

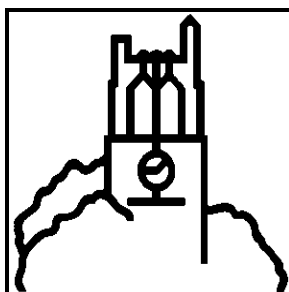
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Improving the Impact of Market Reform on Agricultural Productivity in Africa: How Institutional Design Makes a Difference

by

T.S. Jayne, James D. Shaffer, John M. Staatz, and
Thomas Reardon

MSU International
Development
Working Paper No. 66
1997



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**T.S. Jayne, James D. Shaffer,
John M. Staatz, and Thomas Reardon**

November 1997

This paper is published by the Department of Agricultural Economics and the Department of Economics, Michigan State University (MSU). Funding for this research was provided by the Food Security II Cooperative Agreement (AEP-5459-A-00-2041-00) between Michigan State University and the United States Agency for International Development, through the Office of Agriculture and Food Security in the Economic Growth Center of the Global Bureau (G/EG/AFS). Supplemental funding for this research was also provided to the FS II Cooperative Agreement by the Africa Bureau, through the Food Security and Productivity Unit of the Sustainable Development Division, Productive Sector, Growth and Environment (AFR/SD/PSGE/FSP).

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* An earlier version of this paper was presented by Jayne at the Opening Address of the Third Annual Conference of the Ethiopian Agricultural Economics Association, October 2, 1997, Addis Ababa, Ethiopia. The authors thank Chris Barrett, Gebremeskel Dessaegn, Aklu Girgre, Jean-Charles LeVallée, and Asfaw Negassa for comments on an earlier draft of this paper. The authors also thank Samuel Asuming-Brempong, Gem Argwings-Kodhek, Wilson Nguyo, Youssouf Camara, Bocar Diagana, and Anwar Naseem, for research assistance.

ISSN 0731-3438

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Published by the Department of Agricultural Economics and the Department of Economics,
Michigan State University, East Lansing, Michigan 48824-1039, U.S.A.

EXECUTIVE SUMMARY

In Africa since 1980, more than 30 countries have undertaken agricultural policy reforms as part of broader structural adjustment programs. Many advocates of market reform have argued that the relaxation of controls on private trade and investment would raise productivity based on the premises that (1) liberalized input and output markets would increase farm profitability by increasing average output prices and reducing input costs, thereby spurring farm investments and commercialization; and (2) farm investment and commercialization would lead to dynamic changes throughout the economy to support structural transformation.

However, the results of the reform programs have been mixed and frequently inconsistent with the expected increases in productivity. Using national-level data from Burkina Faso, Ethiopia, Kenya, Mali, Senegal, Zambia, and Zimbabwe, we found that partial measures of agricultural labor productivity increased during the periods of sectoral reform in only three of seven cases; partial measures of agricultural land productivity increased in four of seven cases. These findings are consistent with micro-level research findings indicating that in spite of major benefits achieved through the elimination of former policy-related barriers to private investment in the food system, there remain major institutional constraints in the prevailing economic-legal-contractual systems of exchange that retard the potential for future development.

It is now being realized that the sectoral reform prescriptions have, in many cases, been based upon only superficial knowledge of the prevailing economic institutions and how they affect economic outcomes in particular economies. There is also an emerging general consensus that future productivity growth within the evolving market economies in Africa will require closer attention to the institutional details of the system — i.e., going beyond generalizations that property rights, market rules, and exchange mechanisms need to be defined and worked out, to actually conducting pragmatic applied research on the specific kinds of property rights, rules, and exchange arrangements that would most contribute to economic development under particular country circumstances. This implies a need for procedures of identifying and working out specific property rights, commercial codes, market rules, and exchange arrangements most likely to contribute to improved economic performance, given the values of people and circumstances of the country.

This paper reviews the emerging empirical record of agricultural marketing policy reform and agricultural productivity, drawing from research on food access and agricultural productivity supported by USAID's Africa Bureau on seven countries in West, Eastern, and Southern Africa. We also examine key factors constraining past and future performance of the food systems in these countries. The paper concludes by identifying a set of policy issues for further consideration that would help provide the investment incentives to promote productivity growth for the millions of low-input semi-subsistence rural households in the region.

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1. INTRODUCTION

Poor performance of economies characterized by direct government control over markets has induced policy changes throughout the world regarding the role of government in economic affairs. The ideology of the private enterprise - market economy has promoted transitions in many economic systems, including widespread reform of agricultural marketing and pricing systems. In Africa since 1980, more than 30 countries have undertaken agricultural policy reforms as part of broader structural adjustment programs (Donovan 1996; Jayne and Jones 1997; Seppälä 1997). While there remains substantial debate over the welfare effects of these reform programs, the realities of fiscal and administrative constraints of most African governments have led to a situation in which agricultural policy debates now center less on whether and where to apply market-oriented prescriptions, and more on how to implement these policies.¹

Many advocates of market reform have argued that the transition from an economy with extensive, direct government controls to a market-based economy would raise productivity. Their arguments are usually as follows: (1) liberalized input and output markets would increase farm profitability by increasing average output prices and reducing input costs, thereby spurring farm investments and commercialization; and (2) farm investment and commercialization would lead to dynamic changes throughout the economy to support structural transformation (e.g., Johnston and Mellor 1961). However, market economies have varied widely in their performance. These differences cannot be explained simply by the extent to which governments have stopped “intervening in the market.”

The objective of this paper is to review the emerging empirical record of agricultural policy reform and agricultural productivity in selected countries in Africa, to identify key factors that account for variations in productivity growth across the newly-liberalizing food systems in these countries, and to analyze how the availability of more productive agricultural technologies affects the efficacy of policy reform. The paper argues that a neglect of the institutional foundations of market development has impeded productivity growth in African agriculture. These limitations are due in part to assumptions about how markets would develop, and due to failure to examine the institutional underpinnings of these markets and hence the incentives (or lack thereof) for investment and growth. The paper concludes by identifying options for supporting productivity growth and food security through strengthening the incentives to participate and invest in the newly-liberalizing agricultural input and output markets in the region. The paper focuses on sectoral issues in agriculture, and acknowledges that macroeconomic policy changes, while not explicitly addressed here, have also had major effects on the functioning of agricultural systems in Africa.

The organization of the paper is as follows. We first review the trends in agricultural production and productivity during the post-reform period in the selected study countries. The trends show that response to agricultural policy reform has shown wide variability across countries, and that

¹ This emerging policy environment is also noted in South America by de Janvry, Key, and Sadoulet (1997).

generalized conclusions about the impact of reform on productivity growth are unwarranted. Section 3 identifies some of the factors accounting for the variations in performance across the reformed agricultural systems in Africa. Inadequate attention to key institutional design questions arising from the transition to a market economy has maintained a situation of high transaction costs and uncertainties in the coordination of input generation and distribution, farm credit, and the various stages of commodity marketing in Africa. Section 4 explores potential options for promoting agricultural productivity growth through increased attention to the institutional details of economic policy in a market economy.

2. TRENDS IN AGRICULTURAL POLICY AND PRODUCTIVITY GROWTH

2.1 Evolution of Agricultural Policy: Why Did the Reforms Occur?

Donor thinking on food policy was heavily influenced during the 1980s by the premise that marketing boards in Africa generally depressed food production by taxing agriculture to support a cheap food policy (see, for example, World Bank 1981; Cleaver 1985; Bates 1981). This premise was generally applicable to the coarse grain sectors of West and Central Africa and the non-maize based regions of Eastern Africa. In these countries, sectoral policy was designed not primarily to expand local coarse grain production but rather to capture a certain portion of it to meet urban consumption needs. Urban food security in many cases depended crucially in imported commodities such as rice and wheat, leading to cheap food for privileged urban consumers and low food prices for producers (Bates 1981). Imported rice accounted for nearly half of the calorie consumption in Ouagadougou in the mid-1980s (Reardon, Thiombiano, and Delgado 1988) and more than half the calories of urban Senegalese diets in 1996 (Diagana and Reardon 1997). Moreover, exchange rate overvaluation made rice and especially wheat imports artificially cheap in much of Francophone West Africa before 1994.²

Food policy evolved in a fundamentally different way in much of Eastern and Southern Africa, where settler agriculture was prominent during the colonial period. In general, the greater the importance of European agriculture during the colonial period, the greater the degree of state intervention in food marketing activities, and the greater the subsidization of selected producers (Jayne and Jones 1997). The rise of politically powerful farm lobbies has figured prominently in the determination of agricultural policy, which has in some respects benefitted smallholder as well as European farming interests (Eicher 1995). Also in contrast to West Africa, urban food security depended more heavily on domestically-produced cereals, in particular white maize, which was not readily available on world markets.³ Post-independence food policy in these countries was strongly driven by (a) the priority put on white maize self-sufficiency given the unreliability of alternative sources; and (b) the implicit and sometimes explicit “social contract” that the post-independence governments made with the African majority to redress the neglect of smallholder agriculture and infrastructural development during the former colonial period. As will be argued below, the general predictions that policy reform and privatization would stimulate agricultural production were less accurate in these Eastern and Southern African countries where domestic cereal production was supported by state activities in credit, input, and output markets.

A common feature of agricultural policy in West, Eastern, and Southern Africa was the generation of large budget deficits. The state-led models of credit and input distribution and crop sale

² The impact of currency overvaluation on artificially cheapening rice prices was partially offset, especially in Mali and Senegal, by taxation of rice imports both to protect local irrigated production (due to the political importance of "drought-proofing" the Sahel) and to generate government revenues.

³ Jayne et al. (1995) describe the historical, political, and social processes that transformed white maize from a minor crop into the main staple food of Eastern and Southern Africa over a period of less than six decades.

proved politically and economically unsustainable, particularly for food crops. Fiscal crises and increased donor leverage over domestic policy put agricultural reform on the structural adjustment agenda in the 1980s. After first trying to strengthen the performance of state marketing boards in the 1960s and 1970s, donors and international lenders lost patience with phased and partial reform programs that were increasingly seen as propping up costly and otherwise unsustainable pricing and marketing policies rather than facilitating reform (Jones 1994). In addition, political economy models (e.g., Bates 1981) suggested that state interventions in agricultural markets, while ostensibly designed for rural development or to correct for market failures, were often designed to serve the interests of a dominant elite composed of bureaucrats, urban consumers, the military, and industry. The framework of lending contingent upon acceptance of policies proposed by lending agencies has strongly influenced the path of market reform and has expanded external leverage over domestic agricultural policy through aid conditionality. More than any other factor, agricultural policy reform in Africa has generally been undertaken as a response to fiscal crises and has rarely been initiated with strong domestic political support.

In part, the lack of initial enthusiasm for policy reform by African leaders probably reflected doubts about how responsive the economy would be to these reforms. In many countries, the poor state of roads, irrigation, and other physical infrastructure combined with the lack of varieties highly responsive to intensified input use have, in the past, limited supply response to higher prices resulting from reforms, thereby dampening policymakers' enthusiasm for further reforms. (Binswanger 1990; Cleaver 1985; Barrett and Carter 1997; Staatz and Ba 1996).

Given the policy context, it is not surprising that in many cases the sectoral reforms as prescribed by lenders and outside advisors have been only partially implemented and have been subjected to frequent policy reversals. In much of Eastern and Southern Africa, the state marketing boards continue to operate and remain major players in the market. In other cases, selected functions of the abolished marketing boards are again being carried out by reconstituted public agencies, albeit on a reduced scale, and agricultural price controls are still enforced in some countries. The partial implementation of the reforms underscores the need for caution in assessing the effects of sectoral reform. It should also be noted that many marketing boards and price policies were adopted in response to real problems with existing systems, often related to food and income insecurity. Many of these problems remain, as do political demands for solutions to them.

2.2 Broad Trends in Agricultural Productivity Growth

Figures 1 through 7 present the trends in crop land and labor productivity for Burkina Faso, Senegal, Mali, Ethiopia, Kenya, Zambia, and Zimbabwe. Land productivity is defined as the inflation-adjusted value of crop output per hectare; labor productivity is defined as the inflation-

Figure 1. Zimbabwe: Value of Crop Production per hectare and per agricultural laborer (constant 1993 US\$).

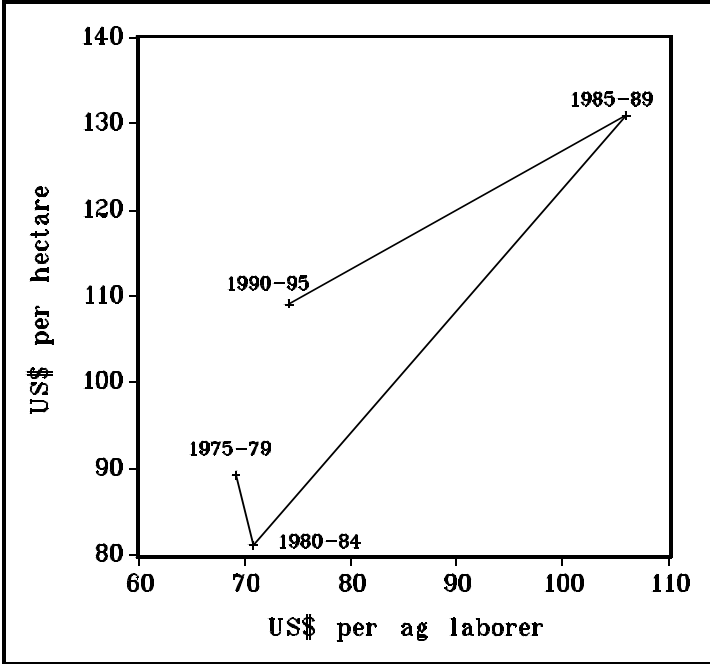


Figure 2. Kenya: Value of Crop Production per hectare and per person in rural areas (constant 1993 US\$).

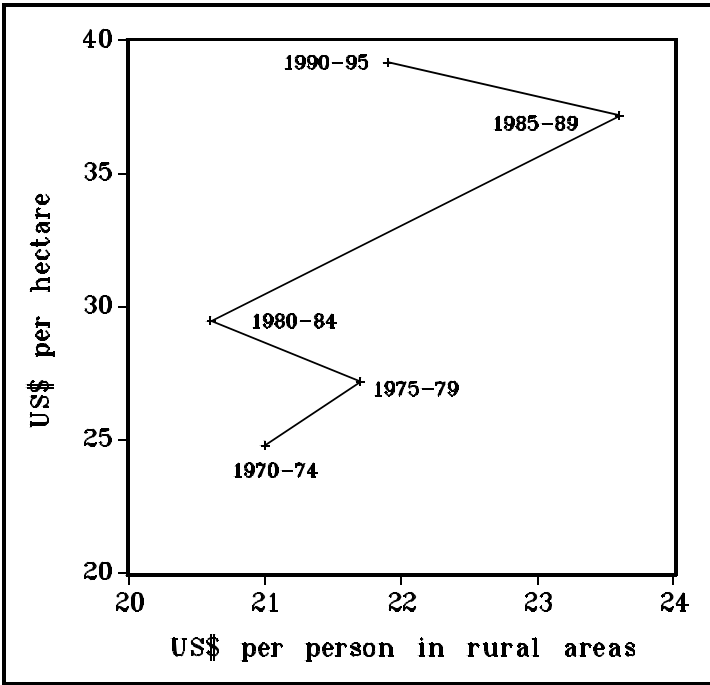


Figure 3. Ethiopia: Value of Crop Production per hectare and per agricultural laborer (constant 1993 US\$).

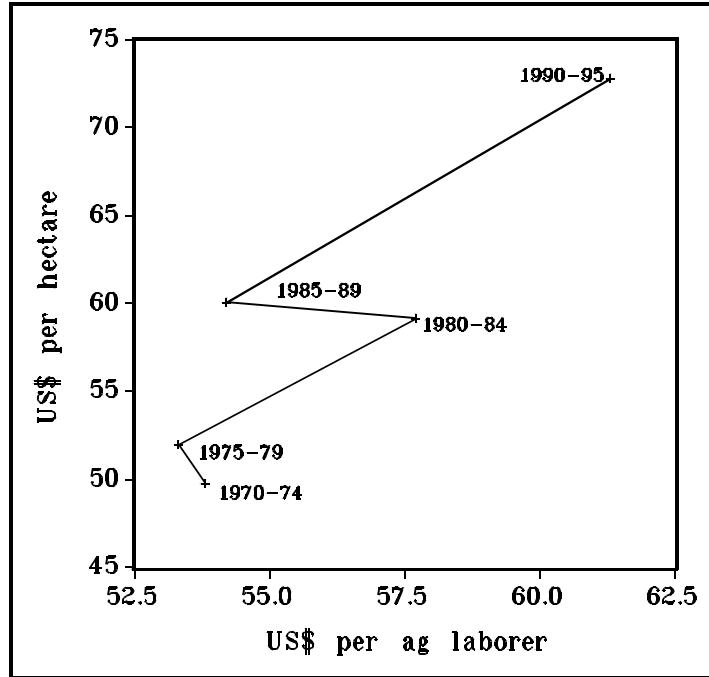


Figure 4. Zambia: Value of Crop Production per hectare and per person in rural areas (constant 1993 US\$).

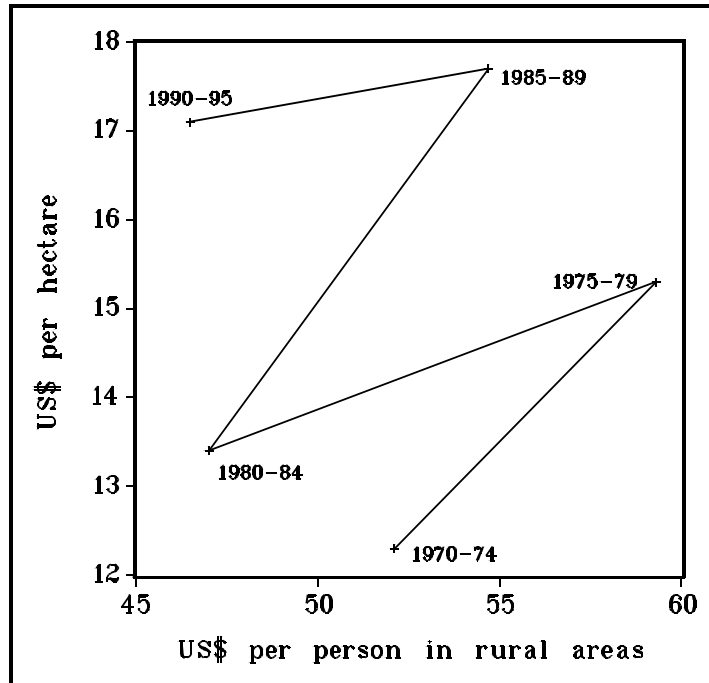


Figure 5. Mali: Value of Crop Production per hectare and per person in rural areas (constant 1993 US\$).

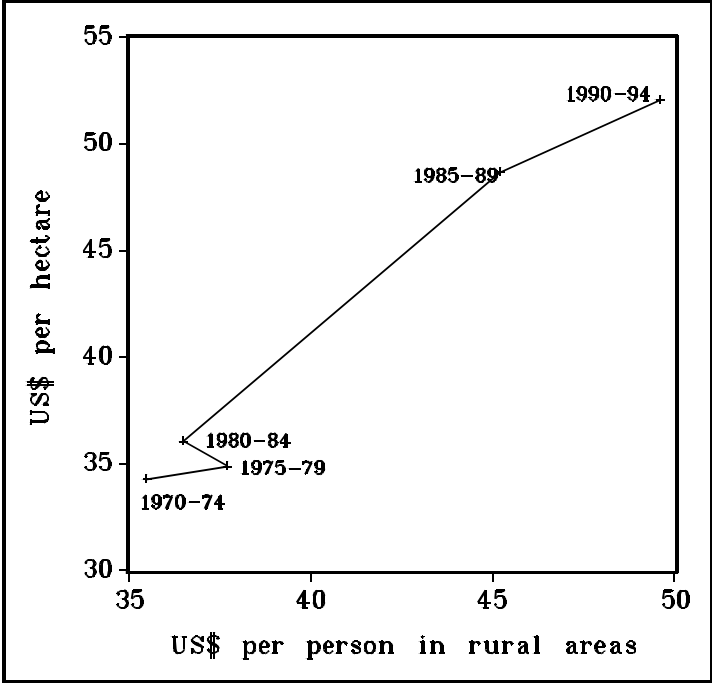


Figure 6. Senegal: Value of Crop Production per hectare and per person in rural areas (constant 1993 US\$).

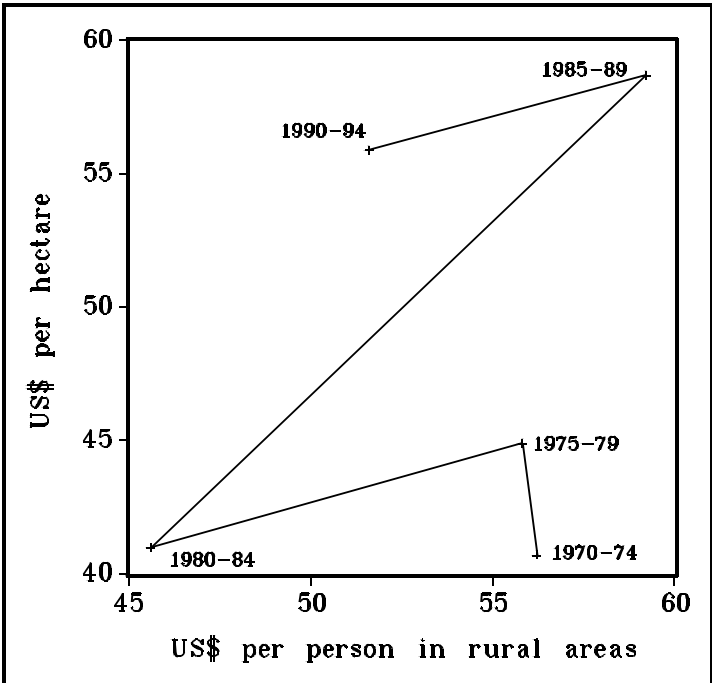
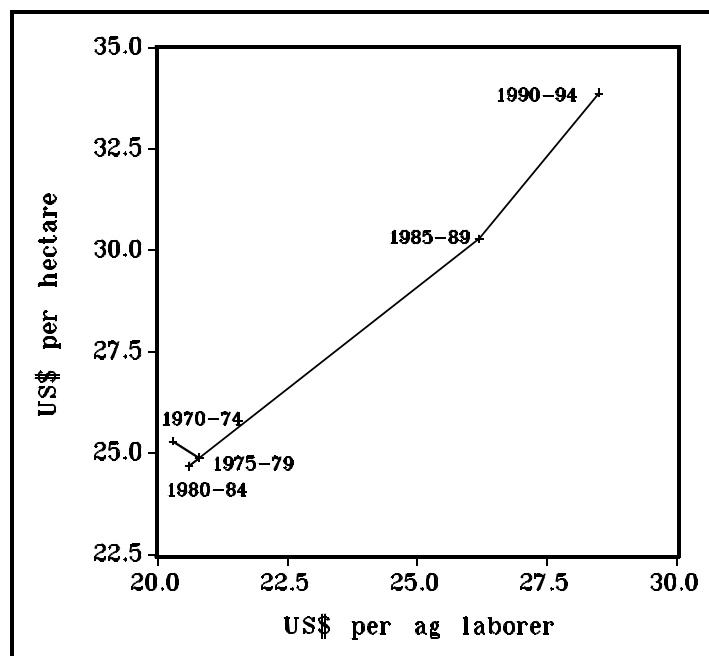


Figure 7. Burkina Faso: Value of Crop Production per hectare and per person in rural areas (constant 1993 US\$).



adjusted value of crop output per rural person. Three-year centered moving averages were constructed from both series to smooth out the effects of random variations such as weather, and then averaged in five-year segments as shown in Figures 1 through 7. This procedure is similar to that used by Block (1994). Annex 1 provides details on data sources and units.

A movement in the coordinates over time from the lower-left to the upper-right portion of the figures represents increases in both land and labor productivity. Movement from the upper-right to lower-left parts of the figure represents a decline in both productivity measures. Note that in these figures, increases in these measures of partial productivity can occur from either shifts in crop mix (e.g., from millet to higher-valued cotton) or from increases in crop output per unit of input, or both. Discussions about single factor productivity can be misleading if interpreted as total factor productivity. On the input side, improvements in labor and land productivity are due to changes in other inputs. New technology, infrastructure, extension, supplies of other inputs (water, for example) are not costless and need to be taken into account in assessing total factor productivity (TFP).⁴ On the output side, the mix of farm and nonfarm activities undertaken by the rural population may have shifted over time. For example, if a larger percentage of rural households' time has gone into nonfarm activities over time, the analysis presented in the figures

⁴ Unfortunately, data is seldom available to measure total factor productivity in Africa (see Thirtle et al. 1993 for an exception), and there is also considerable disagreement about how TFP should be measured.

will understate increases (or overstate decreases) in agricultural labor productivity (Kelly et al. 1995).⁵ Nonetheless, the measures of labor and land productivity can indicate important changes in agricultural systems performance, especially if kept in context of the changes in the use of other factors.

The figures highlight several apparent trends.

- Land and labor productivity have increased between the 1985-89 period and the 1990-95 period in three of the seven countries examined: Ethiopia, Mali, and Burkina Faso (Figures 3, 5, and 7). By 1991, major food and input market reforms had been initiated in each of these countries. The rise in land and labor productivity has been associated with increased use of fertilizer in each of these countries (by 260% in Ethiopia, 61% in Burkina Faso, and 17% in Mali) between 1980-89 and 1990-95. The increase in fertilizer use in Ethiopia has occurred under the continuation of subsidized state input distribution (until 1997) and alleged restrictions on private investment. In Mali and Burkina Faso, however, fertilizer use rose despite the elimination of fertilizer subsidies in part because of policy reform, crop productivity improvements and increases in world prices that served to raise the returns to rice and cotton production.⁶

In some of these cases, e.g., Ethiopia, the restrictions imposed on producers and marketing agents during the control period depressed investment incentives so much that the simple elimination of these restrictions increased agricultural growth. However, as argued later, the emerging market-oriented systems of farm finance, input delivery and commodity marketing also suffer from a number of unresolved constraints that impede the potential for future productivity growth.

- Land and labor productivity both declined during the 1990-95 period in three countries: Zimbabwe, Zambia, and Senegal (Figures 1, 4, and 6). Fertilizer sales to smallholders declined by 25%, 17%, and 15% in these countries,⁷ respectively, between the 1985-89 and 1990-95 period. In each of these cases, the reforms were associated with the withdrawal of state support to key producers in the form of input subsidies, concessional

⁵ A more accurate indicator of labor productivity would have been value of crop output per unit of agricultural laborer, but time series data on agricultural labor was unavailable in most cases. Use of rural population data will give similar trend results to those using agricultural labor data as long as the proportion of rural population engaged in agriculture was relatively constant over the sample period. Productivity trends will be biased upward (downward) if the share of the rural population in agriculture increased (decreased) over the sample period.

⁶ In Mali, for example, the reform of the state's role in the management of irrigated rice production and rehabilitation of rice perimeters increased the returns to fertilizer application on irrigated rice despite the elimination of 15% to 25% subsidies on the value of fertilizer (Cisse 1997).

⁷ However, if fertilizer distributed concessionally to smallholders is counted, fertilizer use actually increased in Zimbabwe by 13% in the post-reform period.

credit, and output price incentives, especially for rice production in Senegal and white maize production in Zimbabwe and Zambia (Wilcock et al. 1997; Randolph 1997; Mosley 1994; Howard and Mungoma 1997). Smallholders in Kenya, Zimbabwe, and Zambia have been affected by a withdrawal of state buying stations (Mosley 1994; Jayne et al. 1994; Howard and Mungoma 1997). In fact, the “smallholder green revolutions” achieved temporarily in the 1980s in parts of the region (see Eicher 1995; Byerlee and Eicher 1997) featured state-led investments in input delivery, credit disbursement and major expansion of state crop buying stations, which increased incentives to adopt new high-yielding seed varieties.⁸ These factors partially explain the dramatic increases in land and labor productivity exhibited in Zimbabwe and Zambia between the 1980-84 period and the 1985-89 period (see Figures 1 and 4). However, this state-led model of service provision to smallholders has proven politically and economically unsustainable (Howard and Mungoma 1997; Jayne et al. 1994). The budgetary deficits incurred through these state-led agricultural policies contributed to the macroeconomic crises that allowed donors to exert control over agricultural policy formation under structural adjustment lending programs.⁹ Privatized systems of fertilizer marketing to smallholders in much of Southern Africa are constrained by climatic risk, underdeveloped credit markets, lack of responsive varieties for drought-prone areas, high transport costs, risky output markets, and lack of technical/management skills and information (Rusike et al. 1997). In Senegal, Kelly et al. (1996) found that liberalization has improved cereal marketing efficiency. The production impact has been small because peanuts (that have a controlled market) still provide greater profits and more predictable markets.

- Land productivity generally increased more rapidly (or declined less rapidly) than labor productivity in most countries examined since 1990. This is because the rural population continues to grow at an average of 3% per year while the area cultivated is almost stagnant in most countries due to constraints on the availability of additional fertile land. There has also been a shift in population over the past two decades from the agroclimatically unfavorable to favorable zones in the Sahel. This may partially account for apparent increases in land productivity, in addition to the shift in crop mix from coarse grains to higher-valued cotton.
- Mixed record of grain production growth: Grain production has declined since the reforms were implemented in almost all the former UK-colony countries of Eastern and Southern Africa (Table 1). Since the mid-1980s, population growth has outstripped grain production growth in most of Eastern and Southern Africa (Table 1, column b). Even in absolute terms, grain production during the 1990-1995 period is lower than in the 1980s

⁸ These incentives were to some extent eroded by currency overvaluation (see e.g., Quiroz and Valdes 1993; Jansen and Muir 1994).

⁹ Examples include the World Bank’s insistence that consumer subsidies on maize meal be eliminated before Zimbabwe received additional structural adjustment loans in 1993.

in most countries.¹⁰ The stagnation in yields and per capita production is especially noteworthy in Zimbabwe, Kenya, and Zambia, where smallholders' use of improved maize hybrids and fertilizer per hectare are the highest in Africa.

However, grain production per capita is increasing in countries such as Ethiopia, Mali, and Uganda. Each of these countries has implemented important macroeconomic and sectoral policy reforms over the past decade, but not clearly more so than the other countries listed in Table 1, where performance has been very mixed. Our conclusion is that the weight of the evidence indicates that there is a moderately positive but highly variable correlation between agricultural performance and the extent to which countries have followed donor specified sectoral and macroeconomic policy adjustments. The most important (but only partial) determinant of the response of agriculture to reform has been the extent to which agriculture was supported or depressed prior to reform. In countries where state activities clearly depressed agricultural production prior to reform (as in Ethiopia and Mali), agricultural productivity growth in the reform period has been encouraging, despite the fact that numerous policy and institutional barriers to productivity growth still need to be resolved. These policy/institutional barriers are examined in Section 3. By contrast, in countries where smallholder grain production was, on net, supported by state intervention (as in Zimbabwe and Kenya), agricultural productivity has been stagnant in the post-reform period, despite the fact that certain aspects of reform have been clearly growth-promoting (Jayne and Jones 1997; Jayne and Argwings-Kodhek 1997). In addition, the supply response to sectoral and macroeconomic policy reform seems to have been greatest in those countries where the reforms were coupled with long-term investments in agricultural technology and human capital development. For example, Savadogo, Reardon, and Pietola (1995) show that prior investments in animal traction and access to infrastructure were important determinants of farmers' supply responsiveness to output prices in Burkina Faso.

- Price instability: The transition from state-controlled grain prices to market-oriented prices has exacerbated intra-annual and inter-annual price instability in some countries (Barrett and Carter 1997; Kangasniemi et al. 1993). The magnitude of price instability

¹⁰ Some of the food output decline in the 1990-94 period can be attributed to the 1992 drought, the worst in decades. But when the effects of the drought are removed (see note a, Table 1), the general picture remains intact, and clarifies that the decline is not simply a transitory phenomenon due to drought.

Table 1. Trends in coarse grain production per capita, area, yield, and net exports, selected countries.

		production (000 mt) (a)	production per capita (kg) (b)	net exports (000 tons) (c)	fertilizer use (000 tons) (d)
----- three-year centered moving average -----					
Zimbabwe	1970-74	1,863	340	628	na
	1975-79	1,866	295	429	378
	1980-84	1,980	267	205	471
	1985-89	2,307	263	314	443
	1990-92	1,602 (1,950) ^a	161 (190) ^a	-228	451
	1993-95	1,078 (2,069) ^a	108 (128) ^a	64	442
Zimbabwe (smallholder sector)	1970-74	612	116	na	8.6
	1975-79	731	117		27.1
	1980-84	948	127		97.2
	1985-89	1,562	177		119.0
	1990-92	1,078 (1,308) ^a	108 (128) ^a		98.0
	1993-94	1,137 (1,269) ^a	102 (115) ^a		86.6
Zambia	1970-74	808	224	-78	47.9
	1975-79	753	160	-94	65.3
	1980-84	1,056	188	-181	74.3
	1985-89	1,618	235	-161	80.4
	1990-95	1,304 (1,402)	173 (193) ^a	-239	68.2
Malawi	1970-74	1,185	328	14	14.1
	1975-79	1,240	286	-5	21.8
	1980-84	1,315	267	30	33.4
	1985-89	1,351	228	-24	43.9
	1990-94	1,346 (1,389)	182 (196) ^a	-215	58.0
Kenya	1970-74	4,215	102	77	144.2
	1975-79	5,771	133	71	130.2
	1980-84	6,928	132	59	155.7
	1985-89	8,533	126	120	235.1
	1990-95	7,427	92	-102	241.5
Tanzania	1970-74	1,332	89	-207	na
	1975-79	2,498	145	-142	
	1980-84	3,015	151	-274	
	1985-89	3,898	166	-113	
	1990-95	3,677	132	-138	
South Africa ^b	1970-74	7,681	327	2,435	na
	1975-79	9,031	332	2,909	
	1980-84	8,476	311	3,069	
	1985-89	7,817	206	1,428	
	1990-94	7,420 (7,913) ^a	204 (216) ^a	1,090	

notes: ^afigures in parentheses exclude the 1992 drought year. ^bfigures for South Africa are for maize only. The share of maize in total coarse grain production during the 1980-1989 period was estimated at 91% in Zimbabwe, 98% for Malawi, 95% for Zambia, 92% for Kenya, and 94% for South Africa (USDA 1992). Sources: Population data: Urban and Nightingale (1993). Grain data: Min. Agric. data files (Zimbabwe); Jones 1994 (Zambia); Min. Agric. data files, compliments of J. Rusike (Malawi); Egerton University, Policy Analysis Matrix database (Kenya); FAO Production, Trade, and Fertilizer Yearbooks (Tanzania); Maize Board, various years, and RSA 1994 (South Africa).

can be especially serious in landlocked areas that fluctuate from grain surplus to grain deficit according to weather conditions, and face high transport costs to other regional and international markets.

In spite of the strong rationale for moderating extreme price fluctuation, the marketing board "buyer and seller of last resort" approach has not emerged as a successful model in the prevailing market environment. First, this system exposes the state to larger trading deficits in a liberalized market environment than in a strongly controlled one if floor and ceiling prices are not constantly adjusted according to prevailing market conditions (Kangasniemi et al. 1993; Pinckney 1993). In several cases marketing board deficits actually increased after the reforms were initiated (Jayne and Jones 1997). Second, stabilization schemes have impeded private investment in the marketing system by dampening spatial and temporal price variation and by the unpredictable and uneven implementation of these schemes. Third, there remains an unresolved conflict between the marketing boards' commercial objectives (implying a withdrawal from unprofitable activities) and their social objectives (implying engaging in unprofitable activities that the private sector will not undertake, such as the "buyer and seller of last resort" approach in remote areas to stabilize prices). The failure of the policy process in the post-reform period to separate the boards' social functions (including price stabilization) from their commercial activities has often resulted in the boards taking steps to improve their financial trading account in ways that exacerbate market uncertainty rather than reduce it.

Moreover, macroeconomic policies such as devaluation can increase the average return to investment (if the farmgate price increase outweighs the increase in cost due to more expensive imported inputs), but would not alone reduce the variability of returns due to rainfall instability, and hence reduce the risk of investment (Reardon et al. 1995). Thus the expected increase in farm investment may not occur. Devaluation could even increase risk by increasing transportation costs, so that prices in production areas will be determined locally and thus be more unstable.

2.3 The Challenge

Although there is some evidence that output marketing reforms have been associated with increases in land and labor productivity at the aggregate level in the countries studied, much of these increases are due to shifts in crop mix and the geographical location of production rather than the intensification of existing farming systems (Block 1994; Dioné et al. 1996; Savadogo, Reardon, and Pietola 1995). Crop mix shifts have often been toward crops whose output markets were not liberalized (e.g., cotton in Burkina Faso, peanuts in Senegal, coffee in Rwanda). However, this does not imply that cash cropping incentives have not benefitted from marketing policy reform in key subsistence crop sectors. Jayne (1994) and Goetz (1993) have shown that the ability to ensure reliable and low-cost food for rural households *as purchasers of food* is an important determinant of their ability to diversify into higher-valued nonfood crops. And the evidence across Africa indicates that food marketing reform has indeed reduced marketing costs for consumers (Staatz and Dembélé 1992; Sasaki 1995; Jayne et al. 1996; Asfaw and Jayne 1997).

Notwithstanding the importance of agricultural productivity growth through shifts in crop composition, there is less evidence that food marketing reform has promoted intensification of the key food crops that constitute the bulk of area cultivated in Africa.¹¹ A major challenge, therefore, is to design input and output marketing systems that support sustainable increases in farm productivity growth for the millions of low-input semi-subsistence rural households that can't move and have limited capacity to change their crop mix. Policy reform needs to expand its focus from liberalizing markets to solving the broader problem of how to induce technical innovation and productivity growth to support structural transformation (Staatz and Ba 1996; Jayne and Jones 1997; Reardon et al. 1996; Reardon et al. 1997).

So far, agricultural marketing reforms have replaced often unreliable, high-cost, and centralized forms of state marketing with more open markets that may be competitive but often lacking in information, infrastructure, and are poorly integrated with other key activities. On the input side, financial market failures restrict farmers' access to credit and thus constrain the demand for productivity-enhancing inputs, which in turn limits private investment in input production and delivery systems (especially serving remote areas). Poor information available to farmers and many traders about fertilizer types, qualities and application rates, weak coordination between importers, wholesalers, and retailers, and levels of scale/scope that are insufficient to reduce unit costs all depress the use of productivity-enhancing modern inputs. These problems have led to a contraction of fertilizer use in smallholder areas, for example, in Burkina Faso (Dembélé and Savadogo 1996) and in Zimbabwe and Zambia (Rusike et al. 1997). Moreover, because of the elimination of state credit services to smallholders and because of the continuing weaknesses of informal credit markets in semi-arid Africa (Christensen 1989), farmers who have the cash on hand for fertilizer and seed are either: (1) those with nonfarm sources of cash income, which relieves the credit constraint (e.g., see Reardon, Crawford, and Kelly 1994 for African evidence; Kelly et al. 1996 for Senegal; Savadogo, Reardon, and Pietola 1995 for Burkina Faso; and Clay et al. 1995 for Rwanda); or (2) in a cash-crop scheme where the farmer generates a sure source of cash income and can often acquire inputs on credit from the cash crop program to use partially on food crops (such as in the case of coffee in Rwanda, see Clay et al. 1995; and cotton in Mali, see Dioné 1989).

The foregoing assessment generally indicates that the transition from controlled production and distribution systems to more market-oriented economies has had widely variable effects on investment incentives and economic performance. While policy reform has created modest successes in some cases, the newly-emerging food systems in most African countries have failed to produce the anticipated stimulus to agricultural growth and rural welfare. This conclusion is consistent with the assessment of Latin America by de Janvry, Key, and Sadoulet (1997). As Reardon et al. (1995) noted, the notion of "getting prices right" has been insufficient to dramatically raise farm productivity, and thus "the debate should be reopened on identifying cost-

¹¹ A notable exception is rice in Mali's *Office du Niger* zone, where liberalization of output marketing and processing, combined with decentralization of management of irrigation perimeters, have led to substantial intensification and production increases (Cisse 1997).

effective ways of increasing access to inputs, through improving the delivery of inputs and enabling farmers to acquire the means to pay for them” (p. 23).

There is increasing recognition that the general prescriptions promoting “liberalization” over the past two decades have been made and implemented with insufficient knowledge and analysis of how specific market institutions were affecting economic outcomes (e.g., World Bank 1997). There is also an emerging general consensus that future productivity growth within the evolving market economies of developing areas will require closer attention to the institutional details of the system — i.e., going beyond the truisms that property rights, market rules, and exchange mechanisms need to be defined and worked out, to actually conducting pragmatic applied research on the specific property rights, rules, and exchange arrangements that would most contribute to economic development under particular country circumstances (Schmid 1992).

3. BASIC CONCEPTUAL FRAMEWORK: HOW INSTITUTIONS MAKE A DIFFERENCE

The functioning of the food system and allied legal and commercial systems may affect farm productivity via several pathways: (1) by affecting the costs and risks of making investments in the food system that raise land and labor productivity; (2) by affecting the costs and risks of production and sale of crop output, which may induce investment in farm capital and use of complementary variable inputs; and (3) reducing costs in one market (e.g., for food) may induce shifts in crop composition toward higher-valued crops and greater commercialization, which is usually associated with increased demand for management skills and knowledge, which in turn increase efficiency (Schultz 1978). To the extent that technical innovation is demand-driven and is responsive to market signals (as suggested by Hayami and Ruttan 1985), changes in agricultural input and output prices may have longer run effects on the types of technology generated. For example, research on urban consumption patterns for coarse grains has led to insights about the attributes that breeders need to stress in their selection strategies (Boughton et al. 1995).

Institutions are the rules, laws, norms of behavior, ideology, and their enforcement characteristics that structure the behavior of individuals and firms in the economic system. Institutions are the rules of the game; organizations are the players. Together they define the incentive structure of societies and economies (North 1994). Institutions and the technology employed determine the transaction and transformation costs that determine the costs of production. In situations where exchange is risky and costly, trade tends to adapt in ways that reduce such risks (such as trade within kinship group networks) but in so doing limit the scope of the market and hence impede the development of more efficient production processes relying on specialization and scale economies (Robison and Siles 1997). While a specific goal of policy is to reduce marketing costs, the evolution of more productive economies over the past two-hundred years has featured the development of more complex and costly marketing and contracting arrangements but which has promoted investment in more technically efficient production processes (North 1994). The evolution of more productive economic systems may involve higher marketing costs, not less. In this regard, marketing systems performance should be evaluated not solely to the extent that costs of the existing system are minimized (a static approach). One needs to consider those costs in relation to the set of services provided, and the effect of these services on technical innovation and productivity growth throughout the food system. For example, a complex contracting mechanism between a supplier and buyer of a given product may involve high costs in terms of negotiation, legal services, monitoring, and related public resources to resolve contract disputes if necessary. Such mechanisms may provide the stability of returns to justify major investments in new technology that lead to productivity gains at other stages of the food system.

The situation of relatively low levels of productivity in Africa coexisting with the widespread use of technical knowledge in many other parts of the world indicates the need for attention to the barriers to the adoption of productivity-enhancing inputs in African food and agricultural systems. From the point of view of the individual peasant or other market participant, it is clearly not a single problem or factor that describes the opportunity set. It is a system. Individuals have limited capacity to deal with the circle of poverty alone. The problems seem to lie in the economic environment which structures economic incentives: constraints and opportunities. A

major barrier to investment, especially in innovative methods and inputs, is the problem of the missing input or market, and of selective market failure (de Janvry, Fafchamps, and Sadoulet 1991).

Before going into more detailed discussion of the institutional aspects of traditional marketing systems, it will be useful to define a few terms that will be used in this section:

Market rules are the regulations that individuals are expected to abide by when engaging in market exchange. In addition to the state, market rules may originate from trade organizations, community norms, and ideological beliefs. An example of a market rule in Michigan is the regulation prohibiting a fruit seller from misleading the buyer by putting all the good fruit on the top of the container. This practice is called “facing,” and the rule prohibiting it is intended to regulate the actions of sellers in order to reduce the transaction costs of exchange. Without rules against “facing,” exchange would require visual inspection of the product. The need for visual inspection inhibits trading remotely by product specification, thus raising transaction costs of exchange for both buyer and seller and reducing volumes traded.

Property rights define rights and obligations in using and exchanging goods and services. Using the above example, the rule against “facing” protects buyers with the right to view product quality without having to incur the costs of inspecting the hidden parts of the container. Notice that property rights are also a form of regulation. By conferring a right to the buyer, they regulate the behavior of the seller. Regulation is therefore not the opposite of freedom. A right for you creates an obligation for me. The right presumably makes my behavior more predictable for you, and may raise your incentive to invest in producing something to trade. Without market rules and property rights to create a reasonable degree of confidence about the behavior of potential trading partners, no market activity would be possible. The common prescription that governments should define property rights and that governments should not regulate markets represents a fundamental misunderstanding of the nature of markets. Without regulation, there would be no market. The existence of rights implies some governance system, but not necessarily formal government.

Exchange arrangements specify the terms and modes by which trade takes place. There are numerous potential exchange arrangements that can occur within a market economy. Examples of exchange arrangements include private negotiation in spot markets, auctions, forward contracts specifying price, product quality, delivery date and location (etc.), and futures contracts. In many developing areas, non-monetary arrangements involving the exchange of food for labor or land are common.

Using these concepts, we now turn to an analysis of how the details of institutional design in market reform programs affect productivity growth in African agriculture.

4. BEYOND LIBERALIZATION: ADDRESSING THE INSTITUTIONAL DETAILS OF MARKET DEVELOPMENT

Market liberalization is not an end in itself. Schultz's "efficient but poor" observation of low-resource farmers also describes the functioning of firms, markets, and entire economies in many developing areas (Shaffer et al. 1985). Marketing margins may approximate costs, but these costs may be too high and unstable to encourage rapid private investment in the marketing system to promote on-farm productivity growth. A market can be efficient and still result in poverty. The institutional challenges in alleviating poverty over the long run can be seen by contrasting marketing systems in high-income countries like the U.S. with those in sub-Saharan Africa. In many high-income countries, policies and infrastructure have lowered the risks and transaction costs of engaging in commercialized agriculture through:

- futures and options markets to shift and absorb market risks associated with production and investment;
- commodity exchanges to enable participants to lock-in quantities for sale or purchase to facilitate advance planning in production decisions;
- specialized insurance to reduce many types of risks;
- low-cost market information accessible on a daily basis, linked to national and global information systems utilizing modern communication technology;
- large volumes handled by marketing and processing firms, which allow them to spread their fixed costs and hence reduce the risks of sunk-cost investments;
- globalized trading networks to reduce covariant supply risks and reduce search costs;
- well-specified grades and standards to allow for remote contracting by commodity specification rather than by visual inspection;
- sophisticated contracting arrangements that reduce the risks of specialized investments with large sunk costs by locking-in the terms of exchange over a relatively long time period;
- well-established legal systems to accommodate more sophisticated contracting arrangements and contract disputes;
- rules addressing problems of concentration of wealth and power (e.g., antitrust legislation);
- rights of farmers to organize to act collectively in the market and politically;
- the establishment of collateral to encourage the development of credit systems; and
- competitive financial systems serving rural areas to reduce credit-related constraints on crop input use; local financial intermediaries linked to, and having access to, international capital.

By contrast, agricultural marketing systems in most of Africa are generally characterized by the following:

- *Primary forms of exchange involving high transaction costs*, such as private haggling in spot markets over small volumes. These costly exchange procedures reduce incentives to invest in specialized production processes by reducing the profitability of production for the market.

- *Use of personalized trading networks.* This reduces transaction costs of exchange, but limit the scope of the market. Marketing systems that fail to reduce the uncertainties and potential opportunism of trading gives rise to alternative trade networks based on personalized kinship ties. Trade based on kinship ties tend to succeed in minimizing transaction costs of exchange. But because they limit the scope of trading activity, marketing systems based on personalized trade ties reinforce semi-subsistence production patterns with high production costs (Robison and Siles 1997; North 1985).
- *Semi-subsistence agricultural structure* (a small percentage of production is marketed), leading to wide fluctuations in volumes traded and prices according to the weather. Markets tend to be thinly traded due to semi-subsistence production patterns, which in turn attracts few buyers. Poor transport and communications also restrict the scope of the market. Small variations in total supplies have large effects on marketed volumes and hence on prices. Price uncertainty increases the risk of commercialized production and thus reinforces the incentives to engage in subsistence agriculture.

Subsistence farm families are typically not specialized in farming but produce a multitude of consumer goods and farm inputs. Diversification can be a strength of a system where markets are risky, but it can be a barrier to an improved system. Increased productivity requires specialization, division of labor, and investment in technological inputs (which often require a larger scale of operation to be productive and profitable). Specialization requires greater coordination between the production of farm inputs, farming, assembly, processing, storage, transport and wholesaling, and retailing. More sophisticated exchange arrangements (e.g., contingent contracts — those that specify partner obligations and rights contingent upon a future outcome like the weather or price level) arise to reduce the risks and transaction costs of participating in more specialized production patterns. Coordination becomes increasingly critical to performance. It is the particular institutions of the system — rules, exchange arrangements, property rights, etc. — that facilitate or inhibit effective coordination in complex sequences of production and distribution.

This problem is exemplified by Ethiopia's food price instability problem. With 80% of a normal crop of grains consumed on farms, a 20% increase in output increases potential domestic marketed supply by 100%. Price fluctuations can be very large and political pressure develops to do something about price instability. Uncertain future grain prices reduce the demand for inputs, which in turn constrains the development of coordinated systems of farm credit and input supply. Although a major increase in fertilizer use would most likely promote farm productivity and food security, fertilizer use in the current system is constrained by failure to develop institutional arrangements for dealing with the price and output risks of farmers, risks of nonrepayment of credit for lenders, and the resulting risks to input suppliers of holding unsalable inventories. An attempt in 1996 to solve the problem through marketing board support prices was ineffective and expensive

(Alemu and Jayne 1997).¹² Analysis shows that better managing of food aid and facilitating regional and international trade could reduce the price instability (Tschirley and Weber 1996).

- *High market risks and ineffective coordination depress incentives to invest in productivity-enhancing technology.* When the market environment is risky (e.g., because of uncertainty over future government actions), traders and potential marketing agents do not perceive it to be profitable to invest in developing either reliable markets or inputs for small farmers. The poverty trap is reinforced. Markets remain thin and risky. Each participant works hard in his or her own perceived interest, prices are more or less competitive, but the aggregate consequences are much less production and consumption than the system could provide with greater specialization and improved coordination.

Uncertainty and transaction costs limit trade and investment, particularly investments with high sunk costs, and reinforce subsistence production patterns. The rate of technical change and productivity growth is not simply a function of available technology, but equally important are institutions sufficient to reduce the risks and transaction costs of exchange to make investment in new technology profitable (Boughton et al. 1995). This is the task currently being faced by the Sasakawa-Global 2000 programs implemented in several African countries. A major contribution of the SG-2000 programs has been to demonstrate that smallholder food production can grow rapidly if given a conducive set of incentives, including access to a viable technical package, credit, and management information. However, the SG-2000 experiments have also demonstrated the transience of such growth if input delivery, credit access, and output markets cannot be coordinated in a sustainable manner (Putterman 1995). Greater attention to the institutional details and coordination mechanisms and their interactions with technology is crucial to develop markets so that they act as a catalyst to farm technology investment and productivity growth.

Such coordination will become even more critical as research information becomes more and more important in the generation of agricultural products. The rising importance of biotechnology in agriculture is creating a variety of new functions in the vertical system for applying new scientific discoveries toward practical use in the food and fiber system. Such applications will require working out intellectual property rights for the product that balance the need for allowing creators of new material to capture adequate returns to maintain incentives with the desire to minimize the capturing of windfall profits through exclusion of competition over the long run (Zilberman, Yarkin, and Heiman 1997). The competitiveness of African farmers may increasingly depend on the ability of local research and marketing systems to utilize, adapt and distribute newly engineered agricultural material. An important implication for research is that social scientists and technical scientists need to work together from the beginning in the design and diffusion of “improved technology” (Staatz 1989; Reardon 1989; Boughton et al. 1995).

¹² For a similar analysis for Mali, see Staatz, Dioné, and Dembélé (1989).

- *Property rights and their enforcement are often uncertain.* Contracting arrangements and contract enforcement become more important as firms increase their reliance on more capital-intensive, specialized, and productive production processes. Property rights established by state government and local traditional hierarchies are often in conflict, with uncertain procedures for resolving the competing jurisdictional boundaries. Gray areas in the structure of property rights leave room for economic outcomes to be determined by power relations and opportunistic behavior. This creates riskiness that impedes investment.

For example, what rights do lender and borrower have if an investment fails? What are the rules for allocating credit among potential borrowers? If an agricultural input is purchased on credit, is the credit contract enforced if the purchased input was not what was promised? Different ways of resolving these questions affect costs and thus the amount of credit supplied and demanded, with implications for input use and agricultural productivity. Foreign investors and firms can make great contributions to agricultural systems. What are the rules that will promote foreign investment and at the same time protect against exploitation? The solution is in the details.

- *Limited vertical coordination or integration between input delivery, farm finance, and crop sale.* Most grain traders tend to be passive, accepting the surpluses that farmers bring to their store rather than identifying potential markets and then actively promoting production to supply them (Shaffer et al. 1985). Larger-scale assembly-wholesaler firms would find it in their interest to link farmers and retailers, providing both groups much needed services, technical inputs and credit, and, most important, reliable markets. However, such coordination is limited by many problems in relationships including lack of trust, opportunistic behavior and the absence of governance institutions that define unacceptable business practices and provide low-cost enforcement of contracts. For example, farmers are not in a position to determine the composition of the material in a bag of fertilizer. What is the most effective method of assuring they get what they pay for? Sue the distributor in court? Provide a national inspection service? Have extension agents offer testing services? Promote competition with advertising and branded products? All of these options require government or another collective agency to provide a “public goods” role. But without analysis of the alternatives, we have little information to guide policymakers in what may be the most effective way to develop these markets.
- *Limited public market information* makes planning difficult. Some kinds of exchange arrangements, e.g., futures markets, produce public market information about the future, which enable individuals to shift risks. When acquiring information on market conditions is costly (e.g., due to poor communication infrastructures or missing markets), this leads to asymmetric information across market participants and incomplete specification of property rights and enforcement.

- *Limited product grades and standards* contribute to higher transaction costs of market exchange by requiring traders to visually inspect the product rather than contracting remotely by product specification.
- *Implicit caveat emptor* (“*let the buyer beware*”) rules in which failure to detect product quality deterioration is a cost incurred by the buyer. This implicit rule tends to increase the potential for opportunism in exchange, which imposes additional transaction costs of trading. In general, not being able to trust participants in the marketing system adds greatly to marketing costs, restricts the use of markets, and thus limits opportunities (Shaffer et al. 1985).
- *Transport constraints*. A considerable part of the food price instability problem in Africa is related to the high cost of transportation, which makes import parity prices two to four times higher than export parity prices in much of the region (Koester 1986). For example, the cost of sending a ton of white maize by rail from the Northwest Province in South Africa to the Copperbelt of Zambia is about \$90, roughly the amount that South African farmers are paid to grow it (Scott 1995). Both the productivity and stability of the food systems in the region could be substantially improved by public investments and policy changes that reduce the costs of distribution — internally, between countries in the region, and with the wider world market (Antle 1983). Transport constraints also contribute to temporary market concentration. Small traders who must wait two weeks after buying products to secure transport have their working capital tied up in inventory. This allows relatively large traders (who have greater liquidity) to temporarily exert greater influence over the market (Gebremeskel, Jayne, and Shaffer 1997).
- *Institutional constraints in linking African farmers to foreign markets*. With inelastic demand in local markets, African agriculture faces the dilemma that success in raising agricultural production would jeopardize continued profitability through a drop in output prices (Delgado 1992). Trade offers the potential to expand agricultural production without depressing domestic output prices, a key issue in sustaining long-run profitability and productivity in the sector. Penetration into global markets is increasingly tied to understanding the complexities of food laws in major importing countries. African-based agribusiness and processing firms need to understand and comply with the proliferating and continuously changing pattern of laws controlling food import into the North American, European, and Asian markets.

Moreover, African agribusiness firms will increasingly need to establish partnerships with firms operating in potential importing countries to ensure demand for their products. Multinational firms have a major advantage in international trade in that resources can be devoted to assembling the product in the country of production (i.e., invest in the complex coordination of input supply, production, processing, and marketing) with the assurance of a subsidiary distributor with established access to retail markets in the importing country. Developing a vertically coordinated system of production/marketing that bridges across countries substantially reduces the risks and costs of engaging in international trade.

- *Intersection between fiscal policy and market institutions.* Food policies in most African countries are strongly influenced by the basic need of the state to raise public revenues. Given the low levels of literacy, administrative capacity, and written records concerning earnings and land ownership, most African governments rely heavily on indirect taxes (especially import and export levies and license fees) to finance their operations. In Mali, Senegal, and Côte d'Ivoire, for example, import taxes on rice have been a major source of government income. Decisions to import may be driven more by the immediate financial needs of the state than by market conditions within the country. Calls for reforms of marketing policies (e.g., abolishing trade taxes at grain checkpoints) that fail to account for the basic need of governments to finance themselves are likely to be ignored by hard-pressed officials unless accompanied by workable alternatives for raising revenue.

The coffee board in Rwanda is another example. It was used to promote coffee production and export and to generate revenue and foreign exchange controlled by the government. External economic advisors generally opposed the board and taxing of exports. At the same time, advisors recommended programs to promote health, education and infrastructure. Coffee export taxes were one of the few practical sources of government revenue to finance such programs. The problems arose with the details of the operation of the coffee board and the government's diversion of the funds from development projects to expenditures on arms and other interests of the political authorities (Tardiff-Douglin and Shaffer 1994).

Abolishing such indirect taxation could also hurt the private sector if it led to reduced expenditures on market infrastructures and delays in the payment of public salaries. Deteriorating infrastructures increase marketing costs. Failure to pay public employees on time can dramatically reduce urban effective demand for basic staples and soak up much of the informal credit in the marketing system that otherwise would finance working capital (Staatz, Dioné, and Dembélé 1989). Experience throughout Africa has also shown that when public employees are not paid on time or are not paid a living wage, they frequently use their positions to extract bribes that greatly increase the transaction costs of marketing. Hence, a major challenge is to fashion reforms that reduce perverse incentives on marketing agents while still providing the state with a workable means of financing its legitimate operations.

- *Collaboration between policy and research.* A key challenge in many African countries is to build the tradition of researchers working collaboratively with policymakers to identify ways of spurring productivity growth. Building this tradition requires recognition by policymakers that "facts make a difference" and that not all conventional wisdom about the food system is necessarily true. It also requires that researchers take seriously the political-economic constraints often facing policymakers. Local researchers have sometimes been perceived by governments as hostile critics, more interested in exposing weaknesses in policy than in working to constructively identify useful alternatives. On the other hand, researchers have sometimes been harassed, sacked, or killed for going public with research results considered offensive to the state. The historical lack of collaboration

between government and university researchers frequently seen in many developing areas inhibits local research solutions to contemporary policy problems.

The ability of ongoing local research to inform policy in a timely way is illustrated by the government of Rwanda's decision to not implement an intended support price policy for beans after research results indicated that most Rwandan farmers were net bean buyers and that much of the local bean supply was imported informally from neighboring countries (Loveridge 1991). The generation of demand-driven policy analysis has been illustrated in Zimbabwe by President Mugabe's call for analysis on how to expand the role of small-scale maize mills, largely in response to applied research within the government and at the University of Zimbabwe.

- *Importance of beliefs and ideology in affecting economic performance.* Peoples' subjective experiences shape how they see the world. Persistent views of private marketing agents as exploitative or uninterested in responding to liberalization have contributed in some countries to a "chicken and egg" dilemma, in which traders are reluctant to invest further in the marketing system for fear of government intervention in storage and pricing. Governments are reluctant to withdraw from the market for fear that the private sector will not respond to adequately stabilize the system. Maize trade in Kenya has featured a policy of legalized private cross-border trade, followed by an import ban, an export ban, and now an import duty over the span of three years. The stability and predictability of the policy environment are largely shaped by societal perceptions about the role and function of private trade: is taking advantage of spatial and temporal price differences an acceptable role for traders, or is this a provocation to government that works against state policy?

Of fundamental importance are the societal beliefs about the legitimacy of the economic and political institutions. What holds a democracy together is a general belief that the system is legitimate and in some sense fair and open to change. This belief follows from socialization. The critical problem in many developing countries is that the losers of political decisions decide to opt out of the system (Hirschman 1970). The transfer of government control is not accepted. Those who are losers want to set up their own system. But fighting over the distribution of wealth destroys the wealth.

Education may be an essential factor in a large complex political economy. Whether the majority of society believes that (a) the role of government is to serve the people, or (b) that winning control of the government is a means for channeling income to particular groups is determined by education and socialization as well as history (which is always interpreted through the lens of socialization).

5. LOOKING TO THE FUTURE: STRATEGIES TO STRENGTHEN THE PRODUCTIVITY OF THE FOOD SYSTEM

A major goal of food policy is to reduce costs throughout the food system and promote structural transformation. This will involve technical innovation. One should not conclude that Africa is failing to utilize much of the agricultural production and marketing technologies being utilized in many other parts of the world because these technical processes are inherently inappropriate in Africa. Rather, their adoption is constrained in some way by incompatibility with the current structure of incentives and institutions. Identifying the rules of the game restricting productive investments and those providing increased security for private investment and innovation represent low-cost, high-return public investments. What is least-cost depends upon the situation, including the political support for development.

The most obvious constraint on development is the lack of resources (broadly defined). It is clear that productivity can be increased by improving transportation and communication infrastructure, public health, education, research, extension, improved legal and police services etc. Even a country committed to private enterprise and markets has to make choices, and that amounts to at least an implicit strategy. Part of the strategy in making the transition to a more productive economy is to focus early on the low-cost, high-pay-off investments. To make an enterprise system work, investing in developing the details of the rules of the economic game and a strategy for public investments needs to be at the top of the list.

Refocusing the debate from economic liberalization to economic development within a market-oriented system will require increased attention to the institutional details of the political economy. These institutional details, by defining rights, costs, and the incentives of market participants, influence the patterns and rate of trade and investment that evolve. Market institutions thus influence both monetary and transaction costs, and hence the supply and demand conditions in the market. If the set of regulations does not adequately reduce uncertainties and transaction costs, then markets break down or fail to develop. Economic activity remains characterized by semi-subsistence production, with low volumes of trade and low levels of economic specialization. A low proportion of production is traded in markets that may be allocatively efficient but unable to reduce the risks and costs of investing in more productive technologies and specialized production patterns. The goal of policy should not focus so much on eking out remaining efficiency gains from existing technology. Rather, it should concentrate on changing the incentive structure to maximize the rate of investment in new productivity-enhancing technology that achieves broad-based increases in living standards.

With the reality of fiscal restrictions facing most African countries, there will be increased emphasis in the foreseeable future on developing financially sustainable means of reducing the risks in the agro-food system. Such an approach will require increased reliance on market-oriented mechanisms that exploit potential gains from local, regional and international trade. But economists will need to get beyond simply prescribing free markets, and become more specific about which set of institutions should be promoted within a market economy. As stated by Bromley (1997, p.17), “there is no such thing as *the* market. Rather, there are infinitely many

ways of constructing [markets].” Prescribing free markets is an incomplete thought (Schmid 1992).

Researchers working to support African development can make a contribution in both their positive and normative analysis by enabling policymakers to understand how particular institutions are likely to alter the performance of the newly emerging agricultural systems in Africa. Unfortunately, a universal set of prescriptions is impossible given the diverse history, cultural norms, and existing institutions in each particular country setting. Moreover, countries that adopt the formal rules of another economy will have very different performance characteristics than the first economy because of different informal norms and enforcement. “Transferring the formal political and economic rules of successful Western market economies to third-world and Eastern European economies is not a sufficient condition for good economic performance” (North 1994, p. 366).

However, what follows is a general set of guidelines to reduce the costs and risks of participating in the food systems under most country conditions.

5.1 Improve Road, Rail, Port, and Communication Infrastructure

Governments must make this a priority. Donor support in this area would make the market liberalization measures they advocated more successful. The dilemma is that improving transport infrastructure is very costly. Phased investments may be required which first target high potential food and cash-crop regions where agricultural intensification is more likely to be financially sustainable. An improved market infrastructure also requires further policy change to remove remaining import tariffs on vehicles and spare parts.

One important role for research is to identify where such infrastructure investments would have the highest payoffs. For example, by analyzing food production, consumption, and price dispersion patterns in a country, researchers can provide insights into where investment in a road would do the most to improve food security or increase production potential through raising farm output prices and lowering farm input prices. Given the high cost of such infrastructure investments, such targeting is extremely important.

5.2 Invest More in Market-Oriented Agricultural Research

In market-oriented growth strategies, well tested and improved cultivars and management practices for commodities for which there are viable markets, work synergistically with improved input and output markets to create sustainable conditions for intensification and productivity growth (Boughton et al. 1995; Oehmke and Crawford 1996). Yet national research budgets and donor funding of technology development are in many cases declining. Many national agricultural research systems (NARS) still face problems of low salaries, dismal conditions of service for their researchers, and continued shortages of operational funds. The history of agricultural research in Uganda shows the impossibility of turning research off and on. It takes only a short lapse in

research support to result in massive losses in human and physical capital that requires painful and expensive new investments to rebuild (Laker-Ojok 1996). And despite claims that fertilizer/seed technologies are on the shelf that can double or triple farm yields in Africa, there remains a dearth of research on the profitability and riskiness of those technologies under farmers' actual control, and under current input and output market conditions or those foreseeable under alternative sustainable input and output marketing arrangements.

The boundaries between production and marketing activities are becoming increasingly blurred as the agricultural product specification becomes more complex. For example, the rising importance of biotechnology will create a variety of new functions in the vertical system for applying new scientific discoveries toward practical use in the food and fiber system and working out intellectual property rights for the product (Zilberman, Yarkin, and Heiman 1997). An increasingly important role of the interrelated research, marketing, and legal systems is to work out the details of use and exchange of information and knowledge.

5.3 Modify the State Marketing Boards' Pricing Policies and Change External Trade Policies to Promote Regional Trade

Pan-territorial and pan-seasonal prices, still continued in some African countries, clearly depress private investment in transport and storage that could over the long-run play an important role in improving market integration and mitigating food price fluctuations. And several states continue to ban private import and/or export of grain, which impedes the potential to stabilize food supplies and prices through intra regional trade. But beyond the elimination of obvious regulatory barriers to trade, cross-border trade will be enhanced by the state taking an active role in developing the marketing institutions that reduce risks and transaction costs of contracting, including the development of commodity exchanges to generate market information and allow for contingent contracting and reputable fora for resolving contract disputes. Infrastructural development between countries would also facilitate incentives for regional trade, thereby reducing the need for large national grain stockpiles that impose additional costs on the marketing system.

5.4 Invest More to Nurture the Political, Legal and Economic Foundations of Private Marketing Systems

A well-functioning legal and political framework for market activity reduces the risks and transaction costs of private trade. Strengthened mechanisms for specifying and enforcing contracts, raising the costs of contract noncompliance, and more pluralistic procedures for developing the rules governing market activity are important adjuncts to developing reliable markets, and inherently involve strengthening the regulatory abilities of the state rather than "getting the state out of market regulation." In general, this means a reorientation of the state from "control" activities to "facilitation" activities designed to reduce farmers' and traders' costs of transacting across inputs, credit, and commodities. Such an approach includes investing more public resources to improve public market information and related market extension capabilities.

These will accelerate both private and public response to supply gluts and shortages in the short run and help farmers and traders plan investments more effectively in the long run. The timely dissemination of market information can also help policymakers monitor the evolving effects of market liberalization better, identify problems that require mid-course correction, and respond to impending supply fluctuations in a more timely way. Such an approach also includes more public support for the development of fledgling commodity exchanges, which have the longer-run potential to improve the dissemination of market information, reduce search costs to link buyers and sellers substantially, and lower supply and price risks through forward contracting and hedging.

5.5 Coordinate Policies and Investments to Gain Complementary Benefits from Higher-Valued Cash and Food Crop Production

In many areas of Africa, successful introduction/promotion to smallholders of high-valued cash crops can have strategic spillover benefits that stimulate the same farmers' food crop output (e.g., cotton in Burkina Faso, Mali and Mozambique). High-valued crops can attract a range of input and output marketing services into a region. While originally intended to meet the needs of cash crop producers, these delivery systems also tend to increase the availability of inputs for food crops. Also, revenue from cash crop sales can help to capitalize farmers and finance household investment in animal traction equipment and other inputs that also promote both cash and food crop productivity improvements. Other important policies to stimulate cash and related food-crop output involve clear rules and implementation of these so as to create incentives for foreign private investments in agribusiness and processing activities.

5.6 Increase Business Skills Training and Related Support for Grass-Roots Farmer Organizations

While the benefits of existing farmer organizations have derived mainly from reducing the transaction costs of acquiring and repaying credit through group schemes, these benefits can be potentially extended into a broader range of input and output marketing activities. For example, in Mali, such organizations handle most of the bulking and initial grading of cotton and the management of local savings and loan associations. Future roles for farmer organizations include greater involvement in the gathering and dissemination of market information, the diffusion of technical advice, and the bulking of farmer surpluses to facilitate smallholder participation in local and regional markets, thereby opening up a number of market-oriented mechanisms for reducing the risks of price and supply instability.

Moreover, there are very different economies of scale at various stages of the food system. Multinational firms may have certain advantages in international trade (acquiring fertilizer and other inputs, hedging on futures markets, having a wider trade portfolio to reduce risks) and accessing technologies from around the world. But given the small size of most African markets, such large firms are likely to have substantial market power and may not have incentives to pass on all these benefits to smallholders. The development of strong farmer groups may mitigate the

potential for actors at highly concentrated stages to exert market power to the detriment of smallholder production growth. Such organizations may even act as subcontractors or partners to multinationals, thereby creating a system that captures the benefits of scale economies in international trade while tailoring specific services to local farmers' conditions.¹³

5.7 Invest in Local Analytical Capacity

The payoffs to market reforms have been most effective when as part of the reform process, there has been a concerted effort to strengthen domestic capacity for ongoing research and analysis to inform the reform process. Because of the paucity of data on food systems in most sub-Saharan African (SSA) countries, most reforms are necessarily designed initially on the basis of scanty empirical information. The strengthening of domestic analysis capacity allows a mechanism for ongoing monitoring of food system performance in response to the reforms and provides a mechanism for mid-course corrections as researchers uncover new empirical information. Given the ongoing nature of the reforms, it is unlikely that outside consultants alone can assure the continuity of monitoring, analysis and evaluation needed to help guide the reforms.

Lasting market and related policy change depends critically on governments' actual belief in the analysis supporting the reforms. There is ample evidence that governments that have reluctantly undertaken market reform programs have reversed them and reimposed the old system of price and trade controls with the advent of drought or other shocks (Jayne and Jones 1997). Local analytical units are often seen as bringing more local knowledge to the analysis, being less ideologically driven, and having greater sensitivity to domestic policy concerns than analysis conceived and driven by donor interests using expatriate analysts. At the same time, cooperative analyses involving both local units and external researchers are often valued, as the involvement of an internationally known research organization often gives local decision makers greater confidence in the scientific soundness of the analysis. The demand for, and credibility of, food policy analysis to guide market development is enhanced by a collaborative research process driven by local researchers and government analysts who take "ownership" of the research agenda and findings.

¹³For example, in Mali the union of cotton farmers, the multinational cotton company, and the state are all signatories to the contract-plan governing the management of the cotton subsector in the country and all receive a share of the cotton company's profits.

6. CONCLUDING COMMENTS

Market policy reforms and technology development need to be viewed as different facets of the same problem (Staatz 1994). Policy-oriented marketing research will need to expand its emphasis from the liberalization of markets to the identification of strategies that will give the incentives to invest in new productive patterns of investment and exchange for the millions of low-input semi-subsistence rural households in the region. This implies a major role for future marketing research in identifying institutional arrangements that can coordinate exchange of inputs, credit, and output markets in a manner profitable to all system participants (including farmers). These solutions will be fundamentally country-specific, dependent upon the current set of market rules, property rights, exchange arrangements, experience and perceptions derived from history, and organizational structure in each country. Promising areas for future research involve how to create the incentives, through attention to the institutional underpinnings of markets, for coordination between farmer organizations (accountable to farmers), multinational input and commodity trading firms, a supportive public sector, and an expanded role for commodity exchanges, forward contracting, and other mechanisms to reduce the costs and risks of investing in the entire food system. Finding workable strategies to implement these scenarios is likely to be the key challenge for food marketing research in Africa well into the twenty-first century.

ANNEX 1

NOTES ON THE DATA

Value of crop output: Output figures are derived from the FAO Crop Production Indices, except for Zimbabwe, which uses smallholder crop output only, as derived from Ministry of Agriculture (1997), to separate smallholder production trends from the large-scale (mainly European) sector. FAO crop output data for various years was rescaled to world market prices during the 1989-91 period. Thus, the indices are in real terms and do not reflect variations in crop price relatives or exchange rates over time. The indices were then converted to agricultural gross domestic product (GDP) in 1994 US\$.

Land and labor: The measures of labor and land are in physical units. The land variable is area cultivated and under permanent crops, as reported by FAO, except for Zimbabwe, Senegal and Ethiopia where actual area cultivated is used (based on Ministry of Agriculture (1997); FAO (1997); and CSA (1997), respectively). The labor variable is population in rural areas, as reported by FAO. This is an imperfect proxy for agricultural labor force; however, it is likely to be highly correlated with rural population except in the event of shifts in labor allocation between farm and nonfarm activities over time.

Fertilizer use: This variable is represented by total fertilizer consumed in the crop year (in thousands of tons), as reported by FAO (1996).

Rainfall: The measure of rainfall is the national average of the total annual precipitation for numerous local rainfall stations, weighted by its long-term average. The index is biased toward agriculture, i.e., rainfall in the wettest areas is given a relatively higher weight than dry areas. The relevant annual period is determined in accordance with the crop cycle, and therefore differs from country to country. The data and methodology are drawn from Gommès and Petrassi (1994).

Reform: Reform is modeled simply as a binary variable taking on a value of zero before the initiation of significant sectoral reform and a value of one thereafter. The initiation of significant sectoral reforms for each country is considered as follows: Burkina Faso (1985); Ethiopia (1990); Kenya (1989); Mali (1985); Senegal (1985); Zambia (1993); and Zimbabwe (1993). Although de jure reforms began earlier in some countries (e.g., the legislation abolishing the grain board's legal monopoly in Mali was passed in 1981), the dates used are based on the authors' estimates of when the reforms in fact began to be implemented.

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