yes	No	I, R.	R, E, F.
Japan (1)	Rice	1900-20	High prices	High stable prices	Private markets	No	No		I	L, R, E, F.
Japan (2)	Rice	1950s	Yes	Yes	Private markets				I	R, E, F
Korea	Rice	1960s	Yes	Yes	Yes	Yes	Some		I, R.	R, E, F, L.
Malaysia	Rice	60s-70s		Yes		Yes	Yes		I,R	R, E, F, L.

Key : *Price support*: X+ above export parity, M- below import parity; *Infrastructure*: R, roads; I, irrigation.
Institutions and services: L, land reform; R, research; E, extension; F, farmer organisations.

Table 4.1 (cont.) **Government Policies and Interventions in Green Revolution areas at the time of transformation**

Irrigated systems (cont.)

Country	System	Years	Price stabilisation	Price support	Dispersed guaranteed output markets	Input subsidies	Seasonal finance delivery	Inter-locking	Infrastructure	Institutions, Services
Mexico	Wheat	1950s	Yes	Yes	Yes +strong urban demand	Yes	Yes	No	I,R	L, E, R, F.
Philippines	Rice	60s-70s	Yes			Yes	Yes		I, R (but still constraint)	R, E, L (but still constraint)
Sri Lanka	Rice	60s-70s	Yes	Yes	Yes & private markets	Yes	Yes		I, R	R, E, L, F
Taiwan	Rice	1946-50	Yes	No, taxed	Yes	No	Yes	Yes	I, R.	L, R, E, F.
Vietnam	Rice	Early 1980s	Yes	Yes	Yes	Yes	Limited, constraint		I	L, O.

Key : *Price support:* X+ above export parity, M- below import parity; *Infrastructure:* R, roads; I, irrigation.
Institutions and services: L, land reform; R, research; E, extension; F, farmer organisations.

Sources: Ahmed, 1999; Barber, 1994; Bautista, 1999; Bhalla and Singh, 2001; Dong, 1987; Francks, 1984; Gonzales *et al.*, 1993; Kherallah *et al.*, 2000b; Lin, 1997; Longworth, 1987; Mahmud, 1999; Rosegrant and Hazell 2000; Salleh and Meyanathan, 1993; Sanderson, 1986; Tomich *et al.*, 1995; USDA, 1968; World Bank, 1993; Yamada and Hayami, 1979.

Table 4.1 (cont.) **Government Policies and Interventions in Green Revolution areas at the time of transformation**

Rain-fed systems

Country	System	Years	Price stabilisation	Price support	Dispersed guaranteed output markets	Input subsidies	Seasonal finance delivery	Inter-locking	Infra-structure	Institutions, Services
India (2):	Rainfed (cereals, oil seeds)	Late 1980s	Yes	X+, M-	Yes	Yes	Yes	Some (private)	R	L, R, E.
Kenya	Rainfed maize	mid 60s +	Yes	No	Yes		Yes	No	R	R, E, L, F.
Malawi	Rainfed maize	1985-92	Yes	X+M-	Yes	Yes	Yes	Yes	R	R, E, F.
Nigeria	Rainfed maize	70s-80s	No	Strong urban demand	Strong private market	Yes plus service centres	No	No	R	R, E.
Zimbabwe	Rainfed maize	1981-85	Yes	Yes	Yes	Yes	Yes	No	R	R, E.

Key : *Price support:* X+ above export parity, M- below import parity

Infrastructure: R, roads; I, irrigation.

Institutions and services: L, land reform; R, research; E, extension; F, farmer organisations.

Sources: Bevan *et al.*, 1993; Carr, 1997; Eicher, 1995; Eicher and Kupfuma, 1998; Eicher and Staatz, 1998; Gabre-Madhin and Johnson, 1999; Gabre-Madhan and Haggblade, 2001; Goldman and Smith, 1995; Howard *et al.*, 1999; Mosley, 1993; Tomich *et al.*, 1995; Wiggins, 2000.

The validity of the evidence about agricultural transformation summarised in table 4.1, and of the conclusions drawn from this, may be challenged on a number of grounds.

- Some of the common elements noted in the table may not have been necessary for the transformations listed, whereas some other necessary conditions may not be included in the table. Thus, for example education, health and governance are not explicitly considered, and although land reform interventions are noted, these varied in their objectives and effectiveness, and, more fundamentally, it is the nature of tenurial arrangements that is important, not the presence or absence of land reform. Similarly the existence of an appropriate technology, for example, may be a necessary condition but is not explicitly considered in the table: although it may be the goal of government policy, it does not automatically or immediately result from policies investing in agricultural research.
- The table concentrates on intensive cereal based transformations of smallholder agriculture. As a result there is very little information from successful transformations in Latin America. This focus is deliberate, as it was argued earlier that intensive cereal based transformations offer the greatest potential for linkage rich, sustained, pro-poor growth. However, the different types of transformation are not always easily separated (with, for example, intensive cereal based transformations supporting intensive export based transformations, and *vice versa*) and it would be useful to examine the conditions associated with other types of agricultural transformation. Some would argue that Africa at least should be looking more towards Latin America than towards South East Asia for a model for economic growth and development.
- A more thorough analysis would compare more systematically areas that have gone through a successful transformation with those that have not, and from this try to establish necessary and sufficient conditions for different agricultural transformations. This would involve using a greater range of information from a greater range of countries.

These challenges suggest an important research agenda. For the moment it is nevertheless useful to consider what may be learnt from the evidence at hand.

Initial examination observation of the table reveals a number of interesting features that warrant some discussion:

- Irrigated transformations tend to be Asian (with the exceptions of Mexico and Egypt), to have happened before the 80s (with the exceptions of China and Vietnam, where the introduction of market reforms and a shift away from a command economy removed critical constraints to transformation)²², and to have continued strongly. In contrast, rainfed transformations are much fewer, tend to be concentrated more in Africa, in the 80s, and to have been weaker in their breadth,

²² China had already achieved quite widespread adoption of many technical features of the green revolution, with improved varieties, fertilisers and irrigation, but these had not been utilised sufficiently widely or effectively, largely due to lack of effective coordination and incentives promoting efficiency and effort.

depth and persistence, with subsequent regression in the 90s being common ²³. India provides a significant exception on the latter points of this pattern, with its ‘second’ green revolution in the 1980s in rain fed areas (Smith and Urey, 2002). This has been sustained and shows strong poverty reducing characteristics, but also builds on the achievements of earlier irrigated transformations.

- Almost every transformation is associated with local research and extension²⁴. National rice and wheat research agencies’ commonly used outputs from international research centres (for example internationally developed varieties) as well as locally developed varieties. For (rainfed) maize there has been much less emphasis on varieties developed internationally and much more dependence on locally developed varieties ²⁵. It is also worth noting that research and extension were often provided by bureaucratic national agencies which are now largely discredited as elitist, ineffective, inefficient and fiscally unsustainable²⁶.
- Another almost universal factor is investment in road infrastructure²⁷.
- The vast majority of transformations involved, in their early stages, government interventions to stabilise output prices and maintain them somewhere between import and export parity prices, and to subsidise input supply and credit. Interlocking arrangements for input credit also feature in a number of cases.

Taking these points together, and relating them to earlier discussion about agricultural growth and about the difficulties facing agriculture in today’s poor agrarian economies, we postulate that there are certain necessary conditions for intensive cereal based transformations to occur: appropriate and high yielding agricultural technologies; local markets offering stable output prices that provide reasonable returns to investment in ‘improved’ technologies; seasonal finance for purchased inputs ²⁸, reasonably secure and

²³ Similar regression, though from a less dramatic transformation, has occurred in other African countries not included in table 4.1, for example Zambia, Tanzania, Ghana and, in limited areas, in South Africa (Mosley and Coetzee, 2001).

²⁴ Vietnam is an apparent exception to this but the basic technologies for increasing rice yields were initially transferred from the International Rice research institute in the Philippines with subsequent development of stronger research and extension efforts coordinated at the provincial level.

²⁵ Eicher, 1995 notes (footnote 4) that CIMMYT recognised 25 ‘mega environments’ for maize and only 7 mega environments for wheat, the largest of which encompasses about a third of the total wheat area in developing countries.

²⁶ Important exceptions should be noted, such as the role played by farmer organisations in extension in Taiwan and by innovative extension systems in Bangladesh.

²⁷ Egypt, Japan (1) and Vietnam are exceptions to this, but in Japan water and road communications were steadily improving at the beginning of the 20th century. Poor road infrastructure is a frequently cited constraint to development in Vietnam Barber, 1994.

²⁸ A point should be made with regard to irrigated systems, that these not only increase productivity (per crop and, through allowing multiple cropping, per year), they also tend to reduce the difficulties that farmers have in financing seasonal inputs, as they both allow easier auto-finance and are more compatible with the structure of micro-finance lending.

equitable access to land²⁹, with attractive returns for operators (whether tenants or land owners); and infrastructure to support input, output and financial markets. How then may these conditions be developed?

As earlier discussion has suggested, these conditions may be achieved more easily where there is moderate to high population density and where irrigation allows relatively low risk, high return multiple cropping with more or less standard technologies. These conditions are not characteristic of most of today's poorer areas. However, it is clear that government policies and direct interventions played an active role in supporting these conditions even under the more favourable circumstances of successful agricultural transformation in Asia in the 1970s.

These government interventions may be classified into those that are supported in current liberalisation policies (for example investment in roads and, in principle at least, in research and extension services, even if the modes of finance and delivery are different), and those that are not supported and are indeed opposed by current liberalisation policies (principally intervention in financial, input, output markets). The prevalence of the latter interventions must challenge the current consensus, and begs three questions:

- What did these policies contribute to the early stages of green revolutions?
- Why have they been discredited?
- What should be the current policy response?

The second question is easiest to answer, and also throws some light on the first. Some of the reasons for the discrediting of these policies were outlined earlier. In areas where an agricultural transformation occurred, they rapidly became very heavy and unsustainable fiscal burdens and the longer they were in place and the greater the fiscal constraints, the less efficient and effective they became. In areas where there was no agricultural transformation, they delivered few benefits but still involved large running costs. In both situations they were seen to predominantly favour larger smallholder farmers. Their contribution to agricultural transformation in a brief critical period may thus be easily overlooked.

For the first question, a number of contributions may be suggested:

- increased profitability of investment in intensification for farmers;
- reduced risks for farmers;
- increased profits for private agents involved in markets, perhaps compensating for high transaction costs and risks;
- reduced transaction risks for these agents;
- the delivery of high transaction cost/risk marketing services by the state when these services would not otherwise have been delivered by private agents.

²⁹ Land reform may have two important roles to play in prop-poor agricultural growth, by improving the incentives for land operators to invest in improved technology, and by increasing equity and hence the elasticity of poverty reduction with respect to growth.

As noted above, interventions in financial, input, output markets tended to favour larger smallholder farmers. In some (generally irrigated, Asian) situations, however, these farmers were not reckoned to need this support: technologies were generally still profitable without subsidies, and increased agricultural profitability was dominated by technical rather than price changes, although seasonal finance constraints might still limit uptake (Desai, 1988; Ranade *et al.*, 1988; Rosegrant and Siamwalla, 1988). This suggests that where very substantial improvements in yield may be achieved (a feature of many irrigated systems, but much less common in rain-fed systems) increased profitability of farmers' investments in intensification, and reduced farmer risk, may not be the major contribution of these policies. Instead, perhaps their major contribution in these more favoured areas was to deal with the high transaction cost problems inhibiting agricultural intensification by (a) easing farmers' seasonal finance constraints to increase effective demand for inputs and production ³⁰; and (b) promoting accessible markets for farm inputs and outputs.

Figure 4.1 shows schematically how the contributions of financial, input and output market interventions may be considered in terms of phases of development. Phase I involves basic interventions to establish conditions for productive intensive cereal technologies (investments in irrigation, roads, research, extension, and, in some cases, land reform). Once these are in place uptake is likely to be limited to a small number of farmers with access to seasonal finance and markets. Agricultural transformation may then be 'kick started' by government interventions (in phase 2) to enable farmers to access seasonal finance and seasonal input and output markets at low cost and low risk. Subsidies are required primarily to cover transaction costs, not to adjust basic prices. Once farmers have become used to the new technologies and when volumes of credit and input demand and of produce supply have built up, transaction costs per unit will fall, and will also be reduced with growing volumes of non-farm activity arising from growth linkages. Governments can then withdraw from these market activities and let the private sector take over (phase 3). Difficulties arise from difficulties in managing these interventions effectively and efficiently and from political pressures to include price subsidies with transaction cost subsidies and to continue with these market interventions and subsidies when they are no longer necessary (and are indeed harmful). Furthermore the deadweight costs of such interventions will be high if they are introduced too early, or continued too long. On the other hand, since their benefits only apply during a critical but short period in the initial transformation, they may easily be overlooked by analysts. This, we would suggest, is one of the causes of their neglect in current conventional policy, which attempts to move straight from phase 1 to phase 3.

³⁰ Rosegrant and Siamwalla, 1988, suggest that on irrigated farms in the Philippines a subsidised credit programme had a major impact on fertiliser uptake on irrigated farms not through subsidised interest rates but through increasing the availability of finance.

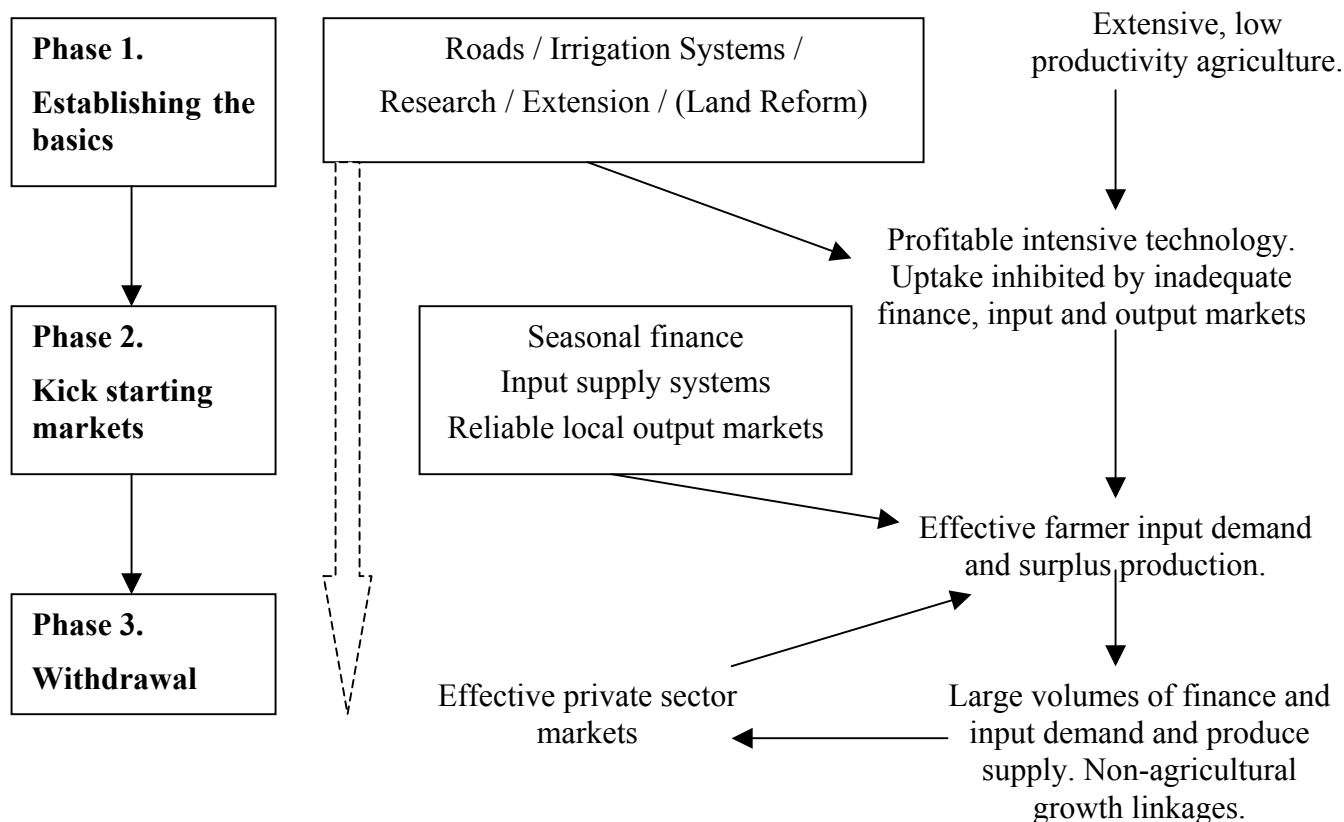


Figure 4.1 Policy phases to support agricultural transformation in favoured areas

The situation in many rain fed areas may be more complicated. In addition to greater challenges in developing more reliably productive technologies, there are likely to be more fundamental problems with the basic profitability of these technologies, with greater yield and price risks. There may thus be a greater need for actual price support (through input or output price subsidies) as opposed to transaction cost subsidies, and market interventions in the 'kick start phase' may be needed for a longer period (due to slower adoption) at greater expense (due to greater subsidy levels and higher delivery costs with lower population densities). The longer period of intervention poses further risks of more entrenched patronage and greater fiscal expenditures. Costs are therefore likely to be higher and effective implementation more difficult as compared with the experience of more favoured areas in the past. These greater costs, and the greater difficulties, pose questions about the fundamental viability of these processes, and hence of agricultural transformation as a driver of pro-poor economic growth³¹. However, these

³¹ These difficulties are illustrated by the problems facing agriculture as a driver of pro-poor economic growth in different parts of Zimbabwe (Poulton *et al.*, 2002): agricultural growth in the better rain fed

greater costs and difficulties need to be considered in context with the costs of other strategies for delivering pro-poor economic growth and with the costs of welfare support in the absence of such growth.

What then should be the current policy response? We will consider this in section 5, after summarising, in the next sub-section of the paper, our main conclusions about the differences between successful green revolution areas and today's poor rural areas.

4.4 Conclusions

Table 4.2 attempts to summarise the main differences between the situations facing today's rural poor and those facing the rural poor who have since benefited from the green revolution in Asia, in terms of their combined effect on the environment, opportunities and constraints facing poor rural areas, and concentrating on changes affecting intensive cereal based patterns of growth (rather than those affecting extensive patterns of growth or intensive export based patterns of growth).

The table suggests that in a number of respects, the challenge to agricultural led poverty reducing growth is greater in today's poor rural areas. They tend to be characterised by:

- less productive and more risky agro-ecological conditions;
- a more limited range of less productive and more risky technologies;
- lower stocks of and/or access to physical and financial capital, with increasing uncertainty and loss of assets as a result of HIV/AIDS;
- greater costs in developing, delivering and accessing services (for input or output markets, or research, extension, health or education services)
- greater competition in their output markets
- poorer access to input and financial services
- more rapidly changing and hence less stable and more uncertain institutions

areas (which experienced a maize revolution in the 80s) may have limited poverty reducing linkages, but other, more marginal areas (where the majority of Zimbabwe's poor live), are unlikely to be able to support sufficiently rapid and widespread growth, particularly as rapid population threatens access to and productivity of the natural resource base on which such growth must build. Their analysis also raises important questions about the role of livestock in both supporting and competing with more intensive crop production in more marginal areas.

Table 4.2 Differences between 1960/70s GR areas and today's' poorest rural areas

Variables	Conditions in today's poorest rural areas
<i>Natural capital</i> Agro-ecology Land access	Less productive, more varied, more risky, less adaptable. ??
<i>Physical capital</i> Irrigation Roads Telephones	More limited extent, experience & potential. Lower density, greater cost/benefit due to low population density in some areas, greater transport/ trade costs and margins. Cell phone systems offer the potential for much greater access at lower cost.
<i>Financial capital</i> Seasonal crop finance Micro-finance Informal finance	Poorer access. Probably not much difference – poor access. Probably lower access.
<i>Human capital</i> Dependency ratios Health Literacy	Currently higher but should fall. Equivalent, except increasing HIV/AIDS impacts. Equivalent.
<i>Social capital</i> ???	??
<i>Activities</i> Food staples Non-farm activities	More restricted farm activity choices. More root/ tuber crops (less tradable). More millet/sorghum (lower input responses) Greater engagement in (low return) non-farm activities.
<i>Markets</i> Output markets Input markets Financial markets	Cereal prices similar or lower, more international competition. Affected by higher transport costs. Poor coordination? Higher prices. Affected by higher transport costs. Probably poorer delivery systems. See under <i>financial capital</i> above.
<i>Technology</i>	Less specific applied research targeted to small scale food crop production despite greater need. More difficult crops. Lower returns to intensification? Opportunities and threats from biotechnology.
<i>Institutions and services</i> Research and extension Service delivery	Rapid change, less stability. Considerably reduced services. Greater costs in low population density areas and more generally affected by higher transport and transaction costs.

?? indicates no consistent differences or information not available

A common thread running through these points is the combination of increased risk and uncertainty with increased costs and/or lower returns to agricultural investment. Many of these difficulties are endogenous, the result of existing agro-ecological, locational, demographic and socio-economic conditions in these areas: that these areas have not already enjoyed a process of agricultural transformation is a direct result of these differences. It is then unfortunate that an already difficult task has been made harder by broader processes of change (for example HIV/AIDS and some aspects of globalisation and of the biotechnology revolution). However, the institutional analysis of section 4.4 above poses even more important questions about the effects of general policy changes. How far have policy changes of liberalisation and withdrawal of the state removed from the policy toolkit critical policy tools to address problems of high transaction costs and risks inducing market failures? Have they indeed removed these tools from situations where, with more variability, risk and uncertainty and with lower densities of economic activity, the need for them is even greater than it was in the Asian green revolutions.

5 Policy measures to promote agricultural led poverty reducing growth?

Thus far in this paper we have argued that agricultural growth, particularly cereal based intensification, offers the best potential for poverty reduction for the large numbers of poor rural people in Sub Saharan Africa and outside the green revolution areas of South Asia. The obstacles to such growth are, however, very large, and are considerably greater than those that faced in successful green revolution areas in South and East Asia in the 20th century. This leaves policy makers with a major challenge as external action to reduce transaction costs and raise the profitability of agricultural intensification is both more important in today's poor rural areas and more difficult and costly. Indeed, it is possible that the conditions faced in many of today's poorer areas are too difficult and challenging for agriculture to be a viable driver for pro-poor economic growth. Before such a conclusion is reached, however, it is important to either identify a viable alternative strategy for achieving such growth, or to recognise the social, economic and fiscal costs implicit in a strategy that fails to deliver growth to support the livelihoods of large numbers of poor people.

What then are the best policy options to 'get agriculture moving' in those areas where it can take off, and to get the maximum pay-off from such growth in terms of poverty reducing growth in the non-farm sector?

New thinking is needed to develop policy measures that learn from both the failures and successes of past interventions, to avoid the high fiscal costs, unsustainability, inefficiency and ineffectiveness of many of the market interventionist policies and deliver reduced transaction costs and increased profitability to farmers and traders where high transaction costs and low profits are constraining pro-poor market development.

Some policy options are not controversial: the benefits of education, health, improved governance, communications infrastructure, and macro-economic stability are widely recognised and benefit farm and non-farm sectors. There is less agreement about the benefits of agricultural research and extension. Despite numerous studies showing high returns to investment in research and extension, there are questions about the robustness of some of the very high returns found in some studies. Policy makers also question their

effectiveness without complementary markets and infrastructure (often absent from today's poor rural areas), and there is a continuing process of experimentation about the best means to finance and deliver these services to commercial and subsistence farmers. These are important issues.

We will however focus more attention here on the set of issues raised by our institutional analysis of the agricultural transformation. In section 4.3 we argued that important functions of Asian green revolution policies, addressing transaction cost induced market failures, are not being catered for in the current consensus for market liberalisation policies. High transaction costs may be even more constraining on agricultural intensification in today's poor rural areas, and there may also be a greater need for price support and stabilisation to make the technologies financially attractive to farmers. However, the high fiscal costs, unsustainability, inefficiency and ineffectiveness of many of the market interventionist policies implemented during the green revolution must also be recognised, and may pose more of a threat in today's poor rural areas which may need these interventions over a longer period of time, but may be less able to afford them. This requires a search for alternative policy instruments that perform the critical functions of these policies more effectively and at lower cost. How should such a search be conducted, and what are likely to be its outcomes?

- Policy analysis should recognise and address the problems of transaction costs and risks in inhibiting competitive private sector market activities at critical stages in agricultural transformations.
- Policy instruments should not be founded on the simplistic presumption that pure competition is always the most satisfactory way of ensuring market access by smallholder farmers to finance and inputs, and hence to output markets.
- The costs and benefits of different policy measures need to be carefully considered, taking account of the specific situations where they are being applied. Direct and indirect costs and benefits need to be accounted for, and the effects on them of, for example, greater integration into world markets and greater exposure to risk in the more marginal agro-ecological conditions of today's poor rural areas.
- The wider social costs of providing welfare support and safety nets to poor rural people left out of economic growth processes also need to be considered. Policy analysis should consider the costs, benefits and difficulties of market interventions together with those of welfare interventions: both face inherent problems of 'state failure' and they frequently compete for resources, but they are not often explicitly examined as alternative means of achieving the same goals.
- Policy formulation must be innovative and imaginative, learning from and building on historical and current institutional innovations, whether in national or local government policies and actions, or by farmers and traders. It should learn more about the problems that these innovations address, and about ways that these problems may be overcome.
- Much greater emphasis should be placed on targeted and time-bound institutional development, with emphasis on the development of market structures and systems

that will encourage rapid withdrawal of state support as these systems become self sustainable.

- Action research is needed in institutional innovation, trying out innovative institutional arrangements involving, for example, elements of interlocking transactions, producer groups, regulated monopsony, cooperative competition and use of agents such as traders, trader information groups.
- A key issue is to identify what elements of former state interventions should be reintroduced, if any, or other mechanisms for achieving the same ends. Thus for example national parastatal monopolies might be replaced by private sector companies which bid for time-limited, regional monopoly licences with performance contracts. The objective would be to obtain key transaction cost reducing benefits with limited price subsidies only when strictly necessary, and with the advantages of access to private sector capital and market based incentives to promote efficiency and continued institutional and technical innovation.

6 Conclusions: issues for policy investigation

In the final section of this paper we suggest important issues for research into pro-poor agricultural growth policies. Some of these emerge from the arguments presented in this paper. Others, however, concern issues that have not been addressed, and question some of the assumptions made. It is not suggested that all of these could or should be addressed in the current project. Many of these questions are closely related, and they are not presented in any particular order.

- What are the relative poverty reducing impacts and costs of and interactions between different combinations of farm and non-farm based growth strategies? What potential is there for pro-poor rural growth which is not agricultural led?
- What are the relative poverty reducing impacts and costs of and interactions between cereal based intensification and export based intensification growth patterns? What differences are there between strategies for relatively high and low potential areas in today's poor rural areas, and what are the relevant advantages and disadvantages and poverty impacts of focussing interventions attention on these different areas? What are the particular elements of high and low potential areas that are critical to their potential for different types of pro-poor agricultural growth? What opportunities are there for low external input technologies? What is the role of livestock in agricultural transformation in different areas, and how is this affected by population densities?
- How important are upstream, downstream, consumption, expenditure and economy of scope (within the rural economy and within livelihoods) linkages for different types of farm and non-activity, in terms of their wider effects on economic growth and their specific effects on the poor? What are the relative poverty impacts of policies that explicitly the poor and those that directly promote economic growth among different categories of the non-poor?

- What are the necessary conditions for cereal based intensification to take off under different agro-economic conditions today, what policies may support the development of these conditions, and what are the costs and benefits of implementing such policies?
- What are the costs and benefits and hence viability of agricultural growth strategies as means of reducing poverty in the difficult circumstances facing today's poor rural areas? How do the costs of different types of policy intervention vary with different agro-ecological, international trade, and institutional conditions? How do these costs compare with other strategies for addressing poverty?
- How important are transaction risks to different categories of market agent and small scale agricultural producer? What different mechanisms can be used to reduce transaction risks, what are their costs to different parties, and how do these reduced costs affect their behaviour? What are the effects of transaction costs on the ability of different categories of poor people to take advantage of agricultural growth, and how may these transaction costs be reduced?
- What are the relationships between production uncertainty and risk on the one hand and transaction risk on the other for producers, providers of seasonal finance, input suppliers and output buyers?
- What are the relationships between density of economic activity, communications infrastructure, transaction costs and the need for policies to support market development? What opportunities are offered by the spread of mobile phone networks to poor rural areas?
- What role did different market intervention, infrastructural investment and service delivery policies play in the green revolutions of the 20th century? What are the likely costs and benefits of implementing different elements and combinations of these in today's poor rural areas?
- What are the relationships between the poverty and growth impacts and costs of policies investing in education, health, infrastructure and different forms of agricultural service?
- What have been the impacts of agricultural market liberalisation policies in different countries, distinguishing between both full and partial implementation and focussing on comparison between with and without rather than before and after scenarios?
- How important is land reform, in terms of asset redistribution and in terms of modifying tenurial relations?
- What are the role of labour markets in different pro-poor growth strategies?
- What are the relationships between different welfare and safety net interventions and the processes of farm and non-farm growth and poverty reduction? What are the impacts of HIV/AIDS on the poor, on poverty, and on different pro-poor growth strategies?

- How are the competitive advantages of small scale and large scale producers within the country and relative to producers elsewhere affected by different policies and by different processes of global and local change?

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Annex 1: Supporting Tables

Table A2.1 Poverty in developing countries 1990 to 2015 under scenarios of base growth, low case growth, and 1990's average growth to 2015.

Poverty measure		1990	1998	2015 scenarios		
				Base	Low	As 1990s
US\$ 1/day	Headcount %	29.0	23.4	12.6	16.4	18.7
	No. of poor (millions)	1276	1175	777	1011	1157
US\$ 2/day	Head count %	61.7	56.1	36.7	43.2	47.5
	No. of poor (millions)	2,718	2,812	2,272	2,672	2,938

Source: World Bank, 2000b

Table A2.2 Regional Incidence and Distribution of Poverty
(people living on less than \$1 a day)

	Poverty incidence		Number of poor (millions)			% of total
	1987	1998	1987	1998	% increase	1998
East Asia & Pacific	26.6%	15.3%	417.5	278.3	-33.3%	23.2%
excluding China	23.9%	11.3%	114.1	65.1	-42.9%	5.4%
Europe and Central Asia	0.2%	5.1%	1.1	24.0	2081.8%	2.0%
Latin America & Caribbean	15.3%	15.6%	63.7	78.2	22.8%	6.5%
Middle East and North Africa	4.3%	1.9%	9.3	5.5	-40.9%	0.5%
South Asia	44.9%	40.0%	474.4	522.0	10.0%	43.5%
Sub Saharan Africa	46.6%	46.3%	217.2	290.9	33.9%	24.3%
Total			1183.2	1198.9		100.0%

Source : World Bank, 2000c

Table A2.3 Regional Poverty, 1990 and future projections of poverty in 2015

Regions	Poverty (% under \$US 1 per day at 1985 PPP)			
	1990	2015 Scenarios		
		A	B	C
Sub-Saharan Africa	44	42	36	25
Middle East & North Africa	3	2	1.6	1
East Asia & Pacific	31	12	12	9
South Asia	47	30	24	16
Latin America & Caribbean	28	19	17	12
Eastern Europe & Central Asia	9	5	4	3
Developing countries	36	22	18	13

The bold figures indicate where the target is projected to be achieved.

Source: Hanmer *et al.*, 2000

Table A2.4 Trends in the Prevalence and Number of Malnourished Children in Developing Countries

	1970	1995
<i>Prevalence (% underweight)</i>		
East Asia	39.5	22.9
South Asia	72.3	49.3
Sub-Saharan Africa	35.0	31.1
<i>Numbers (millions)</i>		
East Asia	77.6	38.2
South Asia	92.2	86.0
Sub-Saharan Africa	18.5	31.4

Source: Smith and Haddad, 2000

Table A3.1 Agriculture Sector Performance by Income Level and Region (1965 – 1998)

	AGRICULTURAL GROWTH				POPULATION GROWTH			AGRICULTURAL LABOUR	AGRICULTURE SHARE IN GDP		
	(average annual % value added)				(average annual %)			(annual % growth)	(value added % gdp)		
					Total	Agric.	Agric.				
	1965-98	1980-90	1990-98	1980-98	1965-98	1980-90	1990-97	1980-98	1970	1980	1998
World	2.3	2.7	1.7	2.3	1.7	..	..	..	9	7	4
Low Income Countries	3.3	4.1	3.7	3.9	2.1	..	..	..	39	31	23
Low Inc. exc. China & India	2.8	3.0	2.7	2.9	2.5	..	..	2.4	41	29	26
Middle Income Countries	2.3	2.7	0.8	1.9	1.7	..	..	1.1	17	12	9
High Income Countries	..	..	0.8	..	0.7	0.0	0.0	..	5	3	2
Low & Middle Income Countries											
East Asia & Pacific	3.6	4.4	3.5	4.0	1.8	1.2	0.3	..	33	24	15
Latin America and Caribbean	2.6	2.1	2.2	2.1	2.1	-0.7	-0.6	..	13	10	8
Middle East and North Africa	4.2	5.5	2.5	4.2	2.8	..	..	2.2	13	10	14
South Asia	2.9	3.2	3.7	3.4	2.2	1.3	1.0	1.5	43	37	28
Sub Saharan Africa	1.9	2.5	2.4	2.5	2.7	2.4	1.7	2.8	21	18	17

Source: World Bank, 2000c; FAO statistics

Table A3.2 Production and Productivity Changes (% change 1979/81 to 1995/97*)

Changes in (%)	ARABLE & PERMANENT CROP LAND		IRRIGATED LAND	FERTILISER USE		CEREAL PRODUCTION			OTHER CROPS
	Area (ha)	Area per capita	ha	total kg	kg/ha	Area (ha)	Yield (kg/ha)	Yield share in prod'n increase	Area (ha)
World	5%	0%	14%	18%	12%	20%	26%	56%	-5%
Low Income Countries	11%	-17%	29%	130%	114%	14%	15%	52%	8%
Low Inc. exc. China & India	14%	-22%	40%	133%	109%	50%	17%	25%	-11%
Middle Income Countries	17%	46%	6%	-14%	-30%	69%	32%	32%	-3%
High Income Countries	-2%	-11%	12%	-6%	-3%	-10%	28%	100%	2%
Low & Middle Income Countries									
East Asia & Pacific	27%	0%	25%	141%	100%	3%	29%	91%	109%
LAC	16%	-16%	35%	46%	26%	-1%	33%	100%	25%
MENA	23%	-28%	69%	85%	57%	13%	53%	80%	32%
South Asia	1%	-30%	40%	157%	157%	-1%	39%	100%	5%
Sub Saharan Africa	20%	-22%	26%	-2%	-18%	71%	28%	28%	-5%

* 1996/98 for some variables; LAC: Latin America and Caribbean; MENA: Middle East and North Africa

Source: World Bank, 2000c

Table A4.1 Irrigated land as a % of crop land

Region	1960	1965	1990	1998
East Asia & Pacific	25.1	27.3	33.5	36.9
South Asia	20.9	20.9	34.1	40.8
Sub-Saharan Africa	3.0	3.1	4.49	4.2

Source: World Bank, 2000c

Table A4.2 Population Density (rural people per sq km)

Region	1960	1965	1990	1998
East Asia & Pacific	528	581	667	688
South Asia	292	305	472	531
Sub-Saharan Africa	218	232	325	378

Source: World Bank, 2000c

Table A4.3 Illiteracy Rate (% of people 15 +)

Region		1970	1980	1990	1998
East Asia & Pacific	Male illiteracy +15	30.7	20.1	12.6	8.8
	Female illiteracy +15	57.9	42.5	29.4	22.3
	Total illiteracy +15	44.1	31.2	20.9	15.5
South Asia	Male illiteracy +15	55.4	47.8	40.5	35.1
	Female illiteracy +15	82.4	75.0	66.4	59.2
	Total illiteracy +15	68.4	60.9	53.1	46.8
Sub-Saharan Africa	Male illiteracy +15	61.3	50.6	40.0	32.0
	Female illiteracy +15	81.5	72.2	59.8	48.7
	Total illiteracy +15	71.7	61.6	50.1	40.5

Source: World Bank, 2000c

Table A4.4 Density of roads and telephones

		1960	1970	1980	1990
Paved Roads Km per 1,000 sq km					
Africa	Sierra Leone	5.5	14	17	20
	Uganda	5	9	16	10
	Malawi	4.1	6	16	20
	Rwanda	1.6	3	15	27
	Cote D'Ivoire	2.6	4	9	13
	Kenya	n.a.	4	9	11
	Zimbabwe	n.a.	21	30	33
	<i>Average</i>	<i>3.8</i>	<i>9.0</i>	<i>16</i>	<i>19</i>
Asia	India	77	98	180	230
	Pakistan	21	31	47	110
	Indonesia	5	10	27	50
	Philippines	21	50	92	74
	Thailand	5	18	46	77
	<i>Average</i>	<i>26</i>	<i>97</i>	<i>80</i>	<i>110</i>

Source: Adapted from World Bank, 1994

Table A4.5 Telephone mainlines per 1000 people

	1960	1965	1970	1990	1998
East Asia/ Pacific	n.a.	n.a.	n.a.	15.7	70.5
South Asia	0.84	1.31	1.8	5.68	19.3
Sub Saharan Africa	5.2	n.a.	6.17	9.5	14.3

Source: World Bank, 2000c

Table A4.6: Trends in main commodity prices (\$US 1990)

	1960	1965	1970	1975	1980	1985	1990	1995	1998	1999	2000
Agricultural raw materials											
Cotton (cents/kg)	314	290	252	257	284	192	182	179	136	113	129
Rubber (cents/kg)	337	234	162	124	198	111	86	133	68	61	68
Tobacco (\$/mt)	8390	5858	4287	4075	3161	3807	3392	2223	3143	2944	2960
Beverages											
Cocoa (cents/kg)	285	169	269	276	362	329	127	120	158	110	90
Coffee, robustas (cents/kg)	270	323	369	298	450	386	118	233	172	144	90
Coffee, Arabica (cents/kg)	446	464	457	319	481	471	197	280	281	222	190
Tea (cents/kg)	497	463	333	253	230	255	206	125	193	178	186
Fats and oils											
Coconut oil (\$/mt)	1507	1610	1583	871	936	860	336	563	620	713	446
Groundnut oil (\$/mt)	1576	1499	1508	1898	1193	1319	964	833	857	762	707
Palm oil (\$/mt)	1102	1262	1036	961	810	730	290	528	632	422	307
Soybeans (\$/mt)	444	542	466	486	411	327	247	218	229	195	210
Soybean meal (\$/mt)	337	435	410	343	364	229	200	166	160	147	187
Soybean oil (\$/mt)	1082	1250	1141	1246	830	834	447	526	590	414	335
Grains											
Grain sorghum (\$/mt)	182	219	206	248	179	150	104	100	92	82	87
Maize (\$/mt)	209	255	233	265	174	164	109	104	96	87	88
Rice (\$/mt)	519	550	503	755	570	287	271	270	287	240	201
Wheat (\$/mt)	280	275	219	330	240	198	136	149	119	108	113
Other food											
Bananas (\$/mt)	692	735	659	546	526	554	541	374	461	361	420
Beef (cents/kg)	356	408	519	294	383	314	256	160	163	178	192
Oranges (\$/mt)	927	755	669	504	542	581	531	447	417	417	360
Sugar											
Sugar, EU domestic (cents/kg)	59	58	45	75	68	51	58	58	56	57	55
Sugar, U.S. domestic (cents/kg)	61	63	66	110	92	65	51	43	46	45	42
Sugar, world (cents/kg)	33	22	33	100	88	13	28	25	19	13	18
Inputs											
Petroleum (\$/bbl)	7.87	6.57	4.82	23.07	51.21	39.62	22.88	14.45	12.31	17.49	27.97
Phosphate rock (\$/mt)	65	60	44	148	65	49	40	29	41	43	43
TSP (\$/mt)	256	250	169	448	250	177	132	126	163	150	136

Source: World Bank http://www.worldbank.org/data/wdi2001/pdfs/tab6_4.pdf

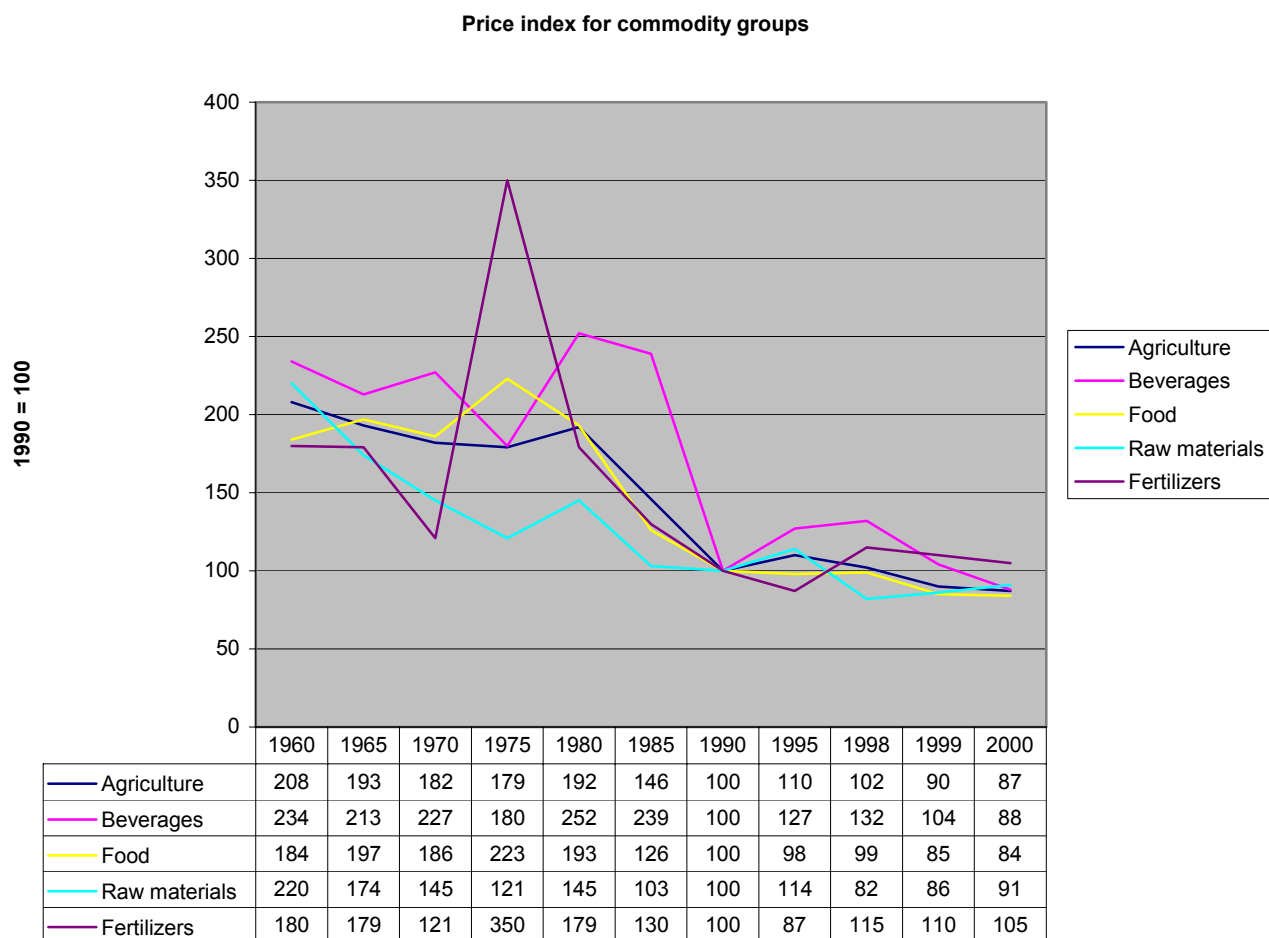
Table A4.4 Rural population as a % of total population

Region	1960	1965	1990	1998
East Asia & Pacific	83	81	70	66
South Asia	83	82	74	72
Sub-Saharan Africa	85	83	71	66

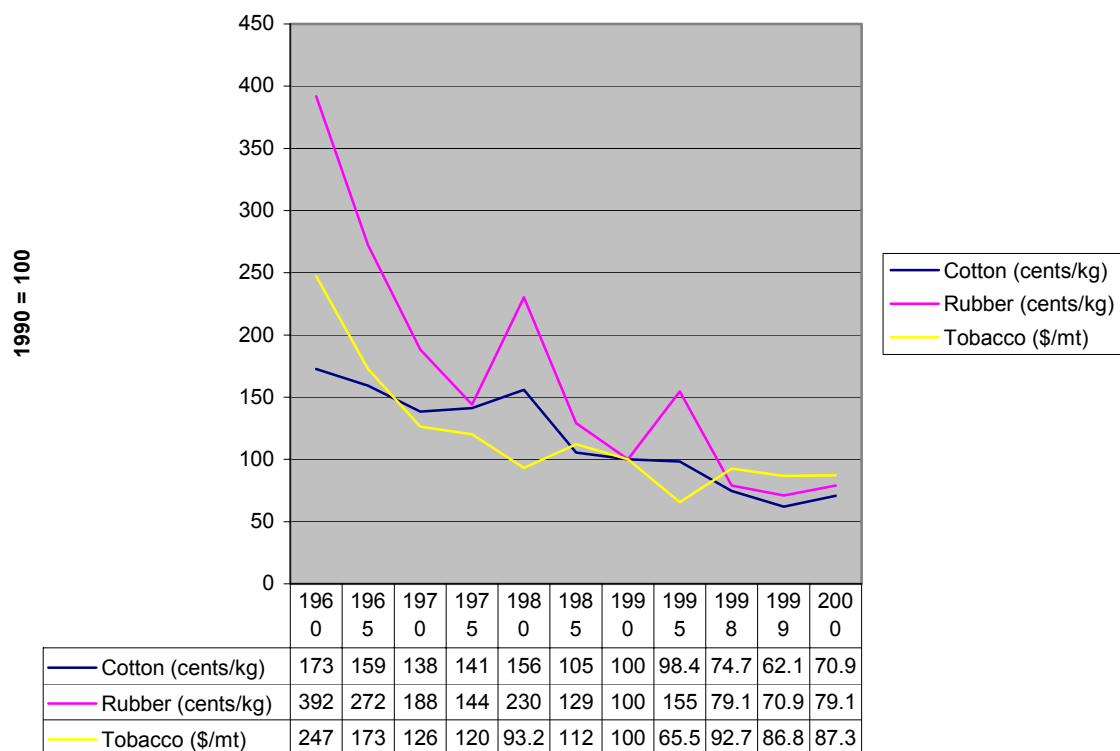
Source World Bank, 2000c

ANNEX 2: AGRICULTURAL COMMODITY PRICES

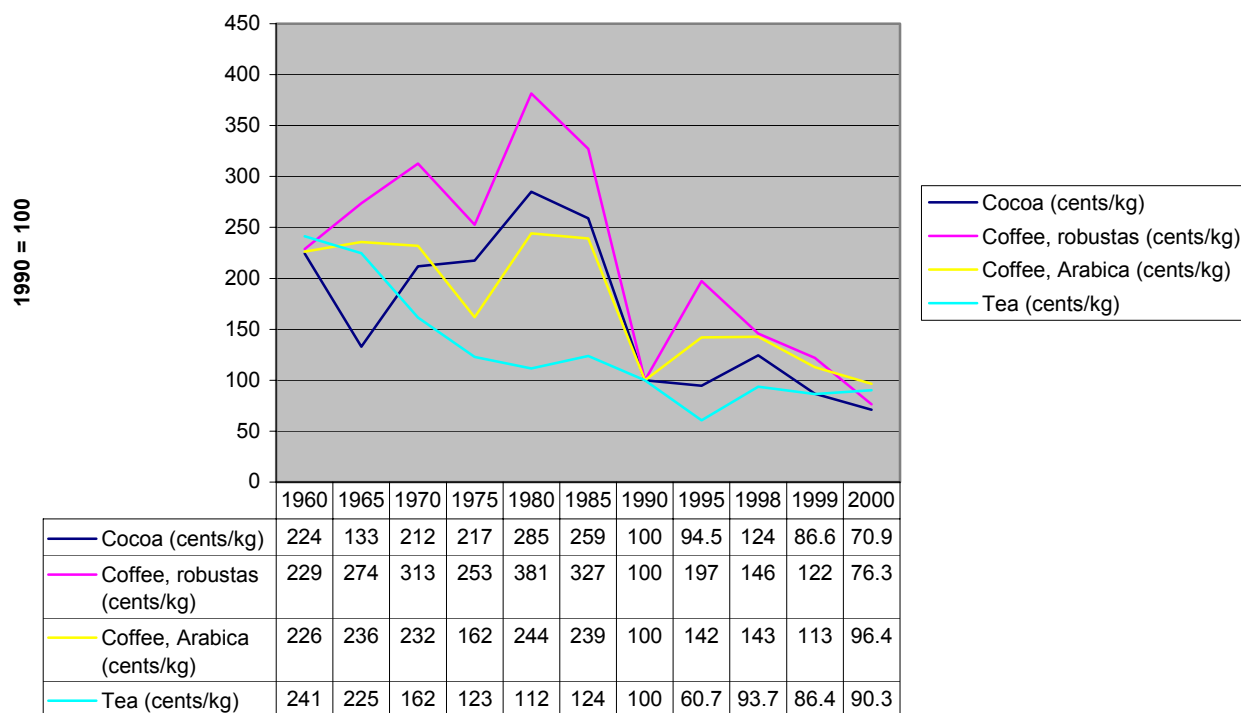
From World Bank Commodity Price Index



Non Food Price Indices

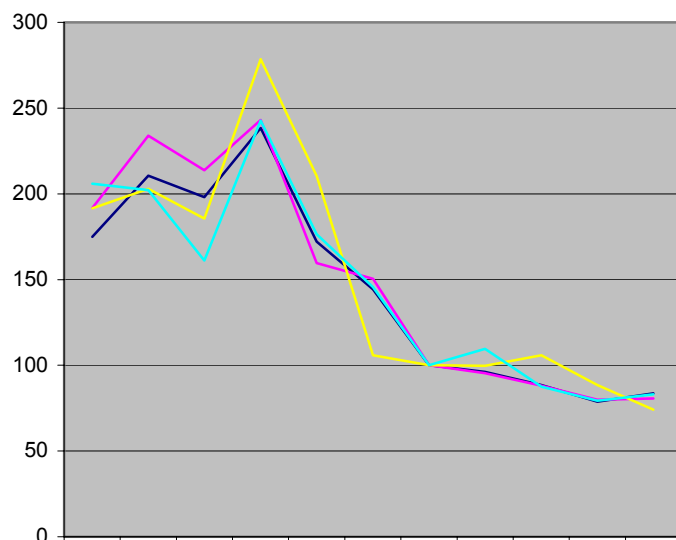


Beverage 1990



Grains

1990 = 100

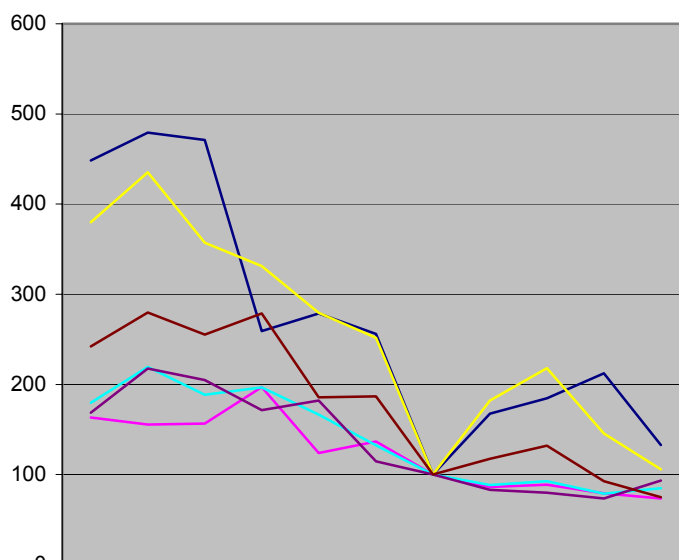


— Grain sorghum (\$/mt)
— Maize (\$/mt)
— Rice (\$/mt)
— Wheat (\$/mt)

	1960	1965	1970	1975	1980	1985	1990	1995	1998	1999	2000
— Grain sorghum (\$/mt)	175	211	198	238	172	144	100	96.2	88.5	78.8	83.7
— Maize (\$/mt)	192	234	214	243	160	150	100	95.4	88.1	79.8	80.7
— Rice (\$/mt)	192	203	186	279	210	106	100	99.6	106	88.6	74.2
— Wheat (\$/mt)	206	202	161	243	176	146	100	110	87.5	79.4	83.1

Fats and Oils

1990 = 100



— Coconut oil (\$/mt)
— Groundnut oil (\$/mt)
— Palm oil (\$/mt)
— Soybeans (\$/mt)
— Soybean meal (\$/mt)
— Soybean oil (\$/mt)

	1960	1965	1970	1975	1980	1985	1990	1995	1998	1999	2000
— Coconut oil (\$/mt)	449	479	471	259	279	256	100	168	185	212	133
— Groundnut oil (\$/mt)	163	155	156	197	124	137	100	86.4	88.9	79	73.3
— Palm oil (\$/mt)	380	435	357	331	279	252	100	182	218	146	106
— Soybeans (\$/mt)	180	219	189	197	166	132	100	88.3	92.7	78.9	85
— Soybean meal (\$/mt)	169	218	205	172	182	115	100	83	80	73.5	93.5
— Soybean oil (\$/mt)	242	280	255	279	186	187	100	118	132	92.6	74.9

Raw material

