



A Policy Agenda for Pro-Poor Agricultural Growth

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Summary. — Sub-Saharan Africa and parts of South Asia are likely to hold large numbers of very poor rural people into the foreseeable future. Although both history and theory suggest a pre-eminent role for agricultural growth in poverty reduction in poor agrarian economies, such growth today faces new difficulties. Many of these difficulties are endogenous to today's poor rural areas, others result from broader processes of global change, but some are due to changes in the dominant policy environment, emphasizing liberalization and state withdrawal. Examination of 20th century Green Revolutions suggests that active state interventions were important in supporting critical stages of agricultural market development. Unfortunately such interventions' benefits in institutional development are easily overlooked, whereas their high costs are much more visible. Policy implications are discussed.

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1. INTRODUCTION

Agriculture is 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 relative importance of the agricultural sector. This, together with increasing recognition of the diversity of poor rural people's livelihoods and with difficulties in "getting agriculture moving" in areas where most poor rural people live today, has led to questions about the importance of agriculture for rural economic growth and poverty reduction, about the benefits of attempts to promote directly agricultural growth and development, and about the best means to promote such growth.¹

This paper examines these arguments. We briefly discuss the main characteristics and extent of global rural poverty, and the way it has changed over the last 30 years or so. We then examine the theoretical and empirical arguments for relying on agricultural growth as an engine for poverty reduction and the difficulties facing agricultural growth in today's poor rural areas. Our conclusions pose serious challenges to current policy.

The issues addressed in this paper are not new: they have been the subject of a large literature. They need however 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 globalization; (d) changing policy environments; and (e) new understanding of the roles of institutions in promoting or inhibiting economic activity and access to economic opportunity.

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2. WORLD POVERTY: MIXED SUCCESS AND FAILURE IN POVERTY REDUCTION

Changes in poverty incidence over the last 30 years and 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 increases in the numbers of people living in poverty in other parts of the world. The problem of poverty is highly regionalized and this concentration is intensifying. South Asia and sub-Saharan Africa are becoming the core areas for absolute poverty (World Bank, 2000b) and now contain 70% of the world's poor. South Asia is home to over 40% of the people categorized as poor living on under the US\$1 per day line. Although poverty incidence declined moderately in South Asia during 1987–98, it was not 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. Looking to the future, although predicted poverty reduction scenarios vary greatly depending upon the rate and nature of growth and the poverty focus of policies, actual evidence suggests that in the 1990's global 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 six (Hanmer, Healey, & Naschold, 2000).

Within these regions, poverty is largely a rural phenomenon. Estimates of the proportion of the world's poor that live in rural areas range from 62% (Pinstrup-Andersen, Pandya-Lorch, & Rosegrant, 2001) to 75% (IFAD, 2001). IFAD predict that rural and urban poverty will not be of the same magnitude until 2035. Rural poverty also tends to be deeper than urban poverty (see for example, Bird, Hulme, Moore, & Shepherd, 2001). Lipton (2001), quotes IFPRI as noting that increasingly the rural poor are concentrated in arid, semi-arid and unreliably watered areas.

3. AGRICULTURAL GROWTH AND POVERTY REDUCTION: LESSONS FROM THE PAST?

(a) *Regional patterns of agricultural growth*

The agricultural sector in less developed countries (LDCs) over the last 30 years or so

shows low rates of growth in the 1980s and 1990s, and indeed negative rates are recorded for value added per capita over most of the period (Dorward & Morrison, 2000; FAO, 2000; World Bank, 2000b). LDC performance (with a preponderance of sub-Saharan African countries) contrasts with Asian performance: in both East and South Asia agricultural growth advanced ahead of population growth, with continuing increases in labor productivity in agriculture. In sub-Saharan Africa, however, agriculture grew more slowly than overall population growth from 1965–98, and more slowly than growth in the agricultural labor force from 1980–98. Sub-Saharan Africa also stands out in the 1980s and 1990s for having increased 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 drop in overall fertilizer consumption in the 1990s, a larger drop in rate of fertilizer use, and only a small rise in cereal yields. The area of irrigated land also shows only a small rise. As a result, whereas other regions are estimated to have achieved 80% or more of their increased cereal production from yield increases, in Sub-Saharan Africa more than 70% of increased cereal production appears to be from area increases (Dorward, Moyo, Coetzee, Kydd, & Poulton, 2001; FAO, 2000; World Bank, 2000b).

Despite the heterogeneity within each region, there is a striking correspondence between these patterns of agricultural growth and the patterns of poverty reduction (or persistence) reported above. What then is the role of agricultural growth in poverty reduction? We discuss two main strands of (related) theory concerned with the role of the agricultural sector, first in wider economic development, and second in the rural economy.

(b) *The role of agricultural growth in poverty reduction*

Johnston and Mellor (1961) argued that in the early stages of development in agrarian dominated economies, agriculture generates export earnings, labor, capital and domestic demand to support growth in other sectors, and agricultural products meet increasing domestic demands from increasing populations with high income elasticity of demand for food. Empirical evidence from the sectoral productivity

literature supports the view that agricultural growth promotes poverty reduction (see the review by Thirtle, Irz, Wiggins, Lin Lin, & McKenzie-Hill, 2001 citing evidence from Datt & Ravallion, 1996; Hanmer & Nashchold, 2000; Irz & Roe, 2000; Kanwar, 2000; Kogel & Furnkranz-Prskawetz, 2000; Matsuyama, 1992; Rangarajan, 1982; Ravallion & Datt, 1999; Stern, 1996; Timmer, 1997; Wichmann, 1997).

A long-standing theoretical and empirical literature has also examined the linkages between different activities within rural economies (for recent reviews see for, example, Delgado & Hopkins, 1998, and Dorward *et al.*, 2001), allowing exploration of the effects of exogenous change as they work through the rural economy. An important conclusion from this literature is that the effects of particular changes on a rural economy and on poverty depend upon the local demand characteristics of goods affected by price or productivity change (their average and marginal budget shares for different income groups), by their tradability and local production characteristics (supply elasticities, labor and tradable input demand, upstream and downstream linkages) and by the operation of factor markets that affect both elasticity of supply and the distribution of income within the rural economy.

How do growth in the farm and nonfarm sectors compare with regard to these characteristics and hence their likely poverty reducing benefits? There are unlikely to be many *tradable* nonfarm activities apart from mining that offer broadly based on employment opportunities in the poorest (relatively low-income and isolated) rural areas.² Only as links with urban areas develop will opportunities for nonfarm tradable activities develop, but these will often be "high barrier to entry" activities, limiting the benefits to the poor (Barrett, Besfuneh, Clay, & Reardon, 2000). Farm activities, on the other hand, are more likely to 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. There is however, potential for them to benefit directly (from increased labor

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

The 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 nonfarm activities is likely to have greater poverty reducing benefits in supporting secondary, linkage dependent poverty reducing growth, particularly if the activities have low barriers to entry and high labor demands. It can be further argued that within agriculture, intensive cereal based growth offers the best prospects for sustained poverty reducing growth (see, for example, Dorward & Morrison, 2000).³

These conclusions tie in well with conclusions from the wider sectoral econometric studies referred to earlier. They also agree with conclusions in a recent review of poverty reducing growth strategies for Africa (Fafchamps, Teal, & Toye, 2001) which argues that while higher rates of growth achievable in export manufacturing may 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, p. 13). The problem is that not many countries have very good prospects in mining and tourism, and these activities often have weak linkages and high leakages in supporting secondary growth processes.

4. DIFFICULTIES FACING AGRICULTURE IN TODAY'S POOR AGRARIAN ECONOMIES

Despite the strong arguments presented above for 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 severe difficulties in raising agricultural productivity or in accessing wider agricultural markets. In the remainder of the paper we consider the difficulties facing intensification of cereal-based growth in these areas, comparing them with the local, global and policy conditions faced earlier by the 20th century Green Revolution areas.

(a) *Local conditions*

Arguably more difficult agro-climatic conditions, population density, human capital and communications infrastructure were a major cause of the lack of any agricultural transformation in many of today's poorest rural areas. These tend to have varied and complex agro-eco systems, a high proportion of cultivated land subject to soil fertility constraints, and lack of irrigated land and of land with “drought proofing” irrigation. These characteristics demand a wider range of more challenging technological solutions, with higher unit costs (per hectare and per capita) of agricultural research, information and other services and greater risks and lower returns to investment (Kydd, Dorward, Morrison, & Cadisch, 2001). Tradability for root crops is also limited by a high bulk/nutrient ratio and (for some crops) rapid post-harvest deterioration. Research & development (R&D) requires

substantial increases in resources and management and is less able to draw on work performed elsewhere.

These difficulties have been exacerbated by lower population densities and low levels of human capital. 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 (World Bank, 2000b). Rural population densities aggregated to this level can be misleading, hiding important local variations. Paradoxically, very high population densities in some parts of Africa mean below-average densities in other areas, with high unit costs in infrastructural development, service provision and trade, and inhibiting the evolving intensification of farming systems (Binswanger & McIntire, 1987; Boserup, 1965; Pingali, Bigot, & Binswanger, 1987; Ruthenberg, 1980). Some of the high population density areas are too crowded and poor to support processes of intensification, and suffer more from involution (Carr, 1997; Tiffen & Mortimore, 1994; Turner, Hyden, & Kates, 1993).

Literacy rates in South Asia and sub-Saharan Africa are now comparable with those in East Asia in 1970 although South Asian female literacy rates remain very low (World Bank, 2000b). Current figures for some measures of human health for South Asia and sub-Saharan Africa match those in East Asia in the 1960s, but the prevalence of malnourished children is very high in South Asia although declining faster than in sub-Saharan Africa (where it has been increasing) (Smith & Haddad, 2000). The impact of HIV/AIDS will be discussed later.

Communications infrastructure continues to be a problem. The density of paved roads varies between African countries and was very low in 1990 as compared with India in 1960, although comparable with some other Asian Green Revolution countries in 1960 and 1970 (World Bank, 1994). A number of studies have also found that truck transport costs are higher in Africa than in Asia (Doyen, 1993; Hine, Ebdon, & Swan, 1997; Platteau, 1996). But the rapid spread of cell phone systems offers the potential for dramatic and low-cost access to phone services in rural areas.

(b) *Global conditions*

Today's global markets, population trends, urbanization, and new technologies also present new challenges to agricultural development.

There is a clear downward trend in real prices for primary agricultural commodities, as agricultural prices have trended downwards since the 1960s (World Bank, http://www.worldbank.org/data/wdi2001/pdfs/tab6_4.pdf) and despite some predictions of limited increases in real grain prices, they are likely to remain lower than in the 1970s and 80s (<http://www.worldbank.org/prospects/gcmonline/subscriber/0002/appendix.pdf>). The globalization of markets within the world economy (as semi-tradables become tradables and local prices fall toward world market prices) further reduces the terms of trade for poor farmers and may weaken local demand for nontradables and its positive effects on consumption linkages and growth. On the other hand, low food prices benefit rural and urban food deficit households. 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.

There is more optimism about opportunities for intensive export-based patterns of growth, particularly opening export markets for non-traditional crops (World Bank, 2000a). But poor infrastructure in many poorer areas may cause growth to be concentrated in enclaves of larger commercial farms with limited poverty reducing linkages, so poverty reducing benefits may be overemphasized (e.g., Kaplinsky, 2000; Kydd & Dorward, 2001). There is also little evidence that globalization of financial markets will benefit smallholder agriculture in poorer areas. The long-run benefits of globalization may also be concentrated in intellectual property rights, knowledge and governance, where barriers to entry allow transnational corporations (TNCs) to retain rents in otherwise competitive markets (Kaplinsky, 2000) while transaction costs of coordinating and ensuring timely delivery of quality assured products militate against small producers (Kydd & Poulton, 2000).

Current dependency ratios in sub-Saharan Africa countries tend to be higher than ratios in Green Revolution countries in the 1960s and 1970s but in many countries are predicted to fall to similar levels over the next 15 years or so with the demographic window of opportunity (IFAD, 2001). This is despite the counteractive effect of HIV/AIDS reducing the economically active population. The HIV/AIDS tragedy will have other serious effects, undermining savings and attacking the social, human and financial capital of the rural poor.

Urban influences tend to be much greater on today's poor rural areas than they were 30 years ago (World Bank, 2000b). This may change the focus of agricultural policy aims away from rural income generation and poverty alleviation to delivery of cheap urban food—and low world food prices and poor rural transport systems may 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.

The last few years have seen a revolution in biotechnology, with a decline in public funded research and increasing activity by multinational corporations concentrating resources on problems facing large numbers of commercial farmers (Pingali, 2001) and potential opportunities to develop new varieties more quickly and cheaply to better address poor farmers' problems may not be realized (Kydd, Haddock, Mansfield, Ainsworth, & Buckwell, 2000).

Finally although much has changed since September 11th 2001, global political interests in the 1990s did not place the same emphasis on agricultural growth in developing countries as was the case in the 1960s to 1980s. The Green Revolution occurred most dramatically in politically stable situations, often involving physical and social reconstruction following conflict, and often supported by global Cold War interests. Meanwhile internal conflicts have become increasingly concentrated in Africa: of the 41 countries in sub-Saharan Africa, 17 are currently or have recently been categorized as "chronically political instable" (World Bank quoted by Farrington & Lomax, 2000).

(c) *Policy conditions*

Over the last 20 years or so there has been a major shift in policy thinking, with increasing recognition of state failure and a move from direct state intervention toward state support for an enabling environment for private sector and civil society, with a stable macroeconomic environment, liberalized markets, tighter fiscal regimes, and a more developed institutional environment. This is closely associated with the process of globalization discussed earlier.

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: there is increasing recognition of the importance of nonfarm incomes and activities in the livelihoods of the rural poor, disillusionment with the lack of agricultural growth in poor areas despite heavy investments in agricultural development in these areas in the past; concern that agricultural development in more marginal areas is more difficult; and acceptance that many of agriculture's problems lie outside the agricultural sector (in roads and telecommunications infrastructure, and in governance, for example). There are also limited prescriptions for direct investment in agriculture, with doubts about the effectiveness of research and extension, and concerns about recurrent costs, fiscal commitments, and appropriate models for finance and delivery (Kydd & Dorward, 2001). Policy makers thus face what Kydd and Dorward (2001) term the "agricultural investment dilemma:" even where the importance of agriculture is recognized it is difficult for donors and governments to design and gain approval for specific agricultural investment programmes.

(i) *The liberalization agenda*

The main arguments for liberalization rest upon the ineffectiveness and inefficiency of state service provision. Extensive evidence exists of parastatals' many failures: late delivery of services; large margins, increasing input prices and decreasing output prices; late and non-payments to producers; large fiscal deficits; rationing of services to exclude the poor; delivery of inappropriate services; and failure to innovate and develop markets. The roots of these problems are also well known: monopolistic and monopsonistic positions; lack of incentives to perform; overstaffing and patronage; political interference and multiple, contradictory objectives; lack of capital for investment; poor staff management and training; and corruption.

The policy agenda addressing these problems has focused on the intrinsic problems of state failure and called 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 privatizing agricultural parastatals. These 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 & Jones, 1997). But, 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: the private sector has not moved in to provide farmers with input, output or financial market services that are attractively priced, timely and reliable. Whether the overall situation is worse or better than it was in the immediate pre-liberalization period is debatable, and few would argue that the pre-liberalization situation could or should have been sustained. But, a lack of substantial improvement and continuing difficulties are widely recognized, particularly with input and 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 liberalization agenda, but of failure to implement it thoroughly (see, for example, Jayne, Govereh, Mwanaumo, Chapoto, & Nyoro, 2001; Kherallah, Delgado, Gabre-Madhin, Minot, & Johnson, 2000a). The main thrust of the "too little liberalization" argument is that partial rather than complete withdrawal of the state together with real or perceived threats of policy reversals and continued price controls and competitive advantages for parastatals have depressed returns and increased risks to private sector investment. The solution is then to complete the market liberalization process,⁴ 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 organizations (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 (World Bank, 2000a).

(ii) *"New institutional" arguments*

Another "new institutional" view (see for example Dorward, Kydd, & Poulton, 1998; Kydd, Dorward, & Poulton, 2001) argues that one reason for states' often half-hearted commitment to liberalization, particularly in food crop markets, is their recognition that pervasive

market failures prevent the private sector from delivering the necessary services. Policy makers' therefore continue to attempt to intervene to remedy these failures. This view does not deny that continued intervention (or its threat) is also due to short-term political economy considerations and further impedes private sector investment, nor that the pre-liberalization situation was unsustainable and needed drastic reform. It does however, demand 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 costs⁵ in financial, input, and output markets. This is particularly the case with financial markets and to a lesser extent with input markets. High transaction costs and risks, exacerbated by low population densities and poor communications, lead to coordination and hence market failures, and as these market failures depress the level of economic activity, raising per unit transaction costs and (with thin markets) risks of transaction failure, a vicious cycle of underdevelopment results.

In this analysis a key ingredient in agricultural development is institutional development. Here the focus is not so much on institutions as organizations 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 & 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 liberalization" arguments and policy recommendations outlined earlier. But, new institutional arguments place more emphasis on understanding the extent of transaction costs (particularly transaction risks) and on the role of institutional arrangements in reducing these. 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. There are parallels here with the "too little liberalization" calls for institutional innovations (for input credit and farmer groups for example), but a more thorough institutional analysis can overcome apparent inconsistencies between simultaneous calls for increasingly competitive input and output markets on the one hand and for non-competitive market arrangements on the other.

We start from the observation that 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 (Coase, 1992), and these may also be used to defend support for noncompetitive contractual relations in the early stages of agricultural development. Dorward *et al.* (1998), for example, 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 robust regulatory frameworks 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.*, 2001). 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 liberalization, and for development of these systems by some private companies engaged in marketing export crops (see for example Dorward *et al.*, 1998; Gordon & Goodland, 2000). They also explain the failure of such systems to develop or function in other situations, most notably in liberalized food crop production systems.

Further problems in food crop production arise where a poor region's staple crop is either nontradable (for example, a perishable or bulky

root crop or plantain) or semi-tradable (for example a grain crop in a land locked country with very high internal and/or external transport costs placing a large wedge between import and export parity prices). Natural, climatic variation between seasons may then 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 fertilizer application, then such investment may be severely curtailed both by lowered average returns to investment and by risk. 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.

Recognition of this vicious circle then leads to serious questions about the extent to which development of infrastructure and the institutional environment will be sufficient on their own to attract the private sector investment necessary to drive 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) argued from experience in the Philippines that governments should intervene in low-volume seasonal finance markets to reduce transaction costs (but not to subsidize 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 drops in transaction risks and costs. It is then important that governments quickly withdraw from expensive and distortionary interventions.

How 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 Dorward,

Kydd, Morrison, and Urey (2002) summarize policies in successful and partially successful green revolution areas at the time of transformation (see Appendix A).

Their summary finds that:

—Irrigated transformations tend to be Asian (with the exceptions of Mexico and Egypt), to have happened before the 1980s (with the exceptions of Bangladesh, China and Vietnam, where in the latter two the introduction of market reforms and a shift away from a command economy removed critical constraints to transformation),⁶ and to have continued strongly. In contrast, rainfed transformations are fewer, concentrated more in Africa, in the 1980s, and to have been weaker in their breadth, depth and persistence, with subsequent regression in the 1990s being common.⁷ India provides a significant exception on the latter point, with its “second” Green Revolution in the 1980s in rainfed areas (see for example Smith & 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 extension.⁸ National rice and wheat research agencies' commonly used outputs from international research centers 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.⁹

—Another almost universal factor is investment in road infrastructure.¹⁰

—The vast majority of transformations involved, in their early stages, government interventions to stabilize output prices and maintain them somewhere between import and export parity prices, and to subsidize input supply and credit. Interlocking arrangements for input credit also featured in a number of cases.

Taking these points together and relating them to the earlier discussion about agricultural growth and its difficulties 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;¹¹ reasonably secure and

equitable access to land,¹² with attractive returns for operators (whether tenants or landowners); and infrastructure to support input, output and financial markets. How may these conditions be developed?

As discussed earlier, 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. It is clear however, that government policies and direct interventions played an active role in supporting these conditions even under the more favorable circumstances of successful agricultural transformation in Asia in the 1970s. These government interventions may be classified into those that are supported in current liberalization 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 liberalization policies (principally intervention in financial, input and output markets). The prevalence of the latter interventions in the Green Revolution processes must challenge current liberalization policies, 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 favor predominantly 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; and the delivery of high transaction cost/risk marketing services by the state when these services would not otherwise have been delivered by private agents.

Although interventions in financial, input and output markets tended to favor larger smallholder farmers, in some (generally irrigated, Asian) situations these farmers were not reckoned to need this support: technologies were still profitable without subsidies, and increased agricultural profitability was dominated by technical rather than price changes, although seasonal finance constraints might still have limited uptake (Desai, 1988; Ranade, Jha, & Delgado, 1988; Rosegrant & 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 rainfed 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 was to deal with the high transaction cost problems inhibiting agricultural intensification by easing farmers' seasonal finance constraints to increase effective demand for inputs and production,¹³ and by promoting accessible markets for farm inputs and outputs.

Figure 1 shows schematically how the contributions of financial, input and output market interventions may be considered in terms of phases of development. Phase 1 involves basic interventions to establish conditions for productive intensive cereal technologies. 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), transferring attention to supporting conditions that will promote

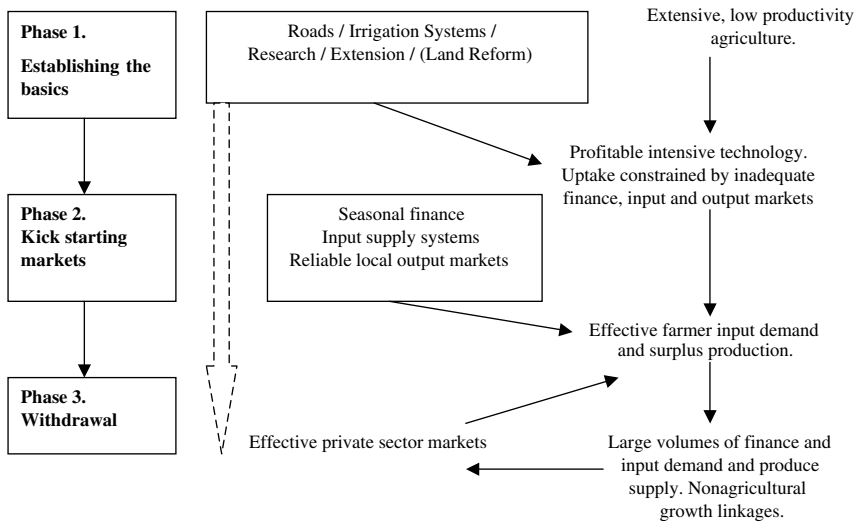


Figure 1. Policy phases to support agricultural transformation in favored areas.

development of the nonfarm rural economy. Difficulties arise in managing these interventions effectively and efficiently, as evidenced by our earlier examination of the record of state failures which made continuing policies of high state intervention unsustainable in most sub-Saharan African countries and built up demands for liberalization. Difficulties also arise 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).¹⁴ 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 relatively short period in the initial transformation, these benefits 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.

There has been limited empirical study of the hypothesis set out in Figure 1, due largely to lack of theoretical and policy attention to the issues raised in this paper. As noted above, however, the hypothesis is compatible with the framework developed by Adelman and Morris, based on their empirical study of factors determining economic development (Adelman & Morris, 1997; Gaur, 1997). The comparative

examination of the different Green Revolutions by Dorward *et al.* provides circumstantial evidence. One recent study specifically designed to examine the hypothesis with regard to investments in India and their impacts over 1960–2000 provides strong support for the arguments in this paper. Fann, Thorat, and Rao (2003) find high agricultural growth and poverty reduction payoffs from government investments in India in the 1960s to investments in fertilizer subsidies, in roads, in agricultural research on HYVs, in power subsidies, and in credit subsidies (in order of descending returns). Returns to these decline over the three succeeding decades, to the extent that they become nonsignificant or negative. Roads are the exception to this, showing consistently high (indeed the highest returns) in the later decades, while returns to educational investments (which are insignificant in the earlier periods) rise.

Turning to consider the difficulties facing today's poor rural areas, the situation in rain-fed areas is generally more challenging than those faced in the irrigated areas of the green revolution. In addition to greater difficulties in developing more reliably productive technologies, there are likely to be more fundamental problems with the basic profitability of these technologies, with substantial yield and price risks. There may thus be a need for price support (through input or output price subsidies) in addition to transaction cost subsidies. Fur-

thermore, 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 political support and greater fiscal expenditures. Costs are therefore likely to be higher and effective implementation more difficult as compared with the experience of more favored 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 growth.¹⁵ These greater costs and difficulties also 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.

5. CONCLUSIONS

It seems clear that in a number of respects, the challenge to agricultural led poverty reducing growth is greater in today’s poor rural areas as they face 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 socioeconomic 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 disease and broader processes of change (for example, HIV/AIDS and some aspects of globalization and of the biotechnology revolution). But, the institutional analysis presented in this paper poses even more important questions about the effects of general policy changes. How far have policy changes of liberalization and withdrawal of the state removed from the policy toolkit critical levers 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?

This leaves policy makers with a major challenge as external action to reduce transac-

tion 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 recognize 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.

We conclude by briefly considering some of the 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 nonfarm sector. Current policies promoting education, health, governance, communications infrastructure, and macroeconomic stability all have an important part to play, and should help to provide necessary (but not sufficient) conditions for pro-poor agricultural growth. We argue however, that fundamental new thinking is needed to develop policies addressing the high transaction costs and low farmer and trader profits that constrain pro-poor market development. These policies must 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 of the past, and to deliver reduced transaction costs and increased profitability to farmers and traders. Key elements of such policies are likely to include recognition of the problems of transaction costs and risks in inhibiting competitive private sector market activities at critical stages in agricultural transformations; rejection of simplistic presumptions that pure competition is always the most satisfactory form of market development; consideration of the direct and indirect costs of alternative policies (comparing, for example, the fiscal costs of successful agricultural development policies with the fiscal and social costs of stagnation, with safety nets and welfare interventions); imaginative learning from reflection on failures and successes with different institutional arrangements involving state and other actors; and innovative action research to develop and test different institutional arrangements.

NOTES

1. See Maxwell and Heber-Percy (2001) for a discussion of decline in investment in agricultural development.
2. See Wiggins (2001), for a fuller discussion of these issues. Migrant labor and remittances may also be considered a form of tradable, exporting labor to bring extra income into an area.
3. The importance of oilseeds in India's second (rain-fed) Green Revolution challenges the argument that intensive cereal-based transformations have historically provided the most sustainable and pro-poor pattern of growth. 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.
4. Jayne (personal communication), 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 urbanization and also more millet and sorghum, and less maize, in West Africa).
5. 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. Transaction risks dominate here: the risk of loss of specific assets invested by farmers (in crop production) or by traders (in stock, in financing, in relational capital, *etc.*) through transaction failure due to opportunistic behavior or failure of complementary investments in the supply chain.
6. China had already achieved quite widespread adoption of many technical features of the Green Revolution, with improved varieties, fertilizers and irrigation, but these had not been utilized sufficiently widely or effectively, largely due to lack of effective coordination and incentives promoting efficiency and effort.
7. Similar regression, though from a less dramatic transformation, has occurred in other African countries not included in Appendix A, for example Zambia, Tanzania, Ghana and, in limited areas, in South Africa (Mosley & Coetzee, 2001).
8. 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.
9. Eicher (1995) notes (4) that CIMMYT recognized 25 "mega environments" for maize and only seven mega environments for wheat, the largest of which encompasses about a third of the total wheat area in developing countries.
10. Egypt, Japan 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).
11. 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.
12. Land reform may have two important roles to play in pro-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.
13. Rosegrant and Siamwalla (1988), suggest that on irrigated farms in the Philippines a subsidized credit program had a major impact on fertilizer uptake on irrigated farms not through subsidized interest rates but through increasing the availability of finance.
14. This analysis of phases of growth follows Adelman and Morris (1997) in suggesting institutional stages in development, problems of market and coordination failure in the early stages, and the need for different types of policy and institutional development at different stages.
15. These difficulties are illustrated by the problems facing agriculture as a driver of pro-poor economic growth in different parts of Zimbabwe (Poulton, Davies, Matshe, & Urey, 2002): agricultural growth in the better rainfed areas (which experienced a maize revolution in the 1980s) 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 growth 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.

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APPENDIX A. GOVERNMENT POLICIES AND INTERVENTIONS IN GREEN REVOLUTION AREAS AT THE TIME OF TRANSFORMATION

(see overleaf)

APPENDIX A

Country	System	Years	Price stabilization	Price support	Dispersed guaranteed output markets	Input subsidies	Seasonal finance delivery	Inter-locking	Infrastructure	Institutions, services
<i>Irrigated systems</i>										
Bangladesh	Rice (mainly)	1970s	Yes	$X+$, $M-$	Yes, and 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 and rice	1990s	Yes	Yes		Removed in 90's			I	F, R, E
India (1): Punjab	Rice and wheat	Early 1970s	Yes	$X+$, $M-$	Yes and 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	1960–70s	Yes	Yes		Yes	Yes		I, R	R, E, F, L
Mexico	Wheat	1950s	Yes	Yes	Yes +strong urban demand	Yes	Yes	No	I, R	L, E, R, F

Philippines	Rice	1960–70s	Yes			Yes	Yes		I, R (but still constraint)	R, E, L (but still constraint)
Sri Lanka	Rice	1960–70s	Yes	Yes	Yes and 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, F
<i>Rain-fed systems</i>										
India (2):	Rainfed (cereals, oil seeds)	Late 1980s	Yes	$X+$, $M-$	Yes	Yes	Yes	Some (private)	R	L, R, E
Kenya	Rainfed maize	Mid 1960s+	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	1970–80s	No	Strong urban demand	Strong private market	Yes plus service centers	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 organizations.

Sources: Ahmed (1999), Barber (1994), Bautista (1999), Bevan, Collier, and Gunning (1993), Bhalla and Singh (2001), Carr (1997), Dong (1987), Eicher (1995), Eicher and Kupfuma (1998), Eicher and Staatz (1998), Francks (1984), Gabre-Madhan and Haggblade (2001), Gabre-Madhin and Johnson (1999), Goldman and Smith (1995), Gonzales, Kasryno, Perez, and Rosegrant (1993), Howard *et al.* (1999), Kherallah, Lofgren, Gruhn, and Reeder (2000b), Lin (1997), Longworth (1987), Mahmud (1999), Mosley (1993), Rosegrant and Hazell (2000), Salleh and Meyanathan (1993), Sanderson (1986), Tomich, Kilby, and Johnston (1995), USDA (1968), Wiggins (2000), World Bank (1993) and Yamada and Hayami (1979).