

**IMF WORKING PAPER**

© 1994 International Monetary Fund

This is a Working Paper and the author would welcome any comments on the present text. Citations should refer to a Working Paper of the International Monetary Fund, mentioning the author, and the date of issuance. The views expressed are those of the author and do not necessarily represent those of the Fund.

WP/94/23

INTERNATIONAL MONETARY FUND

Research Department

Economics, Politics, and Ethics of Primary Commodity Development:  
How Can Poor Countries in Africa Benefit the Most? 1/

Prepared by Uma Lele, James Gockowski, and Kofi Adu-Nyako 2/

Authorized for distribution by Peter Wickham

February 1994

Abstract

The critical role of agricultural commodities in the growth of low-income countries is examined. A combination of factors has resulted in declining agricultural prices, necessitating further increasing volumes by developing countries to maintain export earnings. But low growth in factor productivity in Africa compared to competitors caused declining export shares in African countries. A broad-based smallholder strategy based on producing commodities in which a country enjoys comparative advantage needs to be supported by productivity enhancing innovations in food and export commodities, a stable price environment, availability of infrastructure and access to credit. Such an environment requires partnership between government and private agents.

JEL Classification Numbers:

F43, H10, H50, Q10

---

1/ An earlier version of this paper was presented at a Seminar on Commodity Development Measures in the Context of International Commodity Strategies, June 22-24, 1993, Brussels, Belgium, organized by the Common Fund for Commodities based in Amsterdam, and will be published in a proceedings volume.

2/ Professor Uma Lele, who was a Visiting Scholar at the International Monetary Fund when this paper was prepared, is Director of International Studies and Programs and Graduate Research Professor in the Department of Food and Resource Economics, University of Florida; Mr. Gockowski is a graduate student; and Mr. Adu-Nyako a research associate, both also at the University of Florida, Gainesville, Florida 32611. The authors are grateful to Peter Wickham for his comments on the earlier draft of this paper. The views expressed in this paper are the authors and do not necessarily reflect those of the IMF.

	<u>Table of Contents</u>	<u>Page</u>
I.	Introduction	1
II.	The Inhospitable Environment in International Markets	4
	1. Conflicting interests of donor and recipient countries	4
	2. Balance of payments performance	6
III.	Supply Response: Roles of Price and Nonprice Factors and the Record of Macroeconomic and Sectoral Adjustments	7
	1. The extent of price distortions	8
	2. Record of price adjustments	9
	3. Movement of input prices	9
	4. Availability of credit	10
	5. Public expenditures and investment	12
IV.	Fallacy of Composition and Economic Diversification	13
	1. Supply-side effects and adjustment	13
	2. Diversification inside and outside agriculture: lessons of recent history	14
	Lessons of Successful Agricultural Development Experience at the Micro Level	17
	1. Food insecurity and the labor constraint	17
	2. Role of infrastructure in market integration	18
	3. Role of stable and unstable prices	19
	4. Research and extension	22
	5. Input intensification and environmental concerns	22
VI.	Summary and Conclusions	23
 Table		
	1. Percentage of Export Earnings from Major Agricultural Export Commodities Among Least Developed Countries	2
 Figures		
	1. Agricultural Export Volumes	8a
	2. Agricultural Export Values	8b
	3. Changing Productivities and Land-Labor Ratios in Asia, Africa and Latin America	8c
References		25

## I. Introduction

The poorest countries depend preponderantly on a limited number of agricultural commodities for exports, employment, income, government revenues, savings, and investment (Table 1). In these economies a small percentage change in the output or prices of their major export commodities has a large macroeconomic effect, in contrast to similar changes in nontraditional commodities or services that typically play a small role in the economy. This means that improving production or exports of the most important commodities must receive a high priority if economic transformation is to be achieved. Although this is a rather obvious fact, it is often overlooked in the consideration of economic diversification strategies of poor countries.

Many of these primary commodity producing nations are in Africa. Their immense diversity in terms of soils, climate, institutions, political regimes, and international marketing systems, largely inherited from the colonial era, mean that the development approaches and the subset of commodity strategies will also be large and heterogeneous. Notwithstanding their differences, agricultural commodity-dependent countries share several common features. Specifically, they have extremely limited human and institutional capital, have become marginalized in the share in world exports, and with a few notable exceptions, have increased dependence on food imports. As a group, terms of trade changes have affected African countries more adversely than their higher income Asian or Latin American counterparts. These countries are highly dependent on a fragmented donor community for concessional assistance, at levels that were already high by the end of the 1970s (up to 10-15 percent of GNP) but which have now reached over 50 percent of GNP in some countries, e.g., Mozambique (Lele, 1992b). These increases in concessional aid have been in response to a higher demand for rehabilitation of infrastructure following wars and political disruptions, balance of payments difficulties, and frequent shocks such as the recent decline in terms of trade, international interest rate fluctuations and droughts. In spite of a combination of debt forgiveness, reschedulings and increased concessional aid of the more recent economic assistance, in the short period since the mid-1980s indebtedness has doubled as a share of exports for many countries in this group. These factors and the political chaos in the region have generated donor fatigue and resulted in reduced political support for reforms at home.

While increased aid flows have been necessary, they have also brought a broad range of donor conditionality and economic and social costs. External resources provided by the donor community demand a considerable proportion of the limited capacity of recipient governments, which should ideally be allocated to the macroeconomic management and long-term development of their economies. Apart from the administrative demands, advice and assistance over time is often inconsistent and conflicting both among donors and even by the same donor. This situation persists even though much progress has been made in recent years in coordinating and implementing donor advice with respect to the specifics of macroeconomic reforms. However, as shown in this paper, the absence of institutional memory is a pervasive problem in

Table 1. Percentage of Export Earnings from Major Agricultural Export  
Commodity among Least Developed Countries

Country	Major Agricultural Export	Percent of Total Export Earnings	
		1984-85	1985-86
Benin	cotton	31.5	26.3
Burkina Faso	cotton	46.7	37.2
Burundi	coffee	84.0	86.7
Gen. African R.	coffee	35.4	30.1
Ethiopia	coffee	62.7	69.8
Gambia	oil seeds	24.8	21.6
Ghana	cocoa	66.1	60.7
Guinea Bissau	oil seeds	64.3	54.4
Haiti	coffee	26.7	29.3
Kenya	coffee	27.3	34.5
Liberia	rubber	19.0	18.7
Madagascar	coffee	39.0	40.5
Malawi	tobacco	48.0	49.8
Mali	cotton	56.0	37.0
Niger	cattle	14.2	18.9
Pakistan	cotton	10.6	15.1
Rwanda	coffee	43.0	64.0
Somalia	cattle	79.4	79.3
Sierra Leone	coffee	12.7	18.9
Sri Lanka	tea	39.2	31.4
Sudan	cotton	47.7	44.3
Tanzania	coffee	39.1	50.2
Togo	cotton	11.3	15.5
Zaire	coffee	19.0	24.4

Sources: UNCTAD, *Handbook of International Trade and Development*  
Statistics, 1988 and 1989.

donor agencies. Consistent long-term strategies are important for achieving broad-based, sustained growth in the production of commodities.

As the experience of the last decade has shown, reaching previous peaks in agricultural exports is relatively easy through implementation of macroeconomic reform programs that include depreciation of the exchange rate and a reduction in budget deficits. Where significant policy distortions existed prior to reforms--as in the case of Ghana or Tanzania--large shifts in output from parallel markets to the official economy, the planting of new trees, and greater application of variable inputs by farmers have produced a significant export supply response. However, maintaining these rates of agricultural production and exports often require the removal of structural constraints once initial reforms have been implemented. In Kenya and Malawi, macroeconomic policies were not highly distortionary when external shocks began to affect them in the late 1970s, and by the general standards of developing countries their agricultural export performance has been respectable (Lele and Meyer (1989)). However, their overwhelming problems have been of an institutional nature, e.g., discriminatory policies towards small farmers leading to an unequal distribution of benefits, inefficient public enterprises, weak ministries of agriculture and the non-viability of financial institutions serving the agricultural sector (Lele and Nabi (1991)). These reforms raise complex issues which have not yet been fully explored from a long-term growth perspective by donors. Sustained and broad-based agricultural growth in food and export crop production for these low-income countries will depend on the extent to which governments of both industrial and African countries undertake reforms, of both a price and nonprice nature. Most importantly, growth will depend on the extent to which governments learn from the historical experience of agricultural development in Africa and throughout the developed and developing world and act in light of the relevant policy lessons.

A comprehensive treatment of the issues affecting commodities is overdue. In the past, approaches to the issues have been piecemeal and subject to change. In the 1950s and 1960s questions were often raised concerning limited international market prospects. In the 1970s, investments in integrated rural development projects aimed at achieving food self-sufficiency in the poorest households of resource poor regions in Africa. This strategy, when it ignored the importance of export agriculture or macroeconomic policies, produced very poor results. With a winding down of agricultural investment portfolios in Africa by donors, macroeconomic policy reforms geared to export incentives became the vogue in the 1980s. Introduction of safety nets, particularly to protect the urban poor, attracted increased attention in the latter half of the 1980s, after criticism of donors mounted that their export-oriented adjustment programs lacked a human face. Concern for the environment has become a preoccupation in the 1990s. These piecemeal approaches and changing fashions have lacked an appreciation of the essential balance and complementarity between the fundamental role of government *vis-à-vis* the private sector in the development of smallholder agriculture. This appreciation has also been lacking in the treatment of price and nonprice factors, including

particularly the role of human capital, the development of factor and product markets, public enterprises, infrastructure and of technologies.

Governments are viewed as inefficient rent-seeking bureaucracies and in some cases with justification. But this view poses a fundamental dilemma. Without acknowledgement of the legitimate strategic role of governments in the development of markets, *inter alia*, there is little hope of agricultural development in Africa. Yet without sharply increased investment in the training of nationals, retention of qualified personnel in the public sector, and accountability of governments, they cannot play the essential active facilitative role.

## II. The Inhospitable Environment in International Markets

### 1. Conflicting interests of donor and recipient countries

Poor countries that depend on agricultural commodities face a host of constraints in the international market place, including:

- inelastic world demand for their products e.g., tea, coffee and cocoa;
- rapid technological change in competing countries;
- tariffs on processed agricultural commodities in OECD countries;
- growth of substitute products in importing countries e.g., sweeteners and beet sugar;
- growing environmental concerns associated with production;
- health concerns associated with consumption of, e.g. tobacco, palm oil and sugar;
- oligopolistic market structures in OECD countries;
- restrictions placed by aid-giving countries on recipient countries' production to appease their own internal environmental lobbies while subsidizing production of the same products at home, e.g., the U.S. stance towards the support of tobacco production in Africa;
- reduced import demand by Eastern European and Russian consumers due to severe income compression;

- and not least important, the protectionist policies of OECD countries towards the production of all major and minor cereals, livestock and dairy products, sugar, edible oils, etc.

As a result of these conditions, growth in demand for raw and processed commodities of the poorest countries has been constrained and has greatly reduced production incentives for rural households. Witness, for example, the adverse effects on African production and the financial health of its commodity-based institutions of EC exports of frozen meat carcasses and the dumping of surplus cotton by the United States and China over the last several years (Delgado (1993) and Lele, *et al.*, (1989a)).

Agricultural policies of industrial countries are intended to protect the domestic traditional small family farm "way of life." Yet in reality a large share of the benefits of support prices, government payments and export subsidies accrue to only a handful of politically well organized, large producers, processors and exporters. Various estimates of the likely increase in international prices resulting from liberalization of OECD food policies exceed well over 25 percent, depending on the different assumptions of the models (Anderson and Tyler (1990)). Recent studies also show the high cost of budget deficits in OECD countries on the demand for primary commodities, via the effect on the levels of real interest rates (Duncan (1993)).

In many commodity markets, the consumer benefits from recent price declines in raw commodity markets have been minimal in comparison to those of marketing agents (multinationals and trading houses), perhaps owing to the high degree of concentration. For example, over 70 percent of the world's instant coffee market is controlled by four multinational corporations. The World Bank's latest commodity report observes that between 1988 and 1991 retail prices of coffee to consumers declined by only 5 to 7 percent in the France, Germany and United States, although international arabica coffee prices declined by 40 percent in the same period (World Bank (1992)). An important consequence of the price declines in international markets has been the large growth in coffee stocks in importing countries. Whereas the price elasticities of demand for consumption range from only 0.1 to 0.3, for stocks they range from 0.4 to 1.0 (World Bank (1992)). A consequence of differences in the behavior between retail and "raw" crop prices has been that consumption has not been stimulated as much as might otherwise be envisaged.

One of the rationales for international commodity agreements is to counteract the market power exerted by the industrial nations and their marketing sectors. However, given the inherent instability of cartel schemes, they have usually failed to be effective and when enforced they have had deleterious effects on consumption demand. One solution to this difficult dilemma is for primary commodity producing countries to attempt to integrate upstream in the marketing sector of industrial countries as, for instance, Brazil has done with its coffee sector. However, because of the small size of the economies in many commodity producing countries, their

ability to achieve the economies of scale necessary to compete in the food processing industry is limited. In these cases regional economic cooperation and the development of infrastructure such as roads and other communication links becomes fundamental. But these are not easily implementable solutions. Regional economic cooperation has not worked in Africa before, even between a few countries (e.g., the breakdown of the East African Community), and although major new efforts are underway (e.g., SADCC), the country groupings are often too large and too diverse to achieve the necessary political consensus.

The indirect dynamic effects of these international distortions on low-income countries can be as significant as the direct and indirect taxation in developing countries, where the removal of distortions has correctly been a cornerstone of adjustment programs. It is necessary, therefore, that the Bretton Woods institutions--GATT, IBRD, and IMF--promote free trade and competitive markets not only in the distorted economies of developing countries, but in the distorted markets of OECD countries as well. This will require supporting GATT, opening the European Common Market to developing and former Eastern Block countries, encouraging more stable monetary and fiscal policies in the OECD countries, reforming OECD farm programs, and assisting poor developing countries to increase value added. The potential global welfare gains from the reform of policies of industrial countries are large, namely, from a combination of liberalization in trade regimes, more stable monetary and fiscal policies and a shift to direct income transfers to the needy, small family farms. Such reforms will lower input use, budget outlays, and improve the quality of the environment in industrial countries. Such reforms also mean higher and more stable prices to the low-income producers in developing countries, an increase in global allocative efficiency, reductions in fiscal deficits and reduced aid dependence. These gains are larger than the roughly \$50 billion of concessional aid industrial countries provide to developing countries annually, much of which now goes to the low-income countries in Africa.

## 2. Balance of payments performance

The impact of the growing food demand of low-income countries on the microeconomic dynamics of the farm household and the balance of payments are important in the discussion of commodities, which tends to be narrowly focused on the problems of primary export commodities. Low productivity growth in African agriculture, coupled with rapid population growth, high rates of urbanization, and the varied preferences of urban consumers have led to increased levels of cereal and livestock imports. In 1990, for the first time, food imports in developing countries exceeded those of developed countries. The share of Asia in world cereal imports increased from 37 percent to 60 percent in 1992, and that of Africa doubled from 6 percent to 12 percent. Even with the doubling of food imports, Africa's food aid requirements--estimated at 6 million tons in 1991-92 simply to maintain per capita consumption and at 11.4 million tons to meet UN calorie requirements--could not be delivered owing to an extremely inadequate distribution infrastructure, especially port capacity. It has been estimated that if the current population growth and export earning rates



continue, African food imports could rise from their current level of 5 percent of export earnings to 20 percent by the year 2000--a level never before approached (Delgado and Pinstrip-Anderson (1993)). Unless efforts are made to increase food crop productivity, with the rapid increase in population and the consequent increased pressure on the land, it is likely that there will be even more pressure on Africa's export sector.

Under a similar set of conditions, Asian countries were able to finance a greater variety and increasing volumes of imported agricultural goods because of their own spectacular success in **both** food production and export agriculture and the rapid overall economic growth associated with the impressive, broad-based growth of the agricultural sector. From 1965 to 1990 the world export volumes of agricultural commodities grew at an annual rate of 2.6 percent. During this period, Asia increased its volumes at an average growth rate of 3.9 percent (Figure 1), and gained market shares dramatically in oil palm products, robusta coffee and cocoa--all traditional African exports. Asian shares of nontraditional agricultural and manufacturing exports also increased. Per capita food production also accelerated in Asia following the widespread introduction of high-yielding varieties in the mid-1970s. Growth of the food and export crop in Asia was accompanied by a rapid and broad-based rise in the levels of income and employment in the rural sector and provided a stimulus to the expansion of the nonagricultural sector through an elastic supply of labor, food and rural savings (Figure 2). This in turn has led to reductions in the numbers and proportions of people living in poverty in Asia. In contrast, over the period 1965 to 1990, Africa experienced an annual decline in export volumes of 1.3 percent and nominal agricultural export earnings showed practically no growth during the 1980s, as compared to an average annual growth rate of about 4.6 percent in Asia. Some countries in Africa, for example, Kenya and Mauritius did record growth in nominal export earnings during the period, while others, such as Ghana and Zambia, have shown some growth in export earnings in the aftermath of adopting adjustment programs (Lele and Adu-Nyako (forthcoming)).

### III. Supply Response: Roles of Price and Nonprice Factors and the Record of Macroeconomic and Sectoral Adjustments

It is clear that to compete in an inhospitable global market, Africa urgently needs to augment factor productivity, which has lagged behind that of Asia and Latin America in the 1970s and 1980s and is a significant factor in explaining the region's declining market shares and loss of competitiveness in primary commodity production. As seen in Figure 3, African labor productivity, measured as wheat equivalent units per agricultural worker, declined slightly from 1976 to 1989, while labor productivity in Asia and Latin America registered significant increases. This is especially true in Latin America, the only region where the land-labor ratio ( $A/L$ ) has been increasing.

The most striking observation drawn from Figure 3 is the large jump in land productivity in Asia between 1980 and 1985. The land productivity gain

may be explained by several factors. One important occurrence over the 1980-85 period is the significant increase in productivity of Chinese agriculture resulting from gradual reforms begun in the late 1970s in the output and input markets. Secondly, there has been the diffusion and adoption of a second generation of high-yielding varieties of rice in Asia, including hybrid varieties, developed by the national agricultural research centers and extension services, which are more site specific, higher yielding and more pest resistant than the original Green Revolution varieties (Byerlee (1993)). Certainly another factor has been the decreasing land-labor ratio in Asia. The fact that this ratio continues to decline indicates that in the short-run Asia, especially South Asia, still has a lot of labor in agriculture waiting to be drawn into the industrial sector. A major impact of increased productivity in smallholder agriculture is to increase food security at the household level and free rural labor for production in the export crop sub-sector.

Most evidence on the supply response of agriculture to price factors indicates that short-run aggregate supply elasticities tend to be rather small, almost close to zero (Binswanger (1989) and Faini (1992)). The supply response is, however, higher in the long-run than in the short run. Moreover, particularly in the long run, supply is more responsive to nonprice than to price factors, and this is more true in Africa than Asia. Asia is better endowed with infrastructure, institutions and investment in technology, (see below for more details), and factor and product markets are more competitive and have greater scope for price responsiveness. This means that investments in productivity-enhancing agricultural research, extension, input supply, feeder roads, institutions and human capital in Africa will have a greater impact than price adjustments. However, the latter are by no means unimportant given the importance of profit incentives in technology adoption, and the fact that price distortions have been more acute in Africa than in Asia.

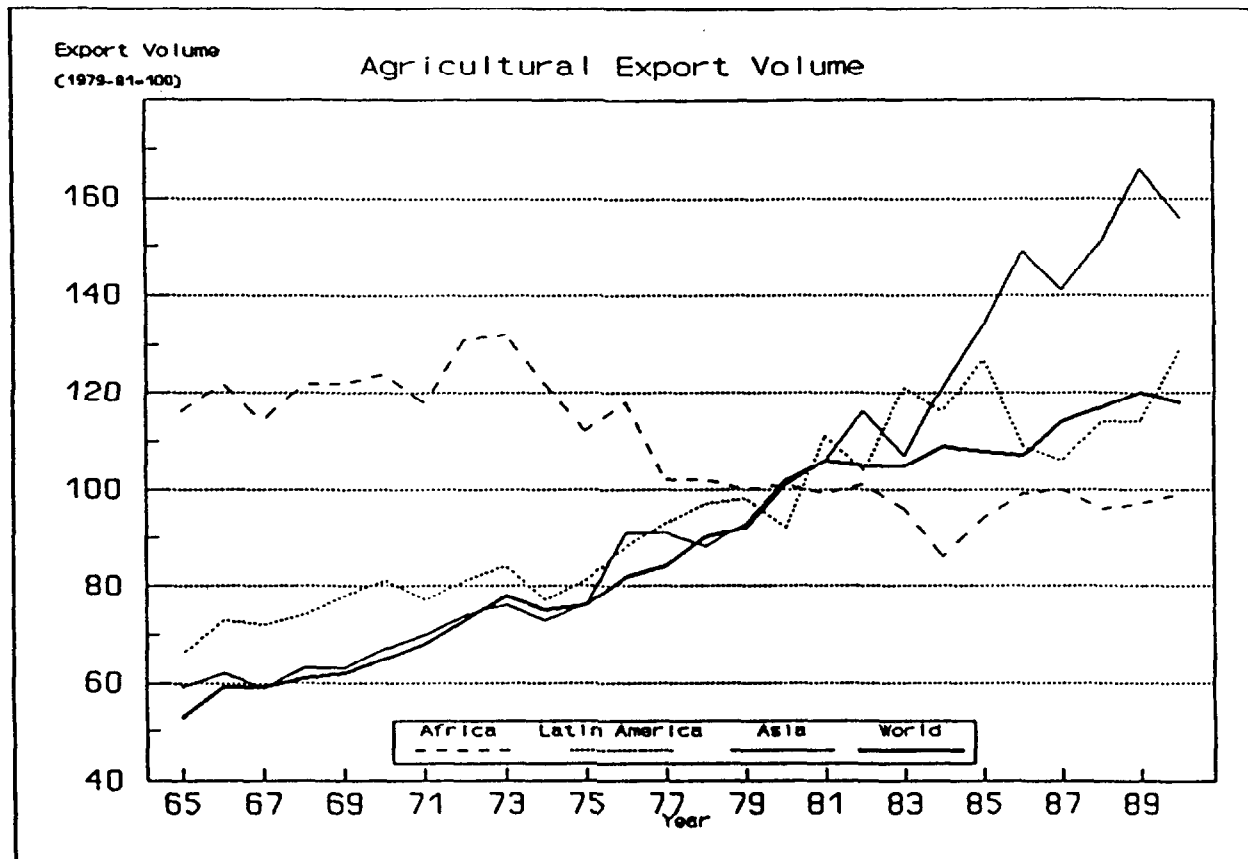
#### 1. The extent of price distortions

In a cross-country study on the level of government intervention in agriculture, (Krueger, *et al.* (1991)) found that the level of producer taxation in the three sub-Saharan African countries was double the levels of the Asian and Latin American countries included in the study, at 51.6 percent of border prices at the official exchange rate. <sup>1/</sup> Differences in the levels of indirect intervention, mainly from overvalued real exchange rates and industrial protection were roughly equivalent among regions--averages ranged from 21.3 percent in the Latin American countries to 28.6 percent in African countries. The main difference between regions was the level of direct taxation, which was roughly eight times higher in the African countries compared to Asian countries and three times higher compared with Latin American countries. This difference explains why both

---

<sup>1/</sup> Countries included in this study were: Côte d'Ivoire, Ghana, Zambia, South Korea, Malaysia, Pakistan, Philippines, Sri Lanka, Thailand, Argentina, Brazil, Chile, Colombia, and the Dominican Republic.

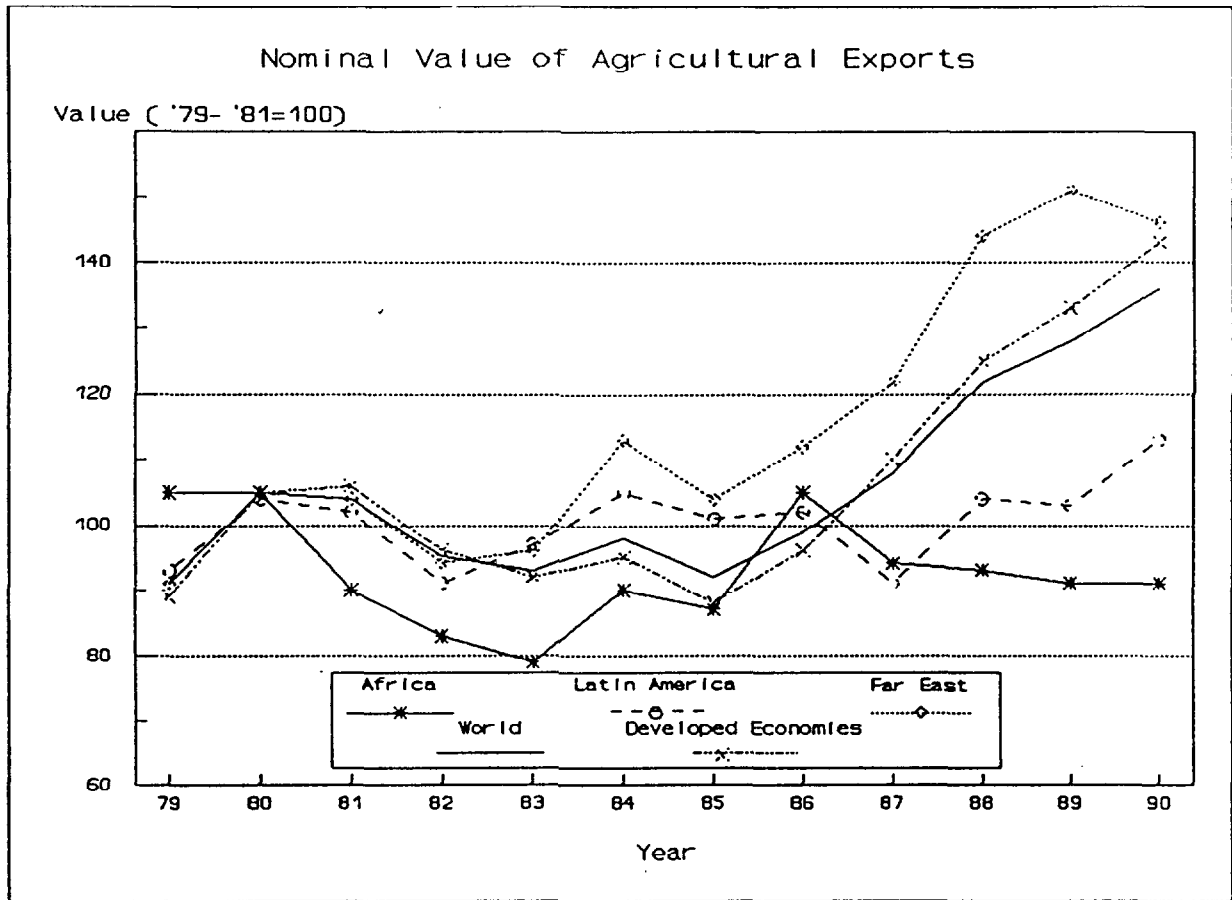
Figure 1. Agricultural Export Volumes, 1979-90



Source: FAO Yearbook of Agricultural Trade, 1991.



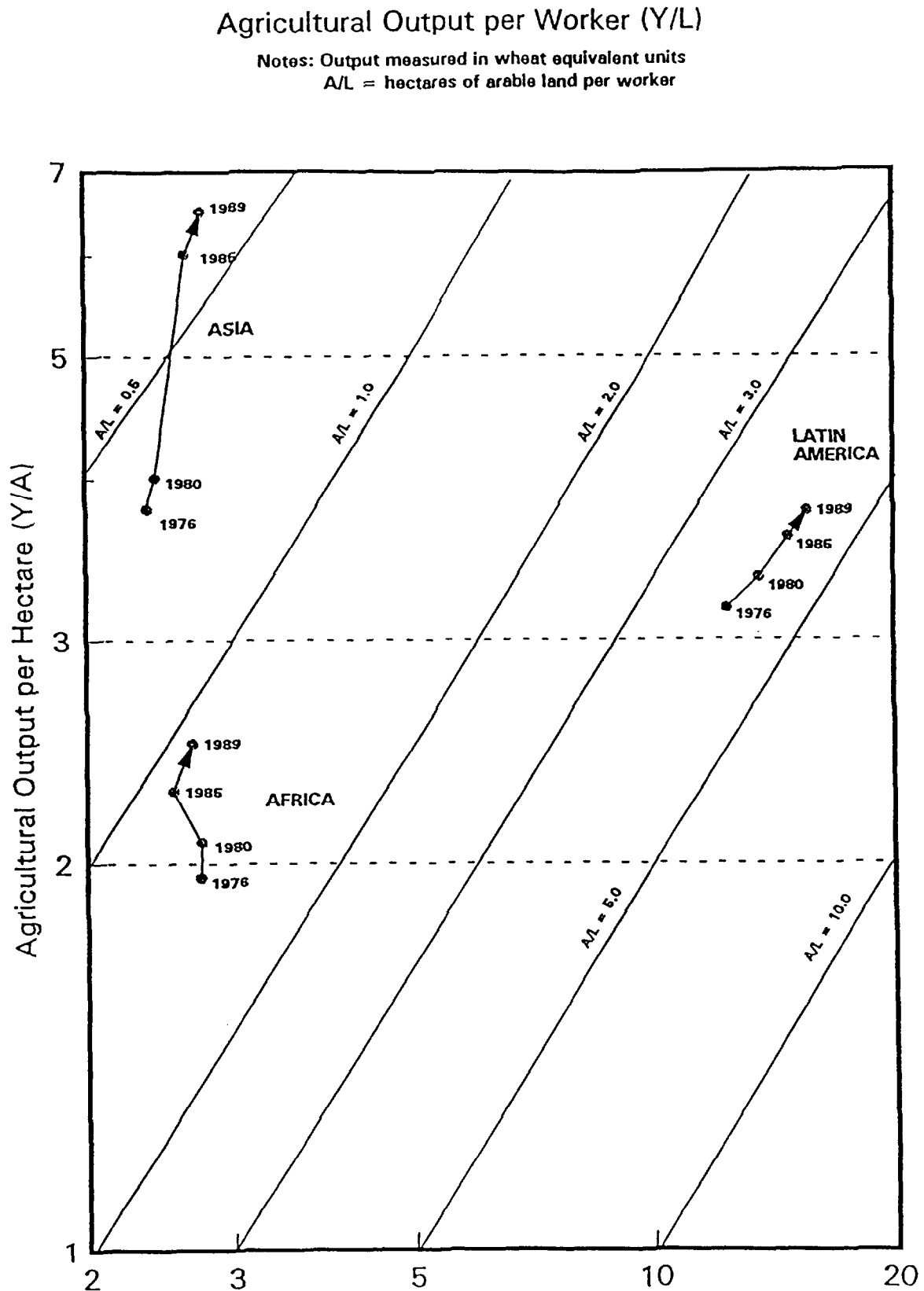
Figure 2. Agricultural Export Values, 1979-1990



Source: FAO Yearbook of Agricultural Trade, 1991.



Figure 3. Changing Productivities and Land-Labor Ratios  
in Asia, Africa and Latin America







sectoral and macroeconomic policy reforms are needed in Africa and have led to the adoption of structural adjustment programs. The findings of Krueger, *et al.* have been corroborated by the MADIA studies <sup>1/</sup> of six African countries, as well as by others (Lele (1989a), Lele (1992b), and Langham and Kamajou (1992)). To date the debate has focused on the removal of price distortions more than on the quality and quantity of public expenditures. Before proceeding to those important issues, we explore the recent record of price reforms in African countries since the adjustment process began.

## 2. Record of price adjustments

In a study of 24 adjusting and nonadjusting countries, Lele and Adu-Nyako (1994) show that real exchange rates have depreciated in most African countries, except for those using the CFA currency which has experienced a strong appreciation since 1985-86 with a substantial cost to external competitiveness. But when price adjustments are examined more closely, progress on reforms is more disappointing. Nearly half the 20 countries undertaking exchange rate adjustments have not passed on the increased prices to producers. Gains appear to have either been absorbed by marketing boards, or to have resulted in higher costs of marketing associated with devaluations and the high import content of transport. Nominal producer prices, deflated by CPI indices decreased in 10 out of 18 countries for which data are available, although often the share of producer price to border price increased owing to a combination of worsening international terms of trade and appreciation (or inadequate depreciation) of exchange rates. Real producer prices in Ghana and Madagascar improved despite a decline in producer to border price ratios, due in part to large devaluations.

## 3. Movement of input prices

The effects of declining real producer prices were aggravated in several countries by increases in the real prices of fertilizers and pesticides owing to a combination of devaluations and the removal of subsidies. Notwithstanding the decline in the world market prices of fertilizers, prices often doubled. An important development in virtually every African country is the widening role of private traders in the sale of improved seeds, pesticides and fertilizers. However, the high cost of internal transportation, the inadequate access of traders and producers to credit, and lack of lucrative opportunities in input trading *vis-à-vis* alternatives means that private trade will not by itself be able to meet the large input needs for modernizing agriculture. Later on in the discussion of microeconomic issues we stress the risk aversion of small farmers in remote areas with few savings or access to credit, and the fundamental

---

<sup>1/</sup> See "Managing Agricultural Development in Africa," Discussion Papers 1 through 12, Uma Lele, ed., The World Bank, Washington, D.C.; see also Aid to African Agricultural: Lessons from Two Decades of Donors' Experience, (The World Bank, Washington, D.C., 1992).

importance of increased fertilizer use as a means of increasing land and labor productivities, particularly women's labor productivity.

#### 4. Availability of credit

Low profitability in agriculture implies low rural savings rates and liquidity constraints for expenditures on agriculture. Limited credit availability to rural households has remained a common feature with only a mixed record of implementation of financial reforms. In 1989, the ratio of the value of agricultural production to domestic credit supplied was only 0.17 in Senegal, but was as high as 1.48 in Ghana. However, in these countries, the share of credit reported to have been allocated directly to the institutions handling the needs of the agricultural sector did not exceed 12 percent of the total credit created on average (Lele and Adu-Nyako (1994)).

A strong positive development is the increased access of private traders to credit, whereas the public sector dominated before. The growing importance of commerce is beneficial to agriculture, particularly as the privatization of trade shifts handling of the marketed surplus from the public to the private sector. Yet, the declining share of agricultural credit in total domestic credit is worrisome. The financial sector tends to prefer the urban and industrial trading sector, which is characterized by less risk and higher returns, as opposed to the agricultural production and trading sector, which is influenced by the vagaries of weather, poor transportation and inadequate market information.

While there is widespread questioning of the directed provision of credit through specialized credit agencies in the drive to liberalize financial markets, in reality nonrepayment problems have often resulted from credit given to large and politically influential producers. For instance, despite four IDA credits to Kenya's Agricultural Finance Corporation (AFC), amounting to well over \$65 million in the decade between 1975 and 1985, the World Bank was unable to persuade the Government of Kenya to make credit available to small farmers with less than five acres of cultivable land even though they constitute nearly 90 percent of farmers in Kenya (Lele and Meyers (1989)). The bulk of overdue payments from the AFC were associated with large commercial and politically powerful farmers.

Liquidity constraints are of course the greatest at the lower socioeconomic levels. Development strategies targeting the very poor must address this fundamental characteristic if this group is to participate in the development process. A commodity-based development strategy can directly and indirectly improve the incomes of these households even though they are typically not commodity producers. Real wages of laborers in the commodity sector increase directly as the demand for their labor increases. Incomes of the landless rural class can increase indirectly through growth effects on the demand for rural goods and services--provided they are not denied access to entrepreneurship by financial, human capital or by other

constraints. 1/ In most developing countries the financial needs of this group are not met by the formal financial sector because of the high costs of administering Western-style credit to numerous low-asset borrowers in an environment of poor infrastructure, inadequate information, etc.. A chief obstacle for many poor households in accessing formal financial markets is the requirement of collateral. Its absence is the result of the past inability of households to accumulate assets, in turn a result of past liquidity constraints and the high cost of borrowing in informal markets. Credit schemes targeted to low-income households can lead to broad participation of the rural population in a primary commodity development strategy.

In Bangladesh, such liquidity constraints on the poorest rural households have been ameliorated by the provision of collateral-free loans from the Grameen Bank. This has enabled marginalized members of the Bangladesh society to benefit from growth in the agricultural sector generated by high-yielding grain varieties (Hossain (1988)). Small bank-financed investments, especially by women, in various commercial and cottage enterprises in the rural nonagricultural sector have led to significant increases in incomes, capital accumulation, and employment in households receiving loans. The average amount of working capital increased nearly four times per borrowing household after a period of two years with the Bank. Total capital accumulation among borrowers increased at an average rate of 52 percent over the first three years of membership in the Bank. This highlights the collateral dilemma facing the poor in obtaining formal sector loans.

The Grameen Bank's excellent loan repayment performance has been attributed to 2/:

- small weekly repayments;
- limiting loans to the extremely needy 3/;
- provision of credit only for activities that generate regular income;
- use of peer group liability (as a substitute for collateral);
- small initial loans with larger loans available contingent upon past repayment performance; and importantly,
- highly trained and dedicated staff.

In Madagascar and Malawi, similarly high loan repayment rates based on peer monitoring have been documented (von Braun, *et al.* (1993) and Lele (1989b)). On a percentage basis, the costs associated with credit targeted to the poor are necessarily higher than for credit to large borrowers, mainly because of

---

1/ For a discussion of these dynamic relationships, see Mellor and Lele (1973).

2/ Hossain (1988) found that only 0.5 percent of the loans to 975 surveyed borrowers were overdue.

3/ To families with less than 0.5 hectares of land (comprising 46 percent of all rural households) Hossain (1988).

the increased managerial demands of numerous small transactions. Bangladeshi borrowers pay interest rates equivalent to the commercial rate of 16 percent which only covers 49 percent of the total credit program costs in 1986. Thus, the implicit subsidy rate is approximately 51 percent of the opportunity cost of funds (Hossain (1988)). By recognizing and removing supply constraints that inhibit the linkage between commodity-led growth and increased demand for rural goods and services, carefully targeted, subsidized credit can enable resource-poor rural inhabitants to participate in the development process.

As the recent insolvency of some private financial institutions in the industrial countries illustrates, weak and insolvent private banks seem no less susceptible to the bad loans and undue influence of the politically powerful elite than government institutions. Stiglitz (1993) and others (Floro and Yotopoulos (1991)) have begun to question the wisdom of rapid financial liberalization in developing countries. They make a strong case for an active government role in creating financial institutions that can supply funds for long-term investments, and provide a strong regulatory presence to prevent the disruptive macroeconomic consequences of financial market failure. Stiglitz also questions the response of savings to high interest rates while stressing the adverse effects of high costs of loanable funds on investments.

There is a need for the development of specialized credit agencies in Africa that would make credit directly available to small farmers. They are needed for growth and equity considerations because of volatile and declining international prices, inadequate and haphazard implementation of price and exchange rate reforms, and institutional uncertainty. Given a weak private sector and the large financial requirement of agriculture, these agencies will have to be government institutions.

##### 5. Public expenditures and investment

The checkered record of adjustment is also evident from the performance of these countries with regard to balance of payments and fiscal deficits. While Ghana and Tanzania were able to reduce fiscal deficits that exceeded 6 percent of GDP, at the same time their current account balances deteriorated. In contrast, the situation was reversed in Kenya and Zimbabwe. This is in part because terms of trade changes affected each of the countries differently depending on their export portfolio. For instance Ghana, with a high agricultural export concentration in cocoa, was more affected by the price decline than others. Aid inflows were large and increased during the period to compensate for the loss in international terms of trade. For a group of 24 sub-Saharan African countries, net overseas development assistance (ODA) adjusted for terms of trade effects increased from an annual average of \$5.9 billion (in constant 1987 prices) during 1981-86 to \$8.5 billion in the 1987-91 period. Net transfers in real terms also increased on average by 42 percent annually over the same period.

Reductions in the fiscal deficits of countries undertaking reforms were mainly the result of decreased investments and public expenditures.

Governments in Africa have tended to freeze the wage portion of the recurrent budget, thus reducing real wages of government employees while cutting support for maintenance and operations. As a consequence of the declining real wage, many qualified professionals have fled from public service, further reducing the effectiveness of the public sector. This has a direct impact on agriculture, which requires a strong, effective, albeit, small public sector, as the record of every country that has been successful in agricultural development attests.

Reductions by government in public investment on infrastructure and other public goods, combined with restrictive credit policies and declining exports earnings, have resulted in a decline in gross domestic investment as a ratio of GDP. In a forthcoming study by Lele and Abu-Nyako (1994), 11 out of 12 countries classified as early, intensive adjusters over the 1983-90 period showed such declines. Faini (1992) also presents evidence that with the adoption of adjustment programs and restrictive credit programs the level of investment in SSA has declined. Empirical evidence of the relationship between net domestic investment (NDI) and export earnings (EE) was obtained using World Bank statistics by regressing the level of NDI for 25 African countries from 1980 to 1987 on EE and a constant term. The results (t-ratio in parentheses)

$$\text{NDI} = \text{Constant} + 0.521 \text{ EE} \\ (24.3)$$

$$\text{Adjusted } R^2 = 0.77$$

indicate a significant positive relationship between the two variables for the sample group of African countries. The negative effects of declining rates of export earnings on rates of net investment in African countries are of great concern to the future growth prospects of these economies.

The discussion now moves to the issues of economic diversification at macroeconomic and microeconomic levels. It then explores the implications for future price and nonprice policies in seeking vigorous and sustained growth of smallholder agricultural productivity.

#### IV. The Fallacy of Composition and Economic Diversification

##### 1. Supply-side effects and adjustment

We have seen above that lower levels of taxation on agriculture can result in significantly higher rates of export. Nevertheless, when devaluations and reductions in taxes are carried out simultaneously by a large number of "small" developing countries, as has been the case in the decade of adjustment, the price effect of supply shifts given inelastic income and price elasticity of demand and oligopolistic import markets on the international terms of trade must inevitably be significant. This old notion of fallacy of composition, first articulated by Singer (1950) and Prebisch (1950), has recently been supported by policy simulation models of the removal of export quotas and taxes on tree crops (tea, cocoa and coffee) in Africa (Panagariya and Schiff (1992) and Evans, et al. (1992)). The

recent studies show declines in the combined income of producers that result from the removal of taxes and quotas. As ameliorating strategies, the authors suggest export diversification and supply control through a cartel-cum-taxation scheme. Duncan (1993) and others argue, and we concur, that such schemes have tended not to benefit small producing countries, which often lose market shares, as occurred, for example, with the breakdown of the international coffee agreement. Increasing efficiency is the more effective way of maintaining competitiveness in periods of declining commodity prices, a strategy effectively pursued by the leaders in commodity exports in Asia (Malaysia and Indonesia) and Latin America (Brazil and Colombia).

In another study, where the effect of a 5 percent increase in the supply schedules for the six most important commodities of African countries was simulated, only cocoa export revenues declined in the short-term (Koester, *et al.* (1988)). In the long-run--after other producing countries had adjusted to the new world prices by decreasing their production--the effect on export earnings was positive in all cases. This in turn prompts one to explore which of the exporting countries are likely to reduce their production for the inadvertent benefit of African countries. Owing to higher returns in alternative activities and rising domestic wage costs, Brazil, Colombia, Costa Rica and Malaysia are seen as likely candidates for production cutbacks (World Bank (1992)). Export diversification and trade expansion in these countries has been stimulated by increasing international capital flows following trade liberalization.

The positive effects of a GATT-style trade liberalization via increased real wages in middle income countries and the resulting shifts out of traditional exports could be large for poor countries. But several of these countries have chosen to remain major producers by increasing efficiency through improvements of technology in production, harvesting and processing. They have also shown a continual willingness to adjust their macroeconomic parameters and promise to be tough competitors for low-income African countries. Nor are Viet Nam, Indonesia, India, Sri Lanka or China--major primary commodity producers with large pools of underemployed labor in agriculture--likely to shift out of primary commodities in the next decade or more.

## 2. Diversification inside and outside agriculture: lessons of recent history

Over the past two decades donors have gone through several short cycles of advising poor countries on diversification strategies, but without a long-term view of the role of primary commodities in the overall economic transformation process. The pessimistic Singer-Prebisch export consensus of the 1960s led the World Bank and the IMF to sound a cautionary note on primary export crop promotion and to promote export diversification. On the advice of the FAO, in 1973 the World Bank adopted a policy to restrict investment lending in support of the expansion of coffee, tea and cocoa except in cases when countries lacked any alternatives in production (Lele (1992a)). However, World Bank assistance to establish the tea

processing capacity in Kenya had the inadvertent beneficial effect of stimulating domestic production. Ignoring conventional wisdom, Kenya consistently encouraged smallholder production and productivity growth of export crops, increasing its world market shares of tea and coffee. This export drive was mainly the result of internal political pressure on behalf of small African farmers to open access to the production of these crops to them--these rights had been denied during the colonial period--and to also provide the same international price at auctions as in the estate sector. In contrast, the taxation of smallholder tobacco in Malawi was much greater than in the estate tobacco sector and farmers' rights to grow export crops were restricted (Lele and Meyers (1989)).

Three types of diversification strategies/objectives are pertinent in these circumstances:

- Diversification of activities already undertaken by farmers in the rural economy, e.g., food crops to meet expanding local demand.

Given the increasing food imports in Africa, such diversification could be of major significance in ameliorating balance of payments problems.

- Diversification of the agricultural sector to new, higher-value activities: for domestic, largely urban consumption e.g., dairy, and poultry; or for export, e.g., horticulture, including nuts and fruits, and also livestock.

Prompted by a strong demand pull resulting from growing urbanization and population pressures, diversification is evident in much of Africa. It could be intensified with more reliable markets, e.g., by stabilizing the supply of feedstock for poultry which tends to be a serious constraint to this industry's growth.

- Diversification outside the agricultural sector through import-substituting industries.

Some acute forms of this strategy have been pursued by African countries and had disastrous consequences for agriculture, although in China development of rural enterprises has proven successful.

Past attempts have been made to diversify along the lines of the above, with mixed results. Numerous small successes can be cited in the diversification to nontraditional activities, such as the shift out of sorghum and millet to hybrid and improved open pollinated varieties of maize throughout Africa. Other successes include the growth of poultry and small-scale irrigated rice in Nigeria to meet the growing urban demand there, and of horticultural crops for export, as in Kenya. However, the macroeconomic effects of these efforts on the balance of payments, employment, income, and government revenues initially tend to be small and take a long time to

achieve significant results. With a longer time horizon, colonialists exhibited more patience in this regard than donors have in the development of African agriculture (see Lele and Meyers (1989)).

The major purpose of export diversification in agriculture is to achieve a cushioning effect on trade balance fluctuations through a diversified portfolio. However, this result is contingent on a negative correlation of the net returns in the export portfolio. Temporal prices of agricultural commodities tend to be positively correlated, while within national borders yields are positively correlated both, spatially and temporally, thus reducing the scope for revenue cushioning of the agricultural sector. 1/ Within a particular commodity subsector, diversification of marketing strategies through increased use of futures markets, forward contracts and commodity options can have some of the desired risk-reducing effects, probably at a much lower cost than production diversification. The opportunity costs of production diversification can be very high especially when national research capability is a constraint. These costs arise mainly from a reduction in specialization, lower research expenditures on a per crop basis, and the resulting decrease in productivity growth. 2/ A major concern in developing countries is that it is easier to improve the productivity of crops already in place than of new crops where expertise is limited.

Kenya, which pursued its comparative advantage in traditional export crops, diversified its agriculture and economy more rapidly than Tanzania, which overlooked its comparative advantage, neglected smallholder agriculture and embarked on an active program of import substitution. Tanzania placed emphasis on the development of food production in marginal areas where there were few obvious technological possibilities, and embarked on regional diversification in the southern highlands, which are remote from the major centers of consumption. Quite paradoxically, the neglect of Tanzania's traditional export sector and of food production in areas of established high potential resulted in an increase in the share of agriculture in a declining GNP and of exports by the end of the 1970s. Emphasizing productivity gains of food and export crops with a demonstrated comparative advantage, while carefully identifying the location-specific costs and benefits of alternative strategies, is the most effective means of diversifying into new crops, and developing underdeveloped regions and industries. Efforts to increase productivity of traditional food crops, i.e., sorghum, millet and cassava, as well as diversification out of

---

1/ In an examination of 26 agricultural commodity prices from 1958-90 of products commonly produced in Africa, the typical commodity was negatively correlated at the 10 percent significance level with fewer than 4 of the 26 commodities. Specifically, arabica and robusta coffee, cotton, cocoa, tea, and palm oil were negatively correlated with 0, 8, 0, 4, 5, and 8 commodities, respectively (Langham, 1992).

2/ The effect of diversification on total factor productivity growth in U.S. agriculture was negative and quantitatively large in a panel data study of the 50 states (Habasch, 1989).



agriculture through industrialization, have had limited success. Despite low international prices, traditional export crops will have to remain a major means of achieving economic growth in Africa.

V. Lessons of Successful Agricultural Development:  
Experience at the Micro Level

1. Food insecurity and the labor constraint

Increasing factor productivity of both traditional food and export agriculture are essential and complementary rather than dichotomous goals. In developing countries, agriculture in the early stages is characterized by a large number of geographically dispersed households with low factor productivity and low-incomes, in which food security considerations dominate production decisions. These households face risky production conditions, and poorly developed or nonexistent markets for commodities and factors of production.

Labor is a major bottleneck for the development of export agriculture by small farmers. Labor constitutes up to 80 percent of value added in agriculture in low-income Africa, compared to 50 percent or less in low-income Asia. In Africa a combination of lower rural population densities and higher labor intensity means considerable shortages of labor at peak periods of land preparation, planting, weeding, and harvesting. However, densely populated rural areas in Africa are increasing, e.g., the Machakos district in Kenya, the southern region of Malawi, the western highlands of Cameroon and in most of Rwanda and Burundi. The increasing population together with labor saving innovations in food crop and household technologies will help to relieve the labor shortage bottlenecks. In particular, advances in food processing, fuel and firewood collection and in the supply of water can enable a proportional redeployment of labor to export crop production. For example, in the 1960s small farmers in the Mwanza region of Tanzania increased cotton production because of the introduction of hybrid maize, which released labor from the previously arduous dependence on sorghum (Lele (1975)).

Ensuring a reliable supply of foods that can be purchased at reasonable prices throughout the year is essential for smallholder farms, which often spend up to 50 percent of their income on food. Food shortages and high food prices have serious income and nutritional effects on rural households, and this in turn affects how productive resources are allocated to cash crop production.

2. Role of infrastructure in market integration

Improvement of fragmented food markets is clearly one way to improve food security. Priority to the building of rural feeder roads is essential to the development of competitive food markets and the stimulation of production. Gaviria, et al., (1989), have documented that in the latter half of the 1980s the density of rural roads in Nigeria, with a population similar to that of India in the 1950s, was substantially lower than in India

during the 1950s. Ahmed and Donovan (1992) make the same point more generally for Africa *vis-à-vis* Asia. For example, in the late 1980s paved roads and rail per 1,000 hectare of cultivable land averaged 1.1 kilometer in Africa and 5.3 kilometers in Asia. Elasticity estimates of the impact of rural roads on aggregate agricultural output and fertilizer use were as high as 0.37 in the case of output and were 0.44 for fertilizer (Antle (1983), Binswanger, *et al.*, (1987), and Binswanger, *et al.* (1989)). Inadequacy of rural infrastructure results in a higher cost of services including transportation and marketing and retards the introduction of new technologies and inputs.

A recent study of countries in the CFA currency zone found that the cost of transportation from farm to local markets was five times higher than the cost from one regional capital to another (Bonnafoous (1993)). Yet development of trunk routes has received more attention by governments and donors. Planning and implementation of rural feeder roads is a function most effectively conducted by local governments even though private sector contractors, where they exist, may be employed to carry out the actual work. Kenya and Malawi have shown an effective capacity to develop and maintain rural feeder roads. In the case of Kenya, the success is due to the superb work of the International Labor Organization in developing local planning and in implementing capacity over more than a decade. Nigeria and Tanzania have had less success, in part owing to the erosion of their local government institutions (Gaviria, *et al.*, 1989). In Tanzania the decline of local institutions occurred even though the government's vastly more effective rhetoric about local participation attracted nearly twice the level of per capita foreign aid as in Kenya. The actual record on the functioning of the participatory institutions in Kenya, such as the Harambee schools and health clinics and the farmer-based cooperative credit/marketing organizations, has been consistently stronger than in Tanzania. Donors need to evaluate their expectations of democratic governments not simply in terms of the presence or the absence of a free press or of a multiparty system, but also about the extent to which local rural institutions operate effectively. On this score, Kenya receives far higher marks than recent Western press reports would lead one to believe.

### 3. The role of stable and unstable prices

When is there a role for governments to intervene in the markets? Tree crops, for instance, are characterized by a higher unit value, even at the current depressed international prices, when exchange rates are close to market rates and producers receive a high share relative to food crops. Tree crops entail long-term investment in a stock of capital. Price variability results in a strong supply response in the upswing and in decreased levels of variable production inputs on the downswing. For example, during the coffee boom in 1977, when coffee plantings increased, the relative coffee price/maize price ratios in Kenya, which has a history of low taxation, with appropriate exchange rate adjustments and low internal food prices, were 45 to 1 compared to only 7 to 1 in Cameroon, which is in the CFA franc zone and had a higher direct tax on coffee, and higher internal food prices (Lele (1992a)). As a result, Kenyan yields of

smallholder coffee farms are three times those in Cameroon and the per hectare or per labor day returns to coffee have been much higher (Lele (1989a)). Tree crop production does not therefore require price stabilization as a way of providing an incentive to producers. It is only when prices remain depressed over a long period and monopolies tax export agriculture, particularly *vis-à-vis* other alternatives, that farmers switch to other crops, as is the case with coffee in Tanzania in 1993.

This principle, however, does not apply to annual crops. Even when competitive markets exist, privatization of marketing still does not solve the problem of intertemporal price instability in Africa, which is common to agricultural production especially in low rainfall areas. In the case of coarse grain staples in East and Southern Africa and in the Sahel, production is highly variable. In Southern Africa surplus production prompted by favorable weather results in low maize prices causing farmers to switch out of maize after ensuring domestic food needs; the subsequent rise in market prices that results generates a cyclical "cobweb" pattern of price and supply variation. Because of the high opportunity cost of capital, such price and supply variability has not, however, been dampened by private trading stocks in developing countries across the years. Major benefits of year-to-year price and supply stability include the inducement to producers to adopt technologies perceived to be risky as well as macroeconomic stabilization from reduced variations in the balance of payments resulting from fluctuating food import bills. Stable prices and supply are also beneficial to annual cash crop sectors, such as cotton, jute and sisal, which require further processing and call for a stable supply of throughput to the processing units in order to achieve full capacity utilization and economies of scale.

As already noted above, food security stocks and stable prices are also needed to ensure the level of consumption of the rural poor. When food security is guaranteed by stable rural markets, producers are more willing to devote resources to cash crop production. Crisis distribution systems and food safety nets are as essential in low rainfall areas of rural Africa as in the urban areas that have been the focus of local governments and donors. This interest is perhaps based on the fact that opposition to reforms tends to originate in urban centers, and the interaction between food and export crop production at the farm level, through the nexus of food insecurity and labor constraints is not widely understood.

Providing a stable price environment requires an integrated and comprehensive approach with important roles for both the private and public sectors. Timmer (1988 and 1993) argues that much of the success of Asian countries in agriculture is attributable to the existence of a stable food price environment, while others have argued, on theoretical grounds, against domestic price stabilization through the holding of food stocks by government (Newbery and Stiglitz (1981)). For countries with unsustainable costly parastatal marketing systems, the example of China highlights the benefits of a gradual transition towards privatization rather than a "big bang" approach to maintaining food security while new marketing institutions develop. In contrast, liberalization of Malawi's grain marketing in a

market environment that is characterized by liquidity constraints, poor market information and high transport costs, coupled with an influx of 700,000 Mozambican refugees resulted in maize shortages and in prices that were three to four times higher than the previous official price (Lele (1989b)).

Spatial stability of prices and market supply are highly correlated with the level of infrastructure. When adequate feeder roads exist, credit markets function, and market information flows adequately, price variability between regions will be substantially reduced as food flows respond to price signals. The role of government in the distribution system in such a situation is considerably reduced, but is of course crucial in ensuring the required infrastructure and information flows. The government must also ensure that collusive behavior by traders does not interfere with the flow of food. Even in countries with high infrastructural development, intertemporal price variability may still threaten food security. Here again, speculative and collusive behavior by private traders can be highly destabilizing and may compound climatically-induced variations, exacerbating the risk of famine. To provide stable prices both spatially and intertemporally, Dréze and Sen (1989) argue for active government participation in food trade and storage, noting that ... "The existence of public stocks can go a long way towards reducing fears of future scarcity and defeating the manipulative practices of private traders." The issue of food security and the relative role of government and the private sector must be addressed on a country-by-country basis. Donor agencies often have not distinguished between the differential causes of parastatal marketing losses. Such losses can range from external shocks, inappropriate government policies, transportation and other infrastructural bottlenecks, provision of noncommercial services such as the maintenance of rural feeder roads, incompetence, or corruption--each of which requires a different type of intervention.

While serving many beneficial roles, price stabilization policies have fallen out of favor because of the high fiscal costs incurred by marketing parastatals. <sup>1/</sup> Implementation of a stable price environment, while likely to require some degree of government subsidization, has proven to be more costly than is necessary for several reasons. In Kenya, the deficits of the National Cereals and Produce Board have been attributed to poor management, a stringent economic environment, a lack of equity capital leading to excessively high financing costs of operation, and restrictions on inter-district movements of grains and monopsony control of purchasing (Lele and Christiansen (1989)).

---

<sup>1/</sup> In Tanzania economic losses of the National Marketing Corporation in 1983 were around \$250 million, while total central government expenditures on agriculture were around \$49 million. In Kenya the accumulated losses of the National Cereals and Produce Board were about \$300 million in 1986, while government agricultural expenditures were only \$8 million (Lele, 1989a).

Many African governments have attempted to maintain a single official price through costly buffer stocks rather than by encouraging private trade through infrastructural development and allowing prices to move freely while acting as a buyer and seller of last resort to maintain a relatively wide price stabilization band. The costs of maintaining buffer stocks can be reduced by substituting financial stocks and trade for physical stocks, especially as import displacement times are reduced by the crucial development of public infrastructure. Use of forward markets can prevent costs due to short-term market fluctuations (including exchange rate variations).

Further savings can be generated by the interest earned on financial stocks invested in international capital markets until they are needed. Public investments in irrigated agriculture reduce the variability in food stocks and greatly increase the level of food security. It is also important to note that the costs of administering an effective price stabilization program increase proportionately with the divergence between the internal price and the world price. Thus, stabilization around long-term world prices will have lower administrative costs than when there is a significant divergence.

The adjustment costs of privatizing parastatal marketing systems can be high especially when the change is sudden and entrepreneurial capacity is limited. As primary commodity producers privatize, training of new traders in the use of increasingly sophisticated trade instruments and contracts will alleviate some of the adjustment costs. In certain cases privatization has resulted in a lowering of quality standards, as in the case of Nigerian cocoa, where the government has had to again assume the role of regulating quality. In contrast to direct government quality control regulation, in Kenya small farm tea auctions assure this role by paying quality premia to smallholders, often 15 percent above the price received by large estates.

To rely in a purist fashion on either the state or the market mechanism will not ensure food security. The challenge of establishing a stable least-cost price environment based on the combined roles of the public and private sectors and the effects of such an environment on productivity growth should be one of the most interesting issues for professional economists.

#### 4. Research and extension

Much of the evidence for sources of total factor productivity (TFP) growth comes from Asia (Azam, Bloom and Evenson (1991), Rosegrant and Evenson (1992), and Evenson and Rosegrant (1993)). These studies show that the main sources of growth in TFP are research and extension expenditures and imports of foreign innovations (measured as patented inventions of agricultural implements). These three factors alone account for 87 percent of the growth in TFP in India, which averaged 1 percent a year from 1956 to 1985 (Rosegrant and Evenson, (1992)). In Africa preliminary estimates of TFP growth show stagnant rates from the early 1970s to the early 1980s with positive rates in more recent years of approximately 1.6 percent (Delgado

and Pinstруп-Anderson (1993)). The factors explaining the slow growth in TFP in Africa have not been analyzed statistically but certainly the ineffectiveness of research and extension systems would head a list of possible factors.

While donors and African governments have devoted substantial resources to agricultural research, many of these investments have suffered from excessive use of short-term consultants, overemphasis on building construction, lack of a long-term commitment, and especially the lack of effective incentive structures for national research scientists (Lele and Goldsmith (1989)). The building of effective sustainable research institutions requires a cadre of indigenous researchers working collaboratively with experienced and qualified international scientists who possess a long-term outlook towards solving technological constraints. In addition, it requires a sustaining environment, where farmers are commercially oriented and willing to adopt and indeed demand innovations. A research policy that is developed by qualified, well-trained, and experienced nationals who are cognizant of farmers' needs is required to address the complex problems of agricultural and rural development. Close collaboration with extension systems can increase the effectiveness of research. The recent experience of the World Bank's Training and Visit Extension program and the Global 2000 program in Africa indicate that positive results that can be achieved. Experience suggests the need for a unified and politically-supported strategy of research and extension that draws on the best of the various systems rather than rigid adherence to a single approach.

##### 5. Input intensification and environmental concerns

In most areas of the developing world, environmental degradation can be linked to the inability of agriculture to provide the surpluses that are necessary for the structural transformation. In the face of slow productivity growth and rapid population growth, the extensive agricultural margin is expanded into environmentally fragile lands. The best strategies for preventing the inappropriate use of marginal agricultural lands are to attempt to increase the productivity of existing lands and to slow population pressures. African governments must insist on--and donors must support their need for--increased access to chemical fertilizers and pesticides. Africa's per hectare fertilizer consumption is the lowest in the world (Lele. *et al.*, (1989b)). While there are major country differences, the sharp rise in internal fertilizer prices, together with haphazard adjustments of producer prices and the uncertainty of input and output markets, have increased the risks in fertilizer application (Lele, *et al.*, (1989b)). Often a decline in the consumption of fertilizer means increased substitution of (largely female) labor into production and the expansion of the agricultural frontier. To prevent this expansion and the resultant land degradation will require attention to expanding productivity growth through investments in research, extension and rural infrastructure while concurrently improving input delivery systems and the access of farmers to these inputs.

## VI. Summary and Conclusions

In conclusion, it is clear that agricultural development through the commodity sector requires careful consideration of a highly diverse set of issues. These include, *inter alia*: technology, institutional and human capital development, resource allocation systems (pricing/marketing systems for the allocation of private goods versus nonmarket allocation systems for public goods), financial sector reforms, and not least important, the location-specific determination of the sets of public and private goods.

This paper has examined a broad range of policies addressing the role of commodities in agricultural development strategies, which provide a number of important lessons. The successful smallholder commodity development in Africa, to the extent that it has occurred, stresses the importance of high quality, location-specific research and extension, rural infrastructure, producer and processor access to finance, processing and marketing arrangements that take into account scale economies in processing, and appropriate price incentives. Most importantly, developing countries require competitive global markets that would allow the full expression of consumer demand and the possibility of vertically integrating commodity processing enterprises into these markets. Opening international markets would benefit the citizens of developing countries as well as consumers in the industrial economies.

Information is a critical component for developing a thriving export sector. This calls for a pragmatic partnership of public and private institutions, rather than ideologically-based preferences for the private or public sectors. It also requires a commitment to the collection and dissemination of the relevant, reliable information to all concerned actors. International flows of the necessary technical, and international market knowledge should be encouraged. And this knowledge should be used to develop and provide access to technology, and to train employees in new forms of management, information systems, and export strategies within the commodity sector. Governments need to be skilled at borrowing knowledge in employing experienced international personnel so as to increase the effectiveness of donor aid programs. For donor countries, there is a need to reexamine their foreign aid policies, in order to determine what policy changes might better help low-income countries in the pursuit of their development strategies. Most importantly, the governments of the least developed African countries need to take stock of the experience of other developed and developing countries and to change the fundamental way in which agriculture now operates in their economies.

### References

- Ahmed, R. and C. Donovan (1992), "Issues of Infrastructural Development," Washington DC: International Food Policy Research Institute.
- Anderson, K and R. Tyers (1990), "How Developing Countries Could Gain from Trade Liberalization in the Uruguay Round," In Agricultural Liberalization: Implications for Developing Countries. ed. Ene Goldin and Odin Knudsen, Paris, OECB.
- Antle, J. (1983), "Infrastructure and Aggregate Agricultural Productivity: International Evidence," Economic Development and Cultural Change, 31(April): 609-19.19.
- Azam, Q.T., E.A. Bloom and R. Evenson (1991), "Agricultural Research Productivity in Pakistan," Economic Growth Discussion Paper No. 644, Yale University.
- Binswanger, H. (1989), "The Policy Response of Agriculture" in Proceedings of the World Bank Annual Conference on Development Economics, supplement to the World Bank Economic Review and the World Bank Research Observer: 231-58.
- , M.C. Yang, A. Bowers, and Y. Mundlak (1987), "On the Determinants of Cross Country Aggregate Agricultural Supply," Journal of Econometrics, 36(1): 111-31.
- , S. Khandker, M. Rosenzweig (1989), "How Infrastructure and Financial Institutions Affect Agricultural Output and Investment in India," World Bank Working Paper Series No. 163.
- Bonafous, A. (1983), "Trucking in Sub-Saharan Africa: What Deregulation?," in Regulatory Reform in Transport: Some Recent Experiences ed. Jose Carbajo, World Bank Symposium.
- Byerlee, D. (1993), "Modern Varieties, Productivity and Sustainability: Recent Experiences and Emerging Challenges," Presented at AAEP/IPFRI Workshop (Post-Green Revolution Agricultural Development Strategies in the Third World), Orlando, Florida, July 30-31.
- Delgado, C., (1993), "Coastal Demand Constraints for Sahelian Livestock Products," In Delgado, C. and O. Badiane, eds. Regional Integration of Agricultural Markets in West Africa, (Book manuscript in preparation).
- , P. Pinstrop-Anderson (1993), "Agricultural Productivity in the Third World: Patterns and Strategic Issues," Presented at AAEP/IPFRI Workshop (Post-Green Revolution Agricultural Development Strategies in the Third World), Orlando, Florida, July 30-31.
- Dréze, J. and A. Sen (1989), Hunger and Public Action Clarendon Press, Oxford.



- Duncan, R.C., (1993), "Market Diversification and Agricultural Export Prospects in Sub-Saharan Africa," in Nathan C. Russell and Christopher R. Dowsell ed. Policy Option for Agricultural Development in Sub-Saharan Africa. CASIN/SAA/Global 2000.
- Evans, David, Ene Goldin and Dominique van der Mensbrugghe (1992), "Trade Reform and the Small Country Assumption," in Ene Goldin and L. Alan Winters (eds.) Open Economies: Structural Adjustment and Agriculture, Cambridge: Cambridge University Press.
- Evenson, R.E. and M. W. Rosegrant (1993), "Determinants of Productivity Growth in Asian Agriculture Past and Future," presented at AAEA/IPFRI Workshop (Post-Green Revolution Agricultural Development Strategies in the Third World), Orlando, Florida, July 30-31.
- Faini, R. (1992), "Infrastructure Relative Prices and Agricultural Adjustment," in Ene Goldin and L. Alan Winters (eds.) Open Economies: Structural Adjustment and Agriculture, Cambridge: Cambridge University Press.
- Floro, S. L. and P. Yotopoulos (1991), "Informal Credit Markets and the New Institutional Economics: The Case of Philippine Agriculture", Boulder, Colorado: West View Press.
- Gaviria, Juan, Vishva Bindlish and Uma Lele (1989), "The Rural Road Question and Nigeria's Agricultural Development," MADIA Discussion Paper No. 10, Washington, DC: World Bank.
- Habasch, Mona (1989), "The Impact of Diversification on Productivity in U.S. Agriculture," unpublished M.S. thesis, Gainesville: University of Florida.
- Hossain, M. (1988) "Credit for Alleviation of Rural Poverty: The Grameen Bank in Bangladesh," Research Report No. 65, International Food Policy Research Institute in collaboration with the Bangladesh Institute of Development Studies.
- IMF (1993), IMF Survey, May 31.
- Koester, Ulrich, Hartwig Schafer and Alberto Valdez (1989), "External Demand Constraints for Agricultural Exports: An Impediment to Structural Adjustment Policies in Sub-Saharan African Countries?," Food Policy 14(3).
- Krueger, Anne, Maurice Schiff and Alberto Valdés (1991), "The Political Economy of Agricultural Pricing Policy," Baltimore: The John Hopkins Press for the World Bank.

- Langham, Max (1992), "Determinants of Productivity in the Agricultural Sector with Implications for Research Policy and Analysis," in Langham, Max and François Kamajou (eds.) Agricultural Policy Analysis in Sub-Saharan Africa, Gainesville: Office of International Programs, University of Florida.
- , François Kamajou (1992), "Price Policy in the Cameroonian Coffee Sub-sector with Emphasis on Arabica: Producers' Returns Versus Government Revenues," in Langham, Max and François Kamajou (eds.) Agricultural Policy Analysis in Sub-Saharan Africa, Gainesville: Office of International Programs, University of Florida.
- Lele, Uma (1975), "The Design of Rural Development", Baltimore: John Hopkins University Press.
- , (1989a), "Agricultural Growth, Domestic Policies, the External Environment, and Assistance to Africa: Lessons of a Quarter Century," MADIA Discussion Paper No. 1, Washington, DC: World Bank.
- , (1989b), "Structural Adjustment, Agricultural Development, and the Poor: Some Lessons from the Malawian Experience," MADIA Discussion Paper Washington, DC: World Bank.
- , (1992a), "Structural Adjustment and Agriculture: A Comparative Perspective on Response in Africa, Asia, and Latin America," International Working Paper Series, Gainesville: Food and Resource Economics Department, University of Florida.
- , ed. (1992b), "Aid to African Agriculture: Lessons from Two Decades of Donors' Experience", Baltimore: John Hopkins University Press for World Bank.
- , Kofi Adu-Nyako (1992), "Approaches to Poverty in Africa," Food Policy, Volume 17, Number 2.
- , Kofi Adu-Nyako (forthcoming), "Adjustment and Agriculture in Africa".
- , M. Agarwal (1989), "Smallholder and Large-Scale Agriculture: Are There Tradeoffs in Growth and Equity?," MADIA Discussion Paper No. 6, Washington, DC: World Bank.
- , R. Christiansen, (1989), "Markets, Marketing Boards and Cooperatives in Africa: Issues in Adjustment Policies," MADIA Discussion Paper No. 11, Washington, DC: World Bank.
- , ———, and K. Kadiresan (1989b), "Fertilizer Policy in Africa: Lessons for Development Programs and Adjustment," MADIA Discussion Paper No. 5, Washington, DC: World Bank.

- , N. van de Walle, and M. Gbetibouo (1989a), "Cotton in Africa: An Analysis of Differences in Performance," MADIA Discussion Paper No. 7, Washington, DC: World Bank.
- , A. Goldsmith (1989), "The Development of National Agricultural Research Capacity: India's Experience with the Rockefeller Foundation and its Significance for Africa," Economic Development and Cultural Change, Volume 37, Number 2 (January): 305-343.
- , I. Nabi eds. (1991), "Transitions in Development: Role of Aid and Capital Flows," San Francisco: Institute of Contemporary Studies.
- , L.R. Meyers (1989), "Growth and Structural Change in East Africa: Domestic Policies, Agricultural Performance, and World Bank Assistance, 1963-86," MADIA Discussion Paper No. 3, Washington, DC: World Bank.
- Mellor, J. and U. Lele (1973), "Growth Linkages of the New Food Production Technologies," *Indian Journal of Agricultural Economics*, Vol. 28 (January-March):33-55.
- Newbery, D. and J.E. Stiglitz (1981), "The Theory of Commodity Price Stabilization: A Study in the Economics of Risk," Oxford: Clarendon Press.
- Panagariya, Arvind and Maurice Schiff (1992), "Taxes versus Quotas: The Case of Cocoa Exports," in Ene Goldin and L. Alan Winters (Eds.) Open Economies: Structural Adjustment and Agriculture, Cambridge: Cambridge University Press.
- Prebisch, Raoul (1950), "The Economic Development of Latin America and Its Principal Problems," New York: United Nations.
- Rosegrant, M. and R. Evenson (1992), "Agricultural Productivity and Sources of Growth in South Asia," American Journal of Agricultural Economics, 74(3): 257-61.
- Singer, Hans W. (1950), "The Distribution of Gains Between Investing and Borrowing Countries," American Economic Review, 40 (2): 473-85.
- Timmer, P. (1988), "The Agricultural Transformation," in ed. H. Chenery and T.N. Srinivasan, Handbook of Economics Volume 1, Amsterdam: North-Holland.
- , (1993), "Food Price Stabilization: The Relevance of the Asian Experience to Africa," in Nathan C. Russell and Christopher R. Dowswell eds. Policy Option for Agricultural Development in Sub-Saharan Africa. CASIN/SAA/Global 2000.

von Braun, J., S. Malik, and M. Zeller (1993), "Credit Markets, Input Support Policies, and the Poor: Insights from Africa and Asia," Presented at AAEE/IPFRI Workshop (Post-Green Revolution Agricultural Development Strategies in the Third World), Orlando, Florida, July 30-31.

World Bank (1992), "Market Outlook for Major Primary Commodities Vol. II: Agricultural Products, Fertilizers, and Tropical Timber," International Trade Division, International Economics Department.