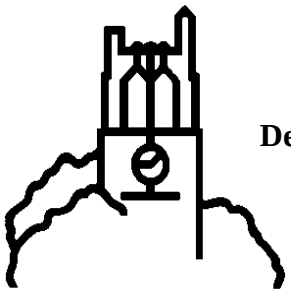
MSU International Development Working Papers

The Effect of Liberalization On Grain Prices and Marketing Margins in Ethiopia

by

T.S. Jayne, Asfaw Negassa, and Robert J. Myers

MSU International Development Working Paper No. 68 1998



Department of Agricultural Economics
Department of Economics
MICHIGAN STATE UNIVERSITY
East Lansing, Michigan 48824

MSU Agricultural Economics Web Site: http://www.aec.msu.edu/agecon/
MSU Food Security II Web Site: http://www.aec.msu.edu/agecon/fs2/index.htm

MSU INTERNATIONAL DEVELOPMENT PAPERS

Carl Liedholm and Michael T. Weber

Editors

The MSU International Development Paper series is designed to further the comparative analysis of international development activities in Africa, Latin America, Asia, and the Near East. The papers report research findings on historical, as well as contemporary, international development problems. The series includes papers on a wide range of topics, such as alternative rural development strategies; nonfarm employment and small scale industry; housing and construction; farming and marketing systems; food and nutrition policy analysis; economics of rice production in West Africa; technological change, employment, and income distribution; computer techniques for farm and marketing surveys; farming systems and food security research.

The papers are aimed at teachers, researchers, policy makers, donor agencies, and international development practitioners. Selected papers will be translated into French, Spanish, or other languages.

Individuals and institutions in Third World countries may receive single copies of papers published since 1993 free of charge. Requests for copies and for information on available papers may be sent to:

MSU Bulletin Office
10-B Agriculture Hall
Michigan State University
East Lansing, Michigan 48824-1039
U.S.A.

Information concerning how to purchase MSU International Development Papers is included in the back of this publication and requests should be sent to:

MSU Bulletin Office
10-B Agriculture Hall
Michigan State University
East Lansing, Michigan 48824-1039
U.S.A.

THE EFFECT OF LIBERALIZATION ON GRAIN PRICES AND MARKETING MARGINS IN ETHIOPIA

by

T.S. Jayne, Asfaw Negassa, and Robert J. Myers

March 1998

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 Africa Bureau's Office of Sustainable Development, Productive Sector Growth and Environment Division, Technology Development and Transfer Unit (AFR/SD/PSGE/TDT).

The authors are Visiting Associate Professor, Michigan State University; Research Scholar, Ministry of Economic Development and Planning/MSU Grain Market Research Project; and Associate Professor, Michigan State University.

ISSN 0731-3438

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

Over the past 15 years, the controlled food marketing systems of most African countries have been reformed as part of economy-wide structural adjustment programs. The effects of these reform programs on food security and farm productivity growth have been hotly debated, partly because of major differences across countries in the way these programs have been implemented. The food market reform experiments in Africa have often been only partially implemented, subjected to policy reversals, and often the state continues to engage directly in grain marketing activities. For these reasons, the empirical record of food market reform is varied, clouded and subject to major differences in interpretation.

This report analyzes the effects of grain market reform in Ethiopia on grain prices and price spreads between major wholesale markets. The experience of Ethiopia during the 1990s represents a case in which a relatively consistent and internally-driven program of grain market liberalization has been pursued with the general approval of international lenders and donors. The state marketing board, while not abolished, has been substantially downsized and has become a marginal actor in the current grain marketing system. Hence, the case of Ethiopia between 1990 and 1997 may constitute a particularly important test of the hypothesis expressed by reform advocates that the removal of regulatory constraints on private trade and the transition to a market-oriented system would reduce grain marketing costs and pass along benefits to both farmers and consumers.

Results and conclusions are based on descriptive indicators and a reduced-form econometric model that examines the effects of reform on maize and teff prices and price spreads after controlling for exogenous factors such as rainfall, food aid distributed onto local markets, and seasonality. Maize and teff are the two most important traded grain commodities in Ethiopia. The model is estimated simultaneously across six markets using seemingly unrelated regression estimator (SURE). Tests for unit roots in the data indicated that maize and teff prices were stationary in almost all cases, as were food aid and rainfall.

The results generally indicated that grain market reform was associated with higher prices in major grain-producing areas and lower prices in major grain-deficit areas. Grain price spreads (the difference in wholesale prices between surplus and deficit markets) declined in 7 of 8 cases for maize and 10 of 11 cases for teff. Since marketing costs account for 40% to 60% of the price that consumers pay for staple cereal commodities in Ethiopia and throughout Africa, the reduction of these costs represents a major opportunity to improve both farm production incentives and household food security. Despite these positive developments, the grain marketing systems in Ethiopia and more generally in Africa continue to operate under numerous constraints that hamper the achievement of further gains in market efficiency that could pass along further benefits to farmers and consumers. Moreover, the reforms in Ethiopia have not appreciably reduced grain price volatility. These findings are indicative of the growing empirical evidence that, while policy reforms have often been critical in reducing costs and risks to farmers, marketing actors, and consumers, they must be viewed as part of a broader program of market development that involves the development of key market institutions, infrastructure, contract law and enforcement, and the general nurturing of civil society.

CONTENTS

LIST OF TABLES

1. INTRODUCTION

Over the past 15 years, the controlled food marketing systems of most African countries have been liberalized as part of economy-wide structural adjustment programs. Since the watershed Berg Report (World Bank 1981), advocates of the reforms have hypothesized that liberalization would reduce costs and risks in grain marketing and act as a catalyst to farm production growth. However, the reforms have often been associated with declining agricultural production and have failed to overcome important barriers to entry and expanded investment in the food system (e.g., Barrett 1997; Jayne and Jones 1997). These reform experiments have usually been only partially implemented, have been frequently subjected to policy reversals, and often the state continues to engage directly in grain marketing activities. For these reasons, the empirical record of grain market reform is varied, clouded, and subject to major differences in interpretation.

The experience of Ethiopia during the 1990s represents a case in which a relatively consistent and internally-driven program of grain market liberalization has been pursued with the general approval of international lenders and donors, and hence may constitute a particularly important test of the market reform hypothesis. The objective of this study is to determine the effect of market liberalization, as it was implemented in Ethiopia, on the levels of grain prices and price spreads between major wholesale markets. The impact of liberalization on price levels is derived after controlling for other exogenous factors such as rainfall, seasonality, and the release of food aid in specific regions. Finally, the paper identifies issues and problems needing attention to reduce cereal marketing costs and guide future food security policy in Ethiopia.

The remaining sections of this paper are structured as follows. Section 2 briefly describes the evolution of Ethiopia's cereal marketing system since the early 1970s. Section 3 presents the conceptual framework and methods on which the findings of this paper are based. A description of the markets and commodities included in this analysis and the sources of data is presented in Section 4. Section 5 presents the results of descriptive and econometric analyses measuring the effects of market liberalization, food aid, and other factors on cereal prices and price spreads. Finally, Section 6 discusses the policy implications and main conclusions of the study.

2. EVOLUTION OF CEREAL MARKETING POLICY: 1974 - 1996

For 16 years until 1990, government policy in Ethiopia had suppressed private grain marketing. A revolution in 1974 introduced a socialist-oriented government that controlled wholesale and retail trade. The Agricultural Marketing Corporation (AMC) was created in 1976, initially with World Bank support, to buy grain from farmers and sell to urban consumers and state organizations. AMC's mandate was ostensibly to stabilize prices of basic commodities and protect the interests of the majority of the population. Interregional private trade was restricted but not eliminated. Traders were forced to sell part of their supplies to the AMC at specified prices. Farmers also had to deliver between 10% and 50% of their grain harvest as a quota to the AMC (Lirenso 1995). The fixed AMC prices were consistently below market prices in most areas. Prices were uniform irrespective of region from 1980/81 onward (Dercon 1994). Despite stated policy objectives, the policy of forcing smallholders to grow and sell particular grains at below-market prices was not designed to raise food production, but rather to capture a certain share of it for distribution to politically influential groups at subsidized prices, mainly urban consumers, the military, and public service agencies.[1] This approach took the view that it was possible to tax agriculture and force sales to the state without depressing agricultural production over the long run.

It is generally concluded that the quota policies at low fixed prices, combined with restrictions on private grain trade, had three main effects: (1) depressing rural incomes; (2) transferring resources from rural households to a relatively small group of urban households through artificially cheap food prices; and (3) depressing cereal production in Ethiopia (Lirenso 1995; Dercon 1994; Franzel, Colburn, and Degu 1989). Low farm gate prices were a deterrent to the use of improved inputs and consequently, population growth rapidly outstripped cereal production, contributing to the country's chronic food crisis during the 1980s.

In March 1990, the grain marketing policy was changed radically. Quotas and fixed grain prices were abolished. Then subsidies on wheat for urban consumers were abolished in 1992. The ensuing Transitional Government of Ethiopia reaffirmed that all controls on interregional grain movement were lifted and the private sector was permitted to operate under relatively few regulatory controls pertaining mainly to external trade and licensing.

In 1992, the AMC was downsized substantially and renamed the Ethiopian Grain Trading Enterprise (EGTE). The role of the EGTE was revised to stabilize producer and consumer prices and maintain buffer stocks.[2] Yet, unlike many other African countries where the marketing

[1] The Government Food Corporation received 51% of AMC's cereal sales, while the Ministry of Defense and other state agencies received 24%. Government ration shops received 17%.

[2] Regulation No. 104/1992. EGTE's current objectives as stated in their 1994/95 Agenda are: (1) to stabilize markets and prices for farmers to encourage them to increase their output; (2) to stabilize grain prices and markets to protect consumers from unfair price increases; (3) when necessary, to export grain to the world market to generate foreign exchange; (4) to maintain buffer stock for market stabilization; and (5) to engage in any other related activity for the attainment of its objectives. It has been mandated that EGTE perform these functions in a self-financing manner. However, very few marketing boards in developed or developing countries have succeeded

boards have maintained a strong presence in the market even after liberalization, the EGTE now plays only a minor role in Ethiopia's grain marketing system. The eight zonal offices were closed, the branch offices were reduced from 27 to 11, and the grain purchase centers shrank from 2,013 to 80. Since this downsizing in 1992, the EGTE has accounted for less than 5% of cereal traded nationally.

Thus, the country represents a particularly important test of the hypothesis long voiced by donors and international lenders that the liberalization of agricultural markets would reduce costs in the system and act as a catalyst to farm production growth. While market participants continue to operate under a wide range of non-policy related constraints, Ethiopia represents a case in which major policy barriers were publicly and clearly lifted to support private trade and where the state's direct involvement in the market has receded to negligible proportions.

in appreciably influencing market price levels without incurring substantial financial losses.

3. CONCEPTUAL FRAMEWORK AND METHODOLOGY

One approach to modeling the effects of liberalization on prices would be to build a structural econometric model consisting of behavioral equations to explain the supply and demand decisions of all participants in the market, including producers, consumers, traders, and state agencies involved in food marketing. However, this would require a large model that embodies many over-identifying restrictions drawn from economic theory. These restrictions usually take the form of excluding variables from particular equations to motivate a particular economic interpretation for the model. Of course, it is not necessary to work with large systems because there are methods for estimating individual structural equations embedded within a larger system. However, estimating liberalization effects in individual equations only provides information on the effects of liberalization on the behavior of the particular agent being modeled (e.g., on producers if a supply equation is being estimated). A structural approach to estimating the effects of market reform on equilibrium prices would require structural equations for all market participants at each stage in the system, from production to marketing to consumption.

A potential problem with large-scale structural models is that the restrictions used to identify the model may not be valid. A multi-market structural model of a vertical marketing chain is complicated, particularly when it involves international trade. Yet economic theory often only provides weak guidelines on how identification can be achieved. For example, Sims (1980) has shown that if expectation variables enter an equation then it is almost impossible to exclude any relevant variable that is known at the time expectations are formed, because these variables will enter through the expectations term. If incorrect identification restrictions are imposed then the model can provide misleading results (Tomek and Myers 1993; Sims 1982). Large-scale structural models also require large amounts of high-quality data.

An alternative is to specify a reduced form model for equilibrium food price levels. Such a model would include variables that might be included in structural models drawn from economic theory, but otherwise the model is left relatively unrestricted. Data availability will also affect what can be feasibly estimated. Historical price correlations are summarized by including lagged variables, and statistical criteria are used to determine how many lags to include (Judge et. al. 1985, Chapter 16). The advantage of this approach is that the minimal restrictions applied to the reduced form provide flexibility that allows the model to be consistent with a wide range of alternative economic structures (Tomek and Myers 1993). The disadvantage is that structural information on the effects of liberalization on the supply or demand decisions of particular market participants is not available. Nevertheless, the main goal of the present study is confined to estimating the *net* effect on CPI-adjusted price levels during the pre- and post-reform periods, summarized by the average price trends during the two regimes. A reduced form approach is very well suited to this task.

We start with a general, reduced form data generating process (DGP) for the price in market *i* at time *t*

$$A(L)P_{it} = X_{it}^{*}\beta_{i}^{*} + B^{*}(L)u_{it} \qquad (i = 1, 2, \ldots n) \tag{1}$$

where X_{it}^* contains all of the exogenous factors influencing price levels (e.g., consumer incomes, weather, technological change, food aid shipments, policy variables, etc.), u_{it} is an identically and independently distributed disturbance term, and $A(L)$ and $B^*(L)$ are polynomials in the lag operator L that allow for general dynamics in the response of P_{it} to market shocks.

In the case of Ethiopian grain markets, not all of the X_{it}^* variables are observable because of data limitations. Thus we partition $X_{it}^* \beta_i^*$ into two components

$$X_{it}^* \beta_i^* = X_{it} \beta_i + Z_{it} \alpha_i$$

where data are available on X_{it} but not Z_{it}. Then the DGP can be written

$$A(L)P_{it} = X_{it}\beta + B(L)v_{it} \qquad (i = 1, 2, \ldots n) \tag{2}$$

where $B(L)v_{it} = Z_{it}\alpha_i + B^*(L)u_{it}$ is the Wold representation of the stochastic component of $Z_{it}\alpha_i$ plus $B^*(L)u_{it}$. Any deterministic mean, trend, or seasonal component of Z_{it} can be incorporated in the intercept, trend, or seasonal component of X_{it}.

The variables included in X_{it} for Ethiopian grain prices were an intercept, seasonal dummy variables, a variable representing food aid deliveries to the market, rainfall in the region surrounding the market, and a categorical variable differentiating the period before and after market liberalization. Furthermore, it was found that the simplest way to represent the dynamics of the price adjustment process adequately was to set $A(L) = 1 - \rho_i L$ and $B(L) = 1$. Thus the final models to be estimated for a given commodity price in a given market take the form

$$P_{it} = \mu_i + \rho_i P_{it-1} + \sum_{m=1}^{11} \pi_{im} D_{mt} + \lambda_i FAID_{it} + \gamma_i RF_{it} + \delta_i LIB_t + v_{it} \qquad (i=1,2,\ldots,n) \tag{3}$$

where D_{mt} are 11 monthly dummy variables; $FAID_{it}$ is a variable measuring the quantity of cereal food aid released in region i over a specified time, RF_{it} is millimeters of rainfall in region i over a specified time, and LIB_t is a variable representing the change in the grain marketing policy environment over the sample period. The n equations in (3) were estimated as a system using iterative seemingly unrelated regression (SURE).

There are several potential problems in using (3) to estimate the effects of liberalization on Ethiopian grain prices. First, to the extent that the explanatory variables included in (3) are correlated with the omitted Z_{it} variables then estimates of the effect of liberalization on price levels may be biased. Without data on Z_{it}, however, there is no way to determine the size and direction of this bias, if any. Furthermore, any problems caused by omitted variables can be minimized by carefully modeling the dynamics (autocorrelation) in each equation. Later we show evidence that

the error terms from estimating equations of the form (3) for different Ethiopian grain prices and markets are indeed serially uncorrelated.

A second potential problem with estimating (3) concerns the value of ρ_i. If $\rho_i = 1$ then the ordinary least squares estimate of ρ_i is biased downward in small samples and its *t*-statistic is unreliable. Furthermore, the issue of whether $\rho_i = 1$ or $\rho_i < 1$ is critical to determining the long-run impacts of grain market liberalization. If $\rho_i < 1$ then the liberalization effect causes a permanent shift in the mean of the price series, but if $\rho_i = 1$ then liberalization causes a permanent shift in the rate of growth in prices. To investigate this issue we conducted augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests for unit roots in each of the (deseasonalized) Ethiopian grain price series, and in the food aid series. Rainfall was assumed to be stationary *a priori* because rainfall in highland Ethiopia is very regular with no major climatic changes occurring in the region. Results of unit root tests indicate that the hypothesis of non-stationarity in prices is rejected in 9 of 12 cases using the PP test and 8 of 12 cases using the ADF test, at the 10% significance level. Furthermore, the tests provide very strong evidence of stationarity in the central terminal market of Addis Ababa. For the central terminal market price to be stationary when outlying markets are non-stationary, then either transfer cost differentials must be non-stationary or the markets are not integrated. Spatial price analysis by Asfaw (1997) indicates a reasonable degree of integration of wholesale cereal prices in Ethiopia since 1990. This creates a presumption in favor of stationarity (i.e., $\rho_i < 1$). The regional food aid variables were also found to be stationary in all cases at the 10% level.[3]

Obtaining unbiased estimates of δ_i depend on the categorical variable *LIB* being uncorrelated with the vector Z_{it} or with the other variables contained in X_{it}. While it is plausible that the period of grain market liberalization has been correlated with rainfall and/or food aid imports, in actuality little difference was found in the mean levels of these variables in the pre- and post-liberalization sample periods. An F-test for a new pattern of seasonality in prices associated with liberalization was also rejected at the 5% level.

The definition and expected sign for each of the right-hand side variables in (3) are discussed briefly.

Seasonality (D): Eleven seasonal dummy variables were included in each of the reduced-form equations. There are clear seasonal patterns in Ethiopian grain prices due to different volumes hitting the market in different months, and also due to costs of storing grain over time.

Policy change (LIB): If market liberalization reduces the costs associated with grain distribution, this is expected to decrease grain prices in deficit markets and increase grain prices in the surplus markets. The coefficient on LIB would then be expected to be positive in surplus

[3] Dercon (1994) found that selected grain market prices in his analysis were non-stationary, using different time periods and a different set of markets. Hence, to examine the robustness of results to the assumption of stationarity, we also estimated the model under the assumption that $\rho_i = 1$ in Equation (3). Our results indicate that the conclusions about the effects of food aid and sectoral policy reform are often sensitive to the assumption regarding stationarity in prices. However, the weight of the evidence from our PP and ADF tests supports the hypothesis of price stationarity in these markets over the sample period, and thus the remaining analysis focuses on the econometric results with ρ_i being freely estimated rather than imposing $\rho_i = 1$ on the data.

markets and negative in deficit markets, with the degree of change in producer and consumer prices being related to the elasticity of supply and demand for grain commodities. LIB takes the value of zero for the pre-liberalization period, values ranging from zero to one during a transition period and the value of one when the full effects of liberalization have been felt. This specification assumes that the effect of liberalization is a gradual process having its full effect after a certain period. A grid-search procedure is used to determine the length of the transition period, choosing from a range of 6-month periods between 6 and 36 months. A transition period of 12 months was found to maximize the value of the likelihood function.

Rainfall (RF): Rainfall may have complex lagged effects that differ over the short and long run. The overall effect of good rain conditions is to reduce grain price levels. The rainfall variables used in the model are the unweighted 3-month moving average of rainfall for the market areas considered in the analysis, lagged one month. This allows prices in the current period, for example, to be affected by cumulative rainfall conditions over the previous one to three months.

Food aid (FAID): Food aid grain was primarily wheat over the sample period. Food aid may affect market prices by reducing the amount of grain that recipient households may otherwise have purchased in the market (thus reducing demand), and by potential sales of food aid onto markets (thus increasing supplies). A negative sign on the food aid variable is expected, but potential substitution and income effects (e.g., a household that receives and sells wheat may use the additional income to purchase another cereal crop) may actually exert upward pressure on prices for some crops. The food aid data used in this analysis is disaggregated region-specific monthly food aid distribution from the National Disaster Prevention and Preparedness Committee (DPPC). After the food aid reached the recipients it was assumed that it takes some time before recipients potentially dispose of some part of the food aid they received on the market or changed their decision on whether to buy from the market. To take into account these lagged effects, a 3-month moving average of food aid volume lagged by one month is used in the model estimation.

4. MARKETS AND SOURCES OF DATA

The two primary marketed grain crops in Ethiopia (maize and white teff) and eight markets are considered in this analysis. Markets are chosen based on the availability of continuous time series price data covering at least three years before and after market liberalization. The estimation period is from January 1987 to December 1996. This covers about 36 months before liberalization occurred, and 72 months afterward.

Six markets are considered for maize: Addis Ababa, Dire Dawa and Mekele, which are mainly deficit markets for maize; and Bako, Shashamane and Jimma, which are surplus markets. Six markets are also analyzed for white teff: Addis Ababa, Dire Dawa and Mekele, which are deficit markets, and Bako, Bahir Dar and Hosaenna, which are surplus markets.

The price data for the markets used in this analysis are obtained from the Ethiopian Grain Trade Enterprise (EGTE). For Bako the price data collected by the Bako Research Center are used. Prices were deflated using the non-food consumer price index (1995=100) for Addis Ababa. The rainfall data for all markets except Bako are obtained from the National Meteorological Station of Ethiopia; rainfall data for Bako are obtained from the Bako Research Center. The food aid data are from the World Food Program (WFP) data files and DPPC.

5. RESULTS

5.1. Descriptive Statistical Results

As a prelude to the econometric analysis, inflation-adjusted grain prices and price spreads were calculated for the periods before and after liberalization (Tables 1 and 2). The results indicate that average real prices for maize and white teff increased after liberalization in the cereal-surplus

Table 1. Summary Statistics of Real Prices of Grain for Several Markets in Ethiopia

	Before liberalization (87:01 to 90:03)			After market liberalization (90:04 to 96:12)			Change		
Markets	Mean	SD	CV(%)	Mean	SD	CV(%)	Mean	SD	CV(%)
Maize									
Surplus areas:									
Bako	56.81	22.78	40	82.95	31.71	38	26.14	8.93	-2
Shashamane	64.45	27.80	28	91.65	23.31	25	27.20	-3.49	-3
Jimma	76.27	34.10	45	88.68	28.99	33	12.41	-5.11	-12
Deficit areas:									
Addis Ababa	96.15	12.41	13	108.50	25.21	23	12.35	12.80	10
Dire Dawa	117.76	25.58	22	150.00	23.31	20	32.24	-2.27	-2
Mekele	196.28	54.11	28	146.72	31.71	12	-49.56	-35.94	-16
White teff									
Surplus areas:									
Bako	134.82	20.22	15	168.50	26.91	16	33.68	6.69	1
Hosaenna	149.61	20.24	14	184.27	25.47	14	34.66	5.23	0
Bahir Dar	158.65	15.56	10	199.68	29.12	15	41.03	13.56	5
Deficit areas:									
Addis Ababa	256.90	23.21	9	236.26	19.95	8	-20.64	-3.26	-1
Dire Dawa	301.41	33.26	11	285.95	23.77	8	-15.46	-9.49	-2
Mekele	389.99	48.64	12	269.95	14.49	5	-120.04	-34.15	-7

areas analyzed in 6 of 6 cases, and decreased in the cereal-deficit markets in 4 of 6 cases (the exceptions were maize in Addis Ababa and Dire Dawa). Prices in the surplus-producing areas have risen by 16% to 46%, while prices in deficit regions have declined by 15% to 120% in 4 of 6 cases, and increased by 12% to 32% in the other 2 cases.

Higher prices in surplus-producing areas and simultaneously lower prices in deficit areas indicate that market liberalization has been associated with a reduction in average wholesale price spreads (the difference between wholesale prices in surplus and deficit regions). This conclusion is supported by direct computation of price spreads for major trade routes in Ethiopia during the pre-liberalization and post-liberalization period (Table 2). Cereal price spreads have declined during the post-liberalization period in 17 of 19 cases for which data are available. The decline in price spreads was especially large for white teff, the cereal that figured most prominently in the former AMC's forced grain procurement system during the control period.

While differences in weather conditions may partially account for changes in price *levels* in the pre- and post-liberalization periods, favorable weather during the post-liberalization period cannot serve as an explanation for why prices in surplus-producing markets rose while prices in deficit markets declined. Reasons forwarded for the decline in interregional marketing spreads during the post-liberalization period include (1) lower transactions costs in grain trading from the reduction or elimination of smuggling, bribery, and illegal grain movement (Franzel, Colburn, and Degu 1989); (2) the restoration of peace after a civil war during the 1980s that disrupted commercial trade especially in the northern regions (Dercon 1994); (3) the cessation after liberalization of forcing traders to sell part of their produce to the state at below-market prices, which may have forced them to recoup losses by offering reduced prices to farmers and higher prices to retailers; and (4) lower levels of uncertainty associated with EGTE's curtailed grain trading activities during the post-liberalization period.

The variability of monthly real prices and price spreads are also presented in Tables 1 and 2. The coefficient of variation in wholesale cereal prices has declined in the post-liberalization period in 8 of 12 cases. This is especially true of the deficit markets, where the coefficient of variation (CV) of prices declined in 5 of 6 of the cases across maize and teff. Similar results were obtained for the standard deviation (SD) measure.

The standard deviation of cereal price spreads between different markets has also declined since liberalization in 18 of the 19 cases for which data are available (Table 2). These findings suggest that the transfer costs charged by traders for distributing cereal from one region to another have not only declined but have also become more stable in absolute terms during the post-

Table 2. Summary Statistics of Monthly Grain Price Spreads Between Different Markets in Ethiopia

	Before liberalization (87:01 to 90:03)			After market liberalization (90:04 to 96:12)			Change		
Pair of markets	Mean	SD	CV(%)	Mean	SD	CV(%)	Mean	SD	CV(%)
Maize									
Addis Ababa-Bako	39.34	19.79	50	25.55	15.25	60	-13.79	-4.54	10
Addis Ababa-Dire Dawa	21.61	15.97	74	41.50	21.10	51	19.89	5.13	-23
Addis Ababa-Jimma	19.87	28.64	146	19.82	14.10	71	-0.05	-14.54	-75
Addis Ababa-Mekele	98.57	51.98	53	41.67	22.69	54	-56.90	-29.29	1
Addis Ababa-Shashamane	31.69	15.71	50	16.85	11.85	70	-14.84	-3.86	20
Mekele-Bako	149.50	52.00	35	63.22	30.12	48	-86.28	-21.88	13
Mekele-Jimma	132.08	51.87	39	56.26	26.65	47	-75.82	-25.22	8
Mekele-Shashamane	130.74	46.50	36	55.42	20.20	36	-75.32	-26.30	0
White teff									
Addis Ababa-Bako	122.08	29.32	24	67.76	21.36	32	-54.32	-7.96	8
Addis Ababa-Bahir Dar	98.25	21.76	22	34.64	21.54	62	-63.61	-0.22	40
Addis Ababa-Dire Dawa	44.51	22.21	50	49.69	18.12	36	5.18	-4.09	-14
Addis Ababa-Hosaenna	111.04	29.53	27	51.98	18.59	36	-59.06	-10.94	9
Addis Ababa-Mekele	115.81	45.28	39	36.49	21.22	58	-79.32	-24.06	19
Dire Dawa-Bako	166.59	41.18	25	117.45	28.56	24	-49.14	-12.62	-1
Dire Dawa-Bahir Dar	142.75	32.69	23	83.61	28.15	34	-59.14	-4.54	11
Dire Dawa-Hosaenna	157.37	35.13	22	101.67	26.39	26	-55.70	-8.74	4
Mekele-Bako	259.38	44.53	17	103.22	33.62	33	-156.16	-10.91	16
Mekele-Bahir Dar	224.23	45.29	20	66.46	31.15	47	-157.77	-14.14	27
Mekele-Hosaenna	239.00	44.04	18	86.81	28.12	32	-152.19	-15.92	14

liberalization period. However, the coefficient of variation of prices increased in 15 of 19 cases, indicating that the mean level of price spreads have declined to a greater degree than the absolute volatility of the spreads.

It is important to note that price instability is not necessarily indicative of price unpredictability. Some variation in cereal prices is predictable and actually necessary, such as intra-seasonal price increases after the harvest to induce incentives for grain storage for consumption later in the year. Also, variations in cereal prices between regions are also important to provide incentives for private traders to transport grain from surplus to deficit regions. Future efforts to improve the performance of grain markets through price stabilization will be more effective if they do not remove the predictable and useful forms of price variation, both spatial and temporal, that are necessary to induce private traders to undertake critical storage and transportation functions.

5.2. Econometric Results

The analysis so far has considered the effect of liberalization on price levels and marketing spreads without controlling for changes in other factors likely to affect price levels. In the following sections, the results of SURE estimations are presented to estimate the effect of liberalization holding constant the influence of other factors, using the model given in (3).

The effects of various factors affecting the maize price levels in six markets (Addis Ababa, Bako, Shashamane, Dire Dawa, Mekele and Jimma) are estimated as a system using SURE. Results are shown in Table 3. The results show distinct seasonal patterns, reflecting variations in harvest schedules throughout the country. The coefficients on food aid and rainfall generally exhibited the expected negative signs, but food aid wheat was found to have a more significant impact on the price of teff than on the price of maize. This result corresponds with the general perception that wheat is more substitutable in consumption with teff than with maize in most parts of the country.

For all the maize markets considered except Mekele, the signs of the coefficients on the liberalization dummy variable are positive, implying that market liberalization has increased maize price levels in real terms. However, the increases are significant only in the major surplus-producing areas of Shashamane and grain deficit markets of Addis Ababa and Dire Dawa. In Addis Ababa and Dire Dawa markets, the short-run effects of liberalization have been to raise maize prices by roughly 5% to 8% in real terms, holding other factors constant, while Shashamane maize prices have increased by 4% to 10% in the short run.[4] For the deficit market of Mekele, market liberalization was associated with a significant short-run decline in maize price levels of 18%, after accounting for the effects of other variables. These results

[4] These short-run elasticities are computed at the price means during the pre-liberalization period.

Table 3. SURE Estimates of the Price Equation for Maize (1987:01 to 1996:12)

	Markets					
	Addis Ababa	Bako	Shashemene	Dire Dawa	Jimma	Mekele
Constant	28.83[a]	6.53	27.98[a]	34.93[a]	13.17[b]	83.52[a]
Mar	3.94	-0.32	3.05	4.14	6.16	-10.10
April	1.34	1.46	4.23	1.64	1.86	-32.83[c]
May	9.38[c]	7.34	11.82[b]	8.03	2.25	-0.95
Jun	8.72	12.10[b]	18.24[a]	6.22	8.63	11.54
July	16.90[a]	8.41	13.93[a]	19.61[b]	9.99	54.18[a]
Aug	14.88[b]	9.49	4.16	5.81	0.45	41.78[b]
Sept	16.76[b]	7.57	5.18	15.34[c]	-0.53	46.47[b]
Oct	10.13	-2.78	-7.42	-4.17	-8.91	61.71[a]
Nov	7.52	-11.41[c]	2.67	2.02	-4.61	22.22
Dec	3.37	1.17	5.56	-8.51	-2.53	-6.62
Jan	2.06	1.38	2.30	2.11	4.38	-22.32
Dlib12	5.73[b]	3.81	9.58[a]	11.83[a]	3.23	-20.76[a]
RF	-0.069[b]	-0.03	-0.09[a]	-0.09	-0.015	-0.53a
FAID	-0.0654	-0.381	0.402	-0.0206	0.0903	0.225[a]
P_{t-1}	0.69[a]	0.90[a]	0.60[a]	0.71[a]	0.83[a]	0.63[a]
Diagnostics						
R^2	0.77	0.90	0.84	0.73	0.83	0.70
JB	1.81	43.64[a]	3.37	151.67[a]	52.57[a]	1.30
Q-S	12.24	10.18	25.64[a]	16.61[c]	14.78	7.83

Note: a, b, and c indicate statistical significance at a probability of less than 1%, 5% and 10%, respectively.

may also be due to the ending of the civil war, which occurred a year after liberalization was initiated, and was especially disruptive in the northern part of the country (Dercon 1994).

For white teff, the effect of liberalization is negative in all three deficit markets and positive in all three surplus markets (Table 4). The effect of market liberalization is statistically significant for the surplus areas of Hosaenna and Bahir Dar at a probability of less than 1% and

Table 4. SURE Estimates of the Price Equation for White Teff (1987:01 to 1996:12)

Independent variables	Markets					
	Addis Ababa	Hosaenna	Dire Dawa	Bako	Bahir Dar	Mekele
Constant	46.92[a]	59.89[a]	91.12[a]	24.51[a]	27.45[a]	115.60[a]
April	2.81	11.46[c]	3.49	-0.86	7.48	11.10
May	17.80[a]	12.13[c]	5.75	4.74	8.81	24.68[b]
June	22.74[a]	21.47[a]	11.69	14.32[a]	15.19[b]	41.21[a]
July	23.06[a]	20.95[a]	18.35[b]	14.29[b]	17.20[b]	46.50[a]
Aug	26.13[a]	23.56[a]	21.04[b]	9.17	17.95	33.04[a]
Sept	31.04[a]	17.74[b]	8.56	8.86	20.85	50.66[a]
Oct	35.63[a]	19.35[b]	3.64	15.62[b]	21.24	52.51[a]
Nov	19.16[a]	5.52	8.95	4.82	17.79	33.51[a]
Dec	4.99	-4.67	-2.93	-4.86	17.33[b]	8.58
Jan	2.91	0.14	18.22[b]	-7.24	1.49	0.99
Feb	2.59	-1.48	5.51	-6.59	8.37	11.98
Dlib12	-1.77	16.31[a]	-6.24	4.88[c]	12.19[a]	-43.01[a]
RF	-0.09[a]	-0.09[c]	-0.013	-0.07[b]	-0.048	-0.287[a]
FAID	-0.114[b]	-0.0152	0.0457	-0.0843[c]	-0.704[b]	-0.0144
P_{t-1}	0.79[a]	0.59[a]	0.67[a]	0.85[a]	0.77[a]	0.70[a]
Diagnostics						
R^2	0.85	0.77	0.61	0.86	0.87	0.96
JB	0.46	9.61[a]	29.77[a]	0.54	4.33	0.67
Q-S	8.91	11.64	5.17	14.53	6.98	9.45

Note: a, b, and c indicate statistical significance at a probability of less than 1%, 5% and 10%, respectively.

at a probability of less than 10% for Bako. In Hosaenna, Bako and Bahir Dar markets, market liberalization was associated with a 12%, 9%, and 2% short-run increase in teff prices, respectively. Market liberalization was associated with a decline in real teff prices (ranging from 1% to 26%) in the deficit markets of Addis Ababa, Dire Dawa and Mekele. The impact of liberalization was statistically significant at the 1% level only for Mekele.

Long-run price impacts of liberalization are reported in Table 5. Long-run elasticities are computed as $\delta_i / (1- \rho_i)$, the long-run price impact of liberalization (holding other factors constant) divided by the pre-liberalization price mean. The results indicate that liberalization has raised prices in the major surplus markets over the long run by roughly 20% to 40% for both maize and wheat. In the deficit areas, long-run maize prices rose by 18% to 33%, other factors constant, in two of the three deficit areas surveyed. These results suggest that the effects of liberalization were not uniformly beneficial to consumers. Long-run teff prices declined in all three cases: by less than 10% for Addis Ababa and Dire Dawa, but by more than 50% for Mekele. Again, Mekele was an area affected by war throughout the pre-liberalization period, and isolating the effects of war from market reform for this particular area is thus difficult.

Table 5. Long-run Elasticities for Maize and White Teff as a Result of Grain Market Reform

	Markets							
Grain	Addis Ababa	Bako	Hosaenna	Shashamane	Dire Dawa	Jimma	Bahir Dar	Mekele
Maize	0.18	0.42	-	0.28	0.33	0.22	-	-0.38
Teff	-0.05	0.27	0.27	-	-0.09	-	0.46	-0.61

Note: Long-run elasticities are computed as $\delta_i / (1- \rho_i)$, the long-run price impact of liberalization (holding other factors constant) divided by the pre-liberalization price mean. Using maize in Addis Ababa as an example, the results indicate that liberalization was associated with an 18% rise in maize prices, holding other factors constant.

Long-run elasticities of liberalization on price spreads are computed as the difference in $\delta_i / (1- \rho_i)$ for various pairs of markets linked by trade, divided by the pre-liberalization level of price spreads. For white teff, the long-run elasticities were all negative and typically between -0.2 and -0.6, indicating that the reforms were associated with 20% to 60% declines in the level of price spreads, other factors constant (Table 6). This reduction in marketing costs has been a major benefit to farmers and consumers of teff. Also for maize, the market reforms were associated with long-run declines in the price spreads for all markets (generally between 5% and 50% declines). These results are fairly consistent with the descriptive results shown in Table 2.

Table 6. Long-run Elasticities of Maize and White Teff Price Spread Between Addis Ababa and Other Markets in Ethiopia

	Maize				White teff			
Measures	Addis Abab a-Bako	Addis Abab a-Dire Dawa	Addis Ababa-Jimma	Addis Ababa-Shashamane	Addis Abab a-Bako	Addis Ababa-Bahir Dar	Addis Abab a-Dire Dawa	Addis Ababa-Hosaenn a
Price spread before liberalization	39.34	21.61	19.87	31.69	122.08	98.25	44.51	111.04
Long-run change in price spread	-19.62	22.31	-0.52	-5.47	-40.96	-61.43	10.48	-48.21
Long-run elasticity	-0.50	1.03	-0.03	-0.17	-0.34	-0.63	0.24	-0.43

6. SUMMARY AND POLICY IMPLICATIONS

Marketing costs account for 40% to 60% of the price that consumers pay for staple cereal commodities in Ethiopia. The reduction of these costs represents a major opportunity to improve farm production incentives and household food security. In Ethiopia, grain market liberalization has been associated with lower real cereal price levels over the long run in 4 of 6 cases involving markets in deficit regions. These findings were statistically significant at the 10% level in 2 of these 6 cases after controlling for other factors affecting cereal prices such as rainfall, food aid, and seasonality. Market liberalization has also been associated with higher real cereal prices in each of the 6 cases involving markets in surplus regions (statistically significant in 4 cases at the 10% level after controlling for exogenous factors). The results indicate that liberalization has in general been associated with lower grain price spreads, especially for teff, the most widely consumed grain in urban areas.

Urban consumers have generally benefitted from lower grain prices during the post-liberalization period (other factors constant). However, some of these gains to consumers are likely to be due also to the ending of the civil war, which disrupted commerce especially in the northern part of the country (Dercon 1994). However, maize prices in deficit regions in the post-liberalization period have conformed less closely to the predictions of market reform advocates. In two important deficit areas, maize price levels increased significantly, and price spreads with surplus areas also widened after liberalization. These results indicate that important barriers in the grain marketing system continue to exist and impede further cost reductions in the food system.

The benefits to surplus cereal producers during the post-liberalization period have been evident in most markets examined and for both cereal types. Wholesale white teff and maize prices rose in every surplus-producing area examined, by 2% to 26%. Data are not available to assess clearly the extent to which increases in wholesale prices have been passed along to farmers in the form of higher producer prices. Yet to the extent that higher prices at wholesale level have been transmitted to producers, liberalization has positively affected cereal production growth and incentives to use fertilizer and other productivity-enhancing inputs.

One reason for the differential effects of market liberalization could be the difference in the development of marketing infrastructure linking these surplus markets to the deficit regional markets. A considerable part of the food price instability problem in Ethiopia is related to the high cost of transportation, which creates a major wedge between import and export parity prices. For example, when areas of Southern Ethiopia are in grain surplus, prices are depressed by high transport costs that limit grain export opportunities. When these areas are in grain deficit, prices are driven upward by the high cost of transporting grain to these areas from other regions. Government and donor support for improved road infrastructure and lower transport costs — both within Ethiopia and between Ethiopia and its regional neighbors — would contribute to both the productivity and stability of the food system and further increase the benefits of market liberalization.

After controlling for other exogenous factors, cereal price spreads between wholesale prices in different markets decreased after the initiation of grain market liberalization in 14 of 19 cases examined (as opposed to 17 of 19 cases where price spreads were simply calculated without

accounting for the effects of other factors). The decline in grain price spreads has conferred important benefits to both surplus-producing farmers and grain-purchasing households in deficit regions. Changes in cereal price spreads between regional surplus and deficit markets are generally explained by changes in the costs and/or margins for transportation, storage, crop finance, and related transactions costs involved in trading.

Despite these gains, however, the grain marketing system in Ethiopia still suffers from numerous constraints that inflate costs in the food system. Tariffs on grain movement have been found to add an additional 20% to 33% onto observed price spreads between surplus and deficit regions, and thus inflate the wedge between producer and consumer prices (Asfaw and Jayne 1997). While tariffs on cereal transport may raise revenue for the regional governments, these taxes work against government efforts to support producer prices in surplus-producing regions and keep consumer prices low in deficit regions. To the extent that the poor spend a greater portion of their income on basic staples, taxes that raise the price of these goods are borne disproportionately by the poor. Taxes on grain storage and/or movement, by increasing the risks and uncertainties of regional grain storage and movement, also decrease the regional interdependence between surplus and deficit regions for grain supplies and thus affect national food security.

Other research on the behavior of wholesale traders indicates the scope for significant reduction in handling and transactions costs if improvements in cereal grading and standards could be achieved. For example, Gabre-Madhin (forthcoming) reports that inadequate grading procedures cause grain to be unbagged and rebagged for quality inspection each time grain changes hands. These findings are indicative of an emerging body of empirical evidence on policy reform in Africa suggesting that, while some reforms have been critical to promote economic growth, they are insufficient by themselves to generate leaps in productivity growth and require associated improvements in key market institutions, infrastructure, and broader nurturing of civil society (Gordon 1996).

The results of this analysis indicate that the transition to a more deregulated market environment in Ethiopia has not significantly affected grain price uncertainty. Crop revenue stability is an important factor affecting farmers' decision-making process. Under highly variable revenue conditions farmers may be reluctant to make important investments such as the use of fertilizer. Variability in grain marketing margins also represents one risk factor for the private grain traders by affecting the uncertainty of revenues derived from grain trading. This also affects traders' decisions to make investments that increase the efficiency of the grain marketing system.

The goal of raising and stabilizing farm revenues can be promoted by improving the efficiency of the grain marketing system. A more efficient marketing system would help pull grain quickly out of surplus areas, thus relieving the localized gluts that depress farm prices, and more quickly deliver grain to deficit areas. Examples of investments that are likely to improve the efficiency of the grain marketing system include more timely and widely disseminated market information, improved road infrastructure, and removing barriers that raise the cost of moving grain from one region to another. The continuation of competitive local purchase operations during large harvest years, guided by timely information on marketed supplies and prices, could also stimulate private investment in the food system, promote competition, and reduce grain and input marketing costs over the longer run.

REFERENCES

Asfaw, Alemu. 1997. Cereal Price Stabilization: Issues, Options, Costs and Benefits. Paper presented at the Second Annual Grain Market Research Project Workshop, December 8, Nazereth, Ethiopia.

Asfaw, Negassa, and T.S. Jayne. 1997. *Response of Ethiopian Cereal Markets to Reform*. Working Paper 6, Grain Market Research Project. Addis Ababa: Ministry of Economic Development and Cooperation.

Barrett, Christopher. 1997. Food Marketing Liberalization and Trader Entry: Evidence from Madagascar. *World Development* 25.5:763-777.

Dercon, Stefan. 1994. *Food Markets, Liberalization and Peace in Ethiopia: An Econometrics Analysis*. Oxford: Centre for the Study of African Economies.

Franzel, Steven, Forrest Colburn, and Getahun Degu. 1989. Grain Marketing Regulations: Impact on Peasant Production in Ethiopia. *Food Policy* 14.5: 347-358.

Gabre-Madhin, E. (Forthcoming). Grain Market Performance and Transaction Costs in Ethiopia. Ph.D. thesis, Stanford University.

Gordon, D. 1996. Sustaining Economic Reform Under Political Liberalization in Africa: Issues and Implications. *World Development* 24.9:1527-1538.

Jayne, T.S., and S.P. Jones. 1997. Food Marketing and Pricing Policy in Eastern and Southern Africa: A Survey. *World Development* 25.9.

Judge, G., R.C. Hill, W. Griffiths, H. Lutkepohl, and T.C. Lee. 1985. *Introduction to the Theory and Practice of Econometrics*, 2nd edition. John Wiley (ed). New York.

Lirenso, Alemeyehu. 1995. Grain Market Reform and Food Security in Ethiopia. Paper presented at the World Bank Seminar on Agricultural Policy in Ethiopia, June 15, Washington, D.C.

Sims, Christopher A. 1980. Macroeconomics and Reality. *Econometrica* 48.1:1-48.

Sims, Christopher A. 1982. *Policy Analysis with Econometric Models.* Paper No. 1, Brookings Papers on Economic Activity. Washington, D.C.

Tomek, William G., and Robert J. Myers. 1993. Empirical Analysis of Agricultural Commodity Prices: A Viewpoint. *Review of Agricultural Economics* 15.1:181-202.

World Bank. 1981. Accelerating African Agricultural Development. Washington, D.C.: World Bank.

MSU International Development Papers

How to order from the MSU Bulletin Office:

All domestic orders under $100 must be prepaid either by check or credit card. Make checks payable to MICHIGAN STATE UNIVERSITY. Charges against credit cards (VISA and MasterCard) must be accompanied by the card's full number and expiration date and the cardholder's signature and daytime business/home phone number. Orders totaling $100 or more can be billed by MSU. Institutions and firms should use their official purchase order.

All foreign orders must be prepaid only in U.S. dollars by American Express Money Order, International Money Order, U.S.A. Postal Money Order, U.S. Dollar World Money Order, or check, which must be drawn on a United States bank.

For foreign orders, include an additional 20 percent for surface postage. For air mail orders, please call for the appropriate amount due.

Please do not send cash. Payment must be included with orders. All sales are final. When ordering from the Bulletin Office by mail, you will need each item's complete identification number and price. Be sure to print your complete address, including ZIP code.

Fill out and send the order form provided to:

MSU Bulletin Office
10-B Agriculture Hall
Michigan State University
East Lansing, MI 48824-1039
Fax: (517)353-7168
Tel: (517)355-0240
E-mail: distbulk@msue.msu.edu

Selected copies are available free of charge to individuals in developing countries, although supplies of these are limited. If free copies are no longer available, MSU will send you order information. USAID officials may obtain free copies through A.I.D.'s Development Information System (CDIE) or single copies are available free of charge by writing to the above address at Michigan State University.

Available from the MSU Bulletin Office

MSU INTERNATIONAL DEVELOPMENT PAPERS

IDP 13 ..... *Sources and Effects of Instability in the World Rice Market* by T. S. Jayne. 1993. 104 pp. $11.00 **(CDIE reference PN-ABJ-359)**

IDP 14 ..... *The Impact of Agricultural Technology in Sub-Saharan Africa: A Synthesis of Symposium Findings* by James F. Oehmke and Eric C. Crawford. 1993. 33 pp. $7.00 **(CDIE reference PN-ABP-321)**

IDP 14F ..... *L'Impact de la technologie agricole en Afrique subsaharienne: Synthese des conclusions du colloque* par James F. Oehmke and Eric W. Crawford. 1993. 34 pp. $7.00 **(CDIE reference PN-ABQ-056)**

IDP 15 ..... *Market-Oriented Strategies to Improve Household Access to Food: Experience from Sub-Saharan Africa* by T.S. Jayne, D.L. Tschirley, John M. Staatz, James D. Shaffer, Michael T. Weber, Munhamo Chisvo, and Mulinge Mukumbu.* 1994. 61 pp. $9.00 **(CDIE reference PN-ABS-755)**

IDP 16 ..... *Improving the Measurement and Analysis of African Agricultural Productivity: Promoting Complementarities between Micro and Macro Data* by Valerie Kelly, Jane Hopkins, Thomas Reardon, and Eric Crawford. 1995. 44 pp. $7.00 **(CDIE reference pending)**

IDP 17 ..... *Promoting Food Security in Rwanda Through Sustainable Agricultural Productivity: Meeting the Challenges of Population Pressure, Land Degradation, and Poverty* by Daniel C. Clay, Fidele Byiringiro, Jaakko Kangasniemi, Thomas Reardon, Bosco Sibomana, Laurence Uwamariya, and David Tardif-Douglin. 1995. 115 pp. $11.00 **(CDIE reference PN-ABX-501)**

IDP 18 ..... *Promoting Farm Investment for Sustainable Intensification of African Agriculture* by Thomas Reardon, Eric Crawford, and Valerie Kelly. 1995. 37 pp. $7.00 **(CDIE reference PN-ABX-753)**

IDP 19 ..... *Effects of Market Reform on Access to Food by Low-Income Households: Evidence from Four Countries in Eastern and Southern Africa* by T.S. Jayne, L. Rubey, D. Tschirley, M. Mukumbu, M. Chisvo, A. Santos, M. Weber, and P. Diskin. 1995. 83 pp. $9.00. **(CDIE reference PN-ABX-754)**

IDP 20 ..... *Cash Crop and Foodgrain Productivity in Senegal: Historical View, New Survey Evidence, and Policy Implications* by Valerie Kelly, Bocar Diagana, Thomas Reardon, Matar Gaye, and Eric Crawford. 1996. 140 pp. $13.00 **(CDIE reference PN-ABY-173)**

IDP 22 ..... *Determinants of Farm Productivity in Africa: A Synthesis of Four Case Studies* by Thomas Reardon, Valerie Kelly, Eric Crawford, Thomas Jayne, Kimseyinga Savadogo, and Daniel Clay. 1996. 50 pp. $7.00 **(CDIE reference pending)**

WORKING PAPERS

IDWP 39/1 ..... *The Impact of Investments in Maize Research and Dissemination in Zambia. Part I: Main Report.* Julie Howard with George Chitalu and Sylvester Kalonge. 1993. 112 pp. $11.00 **(CDIE reference PN-ABS-724)**

IDWP 39/2 ..... *The Impact of Investments in maize Research and Dissemination in Zambia. Part II: Annexes.* Julie Howard with George Chitalu and Sylvester Kalonge. 1993. 81 pp. $9.00 **(CDIE reference PN-ABS-727)**

IDWP 40 ..... *An Economic Analysis of Research and Technology Transfer of Millet, Sorghum, and Cowpeas in Niger* by Valentina Mazzucato and Samba Ly. 1994. 104 pp. $11.00. **(CDIE reference PN-ABT-283 or PN-ABS-728)**

IDWP 41 ..... *Agricultural Research Impact Assessment: The Case of Maize Technology Adoption in Southern Mali* by Duncan

Boughton and Bruno Henry de Frahan. 1994. 95 pp. $11.00 **(CDIE reference PN-ABS-729)**

IDWP 42 ..... *The Rate of Return to Agricultural Research in Uganda: The Case of Oilseeds and Maize* by Rita Laker-Ojok. 1994. 56 pp. $7.00 **(CDIE reference PN-ABS-730)**

IDWP 43 ..... *Assessing the Impact of Cowpea and Sorghum Research and Extension in Northern Cameroon* by James A. Sterns and Richard H. Bernsten. 1994. 48 pp. $7.00 **(CDIE reference PN-ABS-731)**

IDWP 44 ..... *Food Security II Cooperative Agreement: Project Fact Sheets (1994 Version)* by MSU Food Security II Research Team. 1994. 104 pp. $11.00 **(CDIE reference PN-ABW-277)**

IDWP 45 ..... *The Potential Returns to Oilseeds Research in Uganda: The Case of Groundnuts and Sesame* by Rita Laker-Ojok. 1994. 50 pp. $7.00 **(CDIE reference pending)**

IDWP 46 ..... Understanding Linkages among Food Availability, Access, Consumption, and Nutrition in Africa: Empirical Findings and Issues from the Literature by Patrick Diskin.* 1994. 47 pp. $7.00 **(CDIE reference PN-ABS-732)**

IDWP 47 ..... *Targeting Assistance to the Poor and Food Insecure: A Review of the Literature* by Mattias Lundberg and Patrick Diskin.* 1994. 56 pp. $7.00 **(CDIE reference PN-ABS-733)**

IDWP 48 ..... *Interactions Between Food Market Reform and Regional Trade in Zimbabwe and South Africa: Implications for Food Security* by T.S. Jayne, T. Takavarasha, and Johan van Zyl. 1994. 39 pp. $7.00 **(CDIE reference pending)**

IDWP 49 ..... *A Strategic Approach to Agricultural Research Program Planning in Sub-Saharan Africa*, by Duncan Boughton, Eric Crawford, Julie Howard, James Oehmke, James Shaffer, and John Staatz. 1995. 59 pp. $9.00 **(CDIE reference PN-ABU-948)**

IDWP 49F ..... *Une approche stratégique pour la planification du programme de recherche agricole en Afrique sub-saharienne*, by Duncan Boughton, Eric Crawford, Julie Howard, James Oehmke, James Shaffer et John Staatz. 1997. 67 pp. $9.00 **(CDIE reference PN-ACA-071)**

IDWP 50 ..... *An Analysis of Alternative Maize Marketing Policies in South Africa*, by T.S. Jayne, Milan Hajek and Johan van Zyl. 1995. 51 pp. $7.00 **(CDIE reference PN-ABW-091)**

IDWP 51 ..... *Confronting the Silent Challenge of Hunger: A Conference Synthesis,* by T.S. Jayne, David Tschirley, Lawrence Rubey, Thomas Reardon, John M. Staatz, and Michael Weber. 1995. 37 pp. $7.00 **(CDIE reference PN-ABW-276)**

IDWP 52 ..... *An Ex-Ante Evaluation of Farming Systems Research in Northeastern Mali: Implications for Research and Extension Policy,* by Bruno Henry de Frahan. 1995. 82 pp. $9.00 **(CDIE reference pending)**

IDWP 53 ..... *Who Eats Yellow Maize? Preliminary Results of a Survey of Consumer Maize Preferences in Maputo, Mozambique,* by David L. Tschirley and Ana Paula Santos. 1995. 16 pp. $7.00 **(CDIE reference PN-ABX-988)**

IDWP 54 ..... *Food Security II Cooperative Agreement: Project Fact Sheets (1995/96 Version),* compiled by MSU Food Security II Research Team. 1996. 151 pp. $13.00. **(CDIE reference PN-ABY-072)**

IDWP 55 ..... *Trends in Real Food Prices in Six Sub-Saharan African Countries*, by T.S. Jayne, et al. 1996. 70 pp. $9.00 **(CDIE reference PN-ABY-172)**

IDWP 56 ..... *Food Marketing and Pricing Policy in Eastern and Southern Africa: Lessons for Increasing Agricultural Productivity and Access to Food*, by T.S. Jayne and Stephen Jones. 1996. 40 pp. $7.00 **(CDIE reference PN-ABY-547)**

IDWP 57 ..... *An Economic and Institutional Analysis of Maize Research in Kenya*, by Daniel David Karanja. 1996. 24 pp. $7.00 **(CDIE reference PN-ABY-548)**

IDWP 58 ..... *Fighting an Uphill Battle: Population Pressure and Declining Land Productivity in Rwanda* by Daniel C. Clay. 1996. 28 pp. $7.00 **(CDIE reference PN-ABM-627)**

IDWP 59 ..... *Finding the Balance Between Agricultural and Trade Policy: Rwanda Coffee Policy in Flux* by David Tardif-Douglin, Jean-Léonard Ngirumwami, Jim Shaffer, Anastase Murekezi, and Théobald Kampayana. 1996. 14 pp. $7.00 **(CDIE reference PN-ABY-802)**

IDWP 60 ..... *Agriculture R&D and Economic Growth* by Elias Dinopoulos. 1996. 25 pp. $7.00 **(CDIE reference pending)**

IDWP 61 ..... *Zambia's Stop-And-Go Revolution: The Impact of Policies and Organizations on the Development and Spread of Maize Technology* by Julie A. Howard and Catherine Mungoma. 1996. 39 pp. $7.00 **(CDIE reference PN-ABY-803)**

IDWP 62 ..... *Intrahousehold Allocations: A Review of Theories, Empirical Evidence and Policy Issues* by John Strauss and Kathleen Beegle. 1996. 60 pp. $9.00 **(CDIE reference PN-ABY-848)**

IDWP 63 ..... *Transforming Poultry Production and Marketing in Developing Countries: Lessons Learned with Implications for Sub-Saharan Africa* by Laura L. Farrelly. 1996. 46 pp. $7.00 **(CDIE reference PN-ABY-849)**

IDWP 64 ..... *Market Information Sources Available Through the Internet: Daily to Yearly Market and Outlook Reports, Prices, Commodities and Quotes* by Jean-Charles Le Vallée. 1996. 21 pp. $7.00 **(CDIE reference PN-ABZ-754)**

IDWP 65 ..... *Food Security II Cooperative Agreement: Project Fact Sheets (1996 Version)* by MSU Food Security II Research Team. 1997. 190 pp. $15.00 **(CDIE reference PN-ABZ-902)**

IDWP 66 ..... *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. 1997. 39 pp. $7.00 **(CDIE reference PN-ACB-867)**

IDWP 67 ..... *Final Report--Workshop on Experiences and Options for Priority Setting in NARS, August 12-16, 1996, Nairobi, Kenya,* edited by Julie Howard and Eric Crawford. 1997. 76 pp. $9.00 **(CDIE reference PN-ACB-868)**

IDWP 68 ..... *The Effect of Liberalization on Grain Prices and Marketing Margins in Ethiopia,* by T.S. Jayne, Asfaw Negassa, and Robert J. Myers. 1998. 21 pp. $7.00 **(CDIE reference pending)**

..... * Also published by A.I.D./Washington

Mail your marked form (via mail or fax) to:

MSU Bulletin Office

10-B Agriculture Hall

Michigan State University

East Lansing, MI 48824-1039

Fax: (517) 353-7168

Phone: (517) 355-0240

E-mail:
distbulk@msue.msu.edu

ORDER FORM for Papers Available from MSU

Required with all charge card orders:

Check one: _____ VISA ____MasterCard

Card number: _____

Signature: _____

Expiration Date: _____ Daytime Phone Number: ( )_____

SHIP TO:
Name: _____
Address: _____
_____
_____
_____

Domestic orders totaling $100 or more can be billed by MSU. Institutions and firms should use their official purchase order. All other orders, including foreign orders, must be pre-paid.

Mark each choice with the quantity needed and enter total charges.

____IDP 13 $11.00	____IDWP 42 $7.00	____IDWP 55 $9.00
____IDP 14 $7.00	____IDWP 43 $7.00	____IDWP 56 $7.00
____IDP 14F $7.00	____IDWP 44 $11.00	____IDWP 57 $7.00
____IDP 15 $9.00	____IDWP 45 $7.00	____IDWP 58 $7.00
____IDP 16 $7.00	____IDWP 46 $7.00	____IDWP 59 $7.00
____IDP 17 $11.00	____IDWP 47 $7.00	____IDWP 60 $7.00
____IDP 18 $7.00	____IDWP 48 $7.00	____IDWP 61 $7.00
____IDP 19 $9.00	____IDWP 49 $9.00	____IDWP 62 $9.00
____IDP 20 $13.00	____IDWP 49F $9.00	____IDWP 63 $7.00
____IDP 22 $7.00	____IDWP 50 $7.00	____IDWP 64 $7.00
____IDWP 39/1 $11.00	____IDWP 51 $7.00	____IDWP 65 $15.00
____IDWP 39/2 $9.00	____IDWP 52 $9.00	____IDWP 66 $7.00
____IDWP 40 $11.00	____IDWP 53 $7.00	____IDWP 67 $9.00
____IDWP 41 $11.00	____IDWP 54 $13.00	____IDWP 68 $7.00

Sub-Total	$_____
20% (foreign orders, surface mail)	$_____
International Airmail postage (call or e-mail for rates)	$_____
Total Amount	$_____

The MSU International Development Papers published before 1993 (IDP numbers 1-11, IDWP numbers 1-38, and RP numbers 1-31) may be obtained through A.I.D.'s Development Information System (CDIE) and are not available from the MSU Bulletin Office.

How to Order MSU International Development Papers from USAID:

The MSU International Development Papers published before 1993 (IDP numbers 1-11, IDWP numbers 1-38, and RP numbers 1-31) may be obtained **only** through A.I.D.'s Development Information System (CDIE).

The CDIE reference numbers are shown on the following list. They are also available in A.I.D.'s Development Information System CD-ROM Database (CD-DIS), which is available to USAID missions and to USAID/W offices free of charge and to the public for an annual subscription fee.

USAID's Internet Gopher address: GOPHER.INFO.USAID.GOV. Citations (including abstracts) to USAID documents can be found under the Gopher main menu item "Reports and Publications." Document identification necessary to order the full document in paper or microfiche form from the Development Information Services Clearinghouse (DISC) is included with the citations.

If you would like to order any of the pre-1993 IDP's, IDWP's or RP's, please do not request them from MSU, but send your request--with the correct CDIE reference number--directly to the DISC:

Mail: Development Information Services Clearinghouse

1500 Wilson Blvd., Suite 1010

Arlington, VA 22209-2404

Telephone: 703-351-4006

Fax: 703-351-4039

Telex: 703-351-4038

Internet e-mail address: AIDDISC@CAPCON.NET

If you cannot provide the CDIE reference number for the publication you wish to order, contact the A.I.D. Development Information Center Reference Librarian, who will supply you with the complete order information:

Telephone: 703-875-4818
Fax: 703-875-5269

Prices

Documents are provided to AID employees without charge. Others are required to pay reproduction and mailing/handling costs. Current prices may be obtained by contacting the Document Distribution Unit. A limited number of microfiche copies are provided without charge to LDC institutions.

Exchange programs

CDIE has established reciprocal agreements with selected development organizations who provide documents or other information resources to CDIE in exchange for distribution of CDIE documents or information. The materials received as a result of these exchange agreements are located in CDIE.

Deposit accounts

Deposit accounts may be established by USAID contractors and other users to facilitate the payment for documents ordered.

Available in A.I.D.'s Development Information System (CDIE)

MSU INTERNATIONAL DEVELOPMENT PAPERS

IDP 1 ..... *Research on Agricultural Development in Sub-Saharan Africa: A Critical Survey* by Carl K. Eicher and Doyle C. Baker. 1982. 346 pp. **(CDIE reference PN-AAL-692)**

IDP 1F ..... *Etude Critique de la Recherche sur la Developpement Agricole en Afrique Subsaharienne* par Carl K. Eicher et Doyle C. Baker. 1982. 345 pp. **(CDIE reference PN-ABA-840)**

IDP 2 ..... *A Simulation Study of Constraints on Traditional Farming Systems in Northern Nigeria* by Eric W. Crawford. 1982. 136 pp. **(CDIE reference PN-AAP-677)**

IDP 3 ..... *Farming Systems Research in Eastern Africa: The Experience of CIMMYT and Some National Agricultural Research Services, 1976-81* by M.P. Collinson. 1982. 67 pp. **(CDIE reference PN-AAM-826)**

IDP 4 ..... *Animal Traction in Eastern Upper Volta: A Technical, Economic and Institutional Analysis* by Vincent Barrett, Gregory Lassiter, David Wilcock, Doyle Baker, and Eric Crawford. 1982. 132 pp. **(CDIE reference PN-AAM-262)**

IDP 5 ..... *Socio-Economic Determinants of Food Consumption and Production in Rural Sierra Leone: Application of an Agricultural Household Model with Several Commodities* by John Strauss. 1983. 91 pp. **(CDIE reference PN-AAM-031)**

IDP 6 ..... *Applications of Decision Theory and the Measurement of Attitudes Towards Risk in Farm Management Research in Industrialized and Third World Settings* by Beverly Fleisher and Lindon J. Robison. 1985. 105 pp. **(CDIE reference PN-AAU-740)**

IDP 7 ..... *Private Decisions and Public Policy: The Price Dilemma in Food Systems in Developing Countries* by Peter Timmer. 1986. 58 pp. **(CDIE reference PN-AAZ-091)**

IDP 8 ..... *Rice Marketing in Senegal River Valley: Research Findings and Policy Reform Options* by Michael L. Morris. 1987. 89 pp. **(CDIE reference PN-AAZ-092)**

IDP 9 ..... *Small Scale Industries in Developing Countries: Empirical Evidence and Policy Implications* by Carl Liedholm and Donald Mead. 1987. 141 pp. **(CDIE reference PN-AAX-734)**

IDP 10 ..... *Maintaining the Momentum in Post-Green Revolution Agriculture: A Micro-Level Perspective from Asia* by Derek Byerlee. 1987. 57 pp. **(CDIE reference PN-AAZ-093)**

IDP 11 ..... *The Economics of Smallholder Maize Production in Zimbabwe: Implications for Food Security* by David D. Rohrbach. 1989. 100 pp. **(CDIE reference PN-ABD-549)**

WORKING PAPERS

IDWP 1 ..... *Farming Systems Research (FSR) in Honduras, 1977-81: A Case Study* by Daniel Galt, Alvaro Diaz, Mario Contreras, Frank Peairs, Joshua Posner, and Franklin Rosales. 1982. 48 pp. **(CDIE reference PN-AAM-827)**

IDWP 2 ..... *Credit Agricole et Credit Informal dans la Region Orientale de Haute-Volta: Analyse Economique, Performance Institutionnelle et Implications en Matiere de Politique de Developpement Agricole* by Edouard K. Tapsoba. 1982. 125 pp. **(CDIE reference PN-AAZ-527)**

IDWP 3 ..... *Employment and Construction: Multicountry Estimates of Costs and Substitutions Elasticities for Small Dwellings* by W.P. Strassmann. 1982. 42 pp. **(CDIE reference PN-AAM-455)**

IDWP 4 ..... *Sub-Contracting in Rural Areas of Thailand* by Donald C. Mead. 1982. 53 pp. **(CDIE reference PN-AAN-192)**

IDWP 5 ..... *Microcomputers and Programmable Calculators for Agricultural Research in Developing Countries* by Michael T. Weber, James Pease, Warren Vincent, Eric W. Crawford, and Thomas Stilwell. 1983. 113 pp. **(CDIE reference PN-AAN-441)**

IDWP 6 ..... *Periodicals for Microcomputers: An Annotated Bibliography* by Thomas Stilwell. 1983. 70 pp. **(CDIE reference PN-AAN-443)**

IDWP 7 ..... *Employment and Housing in Lima, Peru* by Paul Strassmann. 1983. 96 pp. **(CDIE reference PN-AAN-396)**

IDWP 8 ..... *Faire Face a la Crise Alimentaire de l'Afrique* by Carl K. Eicher. 1983. 29 pp. **(CDIE reference PN-AAN-444)**

IDWP 9 ..... *Software Directories for Microcomputers: An Annotated Bibliography* by Thomas C. Stilwell. 1983. 14 pp. **(CDIE reference PN-AAN-442)**

IDWP 10 ..... *Instructional Aids for Teaching How to Use the TI-59 Programmable Calculator* by Ralph E. Hepp. 1983. 133 pp. **(CDIE reference PN-AAP-133)**

IDWP 11 ..... *Programmable Calculator (TI-59) Programs for Marketing and Price Analysis in Third World Countries* by Michael L. Morris and Michael T. Weber. 1983. 105 pp. **(CDIE reference PN-AAP-134)**

IDWP 12 ..... *An Annotated Directory of Statistical and Related Microcomputer Software for Socioeconomic Data Analysis* by Valerie Kelly, Robert D. Stevens, Thomas Stilwell and Michael T. Weber. 1983. 165 pp. **(CDIE reference PN-AAP-135)**

IDWP 13 ..... *Guidelines for Selection of Microcomputer Hardware* by Chris Wolf. 1983. 90 pp. **(CDIE reference PN-AAR-106)**

IDWP 14 ..... *User's Guide to BENCOS A SuperCalc Template for Benefit-Cost Analysis* by Eric W. Crawford, Ting-Ing Ho and A. Allan Schmid. 1984. 35 pp. **(CDIE reference PN-AAQ-682)**

IDWP 15 ..... *An Evaluation of Selected Microcomputer Statistical Programs* by James W. Pease and Raoul Lepage with Valerie Kelly, Rita Laker-Ojok, Brian Thelen, and Paul Wolberg. 1984. 187 pp. **(CDIE reference PN-AAQ-683)**

IDWP 16 ..... *Small Enterprises in Egypt: A study of Two Governorates* by Stephen Davies, James Seale, Donald C. Mead, Mahmoud Badr, Nadia El Sheikh and Abdel Rahman Saidi. 1984. 187 pp. **(CDIE reference PN-AAU-610)**

IDWP 17 ..... *Microcomputer Statistical Packages for Agricultural Research* by Thomas C. Stilwell. 1984. 23 pp. **(CDIE reference PN-AAZ-516)**

IDWP 18 ..... *An Annotated Directory of Citation Database, Educational, System Diagnostics and Other Miscellaneous Microcomputer Software of Potential Use to Agricultural Scientists in Developing Countries* by Thomas C. Stilwell and P. Jordan Smith. 1984. 34 pp. **(CDIE reference PN-AAZ-523)**

IDWP 19 ..... *Irrigation in Southern Africa: An Annotated Bibliography* by Amalia Rinaldi. 1985. 60 pp. **(CDIE reference PN-AAZ-524)**

IDWP 20 ..... *A Microcomputer Based Planning and Budgeting System for Agricultural Research Programs* by Daniel C. Goodman, Jr., Thomas C. Stilwell and P. Jordan Smith. 1985. 75 pp. **(CDIE reference PN-AAZ-525)**

IDWP 21 ..... *Periodicals for Microcomputers: An Annotated Bibliography, Second Edition* by Thomas C. Stilwell. 1985. 89 pp. **(CDIE reference PN-AAZ-526)**

IDWP 22 ..... *Software Directories for Microcomputers: An Annotated Bibliography, Second Edition* by Thomas C. Stilwell. 1985. 21 pp. **(CDIE reference PN-AAZ-528)**

IDWP 23 ..... *A diagnostic Perspective Assessment of the Production and Marketing System for Mangoes in the Eastern Caribbean* by Alan Hrapsky with Michael Weber and Harold Riley. 1985. 106 pp. **(CDIE reference PN-AAZ-529)**

IDWP 24 ..... *Subcontracting Systems and Assistance Programs: Opportunities for Intervention* by Donald C. Mead. 1985. 32 pp. **(CDIE reference PN-AAZ-943)**

IDWP 25 ..... *Small Scale Enterprise Credit Schemes: Administrative Costs and the Role of Inventory Norms* by Carl Liedholm. 1985. 23 pp. **(CDIE reference PN-AAU-615)**

IDWP 26 ..... *Subsector Analysis: Its Nature, Conduct and Potential Contribution to Small Enterprise Development* by James J. Boomgard, Stephen P. Davies, Steve Haggblade and Donald Mead. 1986. 57 pp. **(CDIE reference PN-AAZ-101)**

IDWP 27 ..... *The Effect of Policy and Policy Reforms on Non-Agricultural Enterprises and Employment in Developing Countries: A Review of Past Experiences* by Steve Haggblade, Carl Liedholm, and Donald C. Mead. 1986. 133 pp. **(CDIE reference PN-AAV-001)**

IDWP 28 ..... *Rural Small Scale Enterprises in Zambia: Results of a 1985 Country-Wide Survey* by John T. Milimo and Yacob Fisseha. 1986. 76 pp. **(CDIE reference PN-AAZ-102)**

IDWP 29 ..... *Fundamentals of Price Analysis in Developing Countries' Food Systems: A Training Manual to Accompany the Microcomputer Software Program 'MSTAT'* by Stephen Goetz and Michael T. Weber. 1986. 148 pp. **(CDIE reference PN-AAZ-103)**

IDWP 30 ..... *Rapid Reconnaissance Guidelines for Agricultural Marketing and Food System Research in Developing Countries* by John S. Holtzman. 1986. 75 pp. **(CDIE reference PN-AAZ-104)**

IDWP 31 ..... *Contract Farming and Its Effect on Small Farmers in Less Developed Countries* by Nicholas William Minot. 1986. 86 pp. **(CDIE reference PN-AAZ-105)**

IDWP 32 ..... *Food Security Policy and the Competitiveness of Agriculture in the Sahel: A Summary of the "Beyond Mindelo" Seminar* by Thomas S. Jayne and Nicholas Minot. 1989. 27 pp. **(CDIE reference PN-ABF-570)**

IDWP 33 ..... *Small Scale Manufacturing Growth in Africa: Initial Evidence* by Carl Liedholm and Joan Parket. 1989. 18 pp. **(CDIE reference PN-ABB-945)**

IDWP 34 ..... *Food Security and Economic Growth in the Sahel: A Summary of the September 1989 Cereals Workshop* by Victoire C. D'Agostino and John M. Staatz. 1989. 44 pp. **(CDIE reference PN-ABD-956)**

IDWP 35 ..... *User's Manual for the SADCC Cereals Trade Database Compiled by the University of Zimbabwe and Michigan State University* by David Kingsbury. 1989. 44 pp. **(CDIE reference PN-ABF-378)**

IDWP 36 ..... *Managing Food Security Action Programs in Botswana* by Sisay Asefa. 1989. 36 pp. **(CDIE reference PN-ABF-377)**

IDWP 37 ..... *User's Guide to BENCOS Lotus 1-2-3 Templates for Benefit-Cost Analysis* by Eric Crawford and A. Allan Schmid. 1990. 23 pp. **(CDIE reference PN-ABF-530)**

IDWP 38 ..... *Research Methods in the MSU Food Security in Africa Project: Conceptualizing and Implementing Policy Relevant Studies* by James F. Tefft with Michael T. Weber and John M. Staatz. 1990. 128 pp. **(CDIE reference pending)**

REPRINT PAPERS

RP 1 ..... *The Private Sector Connection to Development* by Carl Liedholm. 1986. 19 pp. **(CDIE reference PN-AAW-353)**

RP 2 ..... *Influencing the Design of Marketing Systems to Promote Development in Third World Countries* by James D. Shaffer with Michael Weber, Harold Riley and John Staatz. 1987. 21 pp. **(CDIE reference PN-AAV-230)**

RP 3 ..... *Famine Prevention in Africa: The Long View* by Carl K. Eicher. 1987. 18 pp. **(CDIE reference PN-AAZ-119)**

RP 4 ..... *Cereals Marketing in the Senegal River Valley* by Michael L. Morris. 1987. 126 pp. **(CDIE reference PN-AAZ-120)**

RP 5 ..... *The Food Security Equation in Southern Africa* by Mandivamba Rukuni and Carl K. Eicher. 1987. 32 pp. **(CDIE reference PN-AAZ-121)**

RP 6 ..... *Economic Analysis of Agronomic Trials for the Formulation of Farmer Recommendations* by Eric Crawford and Mulumba Kamuanga. 1988. 41 pp. **(CDIE reference PN-AAZ-370)**

RP 6F ..... *L'Analyse Economiques des Essais Agronomiques pour la Formulation des Recommandations aux Paysans* par Eric Crawford et Mulumba Kamuanga. 1987. 33 pp. **(CDIE reference PN-AAZ-122)**

RP 7 ..... *Economic Analysis of Livestock Trials* by Eric Crawford. 1987. 36 pp. **(CDIE reference PN-AAZ-371)**

RP 7F ..... *L'Analyse Economique des Essais Zootechniques* par Eric Crawford. 1987. 36 pp. **(CDIE reference PN-AAZ-123)**

RP 8 ..... *A Field Study of Fertilizer Distribution and Use in Senegal, 1984: Summary Report* by Eric Crawford and Valerie Kelly. 1987. 32 pp. **(CDIE reference PN-AAZ-124)**

RP 8F ..... *Enquete sur la Distribution et l'Utilisation de l'Engrais au Sénégal, 1984: Résumé Analytique* par Eric Crawford et Valerie Kelly. 1988. 43 pp. **(CDIE reference PN-ABC-173)**

RP 9 ..... *Improving Food Marketing Systems in Developing Countries: Experiences from Latin America* by Kelly Harrison, Donald Henley, Harold Riley and James Shaffer. 1987. 135 pp. **(CDIE reference PN-AAZ-125)**

RP 10 ..... *Policy Relevant Research on the Food and Agricultural System in Senegal* by Mark Newman, Eric Crawford and Jacques Faye. 1987. 30 pp. **(CDIE reference PN-AAZ-126)**

RP 10F ..... *Orientations et Programmes de Recherche Macro-Economiques sur le Systeme Agro-Alimentaire Sénégalais* par Mark Newman, Eric Crawford et Jacques Faye. 1987. 37 pp. **(CDIE reference PN-AAZ-127)**

RP 11 ..... *A Field Study of Fertilizer Distribution and Use in Senegal, 1984: Final Report* by Eric Crawford, Curtis Jolly, Valerie Kelly, Philippe Lambrecht, Makhona Mbaye, and Matar Gaye. 1987. 106 pp. **(CDIE reference PN-AAZ-128)**

RP 11F ..... *Enquête sur la Distribution et l'Utilisation de l'Engrais au Sénégal, 1984: Rapport Final* par Eric Crawford, Curtis Jolly, Valerie Kelly, Philippe Lambrecht, Makhona Mbaye, et Matar Gaye. 1987. 106 pp. **(CDIE reference pending)**

RP 12 ..... *Private and Public Sectors in Developing Country Grain Markets: Organization Issues and Options in Senegal* by Mark D. Newman, P. Alassane Sow, and Ousseynou NDoye. 1987. 14 pp. **(CDIE reference PN-AAZ-129)**

RP 13 ..... *Agricultural Research and Extension in Francophone West Africa: The Senegal Experience* by R. James Bingen and Jacques Faye. 1987. 23 pp. **(CDIE reference PN-AAV-929)**

RP 13F ..... *La Liaison Recherche-Developpement en Afrique de l'Ouest Francophone: L'Experience du Sénégal* par James Bingen et Jacques Faye. 1987. 32 pp. **(CDIE reference PN-AAZ-130)**

RP 14 ..... *Grain Marketing in Senegal's Peanut Basin: 1984/85 Situation and Issues* by Mark D. Newman. 1987. 16 pp. **(CDIE reference PN-AAZ-131)**

RP 15 ..... *Tradeoffs between Domestic and Imported Cereals in Senegal: A Marketing Systems Perspective* by Mark D. Newman, Ousseynou NDoye, and P. Alassane Sow. 1987. 41 pp. **(CDIE reference PN-AAZ-372)**

RP 15F ..... *Céréales Locales et Céréales Importées au Sénégal: La Politique Alimentaire a Partier Systemes de Commercialisation* par Mark D. Newman, Ousseynou NDoye, et P. Alassane Sow. 1987. 48 pp. **(CDIE reference PN-ABC-326)**

RP 16 ..... *An Orientation to Production Systems Research in Senegal* by R. James Bingen. 1987. 88 pp. **(CDIE reference PN-AAZ-373)**

RP 16F ..... *Orientation de la Recherche sur les Systemes de Productions au Sénégal* par R. James Bingen. 1987. 94 pp. **(CDIE reference PN-AAZ-374)**

RP 17 ..... *A Contribution to Agronomic Knowledge of the Lower Casamance (Bibliographical Synthesis)* by J.L. Posner. 1988. 47 pp. **(CDIE reference PN-AAZ-375)**

RP 17F ..... *Contribution a la Connaissance Agronomique de la Basse Casamance (Synthese Biblographique)* par J.L. Posner. 1988. 47 pp. **(CDIE reference PN-ABC-167)**

RP 18 ..... *Acquisition and Use of Agricultural Inputs in the Context of Senegal's New Agricultural Policy: The Implications of Farmers' Attitudes and Input Purchasing Behavior for the Design of Agricultural Policy and Research Programs* by Valerie Auserehl Kelly. 1988. 30 pp. **(CDIE reference PN-AAZ-376)**

RP 18F ..... *Acquisition et Utilisation d'Intrants Agricoles dans le Context de la Nouvelle Politique Agricole du Sénégal: Implications des Attitudes et du Comportement d'Achat d'Intrants des Exploitants pour l'Elaboration d'une Politique Agricole et de Programmes de Recherches* par Valerie Auserehl Kelly. 1988. 35 pp. **(CDIE reference PN-AAZ-377)**

RP 19 ..... *Farmers' Demand for Fertilizer in the Context of Senegal's New Agricultural Policy: A Study of Factors Influencing Farmers' Fertilizer Purchasing Decisions* by Valerie Auserehl Kelly. 1988. 47 pp. **(CDIE reference PN-AAZ-378)**

RP 19F ..... *Demande d'Engrais de la Part des Exploitants dans les Contexte de la Nouvelle Politique Agricole au Sénégal: Une Etude des Facteurs Influencant les Decisions d'Achat d'Engrais Prises par les Exploitants* par Valerie Auserehl Kelly. 1988. 58 pp. **(CDIE reference PN-AAZ-379)**

RP 20 ..... *Production Systems in the Lower Casamance and Farmer Strategies in Response to Rainfall Deficits* by J.L. Posner, M. Kamuanga, and S. Sall. 1988. 33 pp. **(CDIE reference PN-ABC-162)**

RP 20F ..... *Les Systemes de Production en Basse Casamance et les Stratégies Paysannes Face du Deficit Pluviométrique* par J.L. Posner, M. Kamuanga, et S. Sall. 1988. 33 pp. **(CDIE reference PN-ABC-163)**

RP 21 ..... *Informing Food Security Decisions in Africa: Empirical Analysis and Policy Dialogue* by Michael T. Weber, John M. Staatz, John S. Holtzman, Eric W. Crawford, and Richard H. Bernsten. 1989. 11 pp. **(CDIE reference PN-ABE-627)**

RP 21F ..... *Comment Informer les Decisions Traitant de la Sécurité Alimentaire en Afrique: Analyses Empiriques et Dialogue Politique* par Michael T. Weber, John M. Staatz, John S. Holtzman, Eric W. Crawford, et Richard H. Bernsten. 1989. 13 pp. **(CDIE reference PN-ABD-104)**

RP 22 ..... *The Creation and Establishment of Production Systems Research in a National Agricultural Research Institute: The Senegal Experience* by Jacques Faye, James Bingen, and Etienne Landais. 1988. 25 pp. **(CDIE reference PN-ABC-161)**

RP 23 ..... *Foreign Trade of Agricultural Products and Inputs in Senegal from 1975 to 1984* by Frederic Martin and Alioune Dieng. 1988. 45 pp. **(CDIE reference PN-ABC-164)**

RP 23F ..... *Le Commerce Exterieur de Produits et d'Intrants Agricoles du Sénégal de 1975 a 1984* par Frederic Martin et Alioune Dieng. 1990. 45 pp. **(CDIE reference PN-ABF-529)**

RP 24 ..... *Regulatory Uncertainty and Government Objectives for the Organization and Performance of Cereal Markets: The Case of Senegal* by Mark D. Newman, P. Alassane Sow, and Ousseynou NDoye. 1988. 24 pp. **(CDIE reference PN-ABC-159)**

RP 24F ..... *Incertitude Réglementaire, Objectifs Gouvernementaux, Organisation et Performances des Marchés Céréaliers: Le Cas du Sénégal* par Mark D. Newman, P. Alassane Sow, and Ousseynou NDoye. 1988. 24 pp. **(CDIE reference PN-ABC-160)**

RP 25F ..... *Etude sur la Commercialisation des Céréales dans la Région du Fleuve Sénégal: Méthodologie* par Michael Morris. 1988. 48 pp. **(CDIE reference PN-ABC-172)**

RP 26 ..... *The Regulation and Organization of Cereal Markets in Senegal: Report on the Marketing Campaigns of 1983/84 and 1984/85* by P. Alassane Sow and Mark D. Newman. 1988. 29 pp. **(CDIE reference PN-ABC-165)**

RP 26F ..... *La Réglementation et l'Organisation des Marchés Céréaliers au Sénégal: Situation des Campagnes des Commercialisation 1983/84 et 1984/85* par P. Alassane Sow et Mark D. Newman. 1988. 35 pp. **(CDIE reference PN-ABC-166)**

RP 27 ..... *Farm Level Cereal Situation in Lower Casamance: Results of a Field Study* by C.M. Jolly, M. Kamuanga, S. Sall, and J.L. Posner. 1988. 35 pp. **(CDIE reference PN-ABC-157)**

RP 27F ..... *Situation Céréaliere en Milieu Paysan en Basse Casamance: Résultats d'une Enquête de Terrain* par C.M. Jolly, M. Kamuanga, S. Sall, et J.L. Posner. 1988. 41 pp. **(CDIE reference PN-ABC-158)**

..... *Annexe 1 Budgets de Culture et Analyse des Marges dans le Bassin Arachidier.* 1988. 134 pp. **(CDIE reference PN-ABC-169)**

..... *Annexe 2 Budgets de Culture et Analyse des Marges au Sénégal Oriental et en Casamance.* 1988. 204 pp. **(CDIE reference PN-ABC-170)**

..... *Annexe 3 Budgets de Culture et Analyse des Marges dans la Vallée du Fleuve Sénégal.* 1988. 214 pp. **(CDIE reference PN-ABC-171)**

RP 29 ..... *Agricultural Development and Policy in Senegal: Annotated Bibliography of Recent Studies, 1983-89* by Eric Crawford, R. James Bingen, and Malcolm Versel. 1990. 254 pp. **(CDIE reference PN-ABE-271)**

RP 30 ..... *Lowland Cropping Systems in the Lower Casamance of Senegal: Results of Four Years of Agronomic Research (1982-1985)* by Joshua Posner, Mulumba Kamuanga, and Mamadou Lo. 1990. 130 pp. **(CDIE reference pending)**

RP 31 ..... *Farming Systems Research in Southern Senegal: The Djibelor Experience (1982-1986)* by Mulumba Kamuanga and Joshua L. Posner. 1992. 57 pp. **(CDIE reference pending)**