Food Security Research In Southern Africa: Policy Implications

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University of Zimbabwe UZ/MSU Food Security Research in Southern Africa Project

FOOD SECURITY RESEARCH IN SOUTHERN AFRICA: POLICY IMPLICATIONS

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Preface

The Food Security Research in Southern Africa Project was initiated in 1985 with a tripartite agreement among the University of Zimbabwe, Michigan State University and USAID in response to a 1980 pledge by the United States to assist SADCC in carrying out its regional food security program. The project objectives were to 1) develop a conceptual framework for analysis of food security issues in Southern Africa, 2) conduct applied research emphasizing food security policy and collection of primary data, 3) train local research professionals, and 4) promote a food security communication network among Southern Africa Universities. One only had to attend one of the seven Food Security Research in Southern Africa Conferences and/or peruse the published conference proceedings to observe that all of these objectives have been competently achieved.

An additional accomplishment of the Project has been the integration of government policy makers from throughout SADCC, as well as the international donor community, into the Conference discussions. This has guaranteed that the food security research conducted throughout the region has not been merely an academic exercise but that the results have helped inform policy decisions. Agriculture, food and nutrition policy conferences, supported by the Project, have been held in Malawi, Tanzania, Zambia and Zimbabwe to assist these governments develop policies that are effective in improving national and household food security. Active food security research projects are currently underway in Malawi, Mozambique, Swaziland, Tanzania, Zambia and Zimbabwe to support such efforts.

However, "all good things must come to an end" and this Project is no exception. The USAID SADCC regional funding, which has made all of this possible, will no longer be available after 31 March 1992. However, there is some indication that an attempt may be made by USAID/Harare to continue the annual conference, thus the networking that has been developed over the life of the Food Security Research in Southern Africa Project. A major concern is where the support for continuing food security research in the individual SADCC countries is to originate.

The Seventh Annual Conference, reported herein, examined the implications of the food security research within the region on related policy. The opening session featured Professor Chetsanga, Pro Vice-Chancellor, University of Zimbabwe, examining the role of the University in contributing to the success of Economic Structural Adjustment Programmes in the region. Dr. Ndimande, Permanent Secretary of the Ministry of Lands, Agriculture and Rural Resettlement, Zimbabwe, followed with a discussion of the policy environment for food and agriculture under the market liberalisation occurring in many countries of the region. These discussions set the scene for the technical papers that followed.

Session II, "Impact of changing grain and inputs market policies on private and public sector participation--implications for household food security and economic development", analysed the impacts of grain market reforms in Tanzania, Malawi, Zambia, Mozambique and Zimbabwe. The shift from government dominated grain marketing to systems permitting the participation of private sector entities is emerging throughout the region. Differential impacts on pricing, movement, storage and market access have been observed within the region.

Session III, "Governments' role in price determination, stock management and import-export of grains and farm inputs--implications for food security", delved deeper into some of the specific issues identified in the previous session. Session IV, "Food entitlement--policy alternatives to improve households' access to adequate food and income growth", examined this very important topic in light of experience in Malawi and Zimbabwe. It was a general consensus that many of the findings reported can be extrapolated to other countries within SADCC.

Session V, "Policy issues related to crop mix, technology and food security", brought some new data from Swaziland into the regional mix relative to the impact of cash cropping on household food security. A discussion of the role of livestock, as insurance or as a source of income to provide for household food security, brought another added dimension into consideration. The session did not overlook the all important impact of crop mix, technology transfer and related policies as they affect household food security.

A look at both the past and the future of Food Security Research in Southern Africa wrapped up the discussions of the Seventh Food Security Research in Southern Africa Conference. Many of the contributions of the UZ/MSU Project to the information base, capacity building and policy networking within SADCC were highlighted together with the need to continue research to further the analytical base for policy making. It was concluded that the UZ/MSU Food Security Research in Southern Africa Project has provided a solid empirical base for policy makers within SADCC. The responsibility for advancing this knowledge base now rests with the regional cadre of professionals and policy makers within SADCC.

Acknowledgements

These proceedings report the research findings presented in formal papers and informal discussions at the Seventh Food Security Research in Southern Africa Conference held at the Makasa Sun Hotel, Victoria Falls, Zimbabwe, October 28-30, 1991. Researchers from throughout the SADCC region shared their expertise with policy makers, donor representatives and government officials for the seventh and last time under the auspices of the UZ/MSU Food Security Research in Southern Africa Project. Their efforts are much appreciated.

The project office has served as the focal point in the SADCC region for those in the six countries hosting food security research as well as persons searching for the latest information and empirical findings. Credit for handling the duties and responsibilities goes to Ms. Florence Chitepo backed by the other project and Department of Agricultural Economics and Extension staff. Special appreciation is due Peter Hopkins, Andrew Barnes and Daphne Chanakira for their logistical and other support throughout the year, but especially at the Conference in Victoria Falls.

A special note of thanks goes to the University of Zimbabwe and its Department of Agricultural Economics and Extension which has served as the Project's host through the years. Backup received from Michigan State University is also appreciated. Dr. Robert Armstrong has served as the project's USAID program officer this year and his easy access and cooperation has been important.

Finally, the page layout and Typesetting has been done by Terry-Ann Koen to whom we are much indebted for filling in as the Project Assistant for the last few months of the Project. Our thanks to all who have contributed to the success of this Project.

Mandivamba Rukuni

J.B. Wyckoff

I

Official Opening

1

ECONOMIC STRUCTURAL ADJUSTMENT PROGRAMMES: THE ROLE AND CONTRIBUTION OF THE UNIVERSITY

Professor C. J. Chetsanga [1]

It gives me great pleasure to welcome you to the **SEVENTH ANNUAL FOOD SECURITY RESEARCH IN SOUTHERN AFRICA CONFERENCE.** It is most appropriate that this **SEVENTH CONFERENCE** be held here in Victoria Falls, one of the **SEVEN WONDERS OF THE WORLD.** The presence of so many of our colleagues from the SADCC region as well as from Europe, North America and Australia is quite gratifying as it confirms the importance of our conference theme: **"POLICY IMPLICATIONS OF FOOD SECURITY RESEARCH IN SOUTHERN AFRICA".** The four major sessions:

* Impact of changing grain and inputs market policies on private and public sector participation--Implications for household food security and economic development,
* Governments role in price determination, stock management and import-export of grains and farm inputs--Implications for food security,
* Food entitlement--Policy alternatives to improve households' access to adequate food and income growth, and
* Policy issues related to crop mix, technology and food security,

deal with topics high on the agenda of policy makers throughout the SADCC region. The special mix of academic researchers and "real policy makers" from the SADCC region at this conference provides a rare opportunity for rationalising theory and practice in developing food security policy for the countries in the SADCC region.

This conference is again co-sponsored by the SADCC Food Security Technical and Administrative Unit and the Department of Agricultural Economics and Extension of the University of Zimbabwe. Unfortunately it is the last of this series to be so sponsored as the University of Zimbabwe/Michigan State University Food Security Research in Southern Africa Project is coming to an end. With active research currently underway in six of the ten SADCC countries, the project has been able to generate a

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[1] **Acting Vice Chancellor, University of Zimbabwe**

underway in six of the ten SADCC countries, the project has been able to generate a sound food security research base and facilitate a regionwide network of food security researchers and policy makers. We appreciate the financial support received from USAID which has made this effort possible.

The countries comprising SADCC have many common characteristics. One of the less desirable ones is the tendency toward slow or declining economic growth. This has necessitated the implementation of "Structural Adjustment Programmes" to revitalise their economies. Zimbabwe has recently initiated such a programme which has raised the question, **"What role can and should the University play in making this effort a success?".**

Universities have several functions, not the least of which are:

* Teaching,
* Research, and
* Extension.

How can these functions be focused towards assisting in the design and implementation of Economic Structural Adjustment Programmes?
Let us first examine the teaching function.

The emphasis of most SADCC Universities, in the first few years following independence, generally was on correcting inherited social inequities and providing required social services. These were properly the responsibility of the public sector and the Universities responded by training students in the appropriate disciplines. As these new governments grew, they tended to dominate the economic sector as well, discouraging the participation of the private sector. Eventually, the demands of rapidly growing populations and their aspirations exceeded the capacity of the government to supply them and "Structural Adjustment" becomes necessary.

The problem is that the University system, which appropriately responded to the earlier needs of the society, now must shift their teaching resources towards the needs of the evolving economic system, i.e., the development of the private sector. As such their graduates must be:

* Trained in skills and knowledge necessary to design and implement "Structural Adjustment Programmes",
* Endowed with an entrepreneurial attitude and associated skills designed to help them succeed in self-employment,
* Capable of taking over those businesses that the government has not been able to operate economically and operate them efficiently and profitably, and

* Able to provide the economic leadership and creativeness that encourages the private investment needed to generate employment for the large number of school leavers seeking jobs in the nation's economy.

Simultaneously, the Universities' research system must be:

* Oriented towards conducting research relevant to support the design and implementation of the "Economic Structural Adjustment Programme",
* Capable of doing policy relevant research that can be fed into and impact the policy making process, and
* Unbiased and able to produce research free from political, donor and interest group pressure.

Finally, the Universities' extension and outreach program must:

* Publish and disseminate research results to all interested parties without fear or favour, and
* Work with small scale entrepreneurs in all sectors of the economy to provide them with relevant advice and assistance to overcome existing and anticipated constraints.

However, Universities can only successfully carry out their responsibilities, including those outlined above, **if** certain conditions exist. These include:

* The maintenance of an environment in which academic freedom is protected and encouraged, intellectual creativeness is stimulated and rewarded, and social responsibility is practiced toward **all** persons and segments of society,
* The creation of a working environment and financial and professional reward systems within the University that makes it possible to recruit and retain competent faculty and support staff,
* The continuous administrative, academic and financial support of research and extension activities within the University system, and
* The recognition and support of workshops and conferences, such as the one we are participating in here today, as an extremely important and effective means of disseminating research results and facilitating the interaction of policy makers and researchers.

Opportunities to exploit "Sister University" relationships, through projects that have long term dimensions such as the UZ/MSU Food Security Research in Southern Africa Project, increase institutional capacity, faculty competence and regional networking. They are to be encouraged. An effort is currently underway, sponsored by USAID/Washington, to formalise such a program between the University of Zimbabwe and Michigan State University.

This reflects the sentiments expressed by our Chancellor, President Robert Mugabe in East Lansing last year, that a special relationship has long existed between these two Universities in many disciplines and should be continued.

In summary, the importance of the Universities' role in the design and implementation of "Economic Structural Adjustment Programmes" in the region should not be overlooked. Governments should recognise the contribution that the academic communities can make and encourage their full participation. Failure to understand the importance of an autonomous, academicly free University system in nation building and failure to provide it with full support, can only lessen a nation's potential.

Again, welcome to Zimbabwe. We are glad that you have chosen to visit us and to enjoy the beautiful natural wonders that this country has to offer. We have provided the surroundings--it is now up to you to facilitate the transfer of ideas and knowledge that will make this a meaningful and memorable conference. I wish you the best.

2

THE FOOD AND AGRICULTURAL POLICY ENVIRONMENT UNDER MARKET LIBERALISATION[1]

Dr. B. Ndimande[2]

There is a wide interest around the world, and in a range of different fora, in the impact of trade liberalisation on the agricultural policy environment. We in Zimbabwe, and I am sure this is true for other countries in the region, tend to concentrate on the consequences of trade liberalisation and associated policies which arise under our domestic structural adjustment programme. There are, however, major issues arising at the international level which also have significant consequences for the agricultural sector of this country and for the SADCC region as a whole.

It is appropriate that we should consider the policy implications of food security research at the national, regional and international level in order to put the various papers to be presented to this conference in the broader context of market liberalisation at these different levels. Clearly this can only be a beginning -- but the movement towards market liberalisation is now so strong that it increasely will come to dominate the environment within which agricultural policy decisions will be made in the future.

Effects of Trade Liberalisation at the National Level

First, the question of trade liberalisation at national level. This is of the most immediate importance and application both in this country and in the other countries in SADCC. The structural adjustment programme for Zimbabwe, which was launched at the beginning of 1991, is aimed at generating an economic growth rate of 5% per annum in

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[1] **Speech read by Mr T. Takavarasha, Deputy Secretary, Economics & Market Branch, Ministry of Lands, Agriculture and Rural Resettlement.**

[2] **Permanent Secretary, Ministry of Lands, Agriculture and Rural Resettlement**

order to create additional employment and raise the standards of living of the national population. Key elements of the programme include a reduction of the budget deficit, gradual liberalisation of the trade sector, the progressive deregulation of domestic controls and implementation of appropriate monetary, fiscal and exchange rate policies. All these elements impact directly on the agricultural sector.

With regards to the reduction of the budget deficit, a substantial element will be the elimination of the financial deficits of the four agricultural marketing boards and the Agricultural Marketing Authority. This requires new thinking on both the operational efficiency of these organisations and on the decision process for determining producer and selling prices for the controlled agricultural products. Basically, the first steps in the new policy have been to decontrol, either partially or fully, those crops for which full control is no longer necessary. These include small grains (sorghum and millet) and, to a lesser extent, cotton and yellow maize. Measures taken to improve efficiency have focussed on the establishment of separate boards of directors for each of the four marketing boards with a strong emphasis on business experience among board members.

In so far as the issue of pricing at the producer and marketing levels is concerned, the government has announced the basic price for cotton for the 1992/3 marketing year and a per-planting price for maize. Cotton lint selling prices are now determined by the Cotton Marketing Board, in consultation with the domestic textile industry, using export parity price as a basis. The Grain Marketing Board's selling price for maize is, however, still determined by government taking into account the need to meet consumer demand while, at the same time, reducing the financial deficits of the GMB's maize trading account.

The gradual liberalisation of trade in farm products within Zimbabwe has begun. The Minister of Lands, Agriculture and Rural Resettlement recently announced the extension of existing provisions permitting movement of maize within a communal area, to allow transport of maize between non-contiguous communal areas. This will make it possible for deficit communal areas to receive grains from surplus areas without having to go through the Grain Marketing Board. Furthermore, maize will be deregulated in Natural Region IV and V. Beginning April 1, 1992, maize can be bought and sold freely in these regions by producers, traders and consumers. Small grains are also being deregulated in order to encourage greater trade and consumption within production areas.

The liberalisation of trade with respect to farm inputs, is of equal importance. A number of imported farm requirements have been placed on Open General Import License (OGIL), including stockfeed ingredients, tyres and cement. More items will be put on OGIL over the coming months.

The progressive deregulation of domestic controls is reflected in the developments I have already set out in relation to trading in maize. Other government policy changes which affect agriculture include the relaxation of regulations on road transport freight operations so as to encourage the growth of small scale rural transport for trucking agricultural produce to depots and markets. Consideration is being given to simplifying local council by-laws and other regulations for areas declared as growth points as a step towards simplification of local government regulations for all areas of the country.

Policies relative to exchange rates also have a direct impact on the agricultural sector. The government has announced its intention to adopt a relatively aggressive exchange rate management policy. The changes already put into practice have been reflected in the Zimbabwe dollar price for export commodities, such as tobacco and horticultural crops, and in the prices of imported inputs of both raw materials and capital items.

It is clear that the agricultural policy environment in Zimbabwe is becoming more dynamic. The first steps in the government's five year economic reform programme have already been taken. These steps give a clear indication of the direction and magnitude of the changes that are being implemented. As I have mentioned previously, comparable programmes now are being implemented at the national level in other countries in Southern Africa with each programme tailored to the particular needs of the countries concerned.

Effects of Trade Liberalisation at the Regional Level: SADCC

The question of trade liberalisation at the regional level -- either in SADCC or in the PTA -- is more complex than at the national level. There has been a great deal of discussion, both within SADCC at the inter-ministerial level and at previous conferences sponsored by the UZ/MSU Food Security Project, of the food situation in the SADCC region and of the need for regional policies to generate needed improvement. There is general agreement that food security programmes should focus simultaneously on food availability and access to food at national regional and household levels, but much remains to be done to achieve a satisfactory food security situation within the SADCC region.

Over the 1980's, the emphasis has been on implementing policies within a developmental planning framework as the route forward. However, the advent of market liberalisation must inevitably alter the environment within which solutions to the SADCC food security problems must be sought. This is not to say that there is no longer a need for greater coordination and cooperation on regional food security within SADCC, but rather, that the terms of reference for that coordination must reflect the market policy environment that presently prevails as well as that of the future.

Effects of Trade Liberalisation at the Regional Level: PTA

In the case of the Preferential Trade Area for Eastern and Southern Africa States (PTA), the treaty provides for harmonisation of common agricultural policies, not only in the export of agricultural commodities, but also in the production and supply of staple food stuffs and the establishment of institutional machinery for agricultural development. The recent PTA draft Trade and Development Strategy states that the PTA wili continuously analyse government policies so as to ensure that they are in harmony regarding producer prices, factors costs, land tenure and agricultural marketing. Service sectors such as agricultural extension and research will be bolstered through the technical assistance fund which is being created so as to standardise the approach in the entire PTA sub-region.

This proposal for providing common agricultural policies can only work in the context of market liberalisation for the PTA region. It is evident that there is a great deal of work to be done. Market liberalisation at the national level is essential to the achievement of common food and agricultural policies at the regional level. Zimbabwe, along with a number of other members of the PTA, is already on the path towards national trade liberalisation. The promotion of the agro-industries, so important to the economics of the SADCC and PTA member states, will also be much more effective with the further development of trade liberalisation throughout the PTA region. For most SADCC and PTA countries, industrial development is highly dependent on the processing of agricultural raw materials -- both in urban and rural environments. Greater agro-industrial production will be encouraged through exploiting comparative advantage in the different member states. This will only be possible in the context of the liberalised trading environment in the SADCC and PTA regions.

The Effects of Trade Liberalisation at the International Level

The consideration of greater trade liberalisation among developing countries worldwide brings us to the third area in which the agricultural policy environment under market liberalisation must be considered. This is the international environment with particular reference to the current round of negotiations under the General Agreement in Tariffs and Trade (GATT). The current situation in relation to market liberalisation of the agricultural sector in an international context is deplorable. The agricultural policies implemented by the developed countries, as represented by the members of the Organisation of Economic Cooperation and Development, involve costs of around Z$1 200 billion, according to the most recent official estimate for 1990.

These subsides include those paid by both consumers and taxpayers. They arise in a wide variety of ways, but basically, from artificially high prices set behind high and often insurmountable trade barriers which prevent external supplying countries from selling on these markets. Taxpayers are also forced to contribute by financing the export

subsidies necessary to dispose of the excess production generated by the excessively high farm support prices set under these systems.

The reform efforts, particularly the current Uruguay round of negotiations under GATT, to be successful, must remove a whole series of border protective mechanisms which prevent the transmission of market signals from world to domestic markets. Projections for 1991 suggest that the situation is likely to get worse, distorting the use of vast amounts of resources even further.

Unfortunately a hard core of resistance to change exists. Little progress has been achieved towards improved market liberalisation and related trade measures. The present policies of highly subsidised and protected agricultural sectors in most of the developed countries lower the overall efficiency of the world's economy. Structural reform is imperative as a means by which OECD and other economies can become stronger and more efficient. However, in the agricultural sectors of these countries, the process has scarcely begun.

Conclusions

It is clear that the response of agricultural policy makers to trade liberalisation gives rise to many very complex and difficult issues. The factors affecting the responses differ according to whether the county or region is a surplus or deficit producer of agricultural products. The willingness to adopt a market led approach at the national level has not been matched, as yet, at the regional or international level. There is a great deal of agreement on the need to make progress at these levels, but this has not led to effective action.

The development of analytical capacity to respond to the complex economic factors involved, both at the level of national government and in regional institutions of SADCC, PTA, etc., is of major concern. Conferences such as this one must give greater attention to the need for capacity building. Without trained and competent manpower, we will never realise the full benefits that can be achieved in the agricultural sector under policies of market liberalisation.

II

Impact of Changing Grain and Imputs Market Policies on Private and Public Sector Participation -- Implications for Household Food Security and Economic Development

3

POLICIES TO PROMOTE AN EFFECTIVE PRIVATE TRADING SYSTEM IN FARM PRODUCTS AND FARM INPUTS IN TANZANIA

H.K.R. Amani
and
W.E. Maro[1]

INTRODUCTION

Background

It is seven years now since Tanzania started to implement trade liberalization measures (Amani et al. 1987 -88-89). The acceptance of a "free" market as superior to a controlled market is no longer an issue of hot debate. Thus, the government of Tanzania recently has eased controls on interregional movements of grains and has given cooperative unions a more competitive role, i.e., they are no longer obliged to operate in remote areas. Following the transfer of the responsibility for maintaining the strategic grain reserves (SCR) from the National Milling Corporation (NMC) to a newly established food security unit, the role of NMC has been reduced to grain milling, a highly competitive business in Tanzania. NMC is competing with numerous small grain millers located throughout the country including the most remote areas.

Currently, the main participants in the marketing of food crops are private traders and cooperative unions. The success of the market reforms, with the recent policy change reducing government involvement in the establishment and management of cooperatives, depends heavily on the capacity of the private traders to perform those marketing functions previously performed by NMC and cooperatives. Earlier market reforms have had some positive impacts. Amani et al. (1989) showed that production of grains had increased as had supplies to urban areas. However, these increases in

[1]**Professor and Research Fellow, respectively, Department of Economics , University of Dar es Salaam.**

marketable output have created serious bottlenecks in crop purchasing and movement.

In addition, there are a number of unresolved issues/policies which would, if resolved, go a long way towards increasing the effectiveness of market reforms. Some of these that need further government action include:

- how to reduce food insecurity in the producing areas,
- how to improve the distribution of agricultural inputs,
- the development of an improved credit system for farmers and private traders/millers,
- the development of an entrepreneurial class capable of and willing to undertake risk,
- The creation of adequate infrastructure, transport and communication networks for the efficient movement of goods, and
- The promotion of efficient financial markets that are able to support commodity and input markets.

This paper examines the marketing roles of private traders and cooperatives. It outlines the responses of private traders and cooperatives to changing grain and input policies and discusses factors and policies which inhibit increased participation by private traders. Impacts of the market reforms on producers, consumers and government also are discussed together with the future role of government in agricultural marketing. The discussion, to a large extent, is documented by research data collected in four regions, i.e., Mtwara, Ruvuma, Singida and Arusha. Arusha and Ruvuma represent food surplus regions while Mtwara and Singida represent deficit regions. In terms of physical accessibility, Arusha and Singida are more accessible than Ruvuma and Mtwara.

Role of Cooperatives

Grassroots cooperatives were encouraged by the government before and immediately after independence . However, they quickly grew in political strength and began to threaten the authority of the government. This caused the government to increase its control over the management of cooperatives. Eventually, these "government managed" cooperatives served the interests of the government more than those of

their members. This probably is one of the main factors[2] that contributed to the failure of cooperatives and their abolition in 1976. The government replaced them with parastatal crop authorities. This new marketing arrangement turned out to be less effective in enhancing agricultural production and marketing. The government re-established the cooperatives in 1982.[3]

The cooperatives have been performing very poorly since their re-establishment in 1982. This has been blamed largely on government's control of the marketing activities of cooperatives in order to further the state's economic and political objectives. The government and the ruling party (CCM) have been appointing and/or involved in elections of key officials at all levels of the cooperative movement greatly reducing the autonomy of the cooperatives as farmer institutions.

There also are other factors that have contributed to cooperatives' poor performance. First, they started with poor, incomplete and almost obsolete equipment inherited from the crop authorities. Second, while the government was implementing the credit squeeze policy, as stipulated under the 1986 Economic Recovery Program (ERP), bank credit to cooperatives rapidly expanded at the expense of the more productive sectors of the economy. Thus, overtime the cooperatives accumulated huge bank debts and encountered serious liquidity problems. The liquidity problems were partly due to the failure of NMC to pay them. The result in recent years -- especially since the 1988/89 marketing season -- is that many cooperatives have been unable to pay farmers promptly, to distribute adequate input and/or credit packages, to purchase all crops delivered to them, or to pay interest due on late loan repayments. Third, cooperatives experienced high and escalating marketing costs particularly, transport and interest costs. This resulted from ERP adjustments towards positive real interest rates. Fourth, the cooperative operations lacked aggressiveness. Cooperatives sold over 95 percent of their purchases to the NMC before NMC's functions were reduced to the single function of grain milling. They have not adjusted to the new competitive environment in agricultural marketing now that they are unable to dispose of their stocks to other buyers. Fifth they had been out of existence for eight years. Hence they were poorly prepared for resuming the function of agricultural marketing. Sixth, the weak economic infrastructure, particularly in remote agricultural areas of the country, and poor management have made it difficult for cooperatives to maintain financial viability. Purchased crops have remained stranded in villages with poor warehousing causing spoilage to some crops.

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[2] **For other factors see Amani and Kapunda. 1990, 86-87.**

[3] **Although the law to re-establish cooperatives was passed in 1982, they did not start operating until 1984.**

Cooperatives, which handle high-bulk and low value crops grown in dispersed areas, have experienced more financial problems than those handling less-bulky and high-value agricultural commodities. Government support, however, did not discriminate against the weak cooperatives. Financial support was given even to cooperatives which proved to be financially not viable. Many of the cooperative unions also failed to provide a suitable vehicle for technology diffusion among farmers in addition to making huge financial losses.

Under marketing institution reform, the private sector was de-regulated and the NMC and cooperatives monopoly removed. Food crop parastatals are not required to confine their operations to unprofitable markets. Cooperatives under the reforms, just like private traders, can buy anywhere they consider profitable. However, cooperatives, as was the case with the NMC, cannot buy at a price below the government's indicative (floor) price for staple crops which is announced at the beginning of every farming season. In addition, the government has removed fiscal support to Cooperative unions and NMC. This has made the marketing functions of cooperatives very difficult.

While the "Cooperatives'" monopoly in crop marketing has been removed, they still retain the monopoly for distributing fertilizers to farmers, a function which has caused a lot of problems to farmers, government and cooperatives themselves. Transport problems have continued to affect early distribution of fertilizers and marketing reforms have worsened credit repayments by farmers.

Private Traders

Private traders for grains and other food crops play an increasing role in food trade in Tanzania. It is not possible to understand the nature of the incentives, income changes and crop choices among producers without taking into account private sector transactions. Similarly, the range of foods available to consumers and the prices they pay for them at any particular time and place largely depends on the performance of the private sector-market.

Food marketing activities by private traders were endorsed by the government in 1987. Some limited operations had been allowed as far back as 1984. Legally, however, private traders still have no role to play in food marketing. As a consequence what has been the response of private traders to the market reforms? What is limiting their marketing operations? What further policy reforms are needed to make market reforms, and particularly institutional reforms, effective in improving food marketing? We now turn to survey data from four regions, together with research findings from other studies, to answer some of those questions. The survey was conducted in April 1990 and repeated in August/September 1990.

Trader Characteristics

A total of 34 private traders were interviewed during the two surveys. The average age of traders was 33 years. This compares favorably with findings from a study by Anita S. and Ana T. (1991). The average education of traders in the survey was standard VII. More than 90 percent of the surveyed traders started their business after the 1984 market reforms, Table 1.

Table 1: Entry Into The Market: % Of Traders Interviewed

Period	No. Entering	Percentage
Before 1984	3	8.9
1984-1986	11	32.3
1987-1990	20	58.8

Source: Survey Data

The same conclusion was reached by Gordon (1988) and Scarborough (1989). The rate of entry in the food trade increased as trade restrictions were removed. The distribution of traders by the type of trade is shown in Table 2.

Table 2: Type of Traders

Type	No. of Respondents	% of Respondents
Retail at Periodic Market	8	23.5
Retail at Fixed Place	11	32.3
Wholesale at Local Market	9	26.5
Wholesale at Regional Market	6	17.7

More than half of the traders sell at the retail level. As for wholesalers, most of them sell to local markets in the source districts. The dominance of retail traders implies that petty traders continue to operate small scale trading. However, the appearance of wholesale traders, particularly at regional markets, is an indication that market reforms have opened up opportunities for large scale private trade.

The traders surveyed came from different backgrounds. As seen from Table 3, eighteen out of the thirty four traders are also farmers. The remaining are

transporters, grain millers and general dealers. Only eight traders have no other business.

Table 3: Type of Other Business

Business	No. of Respondents	% of Respondents
Farming	18	52.9
Transport	4	11.8
General Dealers	1	3.0
Grain Miller	3	8.8
None	8	23.5

Traders' Markets

About 70 percent of traders surveyed bought their crops from farmers. Other sources of purchases are as shown in Table 4. Compared to the most recent marketing season (1990/91), more traders purchased from the official channels in 1989/90. This followed a government directive in early 1989 requiring all traders to buy from official channels. That directive was withdrawn in 1990.

Table 4: Source of Purchases 1989/90 and 1990/91

Source	% of Traders 1989/90	% of Traders 1990/91
Farmers in Villages	68.0	81.8
Primary Societies	24.0	4.5
Cooperative Union	8.0	9.2
Market in the District	0.0	4.5

The main traded crops are maize, rice, beans, cassava and millet. Destinations of purchases were town markets and village markets in 1990/91, Table 5.

Table 5: Destination of Purchases: 1989/90 and 1990/91

Destination	% of Traders 1989/90	% of Traders 1990/91
Town Markets	30.8	80.0
Primary Societies	28.5	0.0
Cooperative Union	0.0	0.0
Village Market	10.0	20.0
Market Outside the Source District Including Inter-regional Trade	15.4	0.0

Reasons given for buying from and selling to official channels included the government directive requiring traders to buy from primary societies and/or cooperative unions; reduction in transport and storage costs; and that primary societies and cooperative unions grade and pay for high quality crops. For traders who did not trade with official agents, the main reasons were too much bureaucracy; cheaper to buy from farmers; and poor quality of crops sold by official agents.

To a large extent the mode of payment was cash. Very few traders buy or sell on credit. Some traders pay farmers in advance and collect crops after harvest. As shown in Table 6, there is little barter trade.

Table 6: Percentage of Traders by Different Modes of Payment: 1990/91

Mode of Payment	When Buying	When Selling
Cash	63.0	83.3
Credit[a]	11.1	7.0
Advance Payment[b]	25.9	1.2
Barter	0.0	8.5

a. All interviewed traders said that they would not require farmers who get credit from them to sell their crop to them after harvest. Only 12% of the traders under study said that they would charge interest on money lent to farmers.

b. Advance payments were made to larger farmers.

Source: Trader Survey 1989/90 and 1990/91

Trade Expansion

It is interesting to compare changes overtime in the volume of trade. Traders were asked during the interview to compare their volume of trade in 1989 with the pre-1989 and 1990 volumes. The results of the comparison are shown in Table 7.

Table 7: Comparison of Trade Expansion Between 1989 and Previous/Recent Periods: % of Traders Responding

Traded	Than Before 1984	Than 1990
More	96.0	40.0
Less	4.0	60.0
Total	100.0	100.0

Source: Trader Survey 1989/90 and 1990/91

Most traders expanded their volume of trade between 1984 and 1989. Nineteen-ninety was an exception due to a very poor harvest that resulted from floods in the south and drought in the north and central parts of the country. Those unable to expand their grain trade indicated that the main limiting factors included lack of credit, transport bottlenecks and the confinement of fertilizer distribution to cooperative unions.

Buying Season

The official marketing season normally begins in July with the peak around August - September. Private traders, however, start buying such crops as beans in the north and casava in the south as early as February with their peak purchases occurring in June, Table 8. Thus, traders outcompete cooperative unions. Farmers get their cash early in the harvest and avoid pre-sale storage costs.

Table 8: Months of Starting Trade as Shown by the Percentage of Traders Trading

Month	1989/90 % of Traders	1990/91 % of Traders
February	3.8	4.0
March	7.7	4.2
June	21.5	28.3
July	15.6	19.2
August	16.9	27.5
September	15.4	4.2
October	3.8	4.2
November	3.8	4.2
December	11.5	4.2

Source: Trader Survey 1989/90 and 1990/91

Other Functions

Some private traders (35%) sell farm implements and seeds to farmers. Traders buy these inputs from the open market, Tanzania Farmers Association (TFA) and Regional Trading Companies (RTCs). Unlike Cooperatives, grain traders start selling farm inputs and seeds as early as May with sales peaking around July. Although most traders sell inputs for cash, a few sell on credit. Barter trade, i.e., exchange of agricultural inputs for crops, is also practiced particularly in the southern part of the country.

Storage of crops is seen by traders as a risky activity for four main reasons. First, government policy on the role of private traders is still unpredictable. Second, private traders find it difficult to correctly assess supply and demand fluctuations (Anita, A. and Ane T. 1991). Third, the possibility of high storage losses is always present. Fourth, construction of storage facilities is very costly. Those who do store crops do so in temporary, open air storage facilities, usually for a period of time not exceeding forty-five days. Twenty-one of the thirty-four traders surveyed undertook open air storage. Their main reasons for storing are as shown in Table 9.

Table 9: Reasons for Storing Crops Before Sale

Reasons	Number of Respondents
Storage Cost Less Than Price Increase	7
No Risks of Losses or Thefts	5
Marketing Activities Require Storage	4
Storage Facility Available to Me	3
Quick Turnovers Not Profitable	2
Total	21

Source: Trade Survey 1989/90 and 1990/91

The main constraints on traders' stockholding occurs in urban areas where it is difficult to lease or rent storage facilities. In rural areas, the problem of storage is less serious. Traders can rent storage space from farmers.

In addition to storage bottlenecks, transport constraints have been a major impediment to private sector grain trade. Many private traders do not own means of transport. Instead, they hire. Of the surveyed traders, ten used own means of transport. One owned a truck while the other nine used their own bicycles. The remaining twenty-four hired a variety of transport equipment as shown in Table 10.

Table 10: Mode of Hired Transport 1990/91

Mode	1991/90 Respondents
Truck	14
Donkey Cart	2
Ox Cart	3
Bicycle	5
Total	24

Source: Trader Survey, 1989/90 and 1990/91

The main source of hired transport is from the private sector -- some 90 percent. Other sources were villages and/or individual farmers who own bicycles or animal carts. Trucks are hired for long distance movement of crops while bicycles and animal carts are used for short distances. Long distance movement of crops has been observed in the northern region of Arusha and in the Southern regions of Mtwara and Ruvuma. Some traders in Arusha transport grains all the way to Shinyanga and Dar es Salaam. In the South, crops are transported mainly from Ruvuma to Mtwara. Transport costs are charged according to the distance and conditions of roads. Table 11 indicates the average distance and time of food movement in the regions studied.

Table 11: Average Distance Time and Quantity Per Trip of Crop Movement by Region, 1990/91

Region	Average Distance (km)	Average Time (Hrs/km)	Average Quantity (bag)
Mtwara	455.5	25.3	30
Ruvuma	50.0	25.0	218
Singida	56.4	35.3	43
Arusha	127.2	47.1	151

Source: Computed from survey data

Road conditions are worse in the south than in the north and central part of the country. Transport costs are highest in areas with poor road conditions due to high rates of breakdowns and high fuel consumption.

Investments

One way to measure the response of private traders to market reforms is to observe their level of investment. Forty-seven percent of the traders surveyed did not invest anything in their business, Table 12.

Table 12: Major Trade Investments Since the Beginning of Trade

Type of Investment	No. of Respondents	% of Respondents
Acquired Ox/Donkey Cart	5	14.7
Bought Equipment	3	8.9
Built Storage	6	17.6
Other Investment	4	11.8
None	16	47.0
Total	34	100.0

Source: Trader Survey, 1989/90 and 1990/91

There is very low investment in transport and storage facilities. Scarcity of initial investment capital and failure to acquire credit are among the main reasons for such low investment. Factors which traders consider to be crucial for their future role in food marketing are, in order of importance, availability of credit, own capital and transport.

Market in Transition

With the NMC confined to grain milling, the cooperatives freed from government intervention and private sector marketing constrained by numerous physical operations, a vacuum is present in agricultural marketing. Cooperatives are unable to play a significant role in food marketing because the government has removed fiscal support. Private traders are unable to invest and expand their marketing activities because they lack financial and legal support. They both also operate with serious infrastructural bottlenecks.

Assessment of Performance

The existing marketing environment affects surplus producers and deficit rural households in remote areas more than other market participants. Survey results from the four regions show that food stock depletion in 55 percent of the rural households, occurs an average of seven months after harvest. M. Seenappa. (1987), in a 1986 survey of 400 farm households conducted in Mtwara, Shinyanga and Zanzibar, observed that 64% of the households in Shinyanga and 43 percent of the households in both Mtwara and Zanzibar, consumed their harvested food grains in six months or less. Almost 80 percent of the 400 households surveyed by Seenappa had depleted their food stocks four months before harvest. A 1989 field study in Rukwa region by

Geier, et al., also confirms the findings by Amani and Maro (1991) and Seenappa, (1986). The Rukwa field study concluded that, on average, one-third of the village population had to rely on additional food to supplement their own production.

It is worthwhile noting that Rukwa is one of the four most productive agricultural regions in Tanzania. Further, even if the deficit households had adequate income to purchase food, availability is a problem as neither cooperatives or private traders are able to supply their needs. Unless there is famine, in which case the government may bring in food to alleviate the hunger situation, these remote food deficit households will continue to be food insecure.

Remote food surplus households also have been negatively affected. Their access to markets has deteriorated, thus, their real producer incomes have declined. This has largely been due to relatively high transport costs and fewer primary markets. A switch towards other crops (mainly export crops), which are marketed to Marketing Boards, is currently constrained by a shortage of inputs, poor infrastructure and the inefficiencies of the Marketing Boards. Consumers in urban areas find prices quite unstable, particularly during poor harvests. They depend almost totally on private traders for food availability. The government is maintaining a Strategic Grain Reserve, not for stabilizing prices, but to prevent famine. Since private traders do not maintain stocks for more than 45 days, and since they confine their purchases to accessible areas, food supplies are quite erratic. The vacuum left by the NMC together with the lack of competitiveness of Cooperatives, is already being felt by consumers.

A crucial factor for improving the performance and productivity of farmers is the quality of institutional support. To the extent that the current market environment does not provide such institutional support, farmers' performance is also at stake. The current organization of the market has failed to ensure a supply of food and agricultural inputs to low income households in less accessible areas; reduce the inherent riskiness of agriculture for small farmers; and ensure markets and input supply to promote price stability.

High transport costs have contributed to low marketing margins affecting the profitability of private traders. For interregional trade, trader transport costs, as a percentage of harvest purchasing price, ranges between 37.8% for Morogoro-Dar to 202.6 percent for Rukwa-Dar route (Anita, S. et al. 1991. p. 37, Table 3.8 forthcoming).

Cooperatives' perception of the current marketing reforms is rather pathetic. Although they are no longer restricted to remote areas, they are still obliged to support producer prices by paying at least the floor price. They are also required to perform the function of input distribution to farmers on credit and collect credit

payments during crop sales -- they are not paid any commission for this function. Worse, the government has withdrawn fiscal support from the cooperatives. Cooperatives now have to negotiate directly with the Banking institutions for loans to purchase crops. Since they already owe banking institutions billions of shillings, they are not credit worthy. Under these circumstances, it is difficult for them to operate let alone compete with the private sector.

The government's perception of market performance appears to be mixed. The objective of reducing government deficits through removal of subsidies to producers, consumers and official marketing agents has largely been achieved. However, the impact of market reforms on consumer prices, rural incomes and access to markets causes the government some concern. The government is considering alternative marketing arrangements to improve market performance. As researchers, we can contribute to the marketing policy debate.

Alternative Marketing Environment

Legislation

The market reforms made thus far have promoted the private sector without first ensuring that the market environment for a successful private sector exists. Past government policies have suppressed private sector activities in almost all major sectors of the economy. Hence, no entrepreneurial class able to undertake the risks inherent in agricultural marketing has developed. The government should take measures to reduce private trader risks and improve the legal and institutional framework in which the private sector operates. The reforms actually made should be institutionalised and legalised via effective legislation.

Transport

Market reform legislation is a necessary but not sufficient condition for improving private sector and cooperative market performance. Adequate and reliable infrastructure is a major requirement. Evidence suggests that, in many rural areas where transport costs are prohibitive, a fully functioning private sector marketing system is not in place. It therefore, is not able to respond adequately to local level demands. In his study in Bangladesh, John W. Mellor (1988) reached the following conclusion

> "We know empirically that poverty is combated by infrastructure investment. In Bangladesh, comparing villages with good infrastructure and poor infrastructure, poverty by absolute measure is 40 percent lower, calorie intake of the poorest 7.5 percent higher, wage rates 12 percent higher, per hectare employment in agriculture 4 per cent higher, and employment in non-agriculture 30 percent higher in the villages with better infrastructure."[4]

Specialization and exchange in rural areas require a good transportation network, at least of light transportation such as carts, bicycles and light four-wheeled vehicles. For long distance trade, an adequate road infrastructure, transport and communication networks are required for the efficient movement of goods. Emphasis should be put on improving feeder roads, particularly in remote but productive areas. This will encourage cooperatives and private traders to operate in the remote areas. The Integrated Roads Project (IRP) which focuses on physical construction of roads and their maintenance, together with improvement of transport equipment and supply of spare parts, has yet to address transport bottlenecks in the remote areas. Improvement of road infrastructure is also a necessary condition for the development of truck and spares markets. Market liberalization should be extended to this sector by eliminating administratively set tariffs on transport and by liberalizing imports of trucks and spare parts.

Credit

Another constraint on the development of private sector trade in food crops is credit. As of now, most private traders are unable to get credit either from formal banks or from private sources. In an Amani and Maro survey (1990), 70 percent of the traders cited credit as a major limiting factor to future expansion of their business. Scarborough (1989) reported that over 80 percent of the traders interviewed reported that they had no access to credit. Credit is needed for crops and agricultural input purchases, construction of storage structures and for the purchase and/or hiring of means of transport. Because of the credit squeeze policy stipulated under the current Economic and Social Adjustment Programme (ESAP 1989), financial institutions are unlikely to offer much credit to traders. The on-going exercise to restructure financial institutions and to introduce private banks may go a long way towards addressing credit requirements for market participants.

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[4] **John W. Mellor 1988.** ***Agricultural Development in the Third World: The Food Development, Foreign Assistance, Trade Nexus.*** **IFPRI, Reprint No. 124, Washington.**

Marketing Functions

The current market reforms permitting private traders to participate in agricultural marketing have excluded trade in fertilizer. Explicit fertilizer price subsidies have been removed but transport subsidies have been maintained together with pan-territorial fertilizer prices. To ensure that these prices are not distorted, the government has granted a production and importation of fertilizer monoply to Tanzanian Fertilizer Company (TFC). In addition, TFC has a monopoly in distributing all fertilizers to the regional towns, the railhead station of the customer or to TFC go-down facilities. At the regional level cooperatives, and to a lesser extent Tanzania Farmers Association, have a monopoly in fertilizer distribution.

Cooperatives have basically failed to perform this function because of the factors discussed earlier in the paper. Thus, there appears to be a role for the private sector to supply agricultural inputs, particularly fertilizer. There is evidence to suggest that the economics of fertilizer use are positive in Africa (Berg, 1983 and Jones and Egli, 1984). Thus, the private sector can enter the input market, sell fertilizer at unsubsidized real foreign exchange cost and still get customers. Private traders can combine the functions of crop purchasing and input distribution to fill the gap left by ineffective cooperatives. The issue of subsidy or credit for fertilizer should not hinder this change. Since the late 1970's, many farmers have been able to pay for fertilizers (see Lele, Christiansen and Kadiseran, 1989). According to the Tanzania Government (1989), about 65 percent of the farmers now have cash to finance their seasonal inputs. If credit is required, the private traders should be able to develop a means to fill the need. Apart from fertilizer distribution, input retailers should attempt to disseminate information on new techniques.

Concluding Remarks

The market reforms in Tanzania have had a positive effect. A preliminary assessment shows that production of food grains has increased as have supplies in urban areas. Despite these gains, the present food marketing system is still characterized by several shortcomings. Some result partly from the partial character of the market reforms and partly from their positive impact on inducing higher food production. The main concern now is to evolve appropriate roles for the private and public sectors. Apparently, further structural adjustments towards privatization of the food marketing system will be necessary.

In Tanzania, privatization has not been preceded by the strengthening of the private sector support systems including the establishment of legal and other institutions such as credit, transporters and wholesalers. The capacity of the private sector (and of cooperatives) to utilize resources is limited by lack or shortage of capital, transportation and market information. Thus, if the private sector is to operate

effectively, the public sector must first enact policies designed to: stimulate the development of an entrepreneurial class capable of undertaking risk; encourage free entry into markets; create adequate infrastructure, transport and communication networks for the efficient movement of agricultural commodities and inputs; and promote efficient financial markets that are able to support commodity and input markets.

The private sector cannot and should not be expected to immediately do everything. Policies formulated to encourage expansion of private sector participation in agricultural marketing must be accompanied by efforts to depoliticize crop parastatal operations designed to increase competition. One role of the public sector may be to act as a buyer and seller of last resort to stabilize consumer and producer prices. This role is currently being neglected.

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4

MALAWI FOOD MARKETING: PRIVATE TRADER OPERATIONS AND STATE INTERVENTION

Ben Kaluwa[1]

INTRODUCTION

In 1987, private traders were, for the first time, legally allowed to compete with the Agricultural Development and Marketing Corporation (ADMARC) in the purchase and sale of food crops from smallholder farmers. The major objectives of this change in policy were to improve efficiency in marketing and national and household food security. The reforms were part of a major programme of market reforms introduced under the Structural Adjustment Programme (SAP) and addressed some specific areas of concern including the financial viability of ADMARC and the effectiveness of its operations.

By the end of 1988, ADMARC had withdrawn from 125 (15 percent) of its 1,090 seasonal markets. This retrenchment was to lower ADMARC's operating costs by reducing operations in higher cost markets. As a result, ADMARC achieved record profits of K16.9m and K16.1m in 1989 and 1990 respectively. It was expected to achieve profits of K23.9m in 1991 but the profitability situation turned out to be much worse than for the previous two years.

ADMARC's retrenchment, which was supposed to be even more extensive, has been questioned because the seasonal markets have had uses other than just crop purchasing. Additional functions included facilitating the distribution of inputs and the recovery of agricultural credit from farmers. The latter has resulted in recovery rates of about 90 percent in most areas (Kaluwa et al. 1990). Since 1989 ADMARC has reopened 88 of the previously closed markets under an arrangement where the government would pay for the losses incurred.

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The preliminary results of the survey reported in this paper were presented by Kaluwa (1990) and Kaluwa and Chilowa (1991). The main objective of the present paper is to present additional analysis and stronger evidence concerning the impact of private trader participation in grain marketing, especially related to policy concerns in production, distribution and consumption. The welfare of the private traders also is addressed since it affects their adaptive behaviour.

The baseline survey was conducted in the post harvest period of 1989. It covered three of the eight Agricultural Development Divisions (ADDs) in the country. The selected ADDs were Mzuzu ADD (MZADD) in the north, Lilongwe ADD (LADD) in the centre and Blantyre ADD (BLADD) in the South. Eighty-seven private traders were interviewed, 53 in LADD, 34 in BLADD and none in MZADD.

THE EMERGING MARKET STRUCTURE

The Pricing Environment

The policy environment is an important element of market structure as it significantly influences the conduct of the market's economic agents. Entry regulations for private traders and the policy environment relating to pricing are key features.

Official commodity prices, administered by ADMARC, are pan-territorial and pan-seasonal and are adjusted before the beginning of the growing season. In Malawi, price interventions for officially traded crops in the smallholder subsector require the Ministry of Agriculture to set producer floor price, as well as maximum consumer prices. These prices are supposed to be observed in ADMARC's operations as buyer and seller of last resort. If these pricing limits were actually to be followed, this would mean that the profitability of moving commodities from producing to consuming areas and storing them interseasonally would depend upon the margin between ceiling and floor prices being wide enough to cover costs and still provide an element of 'competitive' profit.

The twin objectives of raising producer prices as an incentive to produce while maintaining consumer prices at "reasonable" levels have resulted in a serious threat to ADMARC's financial viability. This was manifested explicitly during the 1985-1986 trading year when financial difficulties were experienced in its maize account, Malawi's major food security crop, and its distribution of subsidised seasonal inputs. Permitting private trader operations while allowing ADMARC to withdraw from some remote markets were specifically designed to address this problem. ADMARC's financial viability in the past had been guaranteed by cross-subsidies between ADMARC's cash crop and food crop trading accounts. But the desire to raise producer prices reduced ADMARC's ability to maintain such cross-subsidies, as did the need to move grain from remote areas to make it available to consumers in the deficit areas of the Southern Region.

Lipton (1987) and Sijn (1989) have sought to analyse African policy responses to the food problem by distinguishing two paradigms, i.e., price fundamentalism (pricism) and price skepticism (structuralism).

Price fundamentalism advocates setting prices "right" for inputs, outputs, and foreign exchange. International prices are used as a benchmark for domestic prices. This implies that "right" prices are definable. It also assumes that both producers and consumers respond "rationally" to changes in relative prices. The reduction of state involvement in agricultural markets with "right" prices, thus, would foster rapid and equitable growth of agricultural output through improvements in input delivery, prompt payment to farmers and the availability of consumer goods in the country side.

Sceptics argue that "right" prices are neither readily definable nor attainable due to world market volatility and uncertainties. Further, that there are intervening non-price constraints on supply responses to market signals. Such constaints include access to appropriate technologies (both mechanical and biological) malfunctioning or underdeveloped infrastructure, including those for transport and input delivery systems. The removal of such structural constraints are a key to sustained agricultural growth and food security in addition to price reforms and market liberalisation policies. "Appropriate" state intervention would not necessarily be incompatible.

The World Bank has been offering Malawi assistance in agricultural pricing policy. The government, since the early 1980s, has espoused a move towards world market prices, i.e., export parity or import parity. In practice, producer prices are still determined on a (production) cost-plus margin basis. Prices for major crops purchased by ADMARC are generally more than 50 percent below favoured world market prices[2]. Kandoole, Kaluwa and Buccola (1987) estimated that, although the domestic maize price is responsive to the Chicago price, the response is lower by a factor of four. Also, panterritorial and panseasonal prices criticized in the World Bank Berg Report (1981) for their inefficiency in triggering the right market signals, nevertheless have been retained.

The official practice for smallholder crops is administered pricing. Setting producer prices to achieve optimal levels of relative prices has been a major problem. This especially was pronounced during the mid-1980s with respect to maize and groundnuts which compete for land. The incentive price for maize was furhter distorted by the initiation of the removal of fertilizer subsidies. This resulted in a juggling of crop prices

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[2] **The reserve Bank of Malawi's *Financial and Economics Review* publishes Comparisons of ADMARC and local auction prices as well as those in UK and USA markets. The policy objective for maize is, however, based on the need to balance domestic demand and supply since the government views it as undesirable to either export or import maize (Malawi Government 1987-96 pp. 23-24).**

between the 1981/82 and 1985/86 cropping years (Kaluwa and Kandoole. 1989. pp. 53-54). Continued concern for deficit producers and urban consumers have influenced official selling prices.

However, empirical reality can diverge from official policy with respect to actual market prices. The emergent market structure, following liberalisation, in terms of the number and size distribution of the buyers/sellers, together with whether competitive interaction exists to influence transacted prices as compared to official ones, is a determinant. Whether competitive pressure has been sufficient to force official price reviews is unknown.

Retrospective evidence, i.e., pre-liberalisation, suggests that a price-leader/competitive fringe type of market structure existed in small quantities at different levels including local, district council and urban markets (Kandoole, Kaluwa and Buccola. 1987). Provisions did exist for some large traders to act as buying agents for ADMARC. Others had been observed to buy from farmers, ADMARC or in local markets to supply institutions (Lavrijsen, 1974).

Free market prices have always been observed for maize, the major crop traded in terms of volume, averaging 125 percent of official consumer prices. This was especially prevalent during the 1980s (Kandoole, Kaluwa and Buccola. 1987, Table 1). This has been possible for three reasons: 1) some sellers and producer markets are often closer to some consumers than the nearest ADMARC selling depots; 2) interseasonally, ADMARC's role as seller of last resort has not been guaranteed; and, 3) sellers could invalidate the official price system by using volume rather than weight-based measuring instruments. Free market trading has been associated with prices reflecting interseasonal scarcities (Quinten and Sterkernburg. Undated). The importance of these prices depends on the relative market shares and interdependence of ADMARC and private traders. Information on changing market shares is not available for private traders. ADMARC's share of total maize output exhibits an uneven pattern over time. Between 1976/77 and 1979/80 ADMARC's averaged below 8 percent. Their market share since 1980/81 is shown in Table 1.

Table 1. Smallholder maize production and sales to ADMARC

Crop Year	Output	ADMARC Purchases	Purchases as % of Output	Index of Per Capita Output 1976/77 = 100	Producer Price K/mt)
1980-81	1.24	136.6	11.0	82.6	66
1981-82	1.24	246.1	19.8	80.5	111
1982-83	1.37	244.9	17.9	85.8	111
1983-84	1.40	296.4	21.2	84.9	122
1984-85	1.36	271.6	20.0	79.7	122
1985-86	1.30	112.6	8.7	73.8	122
1986-87	1.20	59.6	5.0	66.4	122
1987-88	1.42	135.3	9.5	76.2	166
1988-89	1.34	231.3	17.3		240
1989-90	1.64	200.7	12.2		260

Source: Kaluwa and Kandoole, 1989; updated from Economic Reports.

ADMARC's share seems to be more responsive to producer prices than to production except during years of exceptionally poor production, e.g., 1986/87 when marketed output was constrained by subsistence requirements. The current possibility of private traders dealing in large volumes can increase their share of the market for food crops, provided they are price competitive. Another possibility, previously observed,[3] is that private traders can increase their market shares through early buying since ADMARC usually undertakes buying much later after harvest when the moisture content of crops is low[4].

Liberalization and Entry

According to the Ministry of Agriculture figures, the total numbers of registered traders were; 1987/88, 387; 1988/89, 917; 1989/90, 543; 1990/91, 609 (excluding Karonga which in 1989/90 had only one trader). After a huge response in the crop year following liberalisation, the number declined but went up modestly in the next year. These fluctuations reflect the relative ease of entry and exit.

[3] **Kaluwa and Chilowa. 1990.**

[4] **Early buying, even at official producer prices, implies *de facto*, better prices to farmers because of the higher moisture content.**

Registration and obtaining a licence likely reflects the intentions of private traders to operate on a sizeable scale. The baseline results indicate that a minority of the traders (19% in LADD and 9% in BLADD) started operating after liberalisation. The difference between LADD and BLADD appears to be related to the relative age distribution of the traders, i.e., there tended to be a larger proportion of younger and better educated traders in LADD than in BLADD. The relative distribution of trading experience is given in Table 2 and indicates a tendency towards longer trading experience in BLADD compared to LADD.

Table 2 Number of Years Trading: % of traders

Years	LADD	BLADD
1 - 4	49.1	20.6
5 - 9	26.4	38.2
10+	24.5	41.2
Total	100,0	100.0

Source: Traders Baseline Survey

Private Trader Characteristics

The baseline survey results identified four female traders, two in each area. Forty percent of the 53 traders in (LADD) were below 35 years of age and 24% were above 50 years. The corresponding distribution for the 34 Blantyre ADD traders was 18% and 32% respectively reflecting older traders as compared to LADD. This relative age distribution appears to influence a number of other characteristics including the level of education, the holding of public positions and even residential status.

Seventy percent of those operating in LADD can be considered to be functionally literate, having attained at least the primary Standard IV level of education. The BLADD percentage is lower, 62%. Thirty-six percent of the LADD and 20% of those in BLADD had some secondary school education.

Forty percent and 59% of the LADD and BLADD traders respectively held some public position. For 17% and 23% of the traders respectively, the positions were in a farmers' club or a business association.

Table 3 shows the residential status of the traders. It indicates that a majority of traders are rural-based and that significant numbers live in the areas in which they operate. Nearly 20% of those operating in LADD are based in either Blantyre or Lilongwe.

Table 3 Private Traders Residentail Status

PLACE	LADD			BLADD		
	No.	%	Cum %	No.	%	Cum %
Within EPA*	23	43.4	43.4	17	50.0	50.0
Within RDP* ex EPA	9	17.0	60.4	9	26.5	76.5
Other Rural	5	9.4	69.8	6	17.6	94.1
Blantyre	9	17.0	86.8	0	0	0
Lilongwe	1	1.9	88.7	0	0	0
Other	6	11.3	100.0	2	5.9	100.0
Total	53	100.0		34	100.0	

* RDP is Rural Development Project and is the second level in the hierarchy from ADD; EPA is Extension Planning Area and is third the level. The last level is the Section or Unit.

Source: Traders Baseline Survey

The majority of the private traders indicate that crop trading is their main activity (64% in LADD and 65% in LADD). Farming is the next important activity with 21% and 15% respectively. None of the traders in LADD were transporters, either as a major or other activity, while in BLADD 5 traders were transporters, Table 4.

Table 4. Private Traders: Major and Other Activity (%)

	Major		Other	
Activity	LADD	BLADD	LADD	BLADD
Crop Trading	64.2	64.7	17.0	8.8
Market Vendor	1.9	0	0	0
Farming	20.8	14.7	26.4	5.9
Grain Milling	1.9	0	5.7	8.8
Retailing	7.5	5.9	9.5	35.3
Employment	3.8	0	1.9	5.9
Transporter	0	11.8	0	2.9
Other	0	0	9.4	2.9
None	0	2.9	30.2	29.4
Total	100.0	100.0	100.0	100.0

Source: Traders Baseline Survey (TBS)

The distribution of private traders by crops transacted is given in Table 5. Four important observations can be made: a) less than a quarter of the traders in either ADD specialise in maize; b) the largest category of traders deal in maize plus other crops; c) significant numbers of traders do not deal in maize; and d) there is a marked shift away from maize in LADD compared to BLADD.

Table 5: Distribution of Traders by Crop: No. of Traders

	LADD		BLADD	
	No.	(%)	No.	(%)
Maize Only	10	(19)	8	(23)
Maize + Other	23	(43)	17	(50)
No Maize	20	(38)	8	(23)
No Purchase	-	(-)	1	(3)
Total	53	(100)	34	(100)

An important implication of this is that a majority of traders are cushioned from the adverse effects of a food marketing or pricing policy that is oriented or focused primarily on maize by the diversity of crops transacted. Beans, pigeon peas and other pulses, for example, are also popularly transacted crops, Table 6. "Other" crops transacted include sorghum/millet, Irish potatoes and cassava, crops ADMARC usually does not buy and for which there is no policy intervention. Nevertheless, 53 and 32 percent of all traders in LADD and BLADD deal in maize in substantial quantities (100 bags to over 10,000 bags) (Appendix 1). Thus, maize oriented policy or interventions are important to them.

Table 7 Number of Traders Dealing in Specified Crops

	LADD		BLADD	
	No.	(%)*	No.	(%)*
Maize	33	(62)	25	(73)
Beans	39	(74)	10	(29)
Pigeon Peas	6	(11)	11	(32)
Rice	2	(4)	0	(0)
Other Pulses	3	(6)	10	(29)
Other	12	(23)	8	(23)

* % of total number of traders, i.e., 53 in LADD and 34 in BLADD
Source: Traders Baseline Survey

The scale of operation indicated by the size of purchases shows that liberalisation has opened up an opportunity for substantial operations. For example, a total of 14 traders (16% of the total for both ADDs) transacted maize in quantities in excess of 1,000 bags. At least Forty percent of those dealing in higher value crops, such as beans, pigeon peas and other pulses, dealt in quantities in excess of 100 bags (see Appendix).

The Incidence of Early Buying

Private traders practice early buying as an avenue of competition. They start buying during the months harvest takes place, i.e., March, April and May, (79% in LADD and 70% in BLADD). This arrangement is attractive to farmers since it relieves them of pre-sale storage. Further, the higher moisture content in the grains immediately after harvest (as compared to later) has a positive price effect.

CONDUCT, PERFORMANCE AND POLICY RESPONSES

The behaviour of private traders can influence their profitability with respect to prices and practices which influence production and consumption. The effects can influence policy interventions.

Private Trader Behaviour and Price Effects

Price can become a complex variable to analyse. Private traders offer distance-weighted prices, buying at or close to the farm-gate as compared to an ADMARC buying point. There are also quality-weighted prices, as in the case of graded crops, including moisture content. ADMARC has always distinguished between producer prices (seasonal markets) and depot delivered prices, dry season buying and buying by grade.

Distance-weighted producer prices offered by private traders have been observed in Mzuzu ADD where, although no traders were actually identified during the survey, a number of private traders and intermediate users, i.e., processors operate on a large-scale[5]. The low population density in MZADD and the remoteness of some large-surplus farmers, led purchasers to offer to collect from bulking points provided transport costs were shared by the farmers. Farmers were receiving official producer prices less their share of the transport costs. Thus, more remote farmers were receiving lower prices than less remote ones. Sharing transport costs was practiced in other areas before liberalization via contractual farm-gate prices offered by traders and supplying

[5] **This information was collected through interviews with ADMARC officials and the managers for the Grain and Milling, and Chibuku Product Companies.**

institutions (Lavrijsen, 1974)[6]. The survey results do show that considerable buying takes place directly from households. This facilitates negotiating contractual prices. Direct purchases from households are indicated in Table 8.

Table 8. Source of Produce in 1989: Major Crops
(% of quantity bought)

	LADD		BLADD	
Source	Maize	Beans	Maize	Beans
Household direct	81	58	0	0
Local market	13	36	5	0
Other rural	1	1	74	39
ADMARC mkt (closed)	0	0	14	43
Other	5	5	12	18
Total	100	100	100	100

Source: Traders Baseline Survey

These results are significant in one important respect. It would be expected that contractual buying arrangements would be more prevalent in remote areas with large farm surpluses. For example, 79 percent of the traders in the remoter LADD said they could buy enough produce. This compared to only 47 percent in BLADD. In BLADD, traders prefer to buy at their own bulking points, either temporary shelters or their own premises, requiring sellers to deliver produce to these points to receive the official prices. This, in effect, is a different manifestation of cost sharing. The trader incurs extra transport costs by bulking and buying close to the sellers. The sellers, on their part, bear the cost -- explicit or imputed -- of transporting the crops from the farm to the selling point.

There is some evidence to suggest that the private trader's view of quality-weighted pricing might benefit farmers more than official prices. For example, the volume of ADMARC purchases of groundnuts plummeted down from 53,068 mt in 1986 to 629 mt and 4,450 mt in 1989 and 1990 respectively. This is attributed to increased oil processing capacity resulting in processors buying directly or contracting with buying agents. One of the largest processors, Lever Brothers, offers collection in the rural areas at bulking points within 10km from main roads at guaranteed prices higher than ADMARC prices

[6] **In fact, the Lavrijsen study showed that some farmers had vertically integrated into the transportation and sale of their own produce, a manifestation of cost-sharing between the different levels of activity.**

for oilseed (now mainly sunflower seed)[7]. In 1988, they offered uniform prices for all grades of groundnuts[8].

The survey revealed that half of the private traders in LADD and BLADD buy hybrid maize. It is high yielding with adequate fertilizer but, in the past, has been less preferred for consumption or storage than the local varieties[9]. Most of the private traders (66% in LADD and 91% in BLADD) would offer approximately the same price for hybrid maize as for local maize. Access to ADMARC (26% of all traders) and direct sales to consumers (21% of all traders in LADD and 17% in BLADD) facilitated immediate selling after purchase, thus passing on storage functions to subsequent links in the marketing chain.

Other Production Effects

The degree to which price effects, as a result of private trader activity, influence production by raising *defacto* producer prices, depends on the price elasticity of supply[10].

Private trader willingness to buy hybrid maize, at prices comparable to those offered for the generally preferred local maize, reduces the major constraint to producing hybrid maize. Higher yielding maize, particularly hybrid maize, is the major fertilizer intensive crop utilising an estimated 70 percent of the total fertilizers used. Sales have been increasing over time from 51.1 thousand tons in 1985 to 104.5 thousand in 1990. These figures indicate increased usage with even better results expected from the introduction of high analysis types. This, despite price increases averaging about 25 percent per annum since 1987. ADMARC's continued willingness to buy hybrid maize will likely sustain private trader transactions for this crop which is assuming an important role in the nation's food security. Experience in 1991 indicates that ADMARC is reluctant to make prompt purchases and payments for delivered produce (Kaluwa. 1992). This places Traders dealing in hybrid maize in remote areas at risk, lowering trading incentives.

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[7] **These are advertised in the newspaper and on the radio.**

[8] **Interview with one contractor.**

[9] **Kaluwa and Chilowa (1990) and Kaluwa et al. (1990). However, note that consumer tastes recently have changed towards greater acceptance.**

[10] **Kircher, Sing and Squire (1985) estimate Malawian own-price and cross-elasticities of smallholder produce to be less than unity due to structural contraints (land, technology, etc.).**

The other possible production effects of private trader behaviour is related to input deliveries. ADMARC's maintenance of their extensive number of markets has ensured an equitable (and effective) subsidized input delivery system. Liberalisation of private trading has not permitted private trader activity in this area. Initiating a system in reverse of maize producer pricing -- i.e., (ADMARC) depot delivered price differentials in reverse, could provide an incentive for private traders, especially those with their own transport, to provide two way trading with the farmers. Even now, some private traders are selling inputs (9% of traders in LADD and 18% in the less remote BLADD). All of these traders expect cash payment for the inputs, making the seasonal credit system facilitated by farmer clubs irrelevant.

Consumption Effects

Consumption effects of private trader activity can be analysed by examining the destination of their purchases, Table 9.
The figures in Table 9 suggest that ADMARC is the main conduit for sales from the more remote LADD. Seventy percent of the traders were rural-based, mostly from within the Extension Planning Areas, while 19 percent were based in the major cities of Lilongwe and Blantyre. Direct household sales account for less than 10 percent of their purchases.

In the less remote BLADD, the situation is quite different. Export sales (mainly refugee camps) are the most important outlet for maize while direct household sales are the most important outlet for beans. The implications are that traders in LADD seek to minimise their transport and storage costs by selling to ADMARC which administers the official consumer prices.

Table 9: Destination of Purchases (% of quantities bought)

	LADD		BLADD	
Source	Maize	Beans	Maize	Beans
ADMARC	81	68	5	0
Local households	7	1	15	61
Town households	1	3	0	0
Town Market	3	11	0	0
Processors	1	5	1	0
Export	0	0	73	0
Other	7	12	6	39*
Total	100	100	100	100

Note * Mainly 'other market', e.g., local council markets and institutional demand.
Source: Traders baseline Survey

Open markets appear to offer private traders wider margins than those implied by the official prices. A large majority of traders said that official buying prices were higher than open market ones (72% in LADD and 62% in BLADD) and that the official selling prices were lower (79% in LADD and 68% in BLADD). It is, therefore not surprising that private traders prefer to base their transactions in market places (64% of those in LADD and 79% in BLADD), where prices are not monitored[11].

Profitability of Private Trade

The survey results suggest that, given favourable supply and demand, private traders can buy crops below official producer prices and sell them above the official consumer prices. However, the competitive behaviour practiced by private traders in the form of early buying, uniform prices for different crop grades and remote area operations can mean that *defacto* producer prices are not much lower and in fact may be more attractive to farmers than the official floor prices at ADMARC buying points and selling later in the season. Baseline survey results indicate that a majority of traders do not feel constrained by price regulations. This is more so in the remoter LADD than BLADD.

Table 10 indicates that private traders, in their year-round, operations often have to pay more than the official price even in some remote areas. One qualification -- soon after harvest, i.e., around March/April, the explicit prices in LADD may be lower, moisture content not-withstanding. However, BLADD price are almost always higher than those in LADD due to the supply and demand situation.

Table 10. Weighted Average Monthly Buying Prices of Maize (Kwacha/90kg)*

Month	LADD	BLADD	Dif(BLADD-LADD
May	27.00	-	-
June	22.50	22.77	0.27
July	23.40	27.72	4.32
Aug	22.95	26.10	3.15
Sept	25.11	72.00	46.89
Oct	25.20	32.40	7.20
Nov	30.15	20.52	-9.63
Dec	-	-	-
Jan	32.40	34.47	2.07
Feb	27.90	30.15	2.25
March	-	31.50	-

Note: * The official producer price for 1989/90 was K23.40 per 90kg bag.
Source: Traders Monthly Survey.

[11] **High consumer prices have been observed in a number of earlier studies, e.g., Mkwezalamba. (1989) and Trivedy. (1988).**

In additional to minimising transport costs, traders have also sought to enhance their profitability by not undertaking significant storage activity. Seventy-two percent and 59 percent of the traders in LADD and BLADD respectively sold their produce immediately after purchase. Modal lengths of storage is up to two months (43% of traders) in LADD and up to one month (71%) in BLADD. Much of the storage is likely associated with bulking while awaiting transport rather than for speculative purpose. The destination of sales corroborate this view.

Existing opportunities (in terms of prices and volumes of transactions) and the adaptive behaviour of the majority of private traders made them better off currently (75% in LADD and 73% in BLADD) because of generally more profitable operations (60% in LADD and 65% in BLADD). This despite the fact that most considered trading more competitive than before (79% in LADD and 73% in BLADD).

Profitability has extended traders adaptive behaviour to investment as summarised in table 11. Forty percent and 56 percent of the traders in LADD and BLADD respectively had made relevant investments mostly in the form of transport and storage. Forty percent had invested less than K1,000. A few had invested substantial sums of money (over K10,000). The failure to invest was associated smaller-scale traders. The storage behaviour and residential status shown imply that investments in storage were associated with short-term storage in rural locations. Traders may avoid substantial investment if hired means of transport is available and as immediate sales continue to be facilitated by demand pressure.

Table 11: Trader Investment Patterns (No. of Traders)

Total value of Investment (K)	LADD			BLADD		
	No.	Type* 1 2 3 4	Impl**	No.	Type* 1 2 3 4	Impl**
<500	7	4 3 0 0	3	6	3 1 1 1	5
500-999	3	0 2 0 2	1	0	0 0 0 0	0
1,000-4,999	5	2 2 0 1	2	7	3 2 0 2	7
5,000-9,999	3	0 3 1 0	1	1	0 1 0 0	1
10,000+	3	1 1 1 0	0	5	2 3 1 0	5
Total	21	7 11 2 3	7	19	8 7 2 3	18

Notes: * 1 = transport; 2 = storage; 3 = buying premises 4 = other. ** Fully implemented.
Source: Traders Baseline Survey

Policy Responses[12]

ADMARC remains the major vehicle for implementing policy related to national and household level food security. ADMARC has not been passive in the face of potential competition from private traders in production, distribution and consumption.

The major issues at the production level are the maintenance of incentive prices and an effective input delivery system. The official prices set by the Ministry of Agriculture attempt to maintain a balance between food and cash crops given the land constraint. Capital-intensity, through higher uptake of improved seasonal inputs in the form of seed, fertilizer and pesticides, is seen as a major area of focus for improving production.

Thus, the government has retained a fertilizer subsidy at 25% of landed cost despite pressure to eliminate it. ADMARC still sees itself as the dominant actor in input distribution. The apparent reluctance of private traders to deal in inputs seems to justify this view, at least in the short-term. This issue had been at the centre of continuing debate concerning ADMARC's withdrawal from seasonal markets with low annual throughputs. The Ministry of Agriculture has used its powers to continue regulating private trader activity at the distribution level through entry licensing requirements and restrictions on trading certain crops.

The licensing requirement is largely ineffective due to lack of policing and the reluctance by private traders to submit the required monthly returns on their operations. The objective of these returns, i.e., to monitor the operations and crop movements, is not being fulfilled. The decline in the number of licensed traders is thought to be a reflection of some traders opting to operate without licenses rather than an actual decline in the number of traders.

Private trader purchases of groundnuts in 1989 was suspended because the high prices offered in the previous years had resulted in very low ADMARC purchases. This threatened the production base because ADMARC could not buy enough seed. Exports of locally consumed pulses were banned in mid-1988. The export ban was due to poor production and is still in place.

The Ministry of Agriculture and ADMARC currently seems to be thinking of reopening the closed, high cost markets to facilitate food distrubtion and input delivery. A survey of households indicated a majority (63%) in the worst food-deficit area, BLADD, depended on ADMARC as a source of food after they had depleted the own stores (Kaluwa and Chilowa. 1991, Appendix VI). The closures particularly affected BLADD

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[12] **Some of the information in this section was obtained from interviews with a senior ADMARC official in 1990 and interview with the Ministry of Agriculture (Marketing Section) in September, 1991.**

where one area (Phalombe) had 24 markets closed out of a total of 125 market closed country wide (Evans et al. 1989) Evidence presented earlier indicated that private traders in BLADD are generally reluctant to sell maize to ADMARC or to households. Thus, for ADMARC to fulfil its role as seller of last resort, it might need to import quantities from other areas. This is costly and requires effective coordination. Kaluwa has documented ADMARC transport contracts shipping maize from remote areas to a main depot only to reverse the process the following week.

However, household food security is not the sole consideration of the government's distribution policy. Diversification of smallholder crop production is an agricultural policy objective under the Structural Adjustment Programme. The household survey revealed that households which could not access food on the market, especially in the remoter ADDs, traded labour for food and grew supplementary food crops. These households were risk-averse with respect to specialisation in higher-value cash-crops (Kaluwa and Chilowa. 1991; Kaluwa. 1990).

Private traders have not been a substitute for ADMARC's input delivery system. This system is not only associated with subsidies, but also dispenses seasonal credit through farmer clubs. ADMARC's continued monopsony in the purchase of cash crops facilitates the recovery of credit from farmers' proceeds. However it is difficult for the government to restrict credit availabilty only to those farmers who grow cash crops. Thus, when farmers sell their produce to private traders, credit recovery must include other forms of guarantees such as the use of the farmers' clubs or systems under a village (MUDZI) Fund project.

Private traders participation, with their pricing flexibility and ability to trade large volumes of crops, have made official prices respond to market-determined prices. The low levels of ADMARC purchases experienced since 1987 forced this adjustment. This adaptive pricing behaviour is the hallmark of true competition and is a significant departure from the past.

Another recent innovation with regard to the official price for maize allows private traders to sell maize at prices higher than ADMARC consumer prices. This is to provide an incentive for private traders to: (a) offer better producer prices and buy more, (b) penetrate the remoter areas, or (c) buy from ADMARC and distribute the maize, and (d) by-pass ADMARC and sell directly to consumers. However, ADMARC may be using (a) and (b) above to reduce its own role in maize transactions to enhance its financial position by reducing the cross-subsidies associated with the crop. This would put it in a stronger position to subsidise the input delivery system which contributed to ADMARC's losses in the mid-1980s. Private trader response and its impact on ADMARC's ability to purchase it needs for depot sales and the government's strategic maize reserves will need to be monitored.

Maize is the staple food crop in Malawi. The government considers the crop to be strategic and feels that it should not be imported or exported. The government has taken over from ADMARC full responsibility for the 180,000 ton central maize reserve silos located in Lilongwe. This capacity represents about 13 percent of average production in the last three years and equals about 90 per cent of ADMARC's purchases in 1989/90, a record crop year. The government has never used the strategic stocks or ADMARC's stocks to deliberately stabilise maize prices in the market except incidentally in the case of emergency food distribution. Implicit subsidies are present due to pan-territorial pricing and the cost of distribution to the remoter areas from centralised storage facilities.

The current refugee situation has provided Malawi the opportunity to dispose of unwanted stock carry-overs. However, a long-term increase in supply would require diversification of maize consumption.

CONCLUSION

This study has presented evidence that private trader activity, especially after liberalisation, has introduced innovative pricing behaviour which has offset the restrictions imposed by the official pan-territorial and pan-seasonal prices. Purchases in some remote surplus producing areas has been made feasible through transport cost-sharing prices. On the other hand, innovations such as early buying of crops (with higher moisture content) and the buying of different crop grades at uniform, higher than official prices have given private traders a competitive edge against ADMARC, benefiting the farmers. However, official price regulations have contributed to the reduction of transactions in well-defined market places where prices are monitored.

Private Traders exhibit a general reluctance to deal in inputs. However, some activity in the less remote areas on a cash basis is developing.

Private traders in the more remote areas tend to sell their produce to the nearest ADMARC depot to maximise profits. Those in high demand areas sell directly to consumers at higher than official consumer prices. Another profit enhancing adaptive behaviour is the minimisation of storage to only that associated with bulking operations. This has been possible because of high demand pressure and the fact that the official pricing system does not provide an incentive for incurring interseasonal storage costs.

The vigour with which private traders have responded to liberalisation has exerted sufficient pressure to invoke adaptive intervention affecting production and consumption. The poor supply response, resulting from structural constaints, is being addressed by maintaining an input subsidy and the existing imput delivery system through ADMARC. This has led to the reversal of the earlier decision to close some of ADMARC's seasonal markets and increased their operating costs. This will facilitate food distribution to some

areas where private traders have been reluctant to enter. The assured availability of food on the market is likely to play an important role in persuading smallholder farmers to orient their cropping patterns more towards cash-crops, reducing the importance of subsistence production.

Interventions influencing distribution and consumption have included bans on the export of certain food crops and the suspension of purchases of others in response to available supplies. It also appears that official prices are becoming more responsive to market pressure. Official consumer prices are now being manipulated to assist private traders achieve objectives such as increasing their role in maize purchasing and distribution.

The combination of liberalization with selective interventions may continue to be necessary to produce desirable trader behavior. Simultaneously, government should not over-react against private traders such as those that seemingly violate floor prices but implicity generate income effects. Farmers producing surpluses will prefer sharing transport costs while selling to private traders for cash rather than facing the procurement difficulties being experienced by ADMARC.

More positive measures may be necessary in redressing constraints to private traders participating in the input delivery system. Investment, where it is deemed necessary, e.g., for local (i.e., rural) interseasonal storage, would need to be supported by permitting official prices to vary interseasonally. Private trader participation can derail important gains that have been made with respect to the input credit recovery. This makes it important to explore recovery channels other than recovery from sales to ADMARC.

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APPENDIX

Appendix 1. Crops Transacted and Scale of Operation Number of Private Traders

BLADD

No of Bags	Maize	Beans	Pigeon Peas	Rice	Other Pulses	Other
Not Indicated	5	1	-	-	-	-
<25	4	4	4	-	3	2
25-49	1	1	-	-	-	-
50-74	4	-	-	-	-	2
75-99	-	-	-	-	1	-
100-499	2	1	2	-	3	2
500-999	5	1	2	-	2	-
1,000=4,000	2	1	3	-	1	1
5,000-9,999	1	-	-	-	1	1
10,000+	1	1	-	-	-	-
Total	25	10	11	0	10	8

LADD

Not Indicated	1	13	-	-	3	3
<25	-	4	4	1	-	2
25-49	3	5	-	-	-	1
50-74	-	2	-	-	-	1
75-89	1	-	-	-	-	-
100-499	9	9	2	1	-	1
500-999	9	6	1	-	-	-
1,000-4,999	10	-	-	-	-	-
5,000-9,999	-	-	-	-	-	2
10,000+	-	-	-	-	-	-
Total	33	39	6	2	3	12

ZAMBIA'S MAIZE POLICIES; CONSEQUENCES AND NEEDED REFORMS

J. McKenzie & Chenoweth[1]

THE POLICIES [2]

In value terms, maize is Zambia's second most important economic commodity after copper. From a social and political perspective, it is even more important than copper. Half of Zambia's working population produce it; the other half rely on it for most of their caloric intake and spend a large share of their disposable income buying it. Policies to support the maize subsector now cost the Government at least 15% of it's annual budget. The policies described here are divided into production, marketing, and consumption. However, policies in each category may impact on persons or businesses in each of the other subsectors.

PRODUCTION POLICIES

Maize production in all parts of Zambia is mostly small-scale, with farmers producing maize for themselves and for about four million urban residents mostly located in Lusaka and Copperbelt. The government traditionally set producer prices, supported agencies authorized to buy the farmers' maize, and supplied improved seed and fertilizer on credit to as many small-scale producers as possible. Both fertilizer, which is the major cash outlay for small-scale producers, and the credit system have been heavily subsidized.

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[1] ZATPID II Project, Lusaka

[2] The views expressed are those of the authors and do not represent official Government of Zambia policy. This paper draws upon Republic of Zambia, 1990. Evaluation of the performance of Zambi's maize subsector. Lusaka and other studies currently being undertaken on other agricultural subsectors. Time contraints prevented the authors from reviewing the editorial changes made on the original version of this paper presented at Victoria Falls.

The Production Sector

Maize dominates Zambian agriculture utilizing 70% of the land under cultivation and providing 90% of the cash receipts of small-scale farmers. In 1989/90, 468,000 small-scale and emerging producers accounted for 81% of the maize produced and 69% of the maize marketed, Table 1.

Table 1: Basic Statistics on the Maize Crop for 1989/90

Type of Grower	No of Growers	Area (ha) Planted	Production (000 bags)	Ave Yield (bags/ha)
Commercial	2,504	64,950	2,015	31.0
Institutional	2,190	14,140	307	21.7
Emerging	59,411	214,820	3,763	17.5
Small-scale	408,764	469,370	6,055	12.9
Total	472,869	763,280	12,140	15.9

Type of Grower	Expected Sales (000 bags)	Sales as % of Production	Retained (000 bags)
Commercial	1,713	85%	312
Institutional	289	94%	16
Emerging	2,425	64%	1,338
Small-scale	2,680	44%	3,375
Total	7,107	59%	5,041

Small-scale farms dominate the sector numerically but have low productivity. These farmers cultivate less than two hectares using family labor and simple hand tools. They produce primarily for subsistence with small marketable surpluses. Crop yields under this system are low, with farmers producing about ten bags of maize per hectare (a bag weighs 90kg).

The numerically small but highly important commercial farm system is comprised of about 2500 units, including about 700 fully mechanized large-scale farmers who cultivate an average of 70 hectares. These commercial farmers receive 30 percent of the marketed value of maize and 65 percent of the value of the other marketed agricultural products. Production under this system uses a range of inputs and is characterized by high yields -- 30 + bags per hectare for maize.

Emergent farmers make up about 12% of all farm households. They cultivate an average of 3 hectares using hand tools and labor together with oxen, hired tractors, and modest amounts of purchased seed and fertilizer. These farmers produce for the market and obtain higher yields than traditional farmers. Their average maize yield is about twenty bags per hectare. These farmers together with traditional farmers, produce about 70 percent of the value of marketed maize and 35 percent of the value of the other marketed agricultural goods.

Producer Price Policies

The producer price for maize traditionally has been set by government. It is the same in all parts of the country (Pan-Territorial) and throughout the year (Pan-seasonal). However, since most producers sell their maize between July and October, pan-seasonal pricing may not be of major consequence. The purchase price for the crop to be planted in November and December is set the preceding June using a cost of production formula consisting of a weighted average of the costs of three different types of producer. For the last three years inflation has made these prices out-of-date by harvest time. In two of the three years, they were adjusted upwards to reflect inflation.

The producer prices for the last three years have been;

1989 K125/bag (adjusted from K108) [$69/mt]
1990 K284/bag (not adjusted) [$79/mt]
1991 K800/bag (adjusted from K500) [$119/mt]

A producer price of K1200/bag has been announced for 1992. This may be further increased for changes in the value of the Kwacha between now and harvest. If so, it will represent $178/mt at official exchange rates and will be the highest real price paid to producers for many years.

Until this year, the producer price was supported by the purchase of all maize by the official marketing agency. This year, other buyers were allowed to buy maize from farmers with the Cooperatives and parastatal mills paying the official price. Thus, the producer price becomes a floor price as long as the Cooperatives and mills have funds to buy maize.

Fertilizer Policies

Zambia uses about 200,000 metric tonnes of fertilizer annually. A large share of this (i.e., about 70%) is applied to maize. Fertilizer prices are set by government each June and are regionally and seasonally uniform. Nitrogen Chemicals of Zambia's (NCZ) large fertilizer factory at Kafue has never operated near capacity and most of the fertilizer is imported in compound form. Most of the raw materials for the NCF plant also are

imported. Fertilizer has been heavily subsidized by government. There have been attempts to reduce this subsidy and current plans call for it's elimination. Fertilizer prices for compounds used for maize have been:

1988/89	**K 85/bag**	**[$170/mt]**
1989/90	**K390/bag**	**[$390/mt]**
1990/91	**K500/bag**	**[$250/mt]**

Foreign exchange allocations for fertilizer imports have always been allocated to the official fertilizer supplier. Thus, fertilizer sold to farmers is implicitly subsidised by an over-valued currency. Donor countries' contribute towards Zambia's fertilizer needs. This has reduced the need to allocate Zambia's own scarce foreign exchange to import fertilizer. Donor fertilizer is sold by government to NCZ at import prices with revenues used by GRZ as counterpart funds. NCZ also has benefitted from government loans and loan guarantees for the acquisition of imported fertilizer. The lack of government funds available for farm credit programs in recent years has resulted in "credit-in- kind" programs, turning fertilizer suppliers into farm lenders.

Seed Policies

Like fertilizer, the price of seed maize has been controlled by government and is uniform regionally and seasonally. Occasionally when seed has had to be imported, the government has provided a subsidy to keep imported seed at the same price as domestic seed. Seed supply is controlled by a parastatal (ZAMSEED) which normally operates profitably. However, in 1990, ZAMSEED, like NCZ, had to advance seed to retailers without appropriate arrangements for payment.

There has been an active plant breeding program to develop new varieties and hybrids suited to Zambian conditions. ZAMSEED presently offers 10 different types of maize for use by producers. Yield potential for these ranges from 40 to 88 bags/hectare.

Credit Policies

The government provides financial support to three lending agencies (Lima Bank, CUSA, and ZCF Finance Services) which collectively provide credit to about 120,000 small-scale and emerging farmers. Farmers using this credit account for about 35% of the maize area planted by small-scale and emerging farmers but they use a much larger share of the improved seed and fertilizer. The programs provide inputs (mainly seed and fertilizer) through a Purchase Order system. For the last three years, the government has encountered difficulty in funding the credit system and has resorted to various special measures, (including "credit-in-kind" programs), to ensure the availability of inputs to credit agency clients.

Interest rates charged by commercial lenders servicing the commercial farm sector are controlled by government through the Bank of Zambia. These rates are currently less than half the rate of inflation estimated to be over 100% annually. Interest rates charged by the three small-scale farmer lending agencies are set by their own Boards with rates significantly below these set by the BOZ.

Other Production Policies

Inputs other than seed and fertilizer are supplied by the private sector but are used relatively little by small-scale farmers. Imported chemicals and machinery carry with them the implicit foreign exchange subsidy resulting from an over-valued currency. Seed and fertilizer distribution was dominated by NAMBOARD and, more recently, by the Cooperative Unions. However, given the precarious financial condition of the Unions, both NCZ and ZAMSEED are trying to find others to retail their products. Government has endorsed this action.

Zambia's low level of land usage reflects available production technologies, the level of producers' skills, the economics of location, and past government policies. Land in Zambia is divided into state land, reserves and trust land. Representing 6 percent, 36 percent and 58 percent of the total respectively. The 1975 Land Act abolished the ownership of land and converted owned land into statutory leasehold (i.e., now state land). When leasehold land changes hands, improvements are valued and sold, and the leasehold is transferred from one leaseholder to another. The leasehold periods range from 14 to 100 years. The constraint of land tenure on agricultural production is considered to be minimal on leased land due to the long term nature of leaseholds. Land tenure on non-leased land (i.e., trust land) is considered to be a major constraint as the farmer does not have security of tenure and the land can not be used as loan collateral.

There is an extensive system of extension officers in the Ministry of Agriculture but they are poorly-equipped and supported. The extension service promoted the production of maize widely across the country during the 1980's.

Impact of Production Policies

Maize production in Zambia has changed since pre-independence. The production of maize for market was dominated by commercial farmers located along the line-of-rail and in close proximity to the Lusaka and Copperbelt markets. Maize was grown throughout the country, but many producers produced only for their own needs. In some regions, other crops such as cassava, sorghum, or millet were dominant. Maize is much more widespread now and other cereals are not as important. Commercial farmers also are more diversified and maize is only one of several crops they produce. Still, maize accounts for about half of their crop area. Commercial farmers have

increased their production of market demanded livestock, especially poultry and beef. The former competes with the human population for maize grain while the latter has competed successfully with maize for land.

Growth and Location

During the 1980's, Zambia experienced significant expansion in maize output, Table 4. Maize production varied from year to year mainly due to weather but also due to policy changes. Since irrigation of maize has not been economic, except for seed and specialty use (i.e., green maize), yields have been highly dependant on rainfall and all is harvested in the period from May to August.

Table 4: Maize Production, Marketings, and Retentions for the years 1982/83 to 1990/91

Year	Production Bags	Marketings Bags	Retentions Bags
	000	000	000
82/83	10,392	5,902	5,490
83/84	9,686	6,348	3,338
84/85	12,471	7,070	5,401
85/86	13,673	10,607	3,066
86/87	11,816	7,296	4,520
87/88	21,591	14,990	6,601
88/89	20,500	13,546	6,954
89/90	12,140	4,900	7,240
90/91est.	16,087	9,000	7,087

Maize production and marketings in the late 1980's on average, were, substantially higher than in the early 1980's. Nineteen eigthy-seven/eighty-eight was a record production year because of good rainfall. It was followed by record plantings and a very good crop in 1988/89. In 1989/90, both area and yields were down, production declined to 12.1 million bags, and marketings fell to less than five million bags the lowest in the 1980's. In 1990/91, area planted declined but yields (except Southern Province) appear good so production will likely be close to national requirements.

The effective demand for marketed maize is in the four line-of-rail provinces (especially Lusaka and Copperbelt) where production has been growing more slowly than requirements. While there is potential for expanded output in this region, maize is currently not competitive with other crops and livestock with liberalized markets.

The existence of large areas of good quality, undeveloped land and the potential for economic yield increases on existing cropland, substantiates Zambia's potential to expand maize production. This can be done while diversifying farm production and increasing the output of other commodities.

Producer Incomes and Costs

Government policies have benefitted small-scale and emerging producers, in locations remote from major markets. (There are very few commercial producers in these locations.) Uniform regional pricing in combination with the fertilizer subsidy and the subsidy on maize marketing have been key policies. Farmers close to Malawi and Zaire have, through unauthorized trade, received prices existing in those countries. Since these farmers receive fertilizer and credit subsidies, they may be better off than under a free market. Some also benefit from the illegal cross-border trade in subsidized fertilizer.

Prices Received vs Market Prices

To compare prices received by farmers with those they might have received in an open market, import replacement prices in the range of $200 to $300/mt have been translated into in Kwacha/bag for exchange rates ranging from 25:1 to 100:1, Table 3. These import parity prices are relevant at the mill door, not at the farm gate. Market prices for producers supplying urban centres must be adjusted for transport costs (currently about one Kwacha/bag/km) and other marketing charges. All producers received less than import parity in 1989 and 1990.

Table 3: Import Parity Prices of Maize (K/bag) for a Range of Landed Costs ($/mt) and Exchange Rates

Landed Cost	Exchange Rates			
	25:1	50:1	75:1	100:1
$200	K450	K900	K1350	K1800
$250	K563	K1125	K1687	K2250
$300	K675	K1350	K2025	K2700

It is widely-accepted within Zambia that the official producer price is a fair price for Zambian producers at the time it is announced. In fact, the formula for deriving it has been endorsed by the Commercial Farmer's Bureau. This appears to be due in part to the cost reductions attributable to subsidized fertilizer and credit. Still maize should be priced higher in order for it to compete with other commodities which were liberalized several years ago. These commodities receive a more attractive price because they are grown closer to urban markets or are exported.

Maintaining the Kwacha at overvalued levels further accentuates the difference between a free-market price and the official producer price. Last year producers were receiving K284/bag while the import parity price (at the mill) was K1500/bag based on an equilibrium exchange rate.

Zambia has been in a maize surplus position in two of the last ten years with export rather than import prices providing the relevant comparison. Zambia stands to receive substantial premiums above World market prices because of the regional preference for white maize and the high transport costs throughout this region. When Zambia was officially exporting maize, it received prices between $150 and $200/mt.

High maize transport costs within Zambia, the rapid increases in costs, together with pan-territorial and pan-seasonal pricing, has resulted in marked differences between the official price and what a free market would be expected to generate. This has meant that some producers have received higher than free market prices while many others have received substantially less. Delayed payments for maize with no compensatory interest payments, together with the rapidly depreciating value of monies received, also have effectively lowered the producer price.

Producer price policy has worked to the disadvantage of all farmers close to the urban areas. Many commercial farmers, small-scale and emerging farmers in Southern, Central, Lusaka and Copperbelt provinces within 300 km of large-scale mills, would benefit from free market prices. These benefits likely would exceed the current value of credit and fertilizer subsidies making maize production competitive.

Maize production in Zambia is not particularly efficient. Small-scale and emerging producers have low yields per hectare and are not able to cultivate large areas of land because of labour and capital constraints. Commercial producers, in spite of government fertilizer and exchange rate subsidies, do not find maize production very attractive. Cost studies suggest that commercial farmers have higher costs than emergent producers. Although largely mechanized, most commercial farmers do not cultivate enough land to reap the full economies of scale associated with mechanization. Most employ large amounts of labour in spite of their heavy investments in machinery. Good returns to commercial maize production in Zambia are more likely to arise through commercial ingenuity or good luck than through improving production efficiency. Thus, government

policies have not contributed to improving economic efficiency among producers and may have distorted comparative advantage in production. This has important implications for liberalized interregional trade and for Zambian consumers.

Viability of Input Suppliers

Both ZAMSEED and NCZ are heavily in debt and cannot sustain operations. Last year's credit-in-kind program advanced more than one billion Kwacha worth of seed and fertilizer to farmers through the Cooperatives without arrangements for payment.

Cooperatives, the main retailers of seed and fertilizer, will not be able to buy seed and fertilizer for this coming season. Zamseed has been having more success in attracting dealers than NCZ. Fertilizer, which is a bulky commodity and must be stored for several weeks at the beginning of the rainy season, has not been profitable for many of the Cooperatives. More retail price flexibility is needed to attract dealers.

There is little private sector supplying of seed and fertilizer to farmers beyond the four line-of-rail provinces. If other areas are to be serviced, either the Cooperatives or state shops must be involved.

Viability of the Farm Credit System

The commercial component of the farm credit system is economically viable but suffers from an excess demand for funds at current interest rates. Increasing producer prices for maize to more competitive levels will further increase the demand for funds, but will do nothing to expand the supply of funds for lending. However, the capacity of commercial farmers to finance their own operations could improve.

The small-scale farmer credit system is not economically viable with requirements estimated at two billion Kwacha this year. The losses would be even higher if fertilizer were not being subsidized. All three of the small-scale farmer lending agencies are incurring both operating and capital losses. Operating losses arise because of the high costs of lending to small-scale farmers -- capital losses arise because of low rates of recovery and negative real interest rates. They received one billion Kwacha in 1989/90 through the credit-in-kind program. In 1990/91, they received another billion. Even with these inflows, they will have only one billion Kwacha of their own to re-lend for 1991/92. About 90% of the lending is for maize production. This constitutes a further fertilizer subsidy.

Public Costs in Support of Production

Production support of Zambia's maize subsector appears in several components of the GRZ budget including:

- the fertilizer subsidy
- grants to the three public lending agencies, and
- research and extension.

Fertilizer subsidies for the last three years were:

1988	**K206 million**
1989	**K357 million**
1990	**K549 million**

Since 70% of the fertilizer is used for maize, most of these expenditures can be attributed to the maize subsector. Commercial farmers receive a large share of the maize-related subsidy because of their heavier fertilizer application rates. They receive virtually all of the fertilizer subsidy for those fertilizers used on other crops and are in a position to make further substantial savings by buying fertilizer just before the annual price increase. The government fertilizer subsidy, coupled with the implicit exchange rate subsidy, has resulted in substantial over-use of fertilizer on commercial farms without achieving economic application rates on small holdings.

The fertilizer subsidy budget for 1991 is K1,853 million, out of which it must pay for subsidies incurred in the 1990/91 crop year. The subsidy rate was originally approved at K225/bag, then revised down to K183/bag. However, because of rising costs and depreciation in the Kwacha, NCZ claimed in early 1991 that a subsidy of K541/bag was required since prices had remained pegged at about K500/bag. Depending on the final resolution of this issue, there may be little remaining funding to pay for this year's subsidy of K500/bag.

The government's contribution to agricultural credit (through Lima Bank, CUSA, and ZCF Finance Services) is not budgeted as a subsidy but is not recoverable, Table 5. The high cost per loan, low recovery rates, and inflation in input costs has resulted in the budgeted amounts in Table 5 not being adequate to maintain the small-scale farmer lending program. One billion Kwacha has been necessary in each of the last three years to ensure that farmers get inputs to plant maize.

Table 5: GRZ Budget Costs (million Kwacha) in Support of Small-scale Farmer Lending Agencies

Program	1988	1989	1990	1991
CUSA	16	28	44	192
ZCF/FS	70	28.5	73.4	420
Lima Bank	130	130	495.4	463.3
Total	216	186.5	612.8	1075.3

The costs of the agricultural research and extension system do not appear excessive. World Bank and MOA evaluations would suggest that public support may need to be increased and the form of the activities modified. These costs will have to be born by the government although there is some potential for funding maize breeding from seed sales. Zamseed has used profits for this in the past. Donors are significant contributors to maize production, through Zamseed, donations of fertilizer and financial support to the farm credit system.

MARKETING POLICIES

Marketing of maize is a substantial and high profile activity in Zambia. It includes:

- the purchase of more than half of the total harvest from producers between May and December;
- the movement of this maize to safe storage before the onset of the rains in November or December;
- the regular monthly distribution of adequate supplies to large-scale mills (mostly in Lusaka and Copperbelt);
- the processing of the maize into meal, livestock feed and beer; and,
- the distribution of the meal to retail shops (both private and state-owned).

In contrast to the government's support of the private sector's role in maize production, government, through various agents, is the main player in maize marketing.

NAMBOARD

Until 1989, NAMBOARD was the government's main instrument for maize marketing. The National Agricultural Marketing Act of 1969 established NAMBOARD as a parastatal. NAMBOARD replaced the Grain Marketing Board and the Agricultural Rural Marketing Board created at independence in 1964. These boards had served farmers along the line of rail and farmers in remote areas respectively. The two boards were vestiges of the colonial dual marketing system, one serving European settlers and

one serving African producers. NAMBOARD was charged with the following functions:

- monopoly purchase, storage, sale, import and export of maize;
- purchase cotton from line/of/rail producers and subsequently, producers in the Eastern Province;
- monopoly on distribution and sale of fertilizers and other agricultural supplies except seed;
- beginning in 1970, market fruits and vegetables as residual buyer, wholesaler, retailer and monopoly importer.

NAMBOARD was beset with a number of problems which included:

- inadequate definition of its responsibilities;
- inadequate number of skilled staff to handle its many activities;
- inadequate cost accounting; and
- logistical problems including:
  - > late arrival of fertilizer and seeds,
  - > improper types and quantities of seed and fertilizer being dispatched to depots,
  - > agents or depot workers not being present to receive farmers' crops,
  - > late payment to farmers due to delay in the release of government subsidies,
  - > late procurement of empty grain bags, and
  - > inadequate transport.

These problems caused the Government to transfer responsibilities for certain functions to other organizations and ultimately, in 1989, to dissolve NAMBOARD. At the time of dissolution, NCZ was assigned responsibility for fertilizer importation and distribution while the cooperative system was allocated the responsibility for maize marketing. Ownership of many of the assets of NAMBOARD remains in question.

The Cooperatives

The cooperative system is a creation of government and has received a great deal of government support. The system consists of four distinct tiers and a few supplementary cooperatives. Zambia Cooperative Federation (ZCF) is the national apex organization. The next tier consists of nine provincial cooperative unions (PCUs). The third tier consists of thirty-two District Cooperative Unions (DCUs) while the fourth includes 1400 primary societies. The supplementary cooperatives include such organizations as ZATCO and Zambia Farmers Cooperative Society. These supplementary cooperatives provide various services for their members, typically commercial farmers. Supplementary cooperatives are usually not involved in maize marketing or fertilizer supply.

In theory, the PCUs and the supplementary cooperatives control ZCF while the primary societies control the DCUs and the DCUs, in turn, control the PCUs. In practice, the primary societies and the DCUs are financially weak and dependent upon the Government, ZCF and the PCUs. ZCF, as the national apex organization for the Cooperative system, was registered in 1973. Due to delays in receiving technical and financial assistance, ZCF did not become operational until 1976. ZCF is owned by the nine PCUs and six other organizations that utilize its services. There are some 500,000 members in 1,400 grassroots primary cooperative societies served by ZCF.

Input supply and maize marketing have been the main functions of the Cooperative system, first with NAMBOARD and, since 1989, as the major player. The primary societies serve as local collection points for crops and distribution points for inputs. Either the PCUs or DCUs actually hold title to these products, are responsible for financing and receive subsidy payments. Many PCUs have been attempting to transfer maize and fertilizer responsibilities to DCUs while diversifying into other activities. ZCF's main roles have been in interprovincial transport, international trade, and managing the Maize Reserve.

Marketing Subsidies and Loan Guarantees

The marketing of maize has long been subsidized by government, first through NAMBOARD and more recently through the Unions and ZCF. The subsidies, at one time, covered most of the marketing costs. Millers were able to buy maize from the marketing agency for little more than the producer price. The subsidy on within-province marketing now has been removed and only the interprovincial movement of maize and the Maize Reserve are subsidized.

The government also ensures the financing necessary to buy the maize crop. The government has guaranteed loans made to the Cooperatives by the commercial banks. Since the Cooperatives took over marketing from NAMBOARD, difficulties were encountered in 1990 and 1991 because the government ran out of funds. The government now is making funds available directly to the Cooperatives while mills are buying current operating stocks directly from farmers.

Storage Policies

NAMBOARD was responsible for off-farm storage of maize. This function was transferred to the Cooperatives, along with major storage facilities when NAMBOARD was dissolved. These facilities, constructed by government or donors, remain with the government. However, any large-scale maize-holder has the right to their use. Thus far, no charges have been levied for the use of storage facilities. NAMBOARD, and then ZCF, were responsible for the maintenance of these facilities. ZCF is currently discontinuing this service since it receives no revenue from it.

The Cooperatives have indicated that there is a shortage of storage facilities in outlying surplus provinces. Government's current policy is to expand storage by annually allotting funds for constructing storage. Storage consists of a mix of silos, sheds, hardstanding, and temporary facilities (poles and tarpaulins). Some facilities are used for both maize and fertilizer while many are used exclusively for maize. Virtually all of the marketed maize must move into commercial storage before the rainy season commences.

Into-mill Prices for Maize

The into-mill price for maize, like the producer price, is set by government. It too is uniform regionally and normally stays constant for one year. It is a compromise between what the government would like to see, (in order to keep meal prices low), and what it feels it can afford in terms of marketing subsidies. There has been a great deal of pressure to raise the into-mill price to reduce marketing subsidies. The into-mill prices for the last three years have been:

1989/90 K160/bag [$89/mt]
1990/91 K442/bag [$123/mt]
1991/92 K1100/bag [$163/mt]

(The above dollar equivalent values are based on exchange rates at the time the prices were set). An into-mill price of K1800/bag [or $264/mt] has been announced for May 1992. It is believed that this will be further increased as the value of the Kwacha declines, making the 1991/92 price roughly equivalent to current import prices for maize landed in Lusaka.

Milling Policies

Large-scale mills produce two products for human consumption, breakfast and roller meal. The former is more highly refined and is a preferred product in most urban areas. It accounts for 60% of mill sales. In 1986, a perceived lack of private sector compliance with pricing policy changes resulted in all of the large-scale, privately-owned mills being nationalized. Two parastatals now control most of the milling industry while Cooperatives operate a few smaller mills in outlying towns.

The government has recently supported the widespread introduction of hammermills in rural areas. These mills operate on a fee-for-service basis and facilitate maize being ground close to where it is produced. Hammermill operators do not receive the same subsidies received by producers of breakfast and roller meal and few operate within urban areas.

International Trade Policies

At present, exports of maize and maize meal are officially controlled by government, exports are only permitted when national surpluses exist. NAMBOARD, and more recently ZCF, have been the only official agencies authorized to engage in the import or export of maize. Parastatal mills have exported meal when permitted. The partial liberalization of the maize market in September 1990, permitted farmers producing more than 10,000 bags of maize to export 50% of the excess. This decision was reversed before the 1991 harvesting season because of an emerging maize deficit.

Control of an export ban is extremely difficult given the strong demand for maize and meal in neighboring countries and the nature of Zambia's borders. Imports must usually be subsidized to keep into-mill prices at the pre-determined level. Donor assistance is often required to generate foreign exchange as was the case with imports from Zimbabwe in early 1991. However, the government itself has had to find the foreign exchange for maize imports planned for the coming rainy season.

Other Marketing Policies

Grain Bags - Most of the maize is marketed in 90 kg bags -- relatively little is handled in bulk. The maize is stored by the marketing agent in the same bags in which it is received from farmers. These bags are later removed from storage and shipped to the mills. The prices and terms of sale of grain bags to farmers have been set by government although this policy is now being phased out. When maize marketing was a NAMBOARD or Cooperative monopoly, bags were provided to producers on credit and a service charge was deducted for the use of the bag. Foreign exchange for the importation of grain bags continues to be allocated to only one supplier -- ZCF.

Weighing and Grading - Maize was purchased from farmers on the basis of grade and efforts were made to weigh all bags of maize bought until 1986. However, in 1986 grading was abandoned and the weighing of maize purchased from farmers also has been discontinued. Maize delivered to large-scale mills is weighed and the supplier is paid by weight. Additionally, maize is typically divided into three categories:

- fit for human consumption;
- fit for brewing or livestock feed;
- unfit -- must be destroyed.

Maize Reserve - The government has had a policy to maintain a Maize Reserve of 2.5 million bags. The Maize Reserve has never reached this amount because of lack of funding. In 1990 funds were made available for ZCF to purchase 2.5 million bags for the Reserve. Some of the maize purchased was resold to mills within a few months. This made funds available a few months sooner and enabled GRZ to pay transport subsidies

Transport rates for maize and fertilizer have been set by government on the basis of data provided by the Trucker's Association and Contract Haulage (another parastatal). Rates vary by length of haul but not by road conditions. They are usually fixed for one year but, with rapid inflation, more frequent adjustments have been made.

Roads Rural roads, critical for the movement of maize from outlying areas, are generally in poor condition and impassible in the rainy season. They are the responsibility of District Councils which have inadequate revenue to maintain them.

IMPACT OF MARKETING POLICIES

Zambia's complex set of maize marketing policies has resulted in a marketing system which is high cost, inefficient, and stagnant. It is dependent upon government for both funding and direction. Currently it has little capacity to maintain necessary capital facilities and some components of the system are on the verge of bankruptcy.

Into-mill Prices Paid vs Market Prices

The into-mill prices for maize set by GRZ were compared with estimated import parity prices at the beginning and the end of the period they were in force, Table 6.

Table 6: Into-Mill Prices versus Estimated Import Parity Prices

Year	Into-Mill Price/Bag	Import Parity Price/bag	
		Beginning	Ending
1989/90	K160	K500	K1000
1990/91	K442	K1000	K1500
1991/92	K1100	K1500	N/A

The large differences between the into-mill price and import parity prices arise because of three factors:

- producer prices which don't keep up with inflation
- heavy marketing subsidies, and
- lack of seasonal increases in into-mill prices to cover interest and storage charges as well as inflation in other costs (e.g., fuel).

When a country is in a surplus position, free market into-mill prices would be expected to be at export parity levels (adjusted for transport and handling charges). Bases upon export prices received by Zambia in 1989 and 1990, domestic into-mill prices were always below export parity. In June 1990 millers were paying the equivalent of $45/mt (i.e., K160/bag) for maize which Zambia could have exported for $175/mt. The into-mill price of K1100/bag, set in July 1991, was comparable to export parity (using official exchange rates).

Marketing Costs

Marketing costs include transport, storage, interest on funds borrowed (mainly for maize purchase), labour and overhead. Transport usually accounts for 70 to 80 percent of the total costs. Interest costs vary depending upon how long the maize is held by the cooperative unions. Storage charges incurred by the Cooperatives do not reflect full economic costs since the Cooperatives have had free use of government-owned storage facilities. Maize preservation activities such as fumigation, are less than economic. During the last few years, transport, interest, and wage rates have all increased during the marketing season making initial estimates of costs lower than those actually incurred.

Maize losses in storage effectively increase marketing costs. Losses arise from insect and weather damage, pilferage, and shrinkage. Poor quality tarpaulins and inadequate fumigation contribute to increased storage losses. Losses are higher the longer a crop is stored. Weather damage can be severe if the crop is not maintained under good storage during the rainy season. Losses were high following the good crop years of 1988 and 1989, a factor which was not fully taken into account when marketing margins, subsidies and into-mill prices were set. The principal reason that the Cooperative Unions experience shrinkage is that they buy maize by the unweighed bag -- as directed by government -- and sell by weight -- as required by the mills.

When the into-mill price was K160 in 1989/90, it was estimated that an into-mill price of K240/bag would cover all marketing costs. This was double the producer price of K125/bag paid that year. A similar relationship is believed to hold this year, i.e., an average into-mill price of about K1500/bag would be required to cover marketing costs. If all maize were produced within 300 km of the mill, these could be reduced by about K300/bag. No analysis is available on the potential for storage cost savings, largely because these are only partly born by the agency that stores the maize. The mark-up of 100% between the farmer and the processor is higher than that observed in other countries, indicating a potential for savings.

Viability of Marketing Agents

Viability of the official marketing agent has been governed by five factors;

- **the producer price of maize**
- **the into-mill price**
- **the subsidy paid by government**
- **the costs of marketing, and**
- **storage losses**

The subsidy plus the margin (into-mill price less producer price) must be adequate to cover costs of marketing plus storage losses for the marketing agent to remain viable. This has not been the case in recent years. While the Cooperatives may be inefficient, large amounts of what they spend to market maize (i.e., transport costs) are beyond their control because of (i) the location of production and consumption centres and (ii) the requirement that they buy all the crop.

The carryovers of maize in 1988 and 1989 resulted in large interest charges for the Cooperatives. PCUs utilize commercial bank overdrafts to obtain cash for maize purchases. Because the PCUs had huge unpaid overdrafts from previous seasons, banks could not consider them credit worthy for additional credit for buying 1990 maize and extended only K250 million guaranteed by the Bank of Zambia. The Bank of Zambia provided an additional K892 million for 1990 overdrafts disbursed through the commercial banks. The Bank of Zambia also provided K129 million of non/maize financing. None of the K1.02 billion was repaid as planned. By mid-1991, the Provincial Cooperative Unions had accumulated debts for maize and fertilizer purchases substantially in excess of their current assets, including their remaining stocks of these commodities. Without assistance in discharging these liabilities, most of the PCUs will have to close down.

Viability of the Milling Sector

Prior to 1991, large-scale mills were finding it difficult to generate funds (or acquire the forex needed) for regular maintenance and construction of new facilities. However, the industry had substantial excess capacity enabling it to maintain domestic supplies.

Many large-scale mills by early 1990, were incurring financial losses and were in a poor position to buy maize in the 1991 marketing season. Slow payment for meal from state shops, ostensibly due to problems with the coupon program, was prevalent. Uncertainty about whether government would cover these losses and as to what subsidies, if any, would be paid in the 1991/92 marketing season existed. By late 1991, the mills found themselves heavily dependent on government meal subsidies. This has made it difficult for them to participate actively in buying maize for storage.

Some large-scale mills have lower operating costs than others. Thus, not all of the existing mills would necessarily survive a move to a fully- liberalized market. Some may be too old to warrant renovation; some may be poorly located; and, overall, the industry may lose market share to hammermills which produce a lower cost but less preferred product. Under free and open competition, one would expect to see significant growth in the hammermill sector in urban areas and some consolidation of hammermills in rural areas.

There is an export demand in nearby countries for Zambian breakfast meal at prices higher than those charged by the mills. Diversifying product lines and packaging both for domestic and export markets has potential. Liberalizing trade and pricing policies will permit the milling sector to capitalize on these opportunities.

International Trade

National maize requirements are estimated at 17 million bags of which seven million are retained in rural areas and ten million are needed to supply urban centres. Total annual requirements are growing faster than the population because low real prices encourages high consumption levels and the rate of population growth in urban areas (above 5%) exceeds the national average.

Zambia imported modest amounts of maize in the early 1980's to make up for the shortfalls between domestic production and consumption. The large surpluses of 1987/88 and 1988/89 placed Zambia in an export position for the first time and some official maize exports took place through ZCF. However, by the end of 1990 it became clear that the country had no surplus maize and exports were again banned.

Unauthorized maize trade along border areas reaches several million bags annually. This has been exacerbated by the substantial overvaluation of the Kwacha. Illegal exports of maize also occur from commercial stocks, at harvest or later in the year. They were high from Copperbelt maize stocks in early 1990 and from Central Province in mid-1991. Shaba province in Zaire relies heavily on supplies of maize from Zambia. Maize also moves from Zambia to Malawi, Namibia, Angola, and Mozambique. Heavily subsidized meal prices, provide incentive for meal to move across borders to neighboring countries.

Public Costs in Support of Marketing

Government costs in support of maize marketing appear in three places in the GRZ budget:

- the Maize Reserve,
- maize marketing, and
- grain storage,

Budget allocations for the Maize Reserve were made in 1990 and 1991 as follows:

1990	**K267 million**
1991	**K132 million**

These allocations cover only handling and storage charges incurred by ZCF. In early 1991 ZCF was allocated one billion Kwacha to buy 2.5 million bags of maize for the Reserve. One billion Kwacha was spent transporting Reserve maize to ZCF storage, then to mills. These costs were charged to the maize marketing budget for 1991. The maize purchase funds should have been recovered from ZCF when the Reserve maize was sold but rather were diverted to fund maize purchases for this season.

The maize marketing subsidy budget allocation for the last three years has been:

1988	**K 745 million**
1989	**K 700 million**
1990	**K1,304 million**

The budget allocation for 1991 of K2,478 million, to cover interprovincial transport was expended by mid-year.

CONSUMPTION POLICIES

Zambia's urban population now exceeds 50% -- a high level for a low-income country. Incomes in the country are highly skewed and, on average, very low. Per capita GDP has declined from K411.7 in 1975 to K282.2 in 1989 (at 1977 prices). Rural per capita incomes are lower than urban incomes while urban unemployment is high. In 1984/85, 60% of the income of low income urban families was spent on food with 40% spent on cereals (mainly mealie-meal). The percentage of income spent of food showed an upward trend in the 70s and 80s and is probably 70% to-day. Thus, it is not surprising that increases in meal prices, or disruptions in meal supply constitute a potential source of social unrest. Government has been sensitive to meal supply and prices as tools to maintain social stability and ensure urban food security.

Consumer Price Policy

The prices of breakfast and roller meal have been controlled by government. However, controls recently have been partially relaxed or have become unworkable. In the 1970's and early 1980's, the prices for breakfast and roller meal were set in June each year, simultaneously with producer and into-mill prices of maize. In the mid-1980's, an attempt was made to partially liberalize the prices of meal. The results and the associated public reaction caused this decision to be reversed. Private mills were nationalized and meal prices remained constant for several years. Other commodity prices were liberalized and

inflation, which had been less than 20% annually, increased to more than 100%. The result was that meal prices, in real terms, declined and required subsidies.

The coupon program introduced in 1989 permitted a large increase in meal prices in January followed by a further increase in June when the new harvest became available. This was followed in July 1990 by an upward revision of almost 100%. This met with an adverse public reaction.

Table 2: Official Prices (Kwacha/25kg) of Breakfast and Roller Meal from Mid-1985 to Present

Time Period	Breakfast Meal	Roller Meal
June 1985 to Dec. 1989	19.15	14.85
Jan. 1989 to Feb. 1989	56.00	41.08
Feb. 1989 to Aug. 1989	70.00	52.00
Aug. 1989 to July 1990	114.00	82.30
July 1990 to Present	215.00	158.00

The government announced measures to partially deregulate the sale of maize by producers in September of 1990. The mills immediately reduced meal prices by 20% on the grounds that buying maize directly from farmers would reduce their costs. No upward adjustment in meal prices has occurred since then although recommendations for adjustments were made in March and again in June 1991. At present, official meal prices are lower than economic prices and are heavily subsidized at the mill level.

The Coupon Program

The coupon program, which the government has operated since January 1989, has subsidized the cost of maize meal for urban and peri-urban households with annual incomes of less than K20,500. The program benefits families in Lusaka and Copperbelt, as well as outlying urban centres and the semi-urban population around major centres. The current coupon value is K42 implying that the coupon covers approximately 48% of the cost of roller meal requirements (14kg/month/person) for recipient families. The coupons can be used for the purchase of either roller meal or breakfast meal.

Coupons are not available to rural households which are considered capable of producing their own food requirements. In the early stages of the coupon program, almost all urban and peri-urban families received them. Eligible recipients will decline rapidly if the income ceiling is not raised to keep abreast of inflation.

Milling Subsidies

In 1988, the government elected to pay part of the marketing subsidy directly to the milling sector. This helped keep the meal prices from rising and linked marketing subsidies to consumer interests. The practice was discontinued when the coupon program was established.

By early 1991, that the mills were losing money on maize meal. A meal price increase of 20% was recommended but the government elected to pay a direct subsidy to the mills. By mid-1991, increased into-mill price coupled with rising operating costs necessitated either increases in meal prices or subsidies. The government chose the second option. The mills are now receiving subsidies/bag in excess of the retail price of meal.

Retail Regulation

A large share of the marketed meal has been sold through state shops. This ensured that retail prices were kept at official levels and facilitated some control of the coupon program. At times, mills have been required to deliver 80% of the meal they produced to state shops. Most meal is sold in 25kg or 50 kg bags but repackaging by small-scale retailers is now permitted. The dominance of these package sizes seems closely linked to price controls and the cost of packaging.

As official meal price became further removed from the economic price, increased black marketeering and smuggling of meal developed. Because retailers are allowed to charge extra for transporting meal beyond 25 km, it is easier to charge higher prices "out-of-town". Black marketeering, is now commonplace and accepted. Black market prices frequently are double official prices.

IMPACT OF CONSUMPTION POLICIES

Seventy percent of the caloric intake of Zambians comes from maize, one of the highest levels in the world. With the population expected to double by 2010, national maize requirements will at least double, while marketed requirements grow even faster.
Consumers in urban areas have benefitted from past government policies through low meal prices. Consumers have exhibited a high level of tolerance for supply disruptions and a low level of tolerance for price increases. Consequences of past government policies for consumers are:

- a high level of dependency on a maize supply system which government can no longer afford: and,
- being exposed to a free market price for maize which seems high (in the near term) because of production and marketing inefficiencies and the high level of past subsidies.

The opportunity cost of public resources devoted to maize production, marketing and consumption may have been very high. These resources, properly applied, might have played a role in reversing the downward slide of the entire economy, including income levels.

Prices Paid versus Market Prices

The following table shows the estimated full cost prices of mealie-meal for August 1991 for three different into-mill prices -- the one currently in effect, current export parity (at the mill--not the farm), and current import parity based on imports from South Africa landed in Lusaka by rail. The latter is the same as the into-mill price announced for May 1992. The table also shows the difference between these and the current official prices of K215 and K158/25kg bag of breakfast and roller meal respectively.

Table 7: Full Cost Prices/25Kg of Roller and Breakfast Meal Based on Different Into-mill Prices for Maize

Into-Mill Prices		Breakfast Meal		Roller	Meal
Price per bag	Price per mt	Full Cost Price	Full Cost less K215	Full Cost Price	Full Cost less K158
K1100	$163	K569	K354	K493	K335
K1350	$200	K698	K483	K584	K426
K1800	$267	K932	K717	K746	K588

Using an export parity into-mill price of $200/mt, consumers are buying breakfast meal for about 30% of what they would pay in a free market situation. Consumers using coupons buy roller meal for K116/bag vs K584 based on export parity and K746 based on import parity. When the into-mill price was raised to K442/bag in mid-1989, meal prices were about 60% free market price.

Consumption in Rural Areas

Per capita maize consumption in rural areas is lower than in urban areas. Not only are rural incomes lower than those in urban areas, but rural diets tend to be more diversified with greater reliance on other foods -- cassava, sorghum, and millet. Data from the early 1980's indicated that rural malnutrition was also relatively high in those regions relying entirely on hoe cultivation and among households with small amounts of cultivated land. While most rural residents grow some maize (or other cereal), many do not grow enough to supply their own needs for a full year. Thus, rural families are both buyers and sellers of maize.

For the small-scale producer, a large share of his/her income (both cash and in-kind) is devoted to food and much of this goes to producing or buying maize. Some studies have estimated that up to 90% of the income of rural families must be devoted to food.

Another characteristic of rural consumption is that it has been to the advantage of small-scale farmers to sell maize and buy back meal. Present prices for maize and meal provide this incentive.

Consumption in Urban Areas

Per capita consumption has been calculated at 14 kg per person per month. Actual sales are ten percent less. Maize is the cheapest source of calories available to consumers dependent upon it. Average family size in urban areas is 7 persons. At the above prices for breakfast and roller meal, this implies the following monthly family expenditures (without coupons).

Table 8: Monthly Expenditures on Breakfast or Roller Meal for An Average Family Given Different Into-mill Prices for Maize and No Milling Subsidy

Into-Mill Price/bag	Into-Mill Price/mt	Breakfast Meal	Roller Meal
K1100	$163	K2276	K1972
K1350	$200	K2792	K2336
K1800	$267	K3728	K3984
Current	Prices	K860	K656

There are families in Zambian cities whose monthly income barely exceeds these values. If the coupon ceiling were raised to K60,000/year to allow for inflation, full cost pricing based on import parity would require families at the ceiling to spend about half their incomes to buy mealie-meal. They would clearly be very receptive to low cost alternatives. This would imply a shift from breakfast meal to roller meal and the emergence of urban markets for hammermeal (which is about 30% cheaper than roller meal) and maize itself. If maize were sold to consumers in urban areas, it could be ground at local hammermills, or at home in a handmill or some urban families might elect to pound the maize as is traditional in rural areas.

Costs of Consumer Subsidies

Budgetary costs of direct consumer subsidies include:

- the coupon program,
- the milling subsidy, and
- subsidies on imported maize.

The coupon program had a budget allocation of K600 million for 1989 and K1.3 billion for 1990. For 1991, it originally had a budget allocation of K1.2 billion (based on no increase in coupon value). The allocation was subsequently reduced to K675 million because of the removal of ineligible people from the list of recipients.

The milling subsidy for 1988 was estimated at K487 million. No milling subsidy was paid in 1989 or 1990. Recent estimates of the milling subsidy for 1991 place it at about K3 billion. There was no allocation in the original budget for such a subsidy.

Subsidies on imported maize are required when the import price is greater than the into-mill price that prevails when the maize is sold to the mills. Subsidies of this sort were paid in the early 1980's but were not required again until this year. In 1991, they will be substantial even though the into-mill price is closer to import parity than in the past. The large quantities of maize imported will result in substantial subsidies even if the per unit subsidy is small.

MACRO-ECONOMIC IMPLICATIONS

The macro-economic implications of Zambia's maize subsector policies are reflected in the following:

- **the aggregate impact on the national budget and government's overall financial capability;**
- **the aggregate impact on the money supply and interest rates;**
- **the impact on trade, exchange rates, and balance of payments; and**
- **the opportunity cost of not investing in other endeavors.**

Total Budgetary Impact

Throughout most of the 1980s maize marketing and fertilizer subsidies comprised between five and ten percent of the total GRZ budget. They were at their lowest level in the mid - eighties but rose steadily in the period when meal prices were held constant from 1985 to 1988. In 1988 and 1989 these subsidies, together with the coupon program exceeded 16% of the budget. However, in real terms, there was a significant decline between 1988 and 1989 when the coupon program was introduced. Table 9 presents data for 1991. Several other budget categories which support the sector (e,g., research and extension and grain storage) are not shown.

Table 9: Total Budget Costs (million Kwacha) for the Maize Subsector - 1988 to 1991

Program	1988	1989	1990	1991
Maize Handling	745	700	1,304	2,478
Fert. Handling	206	354	549	1,853
Maize Reserves			267	132
Coupon Program	487*	592	1,289	1,245
Credit	216	177	613	1,075
Total	1,654	1,832	4,022	6,783
US$ (mill) Equiv	207	83	94	97

* Milling Subsidy

Not all of the public support for the maize subsector comes in the form of direct financial subsidies that appear in the budget. There are two other important categories of support:

- Government must guarantee or provide loans for various parts of the system, some of which are bankrupt; and
- donor funding is used to support the maize subsector.

In addition to the above subsidies, government currently has the following known financial relationships with institutions supporting the maize subsector.

- loan guarantees to PCUs and ZCF, K2.5 billion;
- loan guarantee on behalf of NCZ, K750 million;
- loan to NCZ, K422 million; and
- counterpart funds owing from NCZ, K430 million;

The extent that these relationships result in either increased government outlays or reduced government revenues, constitutes a direct contribution to the deficit.

Impact on Money Supply, Inflation, and (Economic) Interest Rates

In addition to the support provided by government and donors, the Bank of Zambia is involved in supporting the maize subsector. The BOZ has extended loans directly, or through intermediaries, to a number of groups involved in the subsector including Zamseed, NCZ, the Cooperative Unions, and ZCF.

The combined impact of GRZ and BOZ activities related to the maize sector on money supply, inflation and interest rates has not been measured. However, most observers feel that it is significant. This underlies efforts by IMF and World Bank to get GRZ to reduce it's financial support for the subsector.

Impact on Trade, Exchange Rates, and Balance of Payments

The trade and exchange rate impacts of Zambia's maize policies have not been quantified but some observations are relevant. Firstly, fertilizer is Zambia's second largest import. To the extent that fertilizer is not wisely used or is re-exported, this implies a larger than necessary allocation of foreign exchange to this commodity. There was a carry-over of 100,000 mt of fertilizer in 1990, more than half the amount needed for an entire year's consumption. Secondly, maize imports when they occur, are a drain on foreign exchange. This year, such imports could exceed three million bags with an import value of $65 million. Thirdly, maize may well be the agricultural commodity which has the greatest potential to generate foreign exchange earnings for the country.

Tobacco has been Zambia's leading agricultural export. During the 1980's, the total value of tobacco exports ranged between $1 and $5 million. An annual export of five million bags of maize at $200/mt would generate $90 million in foreign exchange. Illegal exports of maize and maize meal from Zambia in some years may have approached this level.

Opportunity Cost of Not Investing in Other Endeavors

Substantial donor funding is used to support the maize subsector. Funding which is used for maize storage, maize imports, etc., is not available for other purposes.

NEEDED POLICY REFORMS

The Need for A Comprehensive Strategy

To reduce public financial support and improve maize subsector efficiency, while providing for adequate maize supplies, any revised set of maize subsector policies should:

- **increase production close to urban centres in order to reduce transport costs of maize moving to domestic markets;**
- **continue production of maize in outlying areas in order to provide food security and incomes for rural people, especially through exports to nearby countries: (Zambia should produce more maize with most of the expansion close to Lusaka and Copperbelt.)**
- **continue a rate of growth in total maize output in excess of the rate of growth in population;**

> > **effectively and expeditiously deal with temporary shortfalls (nationally and regionally) in maize output due to poor rainfall;**
> > **reduce subsidies for fertilizer and farmer credit;**
> > **reduce subsidies and loan guarantees for maize marketing;**
> > **increase competition in input supply, maize marketing, milling and retailing in order to improve services and keep costs as low as possible;**
> > **move parastatal bodies to become profitable; and**
> > **finance self-sustaining systems of maize storage.**

Reduction in the level of public financial support to the maize subsector is considered essential if the budget is to be balanced and the government's overall financial status is to be improved. These goals must be achieved if inflation is to be contained, the decline in the value of the Kwacha is to be arrested and donor confidence in Zambia's economic policies is to be restored. Public financial support for the maize subsector is so large and so inextricably linked to regulations, that reduction cannot be achieved without some adverse effects on:

- continuity and level of maize supplies;
- incomes of some small-scale producers; and
- food consumption among urban dwellers, especially low-income people.

These impacts will be serious in the first two or three years of a revised set of policies. However, the nature of the Zambian society and economy indicates that the latter two, especially the third, may be significant for at least five or ten years. With improved production and marketing efficiency, real economic meal prices to consumers should decline over time with the proper set of policies.

Therefore, **a solution to the "maize problem" must achieve a high level of reduction in public financial support for the subsector while minimizing adverse impacts on producers and consumers and encouraging improved subsector efficiency. The government must be able to preserve peace and stability while fostering broadly-based economic growth. And it must do this by using the limited administrative capability that is currently available.**

Key elements of the proposed strategy are:

- **some form of targeted consumer protection;**
- **full liberalization of domestic maize, meal and input supply marketing;**
- **special assistance to small-scale and emerging producers;**
- **a new maize marketing coordination vehicle;**
- **a realistic relationship between interest rates and inflation;** and,
- **a modified international trading policy for maize, maize meal, and farm inputs**

Without appropriate attention to these six areas, it is doubtful if a revised set of maize subsector policies could be successful. Some of the elements of the policy would require government funding which, **in aggregate** must be constrained to make it fiscally responsible. **In components**, the policy must achieve intended sectoral results. Not only must existing budget funding be reduced, the allocation of remaining funding among budget categories must be different. The coordination of budget planning and policy decisions must be improved.

The six elements of the proposed plan are not mutually exclusive -- they are inter-related in three ways -- through the budget, through effects on each other and through effects on the maize subsector. Major modifications to one part of the plan should not be made without considering expected impacts, both direct and indirect, on both the subsector and the budget.

Targeted Consumer Protection

Some form of continuing consumer protection may be needed because of:

- the high proportion of the population living in urban areas;
- low levels of income and high rates of unemployment;
- the high proportion of income spent on food, i.e., maize;
- the poor prospects for increasing incomes in the near term;
- the traditional government concern and support for provision of basic food in light of higher breakfast and roller meal prices in major urban centres under liberalization.

However this support must not interfer with increasing maize production and marketing efficiency to be achieved under the liberalized system. These latter improvements could reduce into-mill prices for maize by up to 30% by moving from an import parity to an export parity basis. The assistance must be carefully targeted to keep government expenditures low. Any subsidy on breakfast and roller meal is to be phased out **over not more than twelve months** as these commodities move to market prices. Further government must continue to be aware of possible alternatives to protect low income urban consumers to ensure food security, prevent hunger and malnutrition and preserve social stability.

The difference between current subsidized prices and economic prices is quite high. Therefore, it might be necessary to design a meal subsidy program for millers allowing a phased move to market meal prices by the end of 1992. The coupon program is being phased out via curtailed participation and erosion of benefits. Any subsequent coupon program should apply to maize and hammermeal output as well as to breakfast and roller meal. The coupon value could be tied to producer maize prices and the 14 kg/person/month reviewed to see if is realistic. A variety of targeting and administrative

improvements are needed (see recent Price-Waterhouse study). Hammermills for urban areas should be made available through VIS and SIDO on a wide scale basis as soon as possible strictly on commercial criteria. It should be ensured that hammermeal does not have a disadvantage because of subsidies paid on breakfast and or roller meal. Further hammermills must have ready access to maize.

Full Liberalization of Maize and Meal Marketing and Input Supply

The full liberalization of maize, meal and input markets is necessary because:

- the existing regulated system is costing government more than it can sustain;
- the existing system is economically inefficient and wasteful of scarce resources;
- government does not have the capability to regulate the system to achieve overall efficiency and reduce public costs; and
- expanded maize production close to urban centres is needed.

The expansion of maize production close to Lusaka and Copperbelt should arise as a result of liberalization since producers will receive prices which reflect demand in these markets and transport costs of more distant producers. Prices paid to farmers will improve as a result of:

- direct sales to mills;
- elimination of pan-seasonal pricing; and
- into-mill price ceilings at import parity prices.

For example, with an into-mill price of K1800/bag, producers within 250km of the major mills should immediately receive at least K1550/bag as there will be no transport subsidy. At this price, maize becomes profitable for small-scale and emerging farmers (even if fertilizer is not subsidized) along the line-of-rail -- it also becomes competitive with other crops on many commercial farms.

The liberalization of maize, meal and input markets would necessarily entail:

(i) withdrawal of all on-going government financial support from sectoral parastatals and Cooperatives at all levels;

(ii) removal of all existing price controls and price setting regulations from all markets; and

(iii) price determination via the market interaction of supply and demand for parastatal mills and Cooperatives.

Return of the parastatals to the private sector is an essential step in liberalization.

Maize Market Liberalization

Into-mill maize prices along the line of rail should be fully determined by supply and demand forces by May 1992. Imported maize selling prices will determine into-mill prices as long as the country is in a deficit position. Higher into-mill prices will exist in Copperbelt than in Lusaka because of the extra transport costs.

Into-mill prices in Western, Northwestern and Luapula, should be fully decontrolled and mills in these areas should expect to compete with the Zairian market. Eastern, Northern and Southern province mills may be able to buy for less if supplies remain abundant. Producer prices will be determined by supply and demand although a system of producer floor prices is an option.

The Ministry of Cooperatives should ensure that lower level Cooperatives know that they can trade in maize and farm inputs without directives or control from government or higher level cooperatives. This applies particularly to direct sales to mills and sales to residents in periods of local food shortages. The Ministry should also encourage competition -- not collusion -- within the Cooperative system. The continued involvement of individual Cooperatives (including ZCF) in maize marketing should be determined by the market place and member interests -- not by government.

Government may still have to provide some direct assistance to millers and Cooperatives to ensure that the 1992 maize crop is bought. However, by 1993, buying by millers should be handled entirely through normal commercial bank credit while government support for Coop buying should be greatly reduced encouraging cooperatives to do likewise.

Meal Market Liberalization

In the case of mealie-meal consumer prices for roller and breakfast meal must be degazetted and retailers allowed to set their own prices. Private retailers will be allowed to sell at market prices immediately. State shops will do so when the meal subsidy is removed. Sales of meal to all retailers will be uncontrolled. Retail margins for meal sold by state shops may still be set but margins will not be subsidized.

Liberalization of Farm Input Markets

In the case of farm inputs, markets for seed, fertilizer, and grain bags will be liberalized by:

- decontrolling prices;
- permitting anyone to import and/or sell the items to farmers;
- removing government-directed credit through input suppliers;
- not discriminating among suppliers with subsidies until subsidies are eliminated;
- ensuring that foreign exchange available for imports is allocated equitably among importers; and
- allowing the continued existence of NCZ to be determined in the market place.

Transport rates should be decontrolled and rates monitored to be sure that the Trucker's Association does not exert monopoly power and keep rates at the same or higher levels.

Special Assistance to Small-Scale and Emerging Producers

Some form of special continuing non-monetary assistance to small-scale and emerging producers may be needed because:

- small-scale and emerging producers will lose large amounts of support as the current system is liberalized;
- these groups account for most of the maize output;
- maize is the major source of cash income for small- scale and emerging farmers;
- the incomes of small-scale farmers are very low and their resources (skills and financial) are very limited; and
- promotion of maize production has been and may continue to be used as a means of bringing these groups into the market economy.

Impacts of Liberalization on Producers

Under a fully liberalized marketing system, many farmers in outlying provinces would receive similar or higher prices than those being received by farmers close to Lusaka and Copperbelt. This would be a result of strong export demand. However, if exports are not freed immediately, farmers in these areas may not receive these favourable prices.

While the role of commercial farmers in maize production is expected to increase, small-scale and emerging farmers will still be major players in the industry if they can acquire and finance needed inputs (improved maize prices should offset higher fertilizer prices due to subsidy removal), and gain market access for their products. If small-scale and emerging farmers (especially the latter) do not continue in maize production, there

will be a loss in production simply because of their large maize output.

Small-scale farmers in some areas of the country (e.g., parts of Northern Province) may find that maize is no longer more profitable. They will need help to diversify their operations and market their crops.

Types of Assistance

Special assistance to small-scale and emerging farmers should be provided in two forms; 1) access to credit and 2) support for local farm organizations (mainly but not exclusively primary societies) in operating input supply and crop marketing facilities. It is suggested that the three lending agencies focus on emerging farmers (i.e., with more than 5 hectares of crop) and conduct their operations on a commercial basis. This policy, combined with decontrol of the producer maize price will ensure that the money loaned goes for maize production in areas where this activity is profitable. The agencies' task will be to make and collect loans on commercial criteria for this specified clientele. Since the loans will be too small to attract commercial lenders, government and donors must commit funding to these programs, especially in the transitional stage (i.e., the next two to three years). The three agencies should also actively proceed to accept deposits to service their clients and to generate lending resources internally. This will help reduce, but not eliminate, the need for government/donor support.

An injection of K1.5 billion into the farm credit system is needed for this year's planting to partially offset inflation losses. For 1992 a similar injection may be required, but as soon as interest rates and inflation rates can be rationalized, the only budget outlay would be the partial subsidy on operating costs indicated above.

The second form of assistance for small-scale and emerging farmers would entail strengthening local farm organizations (mainly primary Cooperative societies) directly (i.e., not through higher level Cooperatives) by:

- training Directors, management and staff in financial matters;
- enabling these bodies to use their assets for loan security;
- ensuring that they can get reasonable commissions on loans made (for ZCF Finance Services) and on inputs sold and products marketed;
- offering, through the MOC and ZCF Finance Services, a loan guarantee program to enhance the capacity of primary societies to supply inputs and market products.

Reasonable commissions on loans made, inputs sold, and products marketed would arise providing:

- markets are liberalized; and
- MOC and the Cooperative system work to ensure that primary societies become commercial businesses.

This revenue is critical to enable small-scale farmers to collectively acquire the resources needed to store and market their crops. This approach does little to assist the large number of small-scale farmers who have little to sell. A new strategy is needed to enable these farmers to gain control over sufficient land resources to enable them to produce for market.

Maize Marketing Coordination

Under a liberalized marketing system, some of the existing "market coordination" mechanisms would disappear. There would be need for:

- a mechanism to manage the leasing and replacement of government-owned storage;
- a mechanism to collect, maintain and distribute information on marketings, prices, and stocks of maize (and perhaps other grains and even fertilizer) traded among members and stored at public or large-scale private facilities;
- an agent to administer the National Maize Reserve on behalf of government (currently handled by ZCF);
- a mechanism to provide government and donors with marketing information required for managing grain import and export policies; and,
- an official contact point for donors, other countries, and foreign buyers/sellers re large purchases of grain.

If floor prices are adopted there could also be a need for an agency to administer the system. The floor pricing system, coupled with the Maize Reserve operations, would provide the tools for any market stabilization interventions which government might wish to make.

A National Grain Storage and Trading Agency

Existing government Departments and Ministries do not have the capacity to perform these functions. The creation of a National Grain Storage and Trading Agency (or Board) is proposed. Ideally, a representative of small-scale millers would sit on the Agency's Board of Directors.

The GSTA would have no government subsidy but could import maize when needed and sell imported maize to mills at import parity prices. In the near term, it might also buy some maize domestically to sell to hammermills and retailers until the industry is

prepared to carry out this function. Revenues to sustain the new GSTA would come mainly from the leasing of storage facilities. Service charges could also be levied to members (or shareholders) for specific services and/or an annual membership fee could be levied. In the longer run, the GSTA could be the official body to administer weighing and grading regulations. It could also facilitate large-scale grain exchange transactions both domestic and international for current and future delivery.

The GSTA should be established immediately and a storage leasing program developed to recover costs from storage users. Planning and construction of new storage would rest with the GSTA and would be done on strictly a commercial basis. Existing storage would not necessarily be retained by GSTA -- only those large-scale facilities essential for reserves. The primary societies would retain storage at all of their local collection points and mills would have whatever proprietary storage they considered necessary for their operations. The policy of charging for public storage coupled with seasonal price variations should encourage private storage by mills, commercial farmers and primary societies.

The GSTA should be made responsible for ensuring that market mechanisms exist to supply maize to urban hammermills and to consumers in urban areas and advise government on eliminating regulations. The GSTA, in cooperation with Zambia Railways and TAZARA should undertake a feasibility study of the bulk handling of grain using the railways as major carriers.

The logistics Planning Unit in the Ministry of Cooperatives should be transferred to the GSTA in order to collect data on stocks, prices and marketings from all GSTA members.

The GSTA would play role in assisting government to deal with regional food shortages by advising on costs and the most economical way to address the problem. The GSTA would be responsible for the Maize Reserve but, with the exception of maize imports, the operations of the Maize Reserve should be suspended until a domestic surplus is generated. Guidelines for the Reserve should be drawn up and approved. The GSTA would not make a profit or loss on trading of Reserve.grains. However, the GSTA would be allowed to recover a handling margin on all sales equal to the full costs of storage and marketing services.

Related Activities

The Crop Forecasting and Early Warning system in the Ministry of Agriculture should be continued but be more closely integrated with the work of CSO. In addition, the Ministry of Agriculture, in association with CFB and the GSTA should set up information systems to ensure that all farmers and local farmer associations (including primary societies) have:

- full and complete information about how the liberalized system works, and
- regular, timely and accurate information on prices being paid by different buyers.

Government would still be responsible for Famine Relief.

Macro Policies

A "realistic" relationship between interest rates and inflation is needed to:

- prevent continual erosion of lending agency funds;
- stimulate savings at all levels thereby reducing the excessive need for borrowed funds to finance the maize subsector (both production and marketing); and,
- ensure appropriate allocation of labour and capital resources in the subsector, especially in marketing and on commercial farms.

The current negative interest rates cause the three development lending agencies to lose half of their capital annually, even with 100% recoveries. Commercial banks do not have the same problem since it is their depositors, not the banks themselves who lose money. However, the lack of incentive to save is impacting heavily on the economy, including maize production. If there is no incentive to save, farmers themselves will have few funds to buy inputs. Thus, even if maize and input prices are freed and maize production is profitable, if real interest rates remain negative, this will reduce the amount of both equity and credit funds available to small-scale and emerging producers.

The current relationship between interest rates and inflation is also inhibiting the development of private sector capacity to finance maize and fertilizer purchases by the mills, Coops and NCZ. Unless this is corrected, government will find it difficult to withdraw completely even if the other factors are corrected through liberalization.

International Trade Policy

A revised international trade policy for maize, maize meal and farm inputs is needed to liberalize cross-border trade with nearby countries. Exports of maize would be discouraged in 1992 by setting into-mill prices at import parity levels. Exports of maize from all outlying regions should be permitted. Donors may need to assist to ensure that maize imports are available in urban areas over the next two to three years. Further, mills should be encouraged to import maize directly on their own. A monitoring system for exports and imports should be established through the GSTA and the Ministry of Commerce and Industry.

Exports of meal should be banned as long as meal prices are subsidized. When Zambia reaches a maize surplus position, some of the surplus will be exported as breakfast meal. Trade in most farm inputs other than fertilizer, is now free. Removal of subsidies and the favoured status to NCZ will encourage others to engage in fertilizer imports.

Public Financial Support and Budget Administration

The foregoing strategy will result in a reduction in both budget and non-budget financial support to the maize subsector. With the establishment of the new GSTA, all public storage will be funded from GSTA revenues and these revenues would provide the source of funds for storage maintenance. Investment in maize storage would no longer be a budget item. The Maize Reserve would still remain as a budget item but the operations of the Reserve can be designed to minimize financial support. The milling subsidy will be dropped entirely.

Government will have continuing obligations for debts and for loans and loan guarantees. Revised budget planning and administration procedures are needed to establish:

(i) realistic estimates of inflation, and
(ii) within-year and between-year program adjustments.

This means that Ministries preparing the budgets must know what the nature of their maize-related programs for the coming year is going to be at the time of budget preparation. They cannot know this if there is no overall Plan of Action or strategy that has, at that time, received government endorsement. Thus, a strategy such as the one suggested here must be adopted before such procedures can be introduced.

If such a strategy is adopted, it is believed that direct budget support to the sector can be reduced by 50 to 80% and supplementary support eliminated entirely by about 1993.

6

Zimbabwe's Grain Marketing Policy Challenges in the 1990s: Short Run vs. Long Run Options

T.S. Jayne and Munhamo Chisvo[1]

Introduction

The objective of this paper is to identify major food policy challenges likely to confront the Government of Zimbabwe (GOZ) in the 1990s. We examine the congruence between the GOZ's food policy objectives and the organization of the maize marketing and pricing system, then evaluate alternative strategies to promote the achievement of these objectives under the Structural Adjustment Programme.[2]

Short-run and long-run strategies are distinguished. The time lag between policy decisions and payoffs constrains policy options in the short run. While improved crop technology and resettlement offer potential to enhance smallholder incomes and food security over the longer run, these gains are not on the near horizon and offer policy makers little scope to deal with issues of immediate political importance: 1) how to protect vulnerable groups from rising food costs under structural adjustment, 2) how to cut GMB deficits to zero by 1995, and 3) how to do both without eroding farm incomes and productivity. On the other hand, strategies that may meet rather immediate objectives may have little or even negative effects on longer-run objectives. Certain regulations of the existing grain marketing system pose such serious impediments to maize access and affordability that their modification will simultaneously promote agricultural growth and food security.

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[2] The paper's focus on maize is due to its overriding importance in the agricultural economy of Zimbabwe. Maize accounts for 88% of coarse grain production in the country and is the dominant crop in all Natural Regions including IV and V (AGRITEX, various years). Maize meal accounts for 45% of the total caloric intake in Zimbabwe and may be as high as 70% in some rural areas (USDA, 1988; Ramji, 1991).

Evidence is provided to conclude that 1) the need for maize imports in 1991/92 is not a temporary aberration caused only by drought, i.e., under the continuation of status quo policies, Zimbabwe is likely to be a chronic maize importer throughout the 1990s; 2) the country's ability to maintain grain self-sufficiency in the short-run will involve, in the short-run, a 10% to 12% increase in maize producer prices over and above inflation, *ceteris paribus*, and in the long run, improved crop productivity; and 3) the GOZ's ability to raise real producer prices at a time when GMB subsidies are to be eliminated -- without causing large increases in staple maize meal prices -- may be facilitated by selected government investments and policy changes to support the development of small-scale trading and milling networks. Such changes could simultaneously result in higher producer prices to stimulate food supplies without requiring major increases in food prices to low income groups and or large government subsidies. Such gains, however, could be accomplished only in the medium run. In the very short run, a targeted subsidy may be necessary to protect vulnerable groups's access to staple grain. A subsidy on straight-run meal, being self-targetting, would be more cost-effective in protecting vulnerable groups than the current blanket subsidies on roller meal and super-refined meal which confer benefits to all consumers irrespective of income status.

Major Trends in Zimbabwe's Maize Sector

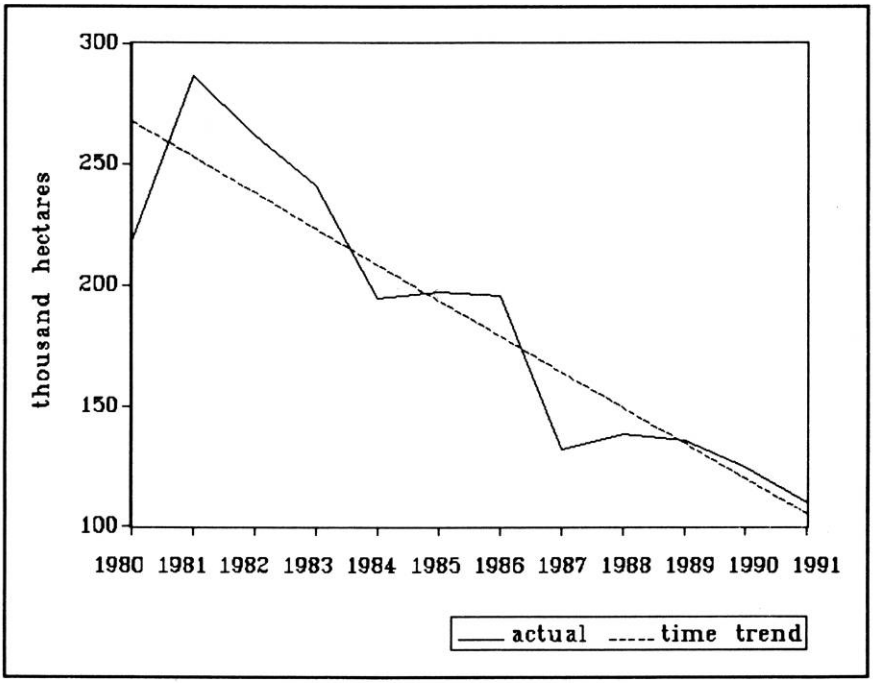
The food policy objectives of the Government of Zimbabwe since independence in 1980, have been, *inter alia*: 1) income growth among rural smallholders; 2) food security, with particular attention to the urban and rural poor; 3) stability in prices and supplies of basic foodstuffs; and 4) the minimization of budgetary losses arising from government marketing and pricing operations (GOZ, 1983; 1986).

Grain pricing and marketing policies have been primary instruments to achieve these broad objectives. The expansion of GMB buying depots into the communal lands was a pillar of post-independence policy to promote income growth among smallholders. Producer prices were normally kept above export parity. Agricultural credit disbursed to smallholders increased dramatically with repayment tied to crop sales to GMB. These policies contributed to the dramatic rise in GMB grain intake from the smallholder sector (Rohrbach, 1989).

However, perceptions have lagged behind reality since the mid-1980s. Since 1985, the growth rates of grain production and supply have been outstripped by growth rates of population and demand. The maintenance of large grain stockpiles, carried forward from the mid-1980s, prompted discussion of methods to dispose of maize surpluses, e.g., via the manufacture of ethanol for fuel, and obscured Zimbabwe's trend toward national grain deficits.

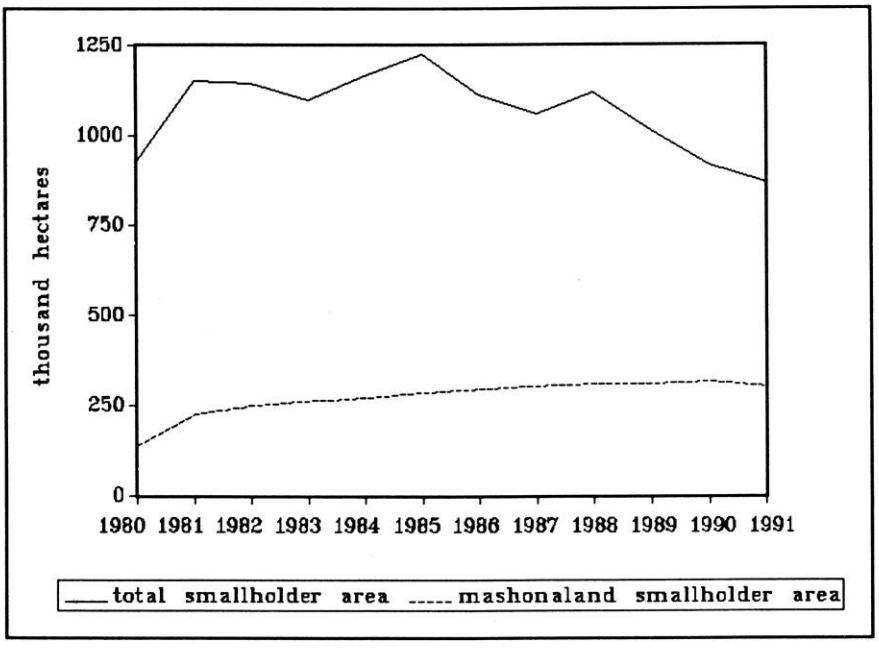
Recent trends

Figures 1 and 2 present trends in area planted to maize during the past decade. Commercial maize area has declined at a rate of 18,000 hectares per year since 1981. Smallholder maize area peaked in 1985 and has declined at an average rate of 55,000 hectares since then. Most of the decline in smallholder maize area appears to be in the lower-rainfall areas and may reflect drought. Mashonaland maize area has been vitually unchanged over the past five years.



Note: specified years are harvest years. Figures for 1991 are estimates.
Source: Central Statistics Office (various years).

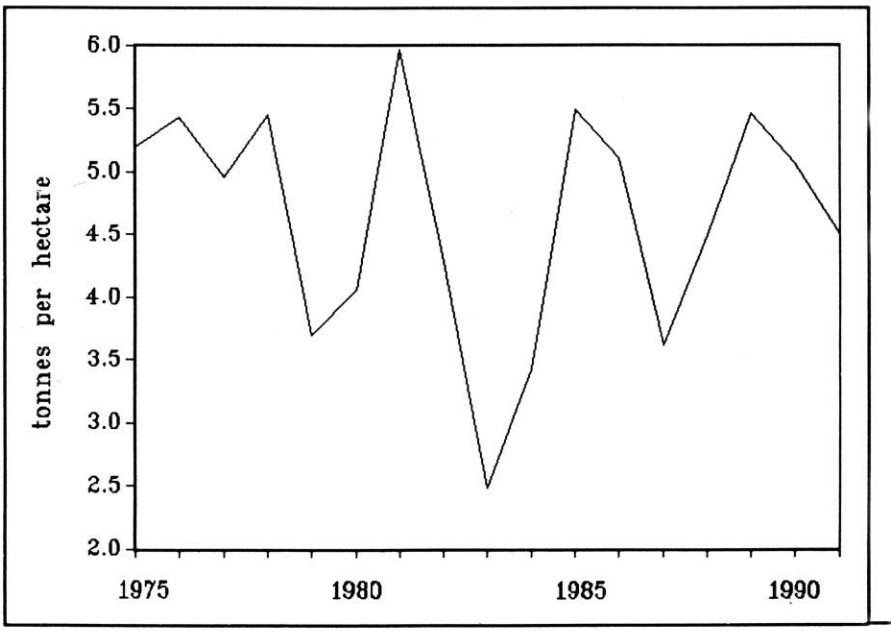
Figure 1. Maize area planted by commercial sector, 1980-91.



Note: specified years are harvest years. Figures for 1991 are estimates.
Source: Agritex Crop Forecast estimates (various years).

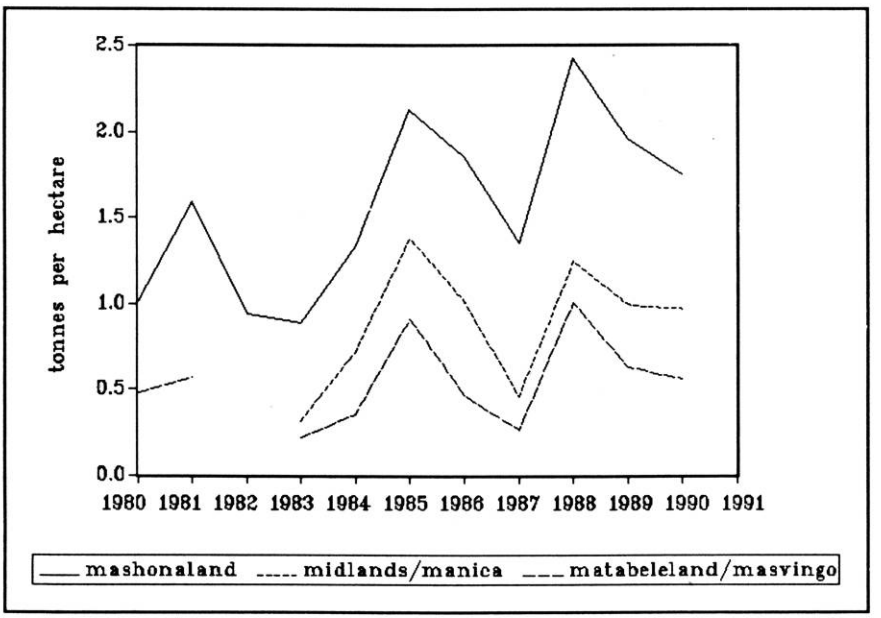
Figure 2. Maize area planted by smallholder sector, 1980-91.

Commercial sector maize yields have been stagnant over the past 15 years, Figure 3. Smallholder yields in the Mashonaland provinces have been trending upward over the decade, but all other provinces show little improvement in productivity since 1985, Figure 4.



Note: specified years are harvest years; figures for 1991 are estimates.
Source: Agritex crop forecasts (various years)

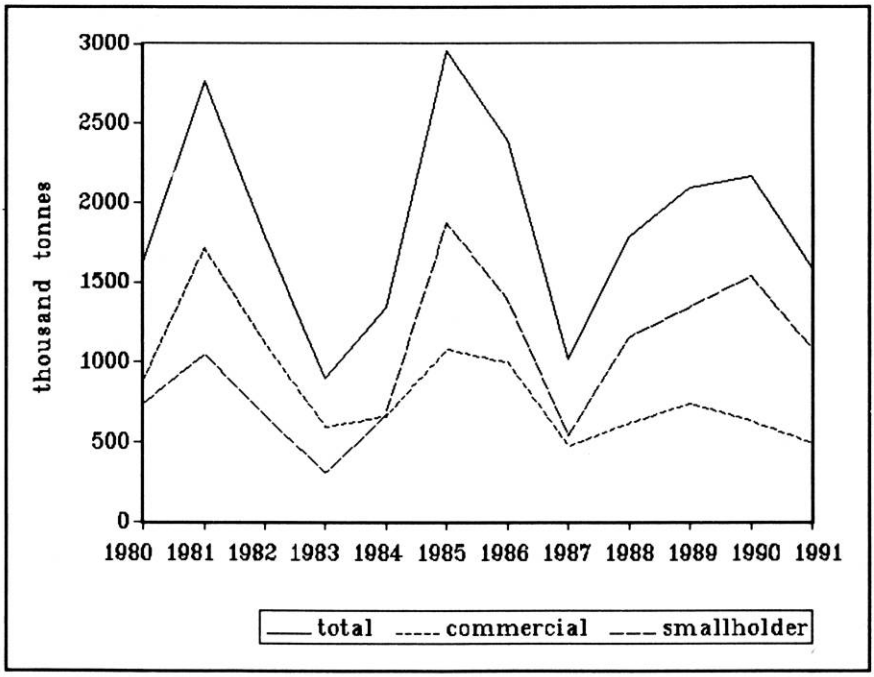
Figure 3. Commercial sector maize yields, 1975-91.



Note: specified years are harvest years; figures for 1991 are estimates.
Source: Agritex crop forecasts (various years)

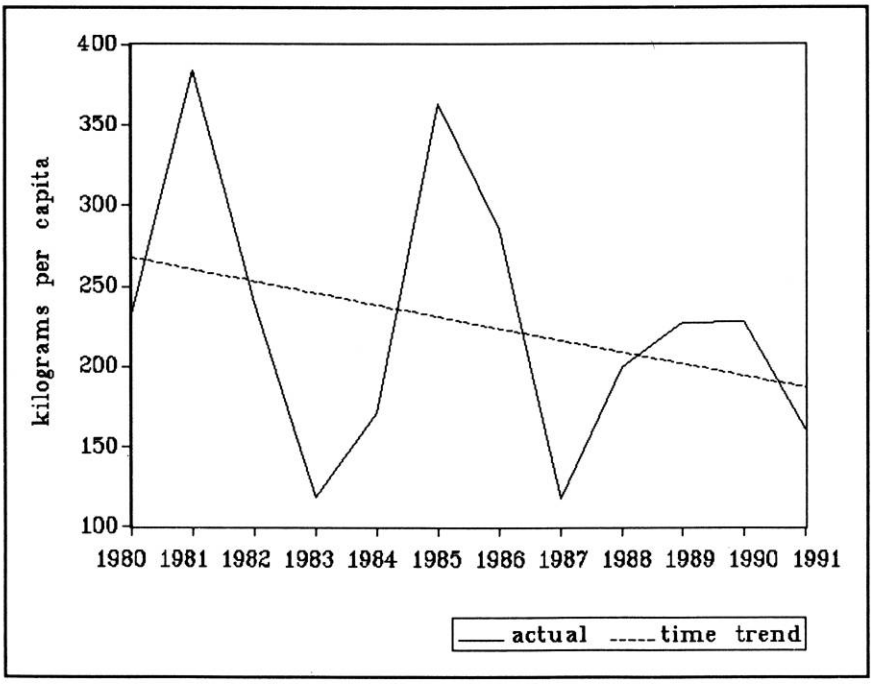
Figure 4. Smallholder maize yields,1980-91.

Both smallholder and commercial maize production fluctuate with the weather, Figure 5. However, neither sector has ever exceeded its 1984/85 production level. Most of the stagnation in maize production is due to declining area. Given average yields, maize production is shrinking at a rate of 90,000 and 53,000 tonnes from the commercial and communal sectors respectively each year. Per capita, maize production is 25% lower in 1991 than at independence, Figure 6.



Note: specified years are harvest years. Figures for 1991 are estimates.
Source: Agritex Second Crop Estimates (various years); Central Statistics Office (various years).

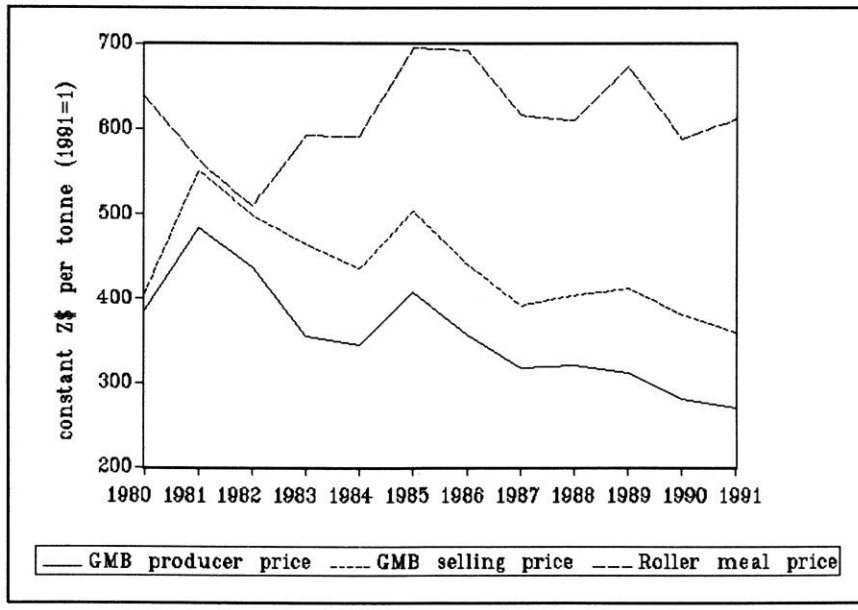
Figure 5. Maize Production in Zimbabwe, 1980-91.



Note: specified years are harvest years. Figures for 1991 are estimates.
Source: Agritex Second Crop Estimates (various years); Central Statistics Office (various years); Central Statistics Office (ND).

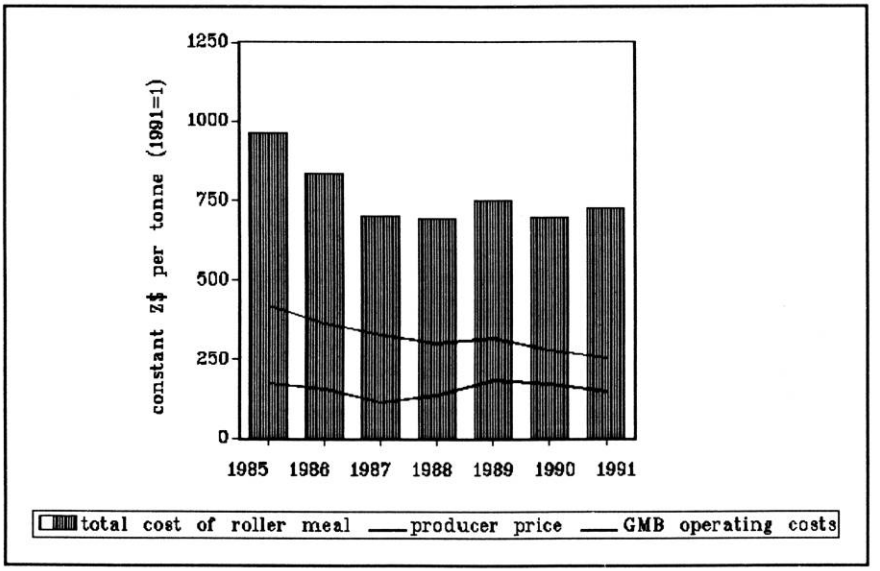
Figure 6. Maize Production per capita in Zimbabwe, 1980-91.

The production stagnation is a associated with a consistent slide in real maize producer prices since 1981 (Figure 7). Real maize prices were, on average, 25% higher during the first half of the 1980s than during the second half. With inflation currently running at 25%-30%, the 1992/93 pre-planting price of Z$325 per tonne is even lower in real terms than the 1991/92 price -- the lowest producer price in real terms since 1970. Yet lower maize producer prices have not resulted in lower consumer prices for maize meal. Marketing costs are absorbing an increasing proportion of the value of industrially-processed maize meal. The higher marketing costs over the past decade, while commonly attributed to GMB, are also due to sustantial increases in subsidies and margins to industrial millers, Figure 8.



Note: Producer and selling prices apply to marketing years (e.g., 1980 = April 1980 to March 1981).
Source: Agricultural Marketing Authority (various years); Ministry of Industry and Commerce files.

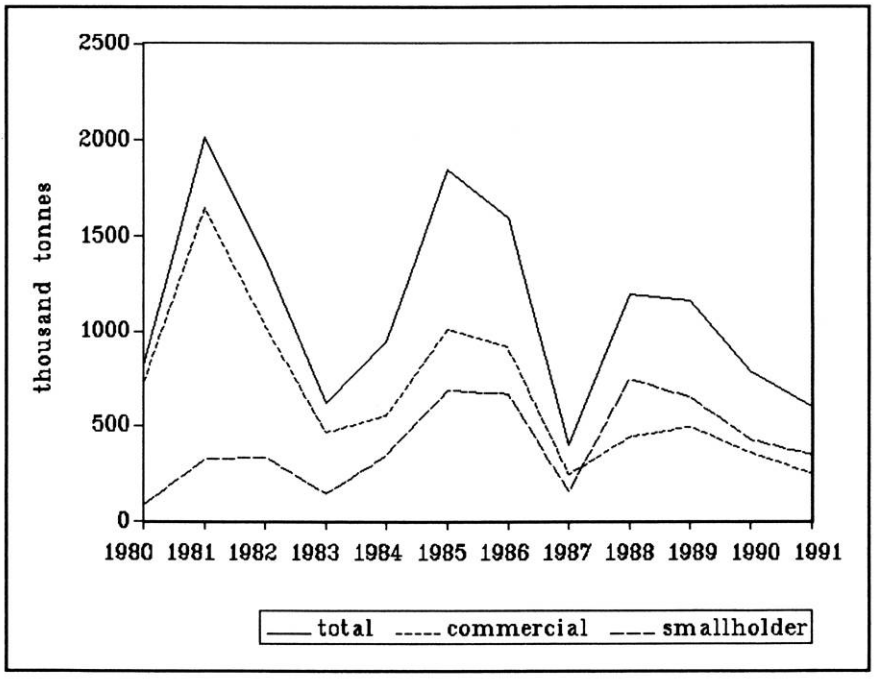
Figure 7. Official maize and roller meal selling prices, 1980-91.



Note: GMB prices and costs apply to marketing years (e.g., 1980 = April 1980 to March 1981).
Source: Agricultural Marketing Authority (various years); Ministry of Industry and Commerce files.

Figure 8. Total cost of roller meal (including subsidies), GMB producer prices, and GMB operating costs, 1985-91.

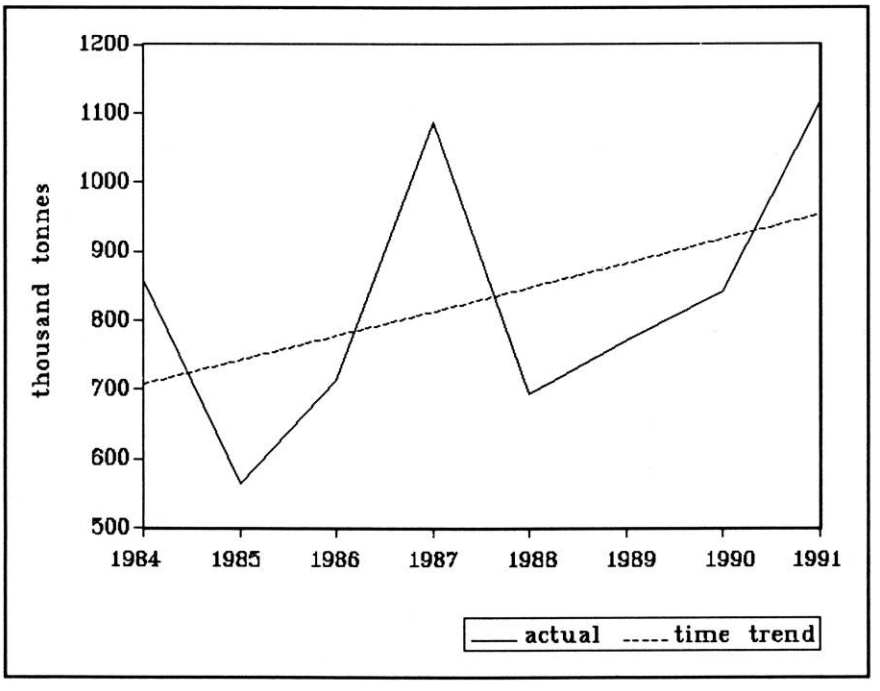
Small Maize deliveries to GMB rose impressively during the first five years of independence, but have shown little upward trend since 1985, Figure 9. This growth is likely to be slowed futher as rural population increases, the private grain trader develops and GMB shuts down depots in remote smallholder areas as currently planned. Commercial maize supplies already have been declining at a rate of 90,000 metric tonnes a year since 1981.



Note: Specified years are marketing years (e.g., 1980 = April 1980 to March 1981). Figures for 1991 are estimates.
Source: Agricultural Marketing Authority (various years).

Figure 9. Maize deliveries to the Grain Marketing Board, 1980-91.

Meanwhile, the demand for GMB maize has increased 5.5% per year since 1985, reflecting rapid urban population growth, Figure 10. Maize sales have exceeded purchases for in the past two years.



Note: specified years are marketing years (e.g., 1980=April 1980 to March 1981). Figures for 1991 are estimates.
Source: Agricultural Marketing Authority (various years).

Figure 10. Maize sales by the Grain Marketing Board, 1984-91.

Factors responsible for the decline in maize self-sufficiency:

The gradual decline in per capita maize production and supply, while exacerbated by poor weather, also appears to have several underlying structural causes:

1. The slide in real maize prices since 1985 -- Producer prices are 25% lower than in 1985, after adjusting for inflation. Since then, there has been little improvement in productivity to offset the effect of declining prices on profitability.
2. The improved hybrid seed varieties that stimulated smallholder productivity during 1980-85 are now almost universally adopted. A new set of technological improvements or management practices is necessary to stimulate additional gains in productivity.
3. AFC credit to smallholders has been declining since 1987 while input costs have been rising. The amount of AN and Compound D fertilizer that can be purchased with AFC credit disbursed to smallholders is now 111,000 metric tonnes compared with 205,000 tonnes in 1987. Declining fertilizer usage, along with relatively poor rainfall, may explain why smallholder maize yields, even in the relatively productive Mashonaland provinces, have exceeded their 1985 level only once.
4. Input delivery systems continue to be largely unresponsive to smallholder needs.
5. Withdrawal of marketing infrastructure -- even though 17 additional grain buying depots have been established since 1985, the number of rural collection points has declined from over 100 in 1985, to 42 in 1989, to 9 in 1991. The major reason for this withdrawal is cost (Zana, 1991).
6. National population growth of 3% per year -- the population is now 20% larger than it was in 1985.

Projecting National Maize Supplies, Demand and Net Exports: 1992/92 - 1994/95

What would be Zimbabwe's expected maize supply, demand and trade position at alternative producer price levels if existing marketing regulations are maintained? This issue is addressed using an econometrically-based simulation model of the maize market. The model forecasts maize production, GMB intake, GMB sales, maize processed by industrial and informal millers, urban consumption, rural consumption and trade as functions of GMB price levels, weather, stock policy and marketing costs between regions. The model includes seven maize production regions: (a) commercial farmers in Mashonaland; (b) smallholders in Mashonaland; (c) commercial producers in the remaining provinces; (d) smallholders in Midlands and Manicaland provinces; and (e) smallholders in Masvingo, Matabeleland North and South Provinces.

Coefficients for the simulation model are based on econometric estimation of structural equations for annual maize area, GMB intake and GMB sales over the 1978 to 1990 period. A description of the model and estimated regression coefficients are contained in Appendices I and II. Those interested in a more detailed presentation of the model are referred to Jayne and Hajek (forthcoming).

Outcomes were simulated over a 3-year period, (1992/93 marketing year to 1994/95 marketing year). Two different rainfall scenarios were examined: (a) a normal rainfall case; and (b) a drought case (*i.e.*, yields are one standard deviation below the mean).

Table 1 presents the projected maize supply, demand and trade position based on the existing structure of the market and current real producer prices (Z$270 in 1991/92 marketing year = Z$338 in 1992/93, assuming a 25% inflation rate). The estimates are derived by setting yield levels at 10-year trend estimates and all other predetermined variables at their 1990/91 levels.

Table 1. Projected national maize supply, demand and deficits under status quo policies and current real price levels.

Year	Maize Supply	Maize Demand	Net Deficit
	---------- 000 metric tonnes ----------		
1992/93	770	833	-63
1993/94	764	875	-111
1994/95	758	919	-161

The increase in projected maize deficits over time is due mainly to population growth and negative trend effects in the commercial maize area. These trends could, in the short run, be reversed by favorable weather or changes in policy. Nevertheless, the data suggest that Zimbabwe's present maize deficit is not simply a transitory phenomenon due to drought. Without significant changes in productivity or policies related to price, land, or market regulation, Zimbabwe appears destined to be a net grain importer for much of the 1990s.

Agricultural Growth, Food Security and the Food Price Dilemma:

Zimbabwe will encounter a food price dilemma during the 1990s. On the one hand, the reversal of Zimbabwe's slide toward maize imports will require, among other things, substantially higher producer prices. Yet higher food prices will exacerbate poverty and food insecurity among low-income consumers. The need to cushion the poor against

rapidly rising staple food prices will be even more pressing in an environment of falling real wages and incomes which is expected to characterize the next several years in Zimbabwe. At the same time, the government's commitment to reduce GMB deficits under the Structural Adjustment Programme will simultaneously exert downward pressure on producer prices and upward pressure on consumer prices.

In the longer run, technical innovation, improved management practices and resettlement offer possibilities to relieve the food price dilemma. Improved farm productivity can reduce per unit costs of production and thus allow lower prices to be passed onto consumers without jeopardizing production incentives. However, very little new technology is on the shelf, especially in the lower-rainfall areas of Zimbabwe where food insecurity appears to be most severe. Likewise, resettlement offers the potential to substantially increase crop cultivation, without requiring higher producer prices, through more intensive use of underutilized land. However, the World Bank (1991) estimates that the process of resettlement will require at least five to ten years before a significant amount of land can be productively utilized by smallholders.

Zimbabwe has already begun the process of structural adjustment. While these changes are ultimately expected to raise the country's rate of economic growth and the living standards of its people, certain short-run problems -- inflation, currency depreciation and lower real wages -- are already being felt. Strategies are clearly needed in the immediate future to guide policy makers attempting to reduce government deficits associated with food marketing without cutting off smallholders from market outlets, introducing instability in food supplies and prices, or exacerbating food access and affordability among vulnerable groups. Furthermore, these short-run strategies would obtain greater donor support if they complement rather than undermine longer-run developmental and budgetary objectives.

Maize Milling in Zimbabwe

This section briefly describes the the structure and behavior of the maize milling sector in Zimbabwe and then estimates the effects of these three policy options to promote maize access for low income groups.

Industrial maize milling is dominated by four large private firms: National Foods, Blue Ribbon Foods, Midlands Milling Company and Triangle Milling Company. National Foods alone handles about 65% of the market, while National Foods and Blue Ribbon combined handle 85%. These millers produce two types of maize meal: super refined meal (60% extraction rate) and roller meal (85% extraction rate). Millers currently buy maize from the GMB and sell to retailers at government-controlled prices. Maize milling margins are based on cost of production data supplied by the millers.

Informal maize millers are numerous, operate primarily in rural areas, and may sell at unregulated prices, although their operations are greatly circumscribed by grain marketing regulations. Small-scale millers are capable of producing two kinds of meal, Table 2. The most common type is straight-run meal, or mugayiwa (96-98% extraction rate). This type of meal is widely consumed in the rural areas. A second type of meal, mudzvurwa, involves removing the bran before milling. Mudzvurwa is similar to roller meal and has an extraction rate of about 90%. This informally processed "roller meal" is currently available in Bulawayo, Buhera, Gokwe and Mberengwa for Z$.56 to Z$.58 per kilogram, compared with Z$.63 for the controlled price of industrially-processed roller meal. Moreover, the milling margins of small-scale mills varies from Z$60-100 per tonne of maize processed, compared with Z$221 and Z$422 per tonne by industrial millers for the manufacture of roller meal and super-refined meal (Chisvo et al. 1990).

The effective demand for the informally-milled meals in urban areas is not well established because grain market regulations have historically blocked the informal sector from moving grain into urban areas and undercutting the prices of meal offered through the GMB/industrial milling system. However, demand for maize meal from informal mills is indicated by the following:

1. Results of a recent household survey in four peri-urban areas of Harare indicate that a moderate demand for straight-run meal exists among lower income groups, reflecting its cost discount. Sixty-two percent of the low-income group stated that they would purchase straight-run meal if it were 12% cheaper than roller meal and available in convenient bag sizes (Jayne et al. 1991). Relatively few of the high- and medium-income groups stated an interest in straight-run meal, even at substantial price discounts to the more refined meals. These findings indicate a potential for self-targetting, i.e., that a subsidy on straight-run meal would be conferred mainly to the poor.

2. Approximately 5,000 tonnes of maize are produced illegally in the Harare area and are milled into straight-run meal by small-scale mills (Mudimu, 1991). In some areas, a land rent has evolved, indirectly indicating an unmet demand for straight-run meal in urban areas.

Table 2. Description of various maize meals produced in Zimbabwe

Type of meal	Description	Extraction rate	Produced by	Selling price per tonne (Z$/mt; 1991/92)*	nutritional profile
Super-refined	meal ground from the starchy endosperm; the hull and germ are totally removed	60% - 65%	Industrial millers	Z$862 (Z$893)	Protein (gms): 8.0 Energy (k'cals): 334 Iron (mgs): 1.1 Calcium (mgs): 6.0 Thiamin (mgs): .14
Roller meal	the hull and germ are mostly removed, leaving mostly starchy endosperm	82% - 85%	Industrial millers	Z$626 (Z$666)	Protein (gms): 9.3 Energy (k'cals): 341 Iron (mgs): 2.0 Calcium (mgs:7.0 Thiamin (mgs): .30
Mudzvurwa	the hull is removed before being milled; the germ is retained	90%	Small-scale millers	Z$580 (no subsidy)	information not available but similar to roller meal
Mugayiwa (Straight-run)	meal processed from the whole maize kernel; the hull and germ are retained	96% - 99%	Small-scale and industrial millers**	Z$580 (Z$616) by industrial millers; custom milled by informal millers at Z$60-80 per tonne	Protein (gms): 10.0 Energy (k'cals): 343 Iron (mgs): 2.5 Calcium (mgs: 12.0 Thiamin (mgs): .35

* Numbers in parentheses include subsidies conferred to industrial millers. Informal milling margins were established from household surveys during 1991 together with before-and-after weight measurements of maize processed through a sample of hammer mills in buhera and Mberengwa Communal Lands (Chisvo et al., 1991).

** Straight run meal was produced by industrial millers in convenient bag sizes until 1979.

3. An unknown but sizable quantity of maize is purchased at commercial farms and milled into straight-run meal for consumption by households in nearby peri-urban areas.

4. Straight-run meal accounted for approximately 5% to 8% of industrially-milled maize meal before its manufacture in convenient bag sizes was discontinued in 1979 (Robinson. 1991). While data is not available on consumption by income category, it is believed that this demand was concentrated primarily among the poor and in the southern portions of the country. The anticipated decline in real wages over the next several years may increase the demand for less-expensive staple food products.

5. A survey of one informal miller producing mudzvurwa indicated that his Bulawayo outlet produces and distributes 20 metric tonnes per day, while his Gokwe outlet produces and distributes almost 40 tonnes per day.[1]

Impediments to the development of a viable small-scale informal milling sector

Despite its potential to reduce maize meal costs, informal maize milling is subject to a number of barriers to entry. The GMB has, in practice, restricted its grain sales to the large industrial buyers: commercial millers (77% of total GMB maize sales since 1980), livestock and poultry feeders (8%), brewers (6%) and food aid (7%). Out of 15 depot managers surveyed during 1990, 13 stated that they do not permit sales to informal buyers suspected of reselling the grain (Chisvo et al. 1991). Furthermore, maize grain cannot legally be transported privately into urban or peri-urban areas. These regulations prevent small-scale millers from sourcing grain to produce less expensive maize meal for the benefit of low-income urban consumers. As a result, the government has conferred a *de facto* monopoly to industrial millers, even though their margins are two to three times higher than those of small scale millers.[2]

Industrial millers receive 132% and 33% more gross revenue for every tonne of super-refined meal and roller meal, sold respectively, than straight-run meal, Table 3. Retailers also receive 5% and 13% more profit for stocking and selling super-refined and roller meal than straight-run meal. Moreover, many retailers are under the impression that straight-run meal is not even available to order from the mills.[3] Lacking any threat of competition from informal millers, which are blocked by policy from procuring grain in important urban areas, the industrial millers, whether by choice or circumstance, are able to operate a higher cost system without losing market share. Government regulation and pricing policy therefore appears to create incentives that perpetuate the distribution of more expensive meal, catering to higher-income tastes, with potentially adverse consequences for nutrition and incomes among the urban poor.

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[1] **These activities, some of which contravene the regulations of the Grain Marketing Act, appear to be tolerated on a selective basis by the authorities.**

[2] **The monopoly granted to industrial millers is further entrenched in some urban municipalities such as Harare where informal maize mills are banned by law.**

[3] **None of the 35 urban shops surveyed stocked straight run meal; 80% of these shopowners stated that they did not think is possible to order straight-run meal from the commercial mills. The other 20% stated that the major problem with ordering straight-run meal was that it was available only in 50kg and 90kg bags, sizes that are geared towards institutional buyers and not convenient for households to buy.**

Table 3. Gross revenue (minus raw material cost) accruing to industrial millers for the manufacture of various maize meals.

	Super-refined meal (62% outturn)	Roller meal (85% outturn)	Straight-run meal (96% outturn)
a. government-controlled 1991/92 selling price of meal *ex mill* (Z$/tonne)	751	535	470
b. procurement cost of maize grain required to produce one tonne of meal (i.e., GMB maize selling price per tonne adjusted for the grain-to-meal outturn rate for each type of meal (Z$)	1/.62 * 360	1/.85 * 360	1/.96 * 360
c. gross revenue from one tonne of meal (Z$) (a - b)	170	111	200
d. approximate market value of maize by-product for livestock feed (1991 Z$/tonne)	200	200	200
e. quantity of maize by-product produced in the manufacture of one tonne of maize meal (tonnes)	1/.62 - 1	1/.85 - 1	1/.96 - 1
f. value of by-product revenue from the manufacture of one tonne of maize meal (Z$) (d * e)	122	35	8
g. direct subsidy to millers (Z$ per tonne of meal produced)	31	39	36
g. total gross revenue from one tonne of meal plus by-product (Z$) (c + f + g)	323	185	139

Source: Authors calculations based on information supplied by GMB and by National Foods. National Foods, using different calculations, contends that the gross margins per tonne for super-refined, roller meal and straight-run meal are Z$231, Z$154 and Z$146, respectively.

Although direct subsidies to the industrial millers were phased out in 1986, they were reintroduced as of April 1991. The effect of this subsidy is to reduce the price of industrially-produced roller meal by about Z$40, or approximately 20% of the milling margin. This subsidy introduces an additional entry barrier to the development of a small-scale milling sector as it artificially reduces the price of the product against which small-scale millers compete. The continuation of such a subsidy will stimulate consumption of industrially-processed meal and narrow the margin within which informal grain traders and millers may operate profitably.

Investment in small-scale grain trading and milling is also constrained:[4]

1. Lack of capital to finance needed investments in equipment, transport, electrical installations, etc.,
2. The ability to procure needed equipment, which is in short supply in Zimbabwe. This constraint appears to be correlated with lack of influence or connections; and
3. The ability to hire trusted subordinate managers. Grain procurement and the operation of distribution outlets over a wide geographical area requires able subordinates to manage company assets consistent with owner objectives.

Simulation results: an evaluation of three strategies to reduce maize meal costs to low-income consumers

The Government of Zimbabwe has committed itself to gradually reduce the deficits of the GMB from current levels of Z$40-60 million to zero by 1994/95. In recognition of the effect that subsidy elimination may have on maize meal prices, the GOZ is currently considering ways to assure access to and affordability of staple maize meal by low-income consumers. Two short-run options are under active discussion:

Option A: Continue the existing policy of subsidizing the price of roller meal and super-refined meal by Z$46 and Z$31 per tonne, respectively. This amounts to a 7% and 4% reduction in the respective consumer prices.

Option B: Provide a direct subsidy to industrial millers for the manufacture of straight-run meal. The subsidy is to be sufficient to make production of straight-run meal as profitable as roller meal from the standpoint of industrial millers. This is estimated to cost approximately Z$11 million.

A third, medium-range strategy is proposed, i.e.,

Option C: Remove direct subsidies on all industrially manufactured meals and promote new entry and investment in small-scale milling.

Options A or B do not preclude the simultaneous adoption of Option C.

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[4] **Results are summarized from surveys of informal millers during 1990 and 1991 by the UZ/MSU Food Security Research Project.**

Results of this analysis are derived from the econometrically-based simulation model described in Appendix 1. The analysis contrasts the three options in terms of GMB maize intake and sales, net exports, GMB operating deficits, subsidies to millers and total GOZ costs. At any given producer price (denominated in 1991/92 prices and based on a projected inflation rate of 25% between 1991/92 and 1992/93), GMB selling prices and maize meal prices are derived by adding a GMB marketing margin of Z$100 per tonne[5] and a milling margin that reflects the costs and subsidies associated with each respective scenario. The quantities of each maize meal purchased is derived from surveys of 515 urban households of different income brackets (Jayne et al. 1991). This survey was designed to identify demand for the various meal types at various prices. For each policy option, the simulation model was run under two rainfall outcomes: mean rainfall and one standard deviation below mean rainfall corresponding to a moderate drought.

Summary results are presented in Table 4. Four conclusions emerge from the analysis:

(1) Maize demand is estimated to be about 3% lower under Option A than under Options B and C. This is because the latter options increase the availability of maize meal at prices below the price of roller meal. The 3% drop in aggregate consumption will be felt mostly among low-income consumers.
(2) A comparison of Options A and C indicate that the GOZ could offer higher producer prices to farmers, lower food prices for low-income consumers -- at a lower cost to the treasury -- than the present option of subsidizing roller meal and super-refined meal.
(3) An important difference between Options B and C is that the latter can achieve about the same level of consumption at less cost to the government treasury. Option C also offers employment generation and income multipliers in the informal sector. Recent research in Tanzania has shown that small-scale milling technology tends to be more labor-intensive than large-scale technology (Bagachwa. 1991).
(4) A major drawback of Option A is that a subsidy on commercially-produced roller meal would adversely affect investment by emergent businesses in informal grain milling and trading. Given that the success of the Structural Adjustment Programme in general, and the Grain Market Reform Program in particular, is based upon and requires increased participation and investment by small scale traders, shopowners, transporters and millers, the pursuit of strategies that discriminate against this sector is likely to compromise the objectives of these Programmes. Furthermore, Option A fails to meet the objectives of the Structural Adjustment Programme to reduce budget deficits.

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[5] **This margin reflects a lower level of GMB subsidy commensurate with its plan to gradually phase out subsidies by 1994/95.**

Table 4. Simulation analysis results for GMB intake, sales, net maize exports and government budget costs associated with selected maize marketing policies and producer prices.

GMB producer price (Z$ per tonne)	GMB intake (000 tonnes)	GMB sales (000 tonnes)	Net maize exports (000 tonnes)	GOZ budget outlays (Z$ million)		
				GMB trading account	Subsidy to millers	Total
Z$270 (1991/92) = Z$340 (1992/93)						
Scenario A	770/664	833/894	-63/-230	25/109	19/26	44/135
Scenario B	770/664	859/919	-89/-255	38/121	4/12	42/133
Scenario C	770/664	855/916	-85/-252	36/119	--	36/119
Z$280 (1991/92) = Z$352 (1992/93)						
Scenario A	789/682	815/876	-26/-194	6/89	19/26	25/115
Scenario B	789/682	840/902	-51/-220	18/101	4/12	22/113
Scenario C	789/682	837/898	-48/-216	16/99	--	16/99
Z$290 (1991/92) = Z$365 (1992/93)						
Scenario A	809/700	796/859	13/-159	11/70	19/26	30/96
Scenario B	809/700	822/884	-9/-182	(2)*/82	4/12	2/94
Scenario C	809/700	818/881	-4/-174	(3)*/80	--	(3)*/80

Note: The first set of figures in each column represents estimated outcomes under mean rainfall conditions; the second set of figures represents a moderate drought scenario (i.e., one standard deviation below mean rainfall). The probability that rainfall will be below this amount is about 33%.

* represents a positive trading account.

Key: Scenario A: subsidize roller meal produced by industrial millers (Z$20 million per year);
Scenario B: subsidize straight-run meal produced by industrial millers (Z$12 million per year);
Scenario C: availability of roller meal and straight-run meal through informal sector at 12% lower price than industrial roller meal (no subsidy).

In addition to these implications for targetting, the results also indicate the following:

(1) Under current real producer price levels and mean rainfall, maize demand is likely to outstrip GMB intake. Unlike the 1990/91 and 1991/92 marketing years, in which maize deficits could be covered largely or entirely by surplus stocks, it is likely that Zimbabwe will be forced to import maize in 1992/93 -- unless good weather prevails or producer prices are raised.

(2) The price increase necessary to obtain self-sufficiency under normal rainfall depends on which policy option is adopted. The simulation results indicate that, holding other factors constant, self-sufficiency would be achieved under Option A at a producer price of Z$365 for the 1992/93 marketing year. Under Options B and C, self-sufficiency would be achieved at Z$370. Pre-planting prices would be required in order to effectively stimulate supplies during the 1992/93 marketing year.

(3) Failure to achieve self-sufficiency will inflate GMB's trading losses. This is because the cost of procuring maize from the world market is 65-80% higher than the cost of domestic procurement (at prices necessary to achieve self-sufficiency under normal rainfall).[6] This calls into question the recently announced plans by the GMB to shut down numerous "unviable" depots and collection points in smallholder areas. While these depots may procure supplies at a loss, the question arises as to whether these unit costs are higher than the unit costs of importing maize.[7]

(4) In the case of a drought, and under status quo policies, GMB operating losses are estimated to rise from Z$31 per tonne (estimating 63,000 tonnes of imports in 1992/93) to Z$122 per tonne (under an estimated 230,000 tonnes of imports).

(5) The producer price level necessary to restore maize self-sufficiency would, under Option A, require large increases in the price of staple maize meal, even with a continuation of the present subsidy of Z$20 million per year. It is estimated that roller meal costs, if unsubsidized, would be Z$850 or more per tonne in 1992/93 terms (i.e., 30% higher than in 1991/92). Price increases of this magnitude are likely to adversely affect nutritional status and real incomes of low-income urban and rural consumers.

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[6] **Given high transport costs to landlocked Zimbabwe, c.i.f. import prices for maize in Harare are on the order of Z$800-850. By contrast, average domestic procurement costs (producer price plus marketing costs paid by GMB) are currently about Z$420, but are estimated to be about Z$505 in order to achieve maize self-sufficiency in 1992/93 assuming normal rainfall. Under current world price and exchange rate conditions, the marginal and average costs of domestic white maize procurement are substantially lower than the cost of importing. This is calculated at the official exchange rate of $Z/$US=5.0. The cost premium of maize imports would be even more pronounced if the US dollar were valued at its shadow exchange rate (Muir and Jansen. 1991).**

[7] **The issue of profitable vs. loss-making depots is affected by weather and GMB's producer and selling prices. Prices and margins are uniform with respect to location and season, and diverge substantially from what would prevail under market-determined prices. Viability determined by looking at depot balance sheets may not be ultimately "correct".**

Government Perceptions toward Small-Scale Milling Sector

Despite its apparent benefits, Option C suffers from a number of perceptional problems, i.e., (a) small-scale milling technology is inefficient; (b) it would be years before sufficient informal milling capacity could be developed to benefit urban consumers; and (c) shifting consumption patterns to more refined, higher-status meals has been a positive change and it would be demeaning to low-income consumers to revert back to the coarser, lower-status meals.

Perception (a) is an empirical question. The criteria for efficiency includes cost per unit for a service demanded by the market. Existing evidence indicates that milling margins (not necessarily costs) per unit of maize milled are considerably lower for small-scale millers than for the larger industrial millers. Informally-milled roller meal (mudzvurwa) cost Z$45 less per tonne than the subsidized price of industrial roller meal.

Perception (b) is also an empirical question. The main impediment to investment in informal milling appears to be access to milling equipment. The GOZ could relieve this constraint by importing and auctioning equipment. Interviews with millers indicate that a plant of 4 shellers and 2 hammer mills would cost Z$250,000 including construction and electricity costs. Given that consumers would pay Z$45 per tonne less for the mudzurwa manufactured by such a plant, the sale of 5,500 tonnes would offset the cost of the initial investment and additional output would represent a net benefit to society.

Concerning perception (c), if low-income consumers prefer to buy straight-run meal, taking the cost discount into consideration, the government would be doing a disservice to their constituents if they restricted this option. Furthermore, to the extent that competition from informal millers would attract market share away from industrial millers, such a dual system may also stimulate the competitiveness of the industrial milling sector,if prices are freed, thus passing along benefits to consumers of all income categories.

6. Longer Run Issues: Grain Marketing, Food Security and Agricultural Growth

These short-run strategies cannot adequately address the underlying structural problems in the grain marketing system. Mechanisms to cushion vulnerable groups from the effects of structural adjustment have been conceptualized primarily in terms of short-run subsidies. However, regulatory aspects of the food marketing system pose serious impediments to maize access and affordability. Their modification must be viewed as part and parcel of a well-defined cushioning strategy as well as an overall growth and development strategy. The GOZ's main policy response to chronic and transitory food insecurity has been food and income transfer programs. The need for these costly programs has become apparent only after long-run food policies have failed.

This conclusion may be clarified by examples of how the structure and regulatory aspects of the grain marketing system exacerbate household food insecurity in ways that cannot be adequately addressed through the continuation of subsidies and free food handouts.

To ensure a consistent flow of maize meal to urban consumers, the GOZ has sought to influence prices and distribution through a controlled and centralized maize marketing system. The official grain marketing system induces a predominantly one-way flow of grain from rural areas to centralised urban milling and storage facilities. Maize may be sold through the official system to one of three procurement arms of the GMB: (1) GMB depots, normally located in town centres, (2) GMB collection points located in rural smallholder areas; and (3) licenced private traders that buy on behalf of the GMB. Private maize trading was never banned in the communal areas, but is nevertheless circumscribed by government regulations:

1. Smallholder maize, unless destined for a GMB depot, is prohibited from moving across the boundaries of urban or commercial farming areas. Since these areas contain virtually all of the country's main roads, this regulation effectively blocks private grain trade between non-contiguous smallholder areas or from smallholder areas to urban consumption centers.

2. Maize may not be moved privately from commercial farming areas to smallholder or urban areas.

3. Once grain is sold to GMB collection points or approved buyers in smallholder areas, direct resale to consumers is prohibited. Instead, the grain must be forwarded to GMB depots, often a considerable distance from rural deficit areas. This effectively siphons supplies out of rural areas, tightens local supply-demand conditions, and exerts upward pressure on rural market prices.

4. The margin between the GMB purchase price and selling price to urban millers since 1986/87 has been roughly half of GMB's actual operating costs (AMA, 1990). The combination of consumer price subsidies and restrictions on direct trade between surplus and deficit rural areas has encouraged the consumption of urban milled meal in rural deficit areas. Pan-territorial prices for commercially-milled meal further extend the dominance of the official distribution system even in the most distant regions. These direct and indirect subsidies in the official marketing channel substantially narrow the scope for intra-rural private trade.

5. The rules governing resale of GMB grain to informal traders are subject to a variety of interpretations. In theory, any individual may purchase grain from GMB depots (see Grain Marketing Act, Section 21). Yet 13 of 15 GMB depot managers interviewed stated that they do not permit sales to informal traders suspected of reselling the grain, due to perceptions that they would exploit poor households needing grain.

6. Small-scale informal maize milling is illegal in urban areas. While there are 25-30 such mills operating in and around Harare, throughput is greatly constrained due to points (1), (2) and (5).

The combination of producer price incentives, expansion of GMB buying points in distant rural areas, subsidies on maize meal marketed through the GMB/urban milling system and movement and resale controls, is based on several implicit assumptions about how Zimbabwe's grain marketing system works:

1. The emphasis on increasing the returns from smallholder grain sales as a means to stimulate rural incomes implicitly assumes that most farmers are surplus grain producers. Even in the marginal areas, GMB infrastructure was built with a view to increase smallholder incomes through increased crop sales.

2. The system is based on an image of grain self-sufficiency in rural areas. Official controls on intra-rural grain trade restrict the development of alternative marketing channels and cause most surplus grain production to be channeled into the GMB system. The uni-directional orientation of the GMB effectively funnels supplies directly to industrial buyers in urban areas. Less than 2% of GMB's total maize intake since 1980 has been resold to consumers or private traders. The organization of the market has forced GMB to serve as de facto procurement agent for the large urban millers, stockfeeders and brewers, who have accounted for 77, 8 and 6 percent of GMB sales since 1980. The remaining 7% of GMB maize sales have been for food aid. Thus, massive stocks at GMB depots in town centres throughout the country do not necessarily ensure grain accessibility in rural areas.

3. The current system provides a statutory monopoly on urban distribution of maize meal to the five large industrial millers. This implicitly implies a perception on the part of the GOZ that the centralized urban millers provide a more efficient system than one encouraging competition from the small scale milling sector.

These assumptions are contradicted by recent surveys of household, trader, and millers in Zimbabwe. The data reveal five salient points, Table 5. First, most smallholders in the drier regions sell little or no grain. Income from grain sales is highly concentrated among a narrow segment of resource rich farmers in the most productive regions. Of the country's 170 smallholder farming areas, 18 have accounted for 75% of GMB grain intake from this sector since 1983. Nationally, the top 10% of smallholders selling grain acount for about 90% of total income accruing to the communal sector from GMB maize sales (Jayne et al. 1991). These smallholders are almost exclusively in the high-rainfall areas.

Table 5: Aspects of household grain marketing behavior in selected smallholder farming areas.

COMMUNAL AREA	PERCENTAGE OF HOUSEHOLDTHAT ARE NET GRAIN PURCHASERS	% OF TOTAL GRAIN SALES BY THE 10% OF FARM HOUSEHOLDSELLING THE MOST GRAIN	AVERAGE HOUSEHOLD NET GRAIN SALES (KGS) SURPLUS H/HOLDS	DEFICIT H/HOLDS	% OF TOTAL GRAIN SOLD TO GMB OR LICENSED	N/BORING H/HOLDS	PVT TRAD	% OF TOTAL GRAIN AND MEAL PURCHASED FROM GMB	NEIGHBORING HOUSEHOLDS	PRIVATE TRADERS	SHOPKEEPER urban-milled
								grain			meal
High Rainfall:											
Gokwe (south)[a]	12	51	3 707	-183	86	8	6	7	80	13	0
Buhera (north)[a]	26	50	1 023	-252	69	16	15	16	70	1	13
Low Rainfall:											
Gokwe (north)[a]	59	59	1 118	-438	5	95	0	10	44	36	10
Buhera (south)[a]	57	72	973	-392	68	31	1	0	40	16	44
Runde[a]	61	74	1 465	-344	30	70	0	0	23	37	40
Mberengwa[a]	85	60	834	-483	43	57	0	26	15	17	42
Nata[b]	94	57	21	-301	0	100	0	0	7[c]		92
Ramakwebana[b]	96	68	340	-383	0	100	0	0	13[c]		87
Semukwe[b]	98	62	46	-352	0	100	0	0	21[c]		79

Note: The results of these surveys pertain to the period [a]April 1989 to March 1990 and [b]November 1988 to October 1989. Rainfall was average to moderately below average during the relevant production years in all survey areas. [c]The distinction between purchases from households and private traders was not made in this study.

Source: [a]UZ/MSU/ICRISAT Grain Marketing Surveys, 1990; [b]Hedden-Dunkhorst, Bettina, 'The role of small grains in semi-arid smallholder farming systems in Zimbabwe: preliminary findings', draft mimeo, SADCC/ICRISAT, Matopos.

Second, between 50 and 100 percent of farm households in the dry areas are typically net purchasers of grain. The exact proportion of grain-deficit farm households depends on the particular geographical area and the quality of the harvest (i.e., weather). The government's investment in GMB infrastructure and producer price incentives have largely bypassed these households. These farmers appear unable to respond significantly to producer price incentives because of other binding constraints on production -- limited land, draft animals, and non-farm income to finance investments in improved technology, poor soil and erratic rainfall (Govereh. 1991).

Third, household incomes in these grain-purchasing areas are often more affected by the price of commercial maize meal than by GMB producer prices. Table 5 indicates that the majority of households in the low-rainfall areas surveyed (Natural Regions IV and V) were net purchasers of grain and that a large portion of purchased grain was in the form of urban-milled meal. Urban-milled meal accounted for 79% to 92% of total grain purchases, and 24% to 37% of total grain consumption, in a survey of three semi-arid smallholder areas studied (Hedden-Dunkhorst. 1990).

Fourth, households selling the most grain tended to have both higher incomes and grain consumption. Household surveys in two semi-arid communal areas indicated that, at the .01 level of significance, household grain sales were positively correlated with per capita income, grain availability per household member and crop sales from oilseeds and cotton (Chigume and Jayne, 1991). The poorest households tended to have relatively few productive assets and were generally purchasers of grain.

Fifth, after the GMB's buying campaign, in which grain from surplus households is transported to depots in town centers, many semi-arid smallholder areas are grain-deficit in the aggregate. This is evident from the circuitous flow of grain in numerous smallholder areas in which marketed maize surpluses flow out of rural areas through the GMB system to be milled in relatively distant urban centers, and then flow back into the same or other rural areas in the form of expensive commercial maize meal (Jayne and Chisvo. 1991). Seventy-five percent of the grain-deficit households interviewed in selected rural areas stated that they bought urban-milled meal simply because grain was not available locally. Ironically, straight-run meal from a rural hammer mill is more

nutritious and less expensive than the more refined commercially-manufactured meal.

The circuitous flow of grain out of rural areas and expensive maize meal into rural areas is a symptom of poorly-functioning intra-rural grain trade linking surplus and deficit households and regions. The state's one-way distribution system, effectively siphons grain supplies out of semi-arid rural areas early in the season. Controls on maize movement, resale and pricing restrict consumers in these same areas from obtaining maize through private trading channels, creating localised shortages later in the season. These controls provide the commercial milling system with a *de facto* monopoly on maize distribution into grain-deficit areas. Therefore, the sale of grain "surpluses" to the GMB, while giving the illusion of rural self-sufficiency, has masked and even contributed to food insecurity in many smallholder areas. Econometric evidence indicates that the national magnitude of this phenomenon -- grain moved out of rural areas by the GMB and urban-milled meal moved in -- is about 130 000 tonnes during a normal rainfall year and as much as 275 000 tonnes or more during a drought year (Jayne et al. 1990). This represents about 26 and 42 percent of total commercial maize meal sales during a normal and drought year, respectively. This rural consumption is concentrated in the low rainfall communal areas and among households working on commercial farms allocated plots of land too small to produce their annual grain needs.

Thus, during drought years, the current organization of the market places increased emphasis on expensive urban-milled meal, transferring income from grain purchasers and rural small-scale millers (along with the multiplier and employment effects) to urban-based commercial millers. The phenomenon of increased demand for urban-milled meal during drought years is largely due to the failure of the marketing system to allow more direct redistribution of grain from surplus to deficit rural areas. The absence of viable intra-rural marketing channels inflates consumer grain prices and has effectively reduced cash incomes among poor rural consumers by as much as 30% (Jayne and Chisvo. 1991).

Effects of Inflated Food Prices on Cropping Patterns

The current underdevelopment of intra-rural grain markets also reduces rural incomes in terms of the value of farm output sold. Evidence suggests that the production of "higher-valued" cash crops such as groundnuts, sunflower and cotton is constrained by high food marketing costs to rural areas. In the semi-arid areas, where most farm households are net purchasers of grain, the opportunity cost of cash crop production is not the net returns to growing and selling food grains, but rather the cost of acquiring the grain foregone by cultivating cash crops, i.e., the acquisition costs of grain rather than the selling prices. Typical assessments of crop profitability (e.g., returns to land and labor) are made with reference to producer prices of alternative crops and thus assume

that farmers are food self-sufficient. However, there is a 110% difference between the GMB maize producer price and the cost of industrial roller meal.[8] Therefore, typical crop profitability analyses may not accurately reflect the household's most economic use of farm resources in food deficit areas since these calculations do not measure the true opportunity cost of devoting scarce resources to non-food crops. Econometric evidence (Jayne. 1991) indicates that cultivation of various oilseed crops in several semi-arid smallholder areas of Zimbabwe is closely associated with the degree of grain self-sufficiency of the household. The results suggest that the direction of causality between cash crop production and household income may run both ways -- those households that engage in substantial cash cropping may have higher incomes, yet in an environment of high food costs, the ability to engage in cash cropping appears dependent on household resources over and above those needed for subsistence grain production needs.

Therefore, active government support to reduce food costs in the grain-deficit rural areas through the development of intra-rural trade may simultaneously contribute to the GOZ's food security and agricultural growth objectives by both reducing the cost of food purchased and by raising the value of farm output sold. Such policies are apparently neglected because of the conventional perception that farm households are, by and large, food self-sufficient. This misconception underscores the negative effects of uni-directional state marketing systems commonly found in East and Southern Africa which are primarily geared to extract grain out of rural areas and into urban milling, storage and consumption centers.

7. Conclusions: Grain marketing policy issues and options in the 1990s.

These structural impediments to rural income growth and food security underscore the need to reassess the congruence between Zimbabwe's food policy objectives and the marketing system in place to achieve them. These relationships also highlight a number of long term challenges facing Zimbabwe in the 1990s:

1. How to secure sufficient grain supplies to satisfy national requirements at least cost, perhaps reversing the clear downward trend in per capita grain production and national self-sufficiency;
2. How to reduce costs in the marketing system, thus providing the opportunity to raise real producer prices (and perhaps restore food self-sufficiency) without causing increases in staple maize meal prices -- this issue is especially relevant in light of the GOZ's commitment to eliminate GMB subsidies under the Structural Adjustment Programme;
3. How to develop an economically efficient grain marketing system to guide

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[8] **Roller meal constitutes the largest form of grain purchases in many semi-arid rural areas of Zimbabwe (Hedden-Dunkhorst. 1990; Jayne and Chisvo. 1991).**

production and distribution to maximise welfare;

4. How to develop informal networks capable of marketing grain directly from surplus to deficit areas at lower cost than the current system;
5. How to design more cost-effective ways of targetting and distributing grain to vulnerable groups that lack effective demand, without destroying private incentives to develop viable informal grain markets;
6. How to induce changes in crop mix consistent with economically efficient agricultural and income growth in Zimbabwean agriculture; and
7. How can maize price and supply stabilization be reliably performed at least cost to the government?

In addition, selected regulatory aspects of the grain marketing system pose such serious impediments to maize access and affordability that their modification must be viewed as part and parcel of a well-defined cushioning strategy as well as an overall development strategy. Evidence suggests that the unregulated milling margins charged by informal millers for the manufacture of mudzvurwa and mugayiwa are 30% to 50% of the margins granted to the four large industrial millers for super-refined and roller meal. Evidence also suggests that mugayiwa, the cheapest meal, would cater mainly to lower-income consumers. However, these meals are largely unavailable in urban areas due to controls on small scale millers. The *de facto* monopoly granted to the industrial millers entrenches a high-cost food system to low-income groups that would otherwise purchase a more nutritious and less expensive meal.

An investment policy that leads to the effective development of small-scale milling capacity would: (1) restrain the upward movement in staple maize meal prices for low-income consumers at no subsidy; (2) efficiently transfer government outlays to low-income consumers should government wish to further reduce the cost of maize meal for low-income consumers using straight-run meal as the targetted commodity without the costly drawback of current policy, i.e., blanket subsidies for all consumers; and (3) permit producer prices to be raised to levels capable of achieving self-sufficiency without requiring major increases in maize meal prices to the poor that would exacerbate food insecurity. This strategy requires no subsidy on maize meal to protect low-income consumers.

However, like technology and resettlement, market development takes time. Even with-out government interference, the level of investment necessary to induce the widespread availability of lower-cost maize meal would take several years. Yet the effects of structural adjustment on real wages and food prices are already apparent. There appear to be few options to cushion vulnerable groups from rising food prices and falling real incomes that do not involve food subsidies. An evaluation of two alternative subsidy options -- roller meal vs. straight-run meal -- indicates that a subsidy on straight-run meal would more cost-effectively target low-income groups than the current policy of

subsidies on the more refined meals. Blanket subsidies on industrial meal depress the development of informal grain trading and milling that, if fully developed, could potentially provide food to urban and rural consumers at lower cost without subsidy.

The industrial and informal milling sector should ideally be viewed as complements to one another. Each sector would fill different niches in the maize meal market. The industrial millers will assuredly retain the majority of meal sold in urban areas, since roller and super-refined meal are the meal of choice by the majority of middle- and high-income groups as well as a signficant proportion of the poor. On the other hand, straight-run meal would be available to meet the demand of a large portion of lower income consumers in urban and rural areas.

Government support for the development of informal grain trading and milling networks could include: (1) the allocation of foreign exchange for importation of small-scale mills, (2) promotion of local metal manufacturing industries that produce parts needed by small mills; (3) removal of import restrictions, tariffs and bureaucratic impediments associated with importing productive equipment and vehicles; (4) assuring that grain can be purchased from the GMB by all individuals and/or businesses in any quantity above the current minimum of 1 bag; (4) modification of city or district by-laws that prohibit informal grain milling in Zone A areas.

These policy changes and investments would be consistent with the GOZ's current initiatives to promote emergent small-scale businesses under the Indigenous Business Development programme. Once such an informal milling and trading network was in place to compete alongside the industrial milling sector, the costly subsidies on roller meal and parlenta could be removed, since low-income consumers would have the choice of obtaining lower-cost mudzvurwa or mugayiwa.

A major implication of the simulation results is that the amount of land and other production resources currently commited to maize can no longer guarantee a national surplus, even during a normal rainfall year. Real producer prices have declined by 35% since 1981, associated with a decline of 450,000 tonnes from annual commercial sector maize production. The dramatic maize revolution in the communal sector during the early and mid-1980s has waned during the past five years. A major implication of these trends for structural adjustment is that policy changes that successfully expand access and affordability of maize to urban and rural consumers will lead to a greater potential for imports and increased GMB operating deficits.

A scenario of national maize shortages will affect the GOZ's ability to cushion vulnerable groups through conventional food and income transfers. The costs and desirability of giving free food to millions of people will change radically if Zimbabwe moves from a situation of surplus stockpiles to one where it must import food aid. It may be worthwhile to consider the potential for developing intra-rural markets to

distribute grain to deficit areas and reserve food aid schemes to specifically targetted groups lacking effective demand.

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Appendix 1

The results of this analysis are based on a regional simulation model of maize production, GMB intake, GMB sales, trade and consumption as functions of GMB price levels, stock policy, marketing margins between regions and weather. The model includes seven maize production and/or consumption regions: (a) commercial farmers in Mashonaland; (b) communal farmers in Mashonaland; (c) commercial producers in the remaining provinces; (d) communal households in surplus areas of Midlands and Manicaland Provinces; (e) communal households in the semi-arid regions of Masvingo, Midlands; (f) communal households in Matabeleland North and South Provinces; and (g) urban consumers.

The model simulates expected effects on maize production, sales to GMB, volume of throughput by commercial *vs.* informal millers, and consumption over a 3-year period (1991-92 marketing year to 1993-94 marketing year) -- given specific GMB producer price and endstock levels and estimated regional price elasticities of supply and demand.[9] For each scenario, three different rainfall cases are examined: (a) a normal rainfall case; (b) a drought case (*i.e.*, yields are 70 percent of normal in each production region); and (c) a good rainfall case (*i.e.*, yields are 125 percent of normal in each production region).

Coefficients for the simulation model are based on econometric estimation of structural equations for annual maize area, GMB intake and GMB sales over the 1978 to 1990 period.

Only the key features of the model are highlighted in this report. Those interested in a more detailed presentation of the model as well as its estimated coefficients are referred to Jayne and Hajek (forthcoming. 1991). A "user friendly" version of the simulation model will be provided to the Ministry of Lands, Agriculture and Rural Resettlement for use in evaluating alternative price and stockholding policies.

3.1.1 Maize Area Equations

Maize area equations are estimated for each region of the form:

$$(1)\ AREA_{it} = a_0 + a_1(PP^{*}_{t}/PF_{t-1}) + a_2(PPSUB_{t-1}/PF_{t-1}) + a_3(AREA_{it-1}) + a_4(TREND_t) + e_{it}$$

where $AREA_{it}$ represents hectares planted to maize by regional group i in harvest year t; PP^{*}_{t}/PF_{t-1} is the expected GMB producer price to be announced in marketing year t/t+1 deflated by the price of nitrogen fertilizer at time of planting; $PPSUB_{t-1}/PF_{t-1}$) is the producer price of a major substitute cash crop in region i also deflated by the price of fertilizer at planting. The substitute crops chosen were tobacco in the Mashonaland commercial equation, cotton in the Mashonaland and Midlands/Manicaland equation, and sunflower in the remaining communal equations. $TREND_t$ is a time trend to capture the effects of excluded time-correlated factors.

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[9] **Regional supply elasticities are based on econometric estimates using GMB maize intake data from 1979 to 1990. Since regional maize consumption data is not available, this study assumes a price elasticity of demand of -1.0 in each region.**

Since GMB producer prices for maize have been announced after planting time for the past decade, the maize area equations must be formulated on the basis of price expectations, using information available to the farmer at planting to predict the likely price announced after harvest. It is well known that the government-determined maize producer price is influenced by the level of GMB maize stocks from the previous harvest and by recent price trends (Wright and Takavarasha. 1988). This suggests a simple maize price expectations model of the form:

$$(2)\quad PP_t^* = b_0 + b_1(ENDSTOCKS_{t-1}) + b_2(PP_{t-1})$$

where PP_t^* is expected price to be announced by GMB at harvest year t, $ENDSTOCKS_{t-1}$ are GMB maize stock levels at the end of the previous marketing year, and PP_{t-1} is the GMB price announced in the previous year.

The model allows for maize yields to be determined randomly through monte carlo simulation based on the mean and standard deviation of rainfall in region i over the past 10 years. Yields can also be held constant in the model at particular levels to examine outcomes of specific weather conditions. The product of yield and area estimates from Equation (1) generates maize production levels for each region.

3.1.2 GMB Maize Intake Equations:

GMB maize intake from region i is modelled as a function of production (Q) in region i:

$$(3)\quad INTAKE_{it} = c_0 + c_1(Q_{it}) + v_{it}$$

Modelling GMB intake as a quadratic function of production produced statistically insignificant results.

3.1.3 GMB Maize Sales Equations:

GMB maize sales equations are disaggregated by type of purchaser. The bulk of GMB sales are to millers for the manufacture of commercial meal. Interviews with managers of several urban milling firms indicate that (a) demand for maize by mills is based on perceived demand for meal rather than by-products; (b) there is a 2 to 3 week time lag between the purchase of maize from the GMB and the time at which it is milled and distributed to retail outlets, and (c) aside from working stocks, these millers do not store maize grain because the GMB's pan-seasonal price offers no incentive for them to do

so. These points suggest that the demand for maize grain by millers is essentially a derived demand for meal by consumers. In addition, past research has noted an inverse relationship between demand for commercial meal and the quality of the harvest (Blackie, 1984). During drought years, annual demand for commercial meal rises substantially. This suggests that the demand for maize grain by millers, a derived demand for maize meal, may be estimated in the form:

(4) $\text{MILL DEMAND}_t = d_{10} + d_{11}(\text{PMEAL}_t) + d_{12}(\text{PBEAD}_t) + d_{13}(\text{GNP}_t) + d_{14}(Q_{jt} - \text{INTAKE}_{jt}) + e_{1t}$

where MILL DEMAND_t is per capita maize grain demanded by millers in year t, PMEAL_t is the retail price of commercial roller meal, PBREAD_t is the retail price of wheat bread, and GNP_t is the gross national product per capita. All prices were deflated by the national consumer price index. $Q_{jt} - \text{INTAKE}_{jt}$ is the level of per capita maize retentions in the smallholder areas (where j = the aggregate of the three smallholder regions in the model).

Results for equation (4) show that demand for grain by millers is negatively associated with maize retentions in the communal lands at the .025 level of significance. Retentions are highly correlated with rainfall. A 50 percent drop in retentions (as in the drought-affected 1987-88 marketing year) is associated with a 150,000 tonne increase in the demand for maize meal.

Maize sales to stockfeeders and poultry producers in year t are assumed to be negatively related to the quality of the harvest in year t (this would increase farm retentions for stockfeed use and thus reduce the demand for GMB maize) and negatively related to the GMB maize/sorghum selling price ratio.

(5) $\text{STOCKFEED DEMAND}_t = d_{20} + d_{21}(\text{PSMZ}_t/\text{PSSO}_t) + d_{22}(Q_{ct}) + e_{2t}$

where PSMZ and PSSO are the GMB selling price of maize and red sorghum, respectively, and Q_{ct} is total commercial sector maize production in year t.

It is commonly held that the composition of maize and sorghum for use as stockfeeds is influenced by the relative GMB selling prices. However, econometric estimation of equation (5) over the 1978-79 to 1989-90 period suggests that this relationship is weak. Although GMB has recently been able to sell much of its rotting small grain stock to pig producers at discounted prices (relative to maize), there is little scope for GMB to continue this practice in a sustainable way. Clearly the most important factor influencing demand for maize by stockfeeders is the quality of harvest in commercial areas for which Q_{ct} is a proxy.

GMB maize sales to beer brewers, accounting for about 5 percent of GMB sales since 1980, are modelled as a constant. The sum of GMB sales to millers, stockfeed and poultry producers, and beer firms constitute total GMB maize sales.

3.1.4 National Flow and Stock Identities:

The estimated values for GMB intake and sales are tied into national accounting identities:

(6) $\text{NET EXPORTS}_t = \text{GMB INTAKE}_t + \text{ENDSTOCKS}_{t-1} - \text{GMB SALES}_t - \text{ENDSTOCKS}_t$

(7) $\text{CONSUMPTION}_t = Q_t + \text{ENDSTOCKS}_{t-1} - \text{NET EXPORTS}_t - \text{ENDSTOCKS}_t$

Substituting (6) into (7) yields:

(8) $\text{CONSUMPTION}_t = Q_t - \text{GMB INTAKE}_t + \text{GMB SALES}_t$

Maize consumption is disaggregated into human and feed components:

(9) $\text{CONFEED}_t = Q_{ct} - \text{GMB INTAKE}_{ct} + \text{STOCKFEED DEMAND}_t$

where Q_{ct} and GMB INTAKE_{ct} are commercial sector maize production and sales to GMB. The portion of commercial production not sold to GMB is largely retained for stockfeed. Finally, maize used for human consumption is derived by subtracting equation (9) from equation (8):

(10) $\text{CONHUMAN}_t = Q_{st} - \text{GMB INTAKE}_{st} + \text{MILL DEMAND}_t$

where CONHUMAN_t is quantity of maize milled into meal for human consumption, Q_{st} is smallholder maize production and GMB INTAKE_{st} is smallholder maize sales to the GMB. It is possible to further disaggregate smallholder maize consumption from urban

and commercial sector consumption. The former is comprised of smallholder maize retentions, Q_{st} - GMB INTAKE$_{st}$, plus a portion of MILL DEMAND$_t$ that is consumed in smallholder areas. The technique used to estimate smallholder consumption of commercial meal in the absence of miller distribution data is contained in Jayne *et al.* 1990.

Estimates of maize meal consumption are derived from Equation (10) by adjusting smallholder maize retentions (Q_{st} - GMB INTAKE$_{st}$) by a storage loss factor (10 percent), which is subsequently multiplied by the informal mill extraction rate of 97 percent. MILL DEMAND$_t$ is multiplied by the average commercial milling extraction rate of .80.

The model holds the following variables constant: Tobacco, cotton, groundnut and sorghum prices at their 1990-91 levels, and GNP. Beginning stocks are set at 500,000 metric tonnes, the amount believed by the GMB to be the appropriate minimum level for buffer stock purposes. Sensitivity analysis on rainfall, GMB maize producer prices, selling prices, and commercial roller meal prices allows examination of the effect of varying the values of these variables on urban and rural consumption, net exports, the GMB maize trading account, and other factors.

GMB Operating Cost Estimation

Estimates of the GMB trading account are modeled as a function of price, intake, demand, stock, and trade outcomes from the simulation model. The GMB trading account equation is based on Buccola and Sukume (1988) but adapted to account for regional variations in GMB's maize procurement costs. The equation is

$$(11)\quad ER*[fob*NX*D - cif*NX*(1-D)] - STK - ADM + P2*D$$
$$- (P1+t1)S1 + (P1+t21)S21 + (P1+t22)S22 + (P1+t23)S23$$

where
- ER = official exchange rate (US/Z)
- fob = GMB maize export revenue (Z$/mt)
- NX = net maize exports (mt)
- D = dummy variable (D=1 if NX >0, D=0 if NX<0)
- STK = GMB stockholding costs [Z$40*(endstocks$_t$ - endstocks$_{t-1}$)/2]
- ADM = administrative costs (Z$15/mt)
- P1 = GMB producer price (Z$/mt)
- S_i = GMB maize intake from region i (1=Mashonaland commercial; 21=Mashonaland smallholders; 22=Manica/Midlands smallholders; 23=Masvingo/Matabeleland smallholders)

t_i = GMB transport and handling costs from area i
P2 = GMB selling price (Z$/mt)
D = GMB sales

APPENDIX 2: Regression Results

Equation (1): Maize area equations (000 hectares):

	Commercial	Smallholder		
		Mashonaland	Manica/Midland	Masvingo/ Matabeleland
Constant	76.2 (2.40)**	71.0 (1.37)	923.9 (3.00)*	202.5 (1.14)
PP^*_t/PF_{t-1}	1.88 (4.13)**	2.15 (4.57)**	4.48 (1.01)	6.34 (3.86)**
$PPSUB_{t-1}/PF_{t-1}$	-12.30 (-3.01)**	-53.78 (-2.96)**	-297.1 (-2.94)*	-188.4 (-2.79)*
$Area_{t-1}$	0.66 (3.29)**	.51 (2.73)**	-0.29 (-.82)	0.46 (1.35)
Trend	-3.14 (-1.74)	5.71 (1.49)		
Adj. R^2	.86	.95	.60	.72
DW	2.27	2.63	1.32	1.80
F	23.03	48.31	3.52	6.16

PP^*_t = producer price expectation made at planting time, derived from equation 2 (Z$/metric tonne);
PF_{t-1} = price of AN fertilizer at planting period (Z$/metric tonne);
$PPSUB_{t-1}$ = price of substitute crop at planting period (tobacco for commercial equations; cotton for all others) (Z$/metric tonne)
$Area_{t-1}$ = lagged area (000 hectares)
Trend = time trend
Price Elasticity of Area estimates:
Commercial: +0.59
Mashonaland smallholders: +0.46
Manica/Midlands smallholders: +0.56
Masvingo/Matabeleland smallholders: +1.09

Equation (3): GMB maize intake equations (000 metric tonnes):

	Commercial	Smallholder		
		Mashonaland	Manica/Midlands	Masvingo/ Matabeleland
Constant	-234.2 (-3.11)**	8.97 (0.15)	-19,450.7 (-0.93)	-20,813 (-1.33)
Q_{it}	1.04 (13.61)**	0.55 (4.27)**	287.77 (5.89)**	271.27 (3.52)*
Adj. R^2	.92	.66	.85	.62
DW	1.34	2.14	2.11	1.31
F	185.14	18.25	34.71	12.39

Q_{it} = production in producer region i

Price Elasticity of Supply estimates (based on mean yields, 1980-91):

Commercial: +0.61
Mashonaland smallholders: +0.45
Midlands/Manica smallholders: +0.71
Masvingo/Matabeleland smallholders: +0.94

Equation (2): Price expectations equation (Z$/metric tonne):

$$PP_t^* = \underset{(1.04)}{104.8} \underset{(-2.85)}{-.60}(ENDSTOCKS_{t-1}) + \underset{(4.38)}{.82}(PP_{t-1}) \quad \text{Adj. } R^2 = .63,\ DW = 1.69,\ F = 12.57$$

Equation (4): GMB maize sales to millers per capita (kgs):

$$MILL\ DEMAND_t = \underset{(1.89)}{59} \underset{(-5.51)}{-.12}(PMEAL_t) + \underset{(2.06)}{80.2}(PBEAD_t) + \underset{(1.30)}{19.3}(GNP_t) + \underset{(-2.68)}{127.3}(Q_{jt} - INTAKE_{jt})$$

Adj.R2 = .79
DW = 2.73
F = 15.77

Equation (5): GMB maize sales to stockfeeders (000 metric tonnes):

$$\text{STOCKFEED DEMAND}_t = 93.3 + 42.5(\text{PSMZ}_t/\text{PSSO}_t) - .075(Q_{ct})$$
$$(1.53)\ (0.66) \qquad\qquad (-3.45)$$
$$\text{Adj. R2} = .51$$
$$\text{DW} = 2.03$$
$$\text{F} = 6.13$$

where:

PP_t^* = producer price expectation made at planting time (Z$/mt)
GNP = deflated gross domestic product (Z$ per capita)
Q_j = smallholder maize production (000 mt)
MILL DEMAND = GMB maize sales to millers (000 mt)
$INTAKE_j$ = smallholder maize deliveries to GMB (000 mt)
PMEAL = deflated price of roller meal (Z$/mt)
PSMZ = GMB maize selling price (Z$/mt)
PBEAD = deflated price of wheat bread (Z$/loaf)
PSSO = GMB selling price of sorghum (Z$/mt)
Q_c = commercial sector maize production (000 mt)

7

Changing Agricultural Market Policies In Mozambique: Insights From Empirical Information On Farmer And Market Behavior[1]

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BACKGROUND

Our paper for last year's conference focused on key changes in economic and market policy in Mozambique, and progress in designing a pilot agricultural market information and analysis system (AMIAS) (Dias, et. al.). Since that date, there has been considerable progress in conceptualizing and organizing such an applied research group in the Ministry of Agriculture. Systematic open market price data is being collected in key markets, and market information bulletins of various types are now being produced and released. With each new publication, project staff acquire additional experience

[1]This paper is prepared as part of the scope of work for the Mozambique component of the Food Security in Africa Cooperative Agreement DAN-1190-A-00-4092-00 between the United States Agency for International Development (USAID), the Ministry of Agriculture of Mozambique, the Department of Agricultural Economics at Michigan State University and the Department of Agricultural Economics (as well as the Bureau of Applied Anthropology) at the University of Arizona. The authors wish to thank Paul Strassberg and Jeff Wilson, MSU research and computer processing support staff, for assistance in data cleaning and processing, Julie Born at the USAID Mission in Mozambique for contributions of information and insights, and Roger Fox of the University of Arizona for comments on draft material. Any errors or differences of opinion are strictly the responsibility of the authors.

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which will assist them in maintaining this analytical activity. To complement the market level analysis, a major farm survey in selected rural districts of Nampula Province was also completed in July and August of 1991. In September 1991, project staff participated in a five week research and data analysis training workshop. Data from the farm level survey were cleaned and partially analyzed in these training sessions, providing up-to-date information on rural household behavior as well as opportunities for hands-on learning of data processing and analytical research methods.

Objectives

The objective of this paper is, first, to discuss market conditions and recent market rule adjustments in Mozambique attempting to identify common beliefs, assumptions and/or concerns about market behavior. A second objective is to utilize farm-level empirical data to examine rural market response to rule changes and to raise questions as well as to inform about production and marketing behavior of small-holders. Finally, this paper will discuss the policy implications of these preliminary findings.

Sources of Data

Rural household data come from the MOA/MSU/UA family sector household survey. This survey was conducted in 15 villages in three districts of Nampula province. Angoche district lies on the southeastern coast of the province, and is a large rice and cashew producing region. Monapo lies approximately 100 kilometers inland on the road between Nacala Port and Nampula City, the provincial capital. Monapo is also where family sector farmers are producing cotton under the umbrella of two large Portuguese companies with long ties to Mozambique (Companhia Industrial Entreposto and Joao Fereiro dos Santos). Finally, Ribaue is located approximately 300 km inland (west) along the rail line between Nampula City and Malawi. Ribaue and the area west of it are major maize and bean producing regions.

A two-stage cluster sample design was utilized. After allowing for security concerns, five villages were randomly selected in each district and approximately equal samples were randomly drawn from each. The total sample size was 343 households. The survey focused primarily on the production, sales, purchase, and consumption behavior of the farm households. See MOA/MSU/UA Research Team-NDAE Working Paper No. 3E for more detail.

GOVERNMENT OBJECTIVES, MARKET RULES AND COMMON BELIEFS

Last year's paper documented the significant difference between "theory versus practice" in agricultural pricing and market regulation policies in rural areas of Mozambique. The importance of accurate and timely information about market price behavior and

marketing practices at the district, provincial and national levels for informed policy making and for private decisions was emphasised. The most recent Government of Mozambique (GOM)/International Monetary Fund/World Bank economic policy framework paper identifies GOM's continuing goal of gradual decontrol of agricultural prices, of improving incentives to farmers, and of replacing the past approach of fixed prices with a more flexible floor price arrangement. Recognizing that agricultural marketed output has been responding positively to ongoing price and market reform, the government believes that further development in the agricultural sector depends to a large extent on the strengthening of competitive marketing conditions.

Competition throughout the country was facilitated by the marketing rules for the 1991 production/marketing year announced by the Ministry of Commerce on the 6th of June of 1991 that formally state that movement of all products by legally recognized merchants from one region to another is completely free and does not require special authorization (Noticias, 6/6/91). However, the issue of what constitutes a legally recognized merchant continues to be unclear. The rules are somewhat general and officials at local and provincial levels of government are involved in granting licenses to operate as a merchant. A recent newspaper article helps document the continuing concern about market access issues among local, as well as national officials.

> "Clandestine Traders Disorganize Agricultural Marketing. Local authorities accuse illegal traders of disorganizing the normal process of cereals and oilseeds marketing in Reapale, Nampula District, with negative consequences for legally recognized traders.
>
> The buying process (marketing) of maize, sorghum, rice, groundnuts and beans in Reapale has been characterized by periods of turbulence with traders making charges against each other.
>
> In accordance with the Reapale source of information, the illegal traders who infiltrate into the current agricultural marketing system, jeopardize the local authorities' efforts to register, and thereby control the flows of marketed crops, and also may cause future famine in the region since the illegal traders incite the farmers to sell all food crops, disregarding the minimum food security stocks necessary to bridge to next season.
>
> The minimum legal prices varies from 400.00 to 11000.00 meticais according to the measurement unit. Nevertheless, the illegal traders buy from producers at higher prices, ranking from 750.00 to 12000.00 competing with the legal traders, who stick to the established minimum prices.
>
> Given the attractive prices offered, the farmers sell almost their total marketable surplus to the illegal traders, leaving the local administrative structure obstructed given that they have little possibility of correctly determining the amounts of local production and marketable surplus.
>
> Reapale administrative authorities believe that if the current disorganized marketing operations persist, the region may be in danger during the forthcoming hungry season, since some farmers have already sold all their crops, including seeds and surpluses

needed for their own consumption. Although the local authorities have tried to explain to farmers the risk involved in selling all their current crops, this does not seem to help change attitudes since farmers believe they have the right to sell whatever they want, and to whomever they wish." (Noticias, 8/14/91).

Prior rapid appraisal results showed that the behavior of local officials is a critical element in the process of rethinking and adjusting to market rule changes made at provincial and national levels. National level rule changes may happen only in theory if local leaders do not understand or want to participate in their implementation. Local officials who live close to rural producers and consumers are among the first to personally feel mistakes in market organization decided upon in distant locations. Hence systematic information about farmer and trader practices and the consequences of these can be useful to help guide the reform process. This process is clearly under doubt by the authorities quoted in the above news clipping. Key dimensions of farmer and merchant behavior that we will inform in this paper are:

- What are current farmer marketing practices, food buying and selling patterns, and what is the degree to which farmers are dependent on the market for cash income and/or for additional food supplies?

- Have the farmers seen or perceived systematic changes in marketing arrangements over the past five years? Have they been affected by new options or by new marketing system participants? Have higher prices, compared to official minimum prices, reached these rural districts? If so, are they stimulating farmers to market supplies needed for on-farm consumption?

- What key factors, in addition to food crop market participation and the production of cash crops, are associated with different levels of food production and availability on the farm?

EMPIRICAL INSIGHTS ABOUT FARMER BEHAVIOR

Farm Households and Markets in Nampula

The family sector household survey provided a information regarding the production, sales, purchase, and consumption behavior of rural households. It obtained qualitative information regarding farmer perceptions of problems and new opportunities facing them in the agricultural sector.

Food Crop Buying and Selling Practices of Farmers

A ten year civil war, together with a long history of tight control over the operation of the private sector, has had a profound impact on Mozambique's rural agricultural marketing system. Heavy destruction of infrastructure, continuing risk of attacks, and uncertainty regarding the content of political reform have hindered the ability of farmers and merchants to respond to the liberalized policy environment instituted under the Economic Rehabilitation Program (ERP). However, preliminary survey analyses indicate that Mozambican smallholders do participate in food and cash crop markets, primarily as sellers, but also as buyers.

Table 1 presents a classification of farm households in each district according to their food crop market behavior.[7] These groups are mutually exclusive, and each are affected differently by government policy, especially price policy.

TABLE 1. HOUSEHOLD FOOD MARKET PARTICIPATION IN SELECTED DISTRICTS OF NAMPULA PROVINCE[1]

Household Food Crop Market Participation	Districts		
	Monapo	Ribaue	Angoche
	----- % OF HOUSEHOLDS -----		
Buy Only	7.3	4.2	2.6
Buy & Sell	13.8	5.0	5.2
Sell Only	53.2	63.0	83.5
Neither Buy nor Sell	25.7	27.7	8.7

[1] Food crops are maize, cassava, beans, rice, peanut, and sorghum

Source: MOA/MSU/UA Farm Household Survey

Should policies stressing price increases be implemented as a means to encourage agricultural production, farmers who only buy and those who buy more than they sell, will see their income reduced, at least in the short-run. In contrast, farmers who only sell and those selling more than they buy, will enjoy increased income. Farmers not participating in the market will remain largely untouched by price policy. But policies

[7] **The food crops included in this and the following tables are maize, cassava, beans, rice, peanut, and sorghum.**

and investments which result in increased competitiveness, efficiency and efficacy in the market will help all farmers already active in the market. They also will encourage participation by those who currently remain outside the system. In the long run, this will result in an improved commercial system, a *"sine qua non"* for the improved welfare of the rural populations.

The results show that large majorities in all districts participate in the food crop market, but that the great majority of these do so only as sellers. This is especially true in Ribaue and Angoche where fewer than 10 percent purchased food crops during the past year. Monapo, the district with the most extensive cotton production, shows the highest proportion of food crop buyers (21 percent). Both Monapo and Ribaue have relatively high proportions of non-participants in the food crop market. In each, slightly more than one-quarter of all households neither bought nor sold any food crop.

Food sales are a significant source of household income in all three districts.[8] The average household derives over 16 percent of its income from food sales. This figure is highest in Angoche (over 27 percent) and lowest in Monapo (8.3 percent) with Ribaue in between (nearly 14 percent).

Food crop purchases are important for a minority of households. Nearly 8 percent of the sampled households were net buyers of food crops[9] and purchases by these households represent nearly 20 percent of their total caloric supply.

These results contrast with recent findings in other sub-saharan Africa countries where it is not unusual to find that over half of all rural households are net buyers of the staple food (Dione; Goetz; Kelly et al; Reardon and Peters). The explanation for a lower proportion of net buyers in Mozambique may be a combination of two factors. First, the Mozambican smallholder for many years has been subject to extractive economic policies oriented toward removing grains from rural areas under the assumption that all rural households are self-sufficient. Grain trade within rural areas, until the past few years, has been actively discouraged. The second factor, the country's ten year civil war, is unique in comparison with other African countries as it has destroyed roads and rural stores, making it very dangerous for rural traders to hold food except for short periods of time. As a result, food generally is not available in many rural stores, except during the harvest season.

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[8] **Household income is calculated as the value of all production (sold and retained), plus cash and in-kind earnings from off-farm work of resident family members, plus remittances of non-resident members, plus the value of sold and slaughtered livestock, minus cash and in-kind payments to hired labor.**

[9] **A household was classified as a net buyer of food crops if, taken together, it bought more calories than it sold in maize, cassava, beans, rice, peanuts, and sorghum.**

Marketing Channels and Prices Paid

One of the objectives of the ERP is to increase competition in rural agricultural markets. As the war ends and marketing infrastructure is rebuilt, the structure of these markets will influence the wellbeing of the rural population. The level of competition for farmers' products will affect this sector's response to the liberalized policy environment and thus the ability of the country to achieve its agricultural potential.

Both survey data and informal information indicate that existing traders continue to enjoy strong market positions. These traders tend to pay the government mandated minimum producer price which is no longer meant to be a fixed price for producers.

Household heads were asked whether they felt the marketing of their products had become easier or more difficult over the past five years. Respondents in Monapo and Angoche generally perceive that marketing has become easier, by proportions of 80 percent and 95 percent, respectively. In Ribaue, the area most affected by the war and with the poorest marketing infrastructure, nearly two-thirds (64 percent) felt that marketing had become more difficult. Those who felt they could now market more easily cited as principal reasons the presence of more buyers (51 percent) and better prices (36 percent). The most common reasons cited for greater difficulty in marketing were transport, security problems and late payment by traders, each with an approximately 20 percent response.

Table 2 presents survey data on the purchase volume and mean prices paid by the two principal types of buyers in the study area. Cashews were included in the basket of food crops due to their great importance as an income source for small holders. Cotton, also a very important cash crop, is not purchased in any appreciable quantities by the two types of traders considered in this table, and was not included. "Lojistas", rural shop owners, were the only officially recognized rural traders prior to economic reform measures. "Ambulantes" are itinerant traders, most of whom have entered the market only since the onset of economic reform. Many reportedly operate without a license.

Results show that absolute quantities sold are quite small, averaging less than 400 kg per family over all crops. Cassava and cashew dominate. Cashews, with an average price of approximately 500 MT/KG vs 110 MT/KG for cassava, leads in the value of sales. The volume data clearly show that established lojistas continue to hold a dominant market position handling almost 70 percent of the total volume transacted. The exception to this pattern is cassava where the new ambulantes captured over two-thirds of all farmer sales.

In every case except peanuts, ambulantes paid higher mean prices than lojistas. For maize and beans, prices paid by lojistas are nearly identical to minimum prices set by the government, a price meant only to provide a floor below which producer prices would not fall (190 Mt/kg for maize and 270 Mt/kg for beans). This is reflected in the weekly AMIAS data, which show producer prices at rural shops are very sticky around the floor prices.

In summary, there is evidence of entry by new market participants and these new entrants are competing with established traders by offering more attractive prices to producers. In the cases of maize and beans, however, this competition has not forced lojistas to pay farmers above the floor prices. It appears that these new entrants have not yet seriously challenged the dominant market position of the established traders.

TABLE 2. PURCHASE VOLUME AND MEAN PRICES PAID BY TYPE OF BUYER IN SELECTED DISTRICTS OF NAMPULA PROVINCE

		Type of Participant in the Market[2]			
		Lojista		Ambulante	
Product[1]	Total Purchases (kg)	Total Purchases	Price (Mt/kg)	Total Purchases	Price (Mt/kg)
Corn	22,302	17,750	195	4,552	246
Beans	4,521	2,741	268	1,780	301
Dry Manioc	46,380	14,580	107	31,800	118
Rice	10,458	8,501	299	1,958	320
Peanuts	3,799	2,389	528	1,410	428
Cashews	44,100	43,970	353	130	425
TOTAL	131,560	89,930		41,630	

1 Cotton, a very important cash crop, is purchased almost entirely by Entreposto and dos Santos, and thus does not appear in this table.

2 Lojistas were the only participants in the market who were officially recognized in rural commerce before the economic reforms. Ambulantes are itinerant traders, most of whom entered the market only after the launching of economic reforms.

Source: MA/MSU/UA Smallholder Survey

Cotton/Food Crop Interactions

The interaction between cash crops and food crops, and the impacts of commercialization on the income, consumption, and nutritional status of rural people, has been investigated throughout the developing world but continues to be a source of

great debate (Maxwell et al.). A major objective of the Mozambique survey is to inform the issue of cotton production in Nampula province and to clarify the policy options available to the country as its rural economy becomes more commercialized.

Cotton production is most established in the district of Monapo. Over 50 percent of interviewed farmers in this district grew cotton. No farmers in Angoche grew the crop and a relatively small and diminishing number produced cotton in Ribaue. Smallholders in Monapo produce cotton on their own land under the supervision of two Portuguese agribusiness enterprises. One of the companies also has blocks of land on which it produces its own cotton to supplement that produced by participating smallholders. These companies have been granted regions of influence by the Mozambican government within which they have monopoly rights for the purchase of cotton. In general, the companies provide pesticides but no other inputs for smallholders.

Preliminary analysis shows that cotton producing households, on average, achieve greater household incomes than non-cotton households cultivating similar amounts of land. This advantage disappears, however, when incomes per adult equivaler. are compared. Caloric production per adult equivalent is higher in non-cotton growing households. This gap is reduced when total calories availability are compared. The analysis has not yet shown causal relationships, nor has it clearly distinguished the many factors which may contribute to this situation. Both will be foci of data analysis over the next few months.

Table 3 presents summary statistics on cotton and non-cotton growing households in Monapo district.[10] Land holdings show the same pattern as incomes. Cotton growers cultivate slightly more land per household, but approximately the same per household adult equivalent (AE) as non-cotton growers. Cotton growers have more adult laborers per household but slightly fewer per hectare cultivated. Dependency ratios are similar, as is the probability of the presence and amount of fallow for those who have it. Cotton growers, on average, allocate 39 percent of their cultivated land to cotton, but are able to produce nearly 30 percent more energy than non-cotton growers per hectare of land in food crops.

Table 4 presents cotton and non-cotton growing households' mean kilocalories produced, the number of households in each group and the percent of kilocalories sold by adult equivalent land area quartile in Monapo.[11] Cotton households, on average, produce less energy per adult equivalent than do non-cotton households in the same land

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[10] **Only Monapo is considered in this section, since cotton has not become firmly established in the smallholder sectors of the other two provinces.**

[11] **These quartiles are based on cultivated land per household adult equivalent. They do not include fallow. They will be referred to simply as land quartiles.**

quartile, Table 4. Land per adult equivalent does not appear to systematically change this pattern.

TABLE 3. SUMMARY HOUSEHOLD LEVEL STATISTICS, COTTON GROWERS & NON-COTTON GROWERS MONAPO DISTRICT

	COTTON	NO COTTON
Net Income (Mt)	405,867	331,411
Net Income/AE (Mt)	120,361	128,545
Cultivated Area	1.77	1.30
Cultivated Area/AE[1]	.53	.57
Area in Cotton (%)	39	0
Adult Laborers[2]	2.7	2.2
Adult Laborers/Ha	2.05	2.2
Dependency Ratio(%)[3]	38	31
% w/Fallow	52	44
Ha in Fallow[4]	1.1	1.0
"Energy Yield"[5]	11,413	8,915

1 Adult equivalent is based on FAO consumption requirements for "normal" activity levels, and is defined as follows:

Males 10 or older:	1
Females 20 or older:	.72
Females 10-19:	.84
Children less than 10:	.60

2 Adult laborers are defined as all residents between the ages of 10 and 65, inclusive.

3 Dependency Ratio is (Total Members - Adult Laborers)/Total Members.

4 For those who have fallow.

5 Kilocalories produced/AE/day on each ha of land in food crops.

Source: MOA/MSU/UA Farm Household Survey

But perhaps the most important result shown in this table is that all but the smallest one-quarter of cotton growers in the sample produce sufficient energy at the household level for each of their members to receive a calorically adequate diet.[12]

[12] **Inadequate intra-household food allocation to children and pregnant and lactating mothers can obviously result in individual household members being under nourished in spite of adequate household supplies (Kennedy and Cogill, 1987). This important issue is not addressed in this paper, due to lack of member level consumption data.**

Cotton households tend to sell a smaller proportion of their energy production than do non-cotton households. But this difference is not as great as one might expect, considering that cash earned from cotton reduces the need to sell food. In fact, non-cotton households have other cash income sources in addition to food crop sales. These households earn more from cashew sales and off-farm work than cotton growing households. Consistent with this pattern, regression analysis indicates that an extra 100 MT earned from cotton sales adds only 46 MT to total cash earnings. Overall, cash income represents 62 percent of total income in cotton households and 49 percent in non-cotton households.

TABLE 4. MEAN KILOCALORIE PRODUCTION AND PERCENT SOLD PER ADULT EQUIVALENT PER DAY, BY COTTON GROWERS AND NON-COTTON GROWERS AND ADULT EQUIVALENT LAND AREA QUARTILE IN MONAPO[1]

	QUARTILES OF AREA CULTIVATED/ADULT EQUIVALENT												TOTAL	
	.11 ha-.29 ha			.30 ha-.44 ha			.45 ha-.71 ha			.72 ha-2.33 ha				
COTTON	KCAL PROD.	N	% SOLD	KCAL PROD.	N	% SOLD	KCAL PROD.	N	% SOLD	KCAL PROD.	N	% SOLD	KCAL PROD.	% SOLD
NO	2103	16	3	2652	10	16	5650	9	11	6374	12	16	4112	11
YES	1258	11	3	2643	18	4	3304	18	10	5713	12	12	3099	7

[1] Food crops included are maize, cassava, beans, rice, peanut, and sorghum

Source: MOA/MSU/UA Farm Household Survey

Table 5 shows the mean kilocalories available per adult equivalent for both cotton and non-cotton producing households after adjusting for sales, purchases, food paid to laborers, and food earned in labor off the farm. Neither type of household appears to use this cash to purchase appreciable quantities of food. Overall, purchases account for slightly more than 2 percent of total available energy for non-cotton households and 5 percent for cotton households. This lack of food purchases should be expected for cotton growers and non-cotton growers who fall into the third and fourth land area quartiles where mean calorie availability is well above the FAO requirement of 2,500 per adult equivalent. On average, cotton growers in the second land quartile also appear to have sufficient energy available, although some households in this group are deficit. This is not the case for non-cotton growers in the second quartile. These households produce

just as much energy, on average, as cotton growers in the same quartile, but sell much more (16 percent compared to only 4 percent for cotton growers). These food sales, in the absence of offsetting purchases, result in average energy availability of only 82 percent of the FAO requirement. Thus, cotton growing in this quartile is associated with greater energy availability through fewer food crop sales.

TABLE 5. MEAN KILOCALORIE AVAILABILITY PER ADULT EQUIVALENT PER DAY,BY COTTON GROWERS AND NON-COTTON GROWERS AND ADULT EQUIVALENT LAND AREA QUARTILE IN MONA

	QUARTILES OF AREA CULTIVATED/ADULT EQUIVALENT				
COTTON	.11 ha-.29 ha	.30 ha-.44 ha	.45 ha-.71 ha	.72 ha-2.33 ha	TOTAL
	---- Mean Kilocalorie Availability/AE/Day ----				
NO	2125	2049	4884	4803	3372
YES	1306	2443	3082	4722	2805

[1] Food crops included are maize, cassava, beans, rice, peanut and sorghum

Source: MOA/MSU/UA Farm Household Survey

Both cotton and non-cotton growers in the lowest land area quartile appear to be at significant nutritional risk with this vulnerability being greatest for cotton growers. The inability of food markets to help these households close their energy gap is especially troubling. Future research needs to address two issues. First, why don't smallholders currently utilize food markets to close the energy gap? And second, why do these households have such limited access to land and other resources?

Perhaps the most important conclusion to draw from these data is that rural product markets are not currently playing a significant role in the food security strategies of smallholders. This contrasts to findings in many other African countries. Cotton growing households have similar total incomes and higher cash incomes than non-cotton growers. But the smaller growers do not or cannot utilize this cash income to achieve acceptable levels of energy availability. This product market failure could become a constraint on increased cash crop production in the smallholder sector (de Janvry et al., Staatz & Wohl; Jayne).

POLICY IMPLICATIONS AND FURTHER RESEARCH

At least four of the empirical results presented in this paper have important policy implications for Mozambique. First, a majority of smallholders are active in the food market as sellers, with more than 16 percent of household income across the three

districts derived from food sales. Food purchases, on the other hand, are negligible except for 5 percent to 10 percent of the population. Thus, in the short run, increased prices for food crops in rural areas should increase the incomes of a majority of producers. Given the relatively large rural-urban margins for most food items, rural food crop prices could increase due to greater competition and efficiency in the marketing process without increasing prices to consumers.

Second, it has been noted that the low level of food purchases in rural areas of Mozambique may be an artifact of the civil war combined with past economic policies. As security in the countryside improves and the rural marketing system begins to develop, it is expected that smallholders increasingly will specialize in the production of higher value cash crops such as cotton and cashew. One would also expect the demand for rural off-farm labor to expand as the rural economy recovers from its current trauma. Thus, the population of net buyers in rural areas could increase. The clear implication for the longer run, is that increasing prices as a strategy to elicit increased food output could have negative rather than positive effects for many rural households.

Third, since the inception of the ERP in 1987, some structural change appears to have taken place in rural markets. The informal trading system, which has emerged with such energy in urban areas, has only begun to be felt in rural areas. Basicly, marketing in the smallholder sector proceeds as always, with established rural store owners purchasing the bulk of the marketed surplus at supposedly "official" prices and moving it through traditional marketing channels. Farmers and traders seem to have little comprehension of the more flexible minimum price policy as contrasted with the abandoned policy of official (fixed) prices. New entrants have begun to pay more than the minimum prices, but buy a relatively small proportion of the marketed surplus. Their activities have not caused store owners to push their own prices above the current minimum prices.

There is need for the government to inform rural producers and traders of the new rules of the game. If the government is to assist the new entrants, it needs to know who they are, how they operate, and what hurdles they face in expanding and improving their operation. The supply response after the war and the policy reform will be facilitated by a more open, competitive and effective rural marketing system.

Finally, cotton growers, on average, are producing nearly 30 percent more energy per hectare of land in food crops than non-cotton growers. As a result, the larger growers (those in the third and fourth land area quartiles) comfortably achieve adequate levels of food availability and enjoy higher incomes than similar non-cotton growers. In the second quartile, cotton growers, on average, have sufficient food available while non-cotton growers do not. But the smallest cotton growers are at nutritional risk and are significantly worse off than non-cotton growers of the same size. Smallholders are unlikely to increase cotton production, or the production of any cash crop, if doing so reduces their food consumption.

The effectiveness and efficiency of rural food markets will determine the wellbeing of the smallholder sector, will strongly influence its response to improved food price incentives and to the enhanced opportunities for cash crop production. The response of millions of small farmers will determine the country's realisation of its agricultural potential or its dependency on foreign aid for the foreseeable future.

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III

Governments' Role in Price Determination, Stock Management and Import-Export of Grains and Farm Input -- Implication for Food Security

AGRICULTURAL PRICING POLICY FOR ZIMBABWE

T. Takavarasha [1]

Introduction

This paper surveys the previous analyses of pricing policy in Zimbabwe since Independence [2]. The general conclusion emerging is that Zimbabwe is one of the few countries where producer price policy has been used successfully to influence farmers' decisions and the pattern of agricultural production. However, Zimbabwe's pricing and marketing policy has encouraged capital intensive, high cost production methods. These policies also have had negative impacts on production efficiency, income distribution and employment (Blackie and Muir, 1991). Many of these problems could be overcome through a true liberalization of agricultural pricing and marketing.

A review of the major objectives of price policy intervention is provided, together with an evaluation of key macro-economic performance indicators during the ten year period from 1980. Nominal rates of protection for individual commodities are calculated, first with the world price converted at the official exchange rate, and secondly, with the exchange rate adjusted for overvaluation. Changes in pricing policy analysis that will be brought about by the new economic reform programme (GOZ, 1991) is examined.

Objectives of Pricing Policy

For a comprehensive assessment of the effects of any particular policy measure, (price policy in this instance), it is important to first fully understand the policy objectives which that policy instrument is designed to achieve, and secondly, the overall Government macro-economic policy objectives within which the pricing objectives are set.

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[1] **Deputy Secretary, Economics and Markets Branch, Ministry of Lands, Agriculture and Rural Resettlement.**

[2] **The bulk of the analysis presented in this paper dwells heavily on work by the Food Studies Group (1990), M Roth (1990), M. Morris (1990), W. Masters (1991), Rukovo et al. (1991), O'Driscoll and Takavarasha (1988), Jansen and Muir (1991), and the author's personal experience working in MLARR since 1980.**

An evaluation of the performance of key macro-economic indicators during the period of analysis will help show the environment in which pricing policy has been operating. The success of any price intervention scheme depends, in part, on the broader development objectives pursued by a country and the corresponding policies used to secure those objectives (FAO, 1987).

The economic objectives of the new independent Government were first set out in *Growth with Equity,* GOZ, 1981. Government stated in this document its desire to pursue and implement policies based on socialist, egalitarian and democratic conditions of rapid economic growth, full employment, price stability, dynamic efficiency in resource allocation and equitable distribution of the resulting benefits. Zimbabwe's Transitional and First National Development Plans (GOZ. 1982, 1986) also set broad policy objectives which included economic efficiency, economic growth, equity , food security, stabilization, inflation control and foreign exchange generation. Each of these objectives has been pursued through a variety of policy instruments including taxes, subsidies, tariffs and price intervention.

While some of these objectives and policy instruments are mutually reinforcing, they can conflict with each other in a number of cases. For example, the equity objective is often framed in the context of providing food at an affordable price to the poor. If done by means of consumer subsidies, it may mean benefiting the urban sector at the expense of the poorer rural population. On the other hand, if the supply of cheap food is achieved by paying food producers low prices, this may discourage domestic production, which conflicts with the efficiency and other objectives. Thus, a key consideration in agricultural price policy analysis is a need to understand the basic national objectives and the policy environment within which the price policy mechanism is expected to operate.

The Ministry of Lands, Agriculture and Rural Resettlement (1989) defined its policy objectives in controlling producer prices as follows:

a) to ensure food self-sufficiency at reasonably low prices to the consumer and satisfy the demand for agricultural raw materials;
b) to raise the average level of producer incomes through increased production at remunerative prices;
c) to improve the contribution of agriculture to foreign exchange earnings by providing producers with the necessary incentives to produce marketed output and minimize food import requirements;
d) to achieve greater control over the supply of agricultural products thereby producing greater price and income stability;
e) to generate high rates of economic growth and to sustain and expand employment in the economy as a whole; and

f) to improve productivity and living standards of farm families in communal, resettlement and small-scale commercial farming areas.

Since independence, increasing emphasis has been placed on the need to promote development of communal area agriculture, at the same time restraining the growing budgetary cost of agricultural intervention [3]. The reconciliation of the various aims of the pricing policy outlined above is one of the most difficult economic management tasks in Zimbabwe. For example, the policy of fixing producer prices may destabilize producer incomes where production is highly variable from year to year as in the communal areas. Fixed consumer prices, on the other hand, may benefit urban consumers by cushioning them from demand pushed price increases.

Zimbabwe's pricing policy objectives are primarily commodity oriented. Producer prices of each commodity are reviewed and determined on a case by case basis. For food crops (maize, wheat and sorghum) the objective has been to promote self-sufficiency and to generate supplies for export where this can be achieved without subsidies.

In the case of groundnuts, which is a labour intensive cash crop mainly grown by communal farmers, price policy aims at stimulating increased production and market sales. Government policy in relation to cotton is to encourage export production. The policy objective for beef and dairy has been to promote expansion of the national herd in order to exploit domestic requirements and to meet viable export opportunities.

A major feature of price policy in Zimbabwe, and central to the price objectives, is the role played by maize pricing. This is due to the importance of maize in consumer expenditure and the high proportion of land and other productive resources dedicated to maize production.

Macroeconomic Conditions and Policies

Zimbabwe's impressive achievements after 1980 included rapid economic growth, resettlement of underutilized land and a sharp increase in smallholder production. Government borrowed abroad to invest in post-war reconstruction, expanded the civil service to cater to the new demands of Government intervention, imposed a high minimum wage and offered high farm prices to improve agricultural incomes and production. The majority of the population were given access to opportunities which, under colonialism, had previously been reserved for a minority. These factors, along

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[3] **The Government allocation to agriculture includes financing to cover agricultural marketing board deficits. In many instances these deficits are the result of low selling prices and non-commercial activities. Over 45% of Government spending on agriculture is absorbed by subsidies to cover the operations of agricultural marketing boards. (Government of Zimbabwe, Estimates of Expenditure, 1980 - 1990).**

with two years of exceptionally good rains, contributed to rapid growth in 1980 and 1981.

On the negative side, the UDI system of tight import control was maintained. This, coupled with rapidly growing domestic demand, caused the real exchange rate to appreciate sharply. The foreign exchange shortage worsened, private investment failed to materialize and bottlenecks in the economy led to sluggish, stop-go growth. Table 1 indicates that there was a deep recession in 1982 - 1984 following the post-independence boom which saw real GDP growing by 10,6% and 12,5% in 1980 and 1981, respectively. There was recovery in 1985, registering a real growth rate of 6,8%; recession in 1986-87; and recovery again in 1988-90. These cycles are triggered primarily by rainfall, reflecting the importance of agriculture in domestic demand, export performance and overall economic growth[4]. For the decade as a whole, real per capita income decreased by an average of 1,7% per annum while GDP grew by an average of 2,7% per annum. The growth rate of agricultural output, at constant prices, between 1980 and 1988 was 2,2% compared with a population growth of over 3,0%.

Agricultural exports played an important role in the recovery and growth of total export earnings as is evident from Table 2. The average percentage distribution of agricultural exports by crop is shown in Table 3. The single most important export crop is tobacco, which accounts for nearly 50% of agricultural exports, followed by cotton lint. Maize[5], meat, tea and coffee and sugar have nearly equal shares in the remainder. Horticulture is expected to make a significant contribution in the 1990's, following major investments made in this sector by commercial farmers.

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[4] **In 1981, agriculture accounted for 11% of GDP (industry 43% and services 46%) and 40% of total merchandise exports. About half of the manufacturing sector relies on agricultural inputs, and the agricultural sector accounts for approximately 70% of informal employment in the rural sector and 25% of formal employment.**

[5] **Maize exports fluctuate considerably due to the sensitivity of yields to rainfall and to the fact that white maize is the main staple. Only that amount surplus to domestic requirements is available for export in any given year.**

Table 1 GROWTH RATES AND INFLATION RATES, 1980-89(%)

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Real GDP Growth Rate	10.6	12,5	2,6	1,6	-1,9	6,8	2,6	-1,5	7,0	5,5
Real GDP Per Capita	7,8	9,7	-0,2	-1,2	-4,7	4,0	-0,2	-4,0	4,2	1,7
Inflation Rate (CPI)	4,4	13,1	10,7	23,1	20,2	8,5	14,3	12,5	7,1	15,0

Source: Jansen and Muir, 1991

Table 2 AGRICULTURAL EXPORTS, 1981 - 1987 (Z$'000)

	1981	1982	1983	1984	1985	1986	1987
Total Agric.	425,3	388,9	471,0	589,5	785,0	896,8	932,4
Annual Change(%)		-8,6	21,1	25,2	33,2	14,2	4,0
Total Exports	888,1	807,1	1025,7	1271,1	1545,3	1699,8	1892,2
Annual Change(%)		-9,1	27,1	23,9	21,6	10,0	11,3
AGRIC. AS % OF TOTAL	47,9	48,2	45,9	46,4	50,8	52,8	49,2

Source: Jansen and Muir, 1991

In sum, Zimbabwe's poor export performance, in terms of both output and employment[6], is attributed to a number of historic and continuing factors: among them, administrative regulations and controls, drought, shortages of raw materials and overvalued exchange rates. Overvalued exchange rates often result in an excess of demand for imports over supply of foreign exchange earned via exports (Masters, 1991). This, in turn, encourages an administrative allocation of foreign exchange for imports with all the inefficiencies and critical shortages that are typical of such a system. Exporters have little incentive to expand their operations and their capacity to export is severely constrained by shortages of essential inputs.

[6] **Unemployment reached 26% in 1989. It is estimated that there are 200 000 to 300 000 school leavers each year against some 20 000 to 30 000 new jobs created in the formal sector each year (CSO, 1990).**

Table 3 AVERAGE PERCENTAGE DISTRIBUTION OF AGRICULTURAL EXPORTS, 1981 - 1987

Tobacco	48,7%
Cotton Lint	18,8%
Sugar	10,2%
Maize	7,4%
Tea and Coffee	7,2%
Meat and Hides	5,8%
Total Agriculture	100%
Agriculture as % of Total	48%

Source: Jansen and Muir, 1991.

In 1990, the public deficit was equivalent to 9 per cent of GDP. Total public expenditure amounted to 49% of GDP while total public sector revenues stood at 40% of GDP. Such ratios leave little room for the development of a market oriented strategy in which the private sector can play a key role. The Government absorbs a large portion of total savings utilizing administered interest rates and inflation. The Zimbabwean economy since UDI (1965), has been plagued with regulations particularly in relation to agricultural marketing, price controls, labour legislation and controls on investments. A related factor has been the increasing involvement of Government in the economy as a direct producer of goods and services through agricultural marketing boards and other parastatals. This has resulted in a requirement for direct subsidies amounting to 3,7% of GDP in 1990/91 or 40% of the Government deficit.

Growing recognition of the deleterious effects of existing economic policies was one of several influences culminating in the Government's decision in 1987 to liberalize the economy. This shift in policy has been expressed in a number of announcements since 1988, e.g.,the establishment of a one-stop investment agency and a willingness to enter into a multilateral investment guarantee agreement. Formal recognition of the need for a change of policy direction was first signalled in the July 1990 budget speech. A second major policy pronouncement was made in October 1990, followed shortly by the announcement that a Structural Adjustment Programme (SAP) would be drawn up with the assistance of the World Bank and the IMF. This programme was presented to a Consultantive Group Meeting (CGM) in Paris in April, 1991.

The Government's Framework for Economic Reform (GOZ, FER, 1991) sets out detailed measures for dealing with some of the problems outlined above over a five year period to 1995. These include:

a) a recovery of investment, especially in the export oriented sector;
b) improved efficiency;

c) trade liberalization aimed at replacing the present system of foreign exchange allocation by an Open General Import Licence System;
d) relaxation of domestic controls, especially labor regulations and price controls; and
e) more uniform import taxes and positive real interest rates.

In relation to agricultural prices and marketing, the document states that "The Government is studying the modification of pricing and marketing arrangements for cotton, dairy products, meat, coffee and small grains to eliminate subsidies and allow progressive development of private marketing channels -- Regional variations in prices and greater participation by private traders in marketing are goals which will be considered as part of the medium term strategy of deregulation and rationalizing the operation of the GMB". (FER, 1991) p. 14). The broad issues to be addressed for agriculture in the 1990s include identifying sources of future growth, increasing the efficiency with which existing resources are used, improving the equity of resource allocation within the sector and devising policy changes and investment strategies that will foster growth. These decisions must be accomplished in a context of improved equity and conservation of the environment. This paper contributes to a clearer understanding of the role of pricing policy in the achievement of these objectives.

Producer Price Trends, 1979 - 1990

Nominal prices for the major crops grown in Zimbabwe increased substantially following independence, Tables 4(a) and (b). This reflects the desire by Government to promote self-sufficiency, to reassure white commercial farmers and to integrate communal farmers into the market economy. Severe drought occurred during the 1983-84 period and food supplies shrank. In response to this, prices of most staples were increased again. Two millet crops (mhunga and rapoko) and sunflowers were brought under the controlled market system with a guaranteed market and prices in 1982 and 1984 respectively. Prices for mhunga and rapoko were set at 178% ($250 per tonne) and 214% ($300 per tonne) of the producer price for white maize -- $140 per tonne in 1984/85. The GMB, as a result, accumulated large stocks of small grains which it could not sell without incurring huge losses. Stockfeed manufacturers argued that the price of small grains would have to be fixed at least 80% below maize before they could use them as stockfeed ingredients. Government kept the producer prices at the same nominal level for the next five years and allowed the GMB to dispose of the stocks at discounted (below cost) selling prices.

Table 4(a) NOMINAL AND REAL PRODUCER PRICES FOR SELECTED CONTROLLED CROPS

	WHITE MAIZE		WHEAT		SHELLED GROUNDUTS		SOYABEANS		COTTON (c/kg)	
	N	R	N	R	N	R	N	R	N	R
1979	85,0	92,83	115,00	125,60	330,00	360,40	145,00	158,36	36,50	39,86
1980	120,0	120,00	135,00	135,00	390,00	390,00	160,00	160,00	37,50	37,50
1981	120,0	105,26	165,00	144,74	420,00	368,42	170,00	149,12	40,00	35,09
1982	120,0	91,60	190,00	145,04	450,00	343,51	200,00	152,67	51,50	39,31
1983	140,0	60,29	220,00	141,89	450,00	290,23	260,00	167,69	51,50	33,22
1984	180,0	99,59	250,00	138,31	500,00	276,63	287,00	158,78	58,00	31,54
1985	180,0	90,93	285,00	143,98	750,00	378,88	320,00	161,66	67,00	33,85
1986	180,0	80,83	300,00	133,96	750,00	334,98	340,00	151,82	75,00	33,49
1987	180,0	70,74	330,00	129,69	900,00	353,70	385,00	151,31	80,00	31,44
1988	195,0	70,88	365,00	132,49	$1 000	362,98	420,00	152,45	85,00	30,85
1989	215,0	69,41	400,00	129,14	$1 000	322,84	435,00	140,44	92,00	29,70
1990	225,0	---	466,00	-	$1 250	-	485,00	---	117,50	-

Source: Producer Prices from MLARR:
Consumer Price Indices from CSO
N = Nominal R = Real

Table 4(b) NOMINAL AND REAL PRODUCER PRICE INDICES FOR SELECTED CONTROLLED CROPS

	WHITE MAIZE		WHEAT		SHELLED GROUNDUTS		SOYABEANS		COTTON (c/kg)	
	N	R	N	R	N	R	N	R	N	R
1979	70.8	77,4	85,2	93,0	84.0	92,4	90,6	99,0	97,3	106,3
1980	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
1981	100,0	87,7	122,0	107,2	107,7	94,5	106,3	93,2	106,7	93,6
1982	100,0	76,3	140,7	107,4	115,4	88,1	125,0	95,4	137,3	104,8
1983	116.7	75,2	163,0	105,1	115,4	74,4	162.5	104,8	137,8	88,6
1984	150,0	83,0	185,2	102,5	128,2	70,9	179,4	99,2	152,0	90,3
1985	150,0	75,8	211,1	106,6	192,3	97,1	200,0	101.0	178,7	90,3
1986	150,0	67,0	244,4	99,2	192,3	85,9	212,5	94,9	200,0	89,3
1987	150,0	59,0	244.4	96,1	230,8	90,7	240,6	94,6	213,3	83,8
1988	162,5	59,0	270,4	98,1	256,4	93,1	262,5	95,3	226,7	82,3
1990	187,5	-	340.7	-	320,5	-	303,1	-	312,0	- -

Source: Food Studies Group, 1990

Table 5 illustrates the extent to which some producer prices have declined in real terms since independence. Real prices were computed by using the consumer price index as a deflator of nominal producer prices in order to estimate the product's real purchasing

power and its incentive (or disincentive) effect on production. From Table 5 it can be seen that, with the exception of maize, prices for controlled crops grown primarily in the commercial sector such as wheat, barley and soyabeans, have either kept pace with inflation or only marginally declined in real terms. Prices of those commodities grown widely by peasant farmers have fallen. Prices of the main export crops have been influenced by world market conditions in addition to domestic considerations.

Measuring the Impact of Price Policies

A system of controlled or administered prices means that domestic price levels will not necessary equal import or export parity prices. The difference between parity prices and the determined prices represents the opportunity cost to the producers and consumers of Government intervention.

Nominal Rates of Protection

In order to quantify the price distortions caused by Government intervention, Nominal Rates of Protection (NRPs) were calculated for cotton, maize, wheat, groundnuts, soyabeans, red and white sorghum and beef, covering the period from 1966/67 (where data were available) to 1988/89 (Rukovo et al 1991).

Table 5: ANNUAL GROWTH RATES FOR OFFICAL PRICES, 1979-1989

	Nominal Prices (%)	Real Prices (%)
Maize	8,80	- 2,68
Sorghum (red)	7,65	- 3,78
Sorghum (white)	9,41	- 2,11
Pearl Millet	0,00	- 9,39
Finger Millet	0,00	- 9,39
Wheat	12,00	0.26
Barley	12,34	0,62
Groundnuts	10,60	- 1,01
Sunflower	11,44	- 0,25
Soyabean	10,51	- 1,10
Cotton	8,77	- 2,71
Tobacco	16,20	4,01

Source: Food Studies Group 1990.

The Nominal Protection Coefficient (another way of expressing the NRP) is the ratio of output valued at market prices to its estimated national opportunity cost. A nominal rate of protection compares the prices a producer actually receives for a commodity with what he would have received in the absence of Government intervention in pricing, trade and exchange rate policy. In the absence of these policies, producers would obtain the

prevailing world price for the commodity i.e., the c.i.f. import price if it is an import substitute and the f.o.b. export price if it is exported[7]. These prices would be converted to domestic currency at an exchange rate set by free market forces, i.e., the market clearing price for the Zimbabwe dollar on the world's foreign exchange market.

The numerator of the NRP is the actual producer price in domestic currency and the denominator is the world price, converted into domestic currency by use of an exchange rate. This ratio is then converted into a rate by subtracting one from it. An NRP greater than one indicates that the producer of the commodity has received a positive incentive or "protection" from Government pricing policies -- an NRP less than one indicates that the producer has received negative protection or has been taxed by Government pricing policies.

The Nominal Rate of Protection is expressed as follows:

$NRPi = Pi - Pi^*)/Pi^* = Pi/Pi^*-1$

Where NPi is the nominal rate of protection on good i

Pi is the domestic price of good i

Pi* is the border or world price of good i adjusted for transport and other marketing costs.

NRPs are often calculated only to compare the actual price with the world price converted at the official exchange rate. This only assesses the impact of commodity pricing policy. For a broader focus of policy effects, such as the effect of trade and exchange rate policy as well as pricing policy on agricultural production it would be necessary to use an exchange rate adjusted for policy distortions.

Table 6 provides average NRPs for individual commodities based on calculations in Rukovo et al. 1991 which were done using the official exchange rate. It can be seen that only groundnuts and soyabeans were taxed on average throughout the sample period. The parity price for imports is the c.i.f. value less local transport and marketing costs. This may account for the fact that the NRPs calculated in Table 6 for soyabeans differ from those calculated by others[8] since soyas were imported in the early 70s and 80s.

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[7] **For importable goods the border price is defined as the World price (equal to the c.i.f. import price) plus cost of unloading, transport to the wholesale market, and marketing less transport and marketing costs between the farmgate and wholesale market. For an exportable good, the border price measured is defined as the world price less the cost of export handling, transport and marketing not only to the port and border point, but also between the farmgate and the local wholesale market (in order to make a comparison with farmgate prices). Details of NRP calculations are shown in the Appendix.**

[8] **For example, Jansen & Muir. 1991.**

Table 6 Average Nominal Rates of Protection (Percentage)

Commodity	1966-1971	1972-1979	1980-1989	Average
Seed Cotton	+120	- 9	- 4	+27
Maize	n.a.	-22	+30	+ 6
Wheat	n.a.	+11	+ 6	+ 8
Groundnuts	n.a.	-22	-15	- 8
Soyabeans	n.a.	- 7	-24	-13
Beef	+ 13	+53	+100	+61
Red Sorghum	n.a.	+18	+111	+58
White Sorghum	n.a.	+18	+169	+83

a "+" implies protection, "-" taxation of domestic producers.
n.a. indicates that data are not available.
Source: Rukovo et al. January 1991.

Seed cotton received a very high level of protection from 1966 to 1971 but then was unprotected. The Government set the producer price of seed cotton substantially above the world market price to encourage production resulting in an average NRP of 120 percent. From 1971/72 onwards, the Government recognised the need to remain competitive on international markets since about 70% of the cotton lint produced in Zimbabwe is exported. This led to a reduction in the level of protection to a point where seed cotton producers were taxed with the exception of 1974/75, 1976/77, 1982/83, 1986/87 and 1987/88. Falling real producer prices resulted in a decrease in seed production in the 1989/90 season. This forced the Government to announce a pre-planting producer price for the 1990/91 growing season, deviating from its general policy of announcing producer prices after the planting season (or at harvest time).

Cotton production is being actively promoted by the Government for three reasons:
i) cotton lint is a valuable foreign exchange earner;
ii) cotton is an important cash crop for communal farmers; and,
iii) cotton production provides jobs for as many as half a million people.
In part, because of its drought tolerant qualities, cotton has proved to be a particularly valuable cash crop for the communal sector which accounts for well over half of total sales to the Cotton Marketing Board. Cotton thus has important implications for attaining the Government's objectives of income distribution and employment.

For maize, NRPs were negative in the 1970s and positive in the 1980s. Prior to 1980, maize producers were taxed heavily, whereas the consumers received subsidies. Since 1980, Government policy has been to restore self-sufficiency in the nation's staple food crop and to enhance household food security in the communal farming sector. Consequently maize producers have been protected since 1980 with the exception of the 1984/85 and 1988/89 marketing years when NRPs were - 45 per cent and -26 per cent

respectively. This new attitude towards maize was also reflected in higher real prices during 1980/81 and 1981/82 seasons (see Appendix B). Simultaneously, the Government progressively has reduced consumer subsidies.

White maize undoubtedly lies at the centre of agricultural policy management in Zimbabwe. Decisions on marketing and pricing policies for maize have a major impact on resource allocation within the agricultural sector owing to the high proportion of land and other productive resources dedicated to the crop. The production and availability of maize in different regions and for different socio-economic groups directly affects incomes and household food security. Further, the financial costs of public sector marketing of the crop, which accounted for 67% of GMB losses between 1980 and 1990, has a significant impact on the macro-economy.

A structural shift has occurred over the decade towards production and marketed supplies being provided by the small-scale farmers who now plant 1,1 million hectares with a yield averaging about 1 tonne per hectare, all produced under dryland conditions The high variability of yield from this sector compared with the large-scale commercial sector has serious implications for national food security and marketing efficiency. Moreover, the marked differences between yield levels of maize in different natural regions, when taken in conjunction with consumption requirements, have a strong influence on equity and on transport costs (see section on pan-territorial pricing in Muir and Takavarasha. 1989).

In the case of wheat, (the only import commodity considered), domestic prices modestly exceeded world market prices. Since independence, the Government apparently has attempted to set wheat producer prices to provide just enough incentive to encourage most farmers to make full use of existing irrigation potential (Jansen. 1982; Morris. 1988). Selling prices to local millers were above import parity prices in most instances. Millers in turn received subsidies in order to guarantee low bread prices for consumers.

Wheat production in Zimbabwe grew from 4000 tonnes in 1964 to reach 256 000 tonnes delivered in 1988/89. Of the latter, 242 000 tonnes, or 94,5%, was produced by large-scale commercial farmers primarily as an irrigated winter crop. Wheat is playing an increasingly important role in national food security. It is the sole major winter cereal for direct consumption, accounting for about 11% of the total cereal production of 2,3 million tonnes. Wheat consumption has increased from a level of 220 000 to 230 000 tonnes between 1981/82 and 1984/85 to 287 000 tonnes in 1988/89. The increase is due mainly to the convenience of wheat flour and wheat products and a price policy which encourages the consumption of wheat through a subsidy of 14%, primarily benefiting the growing urban population (Food Studies Group. 1990). Producer prices have been below import parity with producers receiving an average of Z$365 in 1989 compared with Z$429 for landed imports and Z$460 in 1990 compared with an estimated import parity of Z$620, all calculated at nominal exchange rates. Long term prospects for wheat

production in the country depend on the prospects for the large farm sector. The mechanized technology and irrigation requirements of wheat as a winter crop militate against its ready adoption by smallholders.

After 1980, the real producer price for groundnuts declined and producers continued to be taxed except for 1985/86, 1987/88 and 1988/89, when the NRPs were 23%, 4% and 10% respectively. Since groundnuts are quite an important crop for communal farmers, the pricing policy appears to be inconsistent with the Government's concern for reducing rural poverty. Nearly 90% of total groundnuts production occurs in communal areas where most of the crop is retained for home consumption or sold on the informal market. In 1989, top quality sales to the GMB secured a price of Z$650 per tonne while prevailing local market prices were around Z$1500 according to the GMB Groundnut Review Committee.

Beef[9], as well as red and white sorghum, were subject to protection with increasing trends; the NRPs being on average 100% and more since 1980. Beef producers have been protected since 1965 -- only in 1986/87 and 1987/88 seasons were NRPs negative. (The calculation of the protection rates in Table 6 is based on the average realization of the quota into the heavily protected EEC market indicated by the extraordinarily high export parity prices in those years).

It is important to note that large-scale commercial farmers produce 80% of all commercial beef sales through the Cold Storage Commission although communal farmers own 69% of Zimbabwe's estimated 5,6 million cattle. Cattle in communal areas play a multi-purpose role which includes provision of draft power, manure and transportation. In addition, cattle are an important source of wealth. For this reason, beef has a negative response to price in this sector. The benefits from a heavily protected beef industry, therefore, have not accrued to communal farmers.

The levels of protection for sorghum producers increased after independence. This led to high stocks of sorghum (particularly red sorghum), which the market would not absorb at prices comparable to the prices paid to domestic farmers[10]. The GMB had

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[9] **Despite the strong protection of farmers, beef production declined in the 1980's mainly as a result of the war of liberation and four years of drought during the decade. High export parity prices were recorded during the years when Zimbabwe was exporting beef into the lucrative EEC market on a quota basis.**

[10] **From the 1990/91 marketing year, the red sorghum market was partially decontrolled. Brewers who normally utilize red sorghum for malting purpose were encouraged to enter into contracts with local farmers (both large-scale commercial and small-scale farmers) with the GMB acting only as a residual buyer.**

to sell the accumulated surplus of over 100 000 tonnes at a discount, thus exacerbating the trading deficit. The marketing strategy for sorghum, which had been based on extending formal public marketing for purchasing surpluses from rural areas and providing market incentives for greater production, has not been appropriate for the role played by this crop. The role of sorghum in the drier rural areas as a food security crop is of prime importance. But food security is little affected by the policy of attempting to raise the incomes of poor rural groups through high sorghum prices owing to the limited marketing by the poorest farmers.

Pricing policies in Zimbabwe have not discriminated against agricultural commodities. Out of the seven products considered, only groundnuts and soyabeans on average were taxed. The fact that only wheat has to be imported to supplement domestic production indicates a high degree of self-sufficiency for Zimbabwe which is partly due to favourable pricing policy for most commodities. The level of prices, and in particular relative prices, has had an important effect on the allocation of resources and has favoured the large-scale commercial sector. In addition, the subsidies inherent in the level of input and output prices for a large proportion of controlled products have tended to accrue to upper income groups. The inter-sectoral differences in the incidence of benefits from price policy stems from the fact that most communal farmers do not produce a marketable surplus, their dependence on relatively low value crops such as sorghum, millet, maize and their limited access to productive inputs and markets.

The implication from this analysis is that price policies pursued since independence have benefited the large scale farmers while failing to increase incomes and producing a decline in the terms of trade faced by communal farmers. These results are at variance with the Government's stated aim of extending the full benefits of agricultural development to farmers in communal areas.

Effects of Exchange Rates and Other Macroeconomic Policies

In order to incorporate the effect of trade and exchange rate policy on NRPs, it is necessary to use a market-clearing exchange rate rather than the official exchange rate to convert the commodity's world price into domestic currency. Table 7 (a & b) represents NRPs for major crops calculated by Jansen and Muir (1991) using, first, the official exchange rate (Table 7a) as well as the "REAL" exchange rate (Table 7b). In the 1981-89 period, the Zimbabwe dollar was overvalued and affected the NRPs. World prices converted to Zimbabwe dollars at the official exchange rate are considerably lower than they would be if they were converted at a more realistic (not overvalued) exchange rate. As a result, one would expect the NRPs at the real exchange rate to show low rates of protection or higher rates of taxation (negative protection) than those calculated using the official exchange rate. These results also would change significantly to relect the recent devaluation of the Zimbabwe dollar (1 to 5 with the US$ as of October 1991, compared to 1 to 3 in August 1991).

Similar conclusions emerge from the NRPs presented in Table 7 (a), i.e., that commodity pricing policy has generally had a negative effect on the production of Zimbabwe's major tradable agricultural commodities. In the case of tobacco, there is no effect, since that price is not set by Government. For most of the controlled commodities, for which Government sets the price, there has been a negative effect. The exception is maize which has had, on average, a 31 per cent nominal rate of protection during the 1981-89 period and wheat and groundnuts during the latter half of the period. Where real exchange rate has been used to convert world prices into domestic currency, Table 7b, the NRPs are larger. Incorporating the effect of an overvalued exchange rate raises the value of the denominator and leads to much lower rates of protection and much higher rates of disprotection. All of the commodities had negative rates of protection during the 1981-89 periods, Table 7b, suggesting that trade and exchange rate policy has significantly added to the disincentive provided by Government commodity pricing policy for agriculture in the post-independence period.

Masters (1991) has explored the changes in profitability and comparative advantage that is caused by a range of macro-economic and product market conditions. He concluded that since prices for controlled crops are set through the process of negotiations between producers and Government, prices have almost replicated the interaction of supply and demand in a competitive market. He argues that for most crops, the local market follows border prices because nominal prices almost never decline. His findings also indicate that the highest degree of nominal disprotection is in soyabeans, groundnuts and cotton, reflecting Government policy to support agro-industries, and that this does not augur well for equity and efficiency objectives. The problem with groundnuts appears to have more to do with the relationship between formal and informal markets, while in the case of sunflowers, it is the issue of low yields that needs to be tackled by policy. The central issue for white maize is the scale and location of production, where, according to Masters, smallholder farmers have a comparative advantage for this crop. In the case of coarse grains (millet and sorghum) including yellow maize, the critical problem arises from limited urban and industrial demand for the crops. It therefore follows that crop movement and market development (food beverages and animal feed) could make a considerable contribution to rural welfare, particularly in drought prone areas.

Table 7(a) Nominal Rates of Protection at Offical Exchange Rates 1981 - 1989 (Percentage)

	Maize	Wheat	Groundnuts	Soyabeans	Cotton	Tobacco
1981	18	1	-18	22	-11	0
1982	84	7	-12	0	31	0
1983	59	-11	-35	0	-2	0
1984	-45	- 7	-34	0	-33	0
1985	36	10	23	0	-17	0
1986	123	0	-28	0	23	0
1987	52	23	4	-45	7	0
1988	-26	19	10	-40	-13	0
1989	-19	n.a.	n.a.	-38	-5	0
1990						
Averages						
1981-84	29	- 2	-25	6	-4	0
1985-89	33	n.a.	n.a.	-25	-1	0
1981-89	31	n.a.	n.a.	-11	-2	0

Source: Jansen and Muir, 1991

Table 7(b) Nominal Rates of Protection at Real Exchange Rates 1981 - 1989 (Percentage)

	Maize	Wheat	Groundnuts	Soyabeans	Cotton	Tobacco
1981	-9	-22	-37	- 6	-32	-23
1982	22	-29	-41	-33	-13	-33
1983	4	-42	-57	-34	-36	-34
1984	-62	-35	-54	-30	-53	-30
1985	-10	-27	-19	-34	-45	-34
1986	38	-38	-55	-38	-24	-38
1987	-10	-27	-39	-67	-37	-41
1988	-55	-27	-33	-63	-47	-39
1989	-54	n.a.	n.a.	-65	-47	-44
1990						
Averages						
1981-84	-11	-32	-47	-26	-33	-30
1985-89	-18	n.a.	n.a.	-54	-40	-39
1981-89	-15	n.a.	n.a.	-41	-37	-35

Source: Jansen and Muir, 1991

A more complex indicator of the transfer effects of policy is the Effective Protection Coefficient (EPC), which compares value added in private and national terms. This concept covers protection effects on the input side of a protective system. These have, however not been included in this paper which focuses mainly on output pricing policy.

Conclusion

In conclusion, pricing policy is one of the important instruments used to influence agricultural output in Zimbabwe. There is evidence to suggest that farmers are highly responsive to price changes. The structure of agricultural to a large extent has been determined by the relative prices of crops. The design and implementation of price policy is, therefore, of utmost importance in influencing increased output for all crops. The Zimbabwe Government intervenes in the agricultural sector by regulating producer prices of a number of crops and livestock products. The pricing policy objectives are primarily commodity oriented as each price is determined on a case by case basis. The producer price formulation mechanism is complex and is governed by numerous factors which include the marketing environment, the inflation rate, marketing board stocks and trading accounts, parity prices, costs of production and demand patterns. Official producer prices are set uniformly throughout the country (pan-territorial) and for the whole marketing year (pan-seasonal), using cost of production models formulated under large-scale commercial farming conditions. In this regard, it is likely that the present producer price policy entails efficiency losses, since it does not take into account geographically varying comparative advantages and changing seasonal demand and supply conditions in the domestic market.

Since 1980 the objective for food crops (maize, wheat, and soyabeans) has been to promote self-sufficiency and to generate supplies for export where this can be achieved without subsidies. Policy in relation to cotton is to encourage export production and employment in the industrial sector. For groundnuts, the policy is to stimulate market sales and improve the level of nutrition in the rural sector. The policy objective for beef and dairy has been to promote expansion of the national herd in order to meet domestic requirements and to meet viable export opportunities. To determine the extent to which these objectives have been achieved, when measured against their effects on growth, equity, efficiency (marketing board costs) and the achievements of food security (farm incomes and nutrition levels), requires more analytical work.

Agricultural Pricing Policy Issues for the Future

There are several changes to be expected, both in the thrust and administration of agricultural pricing policy, in the future arising from the Government's new economic policy reform programme of 1991. The most immediate factors are the need to raise the agricultural growth rate to 3,2 per cent per annum, the modification of pricing and marketing arrangements to reduce the financial deficits of the agricultural marketing boards, changes in the regulations affecting marketing and movement of crops and the facilitation of private marketing in the rural areas.

a) The main change envisaged in pricing policy is a movement away from a system of uniform (pan-seasonal and pan-territorial) prices and post-planting prices based on cost of production estimates and administered through a single channel controlled marketing system (marketing boards), to a more liberalized system in which prices are determined on the basis of market forces, reflecting regional and seasonal variations in supply and demand. Market liberalization is expected to create a multi-channel marketing system in which the private sector will play an increasingly important role.

b) The process of price determination will shift from direct Government intervention to one that allows the interaction of supply and demand, with the marketing boards providing floor prices to protect producers in disadvantaged areas and intervening only in those cases where market forces may result in excessive fluctuations in prices.

c) There will be a greater need for Market Information Systems to monitor price trends and marketing margins for private traders. At present, most of the data used in price analysis relies on gazetted prices and the published annual reports and accounts of statutory marketing boards, which have generally been easy to find. It will be necessary to monitor and measure prices paid and quantities purchased in the informal market. The need to monitor the impact of introducing regional and seasonal variations in prices for grain will inevitably call for more sophisticated methods of data collection and price analysis.

d) For export crops, there will be need to monitor international price movements, changes in demand caused by technological improvements, exchange rate changes and handling and transport costs for calculating parity prices and supplementary payments for producers of exportable commodities.

e) Market reform and liberalization will entail greater opportunities for rural traders to invest in storage, transport, processing, input supply and agro-industries. This will require specialised training and credit facilities, infrastructural development (roads, telephones, power, dams) and supportive policy measures such as tax incentives and foreign exchange retention schemes for small traders together with measures to attract established investors into rural areas.

f) Each specific commodity faces different policy issues. Maize will remain the most strategic basic grain and it will be important for policy to sustain a reliable production base in Natural Region II by using variable two-tier pricing systems to build strategic food reserves and take advantage of regional exports. Zimbabwe is well placed to supply seed and grain in the Southern African region where white maize is the major staple. Maize production and distribution in the communal areas will benefit from improved activity by private traders. The GMB can complement these activities by establishing distribution depots at strategic points in grain deficit areas as well as by providing a floor price for surplus producers. The industrial use of yellow maize for snacks, breakfast foods, starch and stockfeed will need to be fully exploited. Pricing

policy can play a role in promoting this objective.

g) Wheat, being a winter crop, has significant advantages in promoting investment in water storage, irrigation and research, which are basic requirements for food security. This suggests that the cost of producing wheat will remain high. The consumer can be cushioned by taking advantage of wheat imported at lower world prices to supplement high cost domestic production. Again, pricing policy has an important role in this regard.

h) Pricing policy in relation to small grains has been concerned with the need to encourage communal and other small-scale producers to grow rapoko and mhunga (millet) and red and white sorghum for their own immediate consumption. These crops can play a significant role in keeping the cost of basic food low provided varieties and milling characteristics are improved. The deregulation of the marketing system should facilitate the participation of private companies in developing these crops.

i) The markets for oilseed crops (soyabean, sunflowers, groundnuts), beef, dairy and horticultural products remain strong both within Zimbabwe and regionally. There are major opportunities for growth in the supply and demand for these commodities. Pricing policy should change from a fixed price system to one that is dependent on net market realizations so that benefits from improvements in the market prices can be passed on to producers in the form of supplementary payments.

j) Finally for cotton, steps have already been taken to replace administered prices with market determined prices and supplementary payments. Small scale producers appear to have a comparative advantage in the production of cotton which has not been fully exploited due to transport and marketing constraints and poor crop management practices. Domestic lint prices will be brought more into line with market values.

It is clear that the price mechanism, even under pricing arrangements other than the existing controlled system, will continue to play a critical role in increasing output, integrating small producers into the market economy and enabling the agricultural sector to meet the requirements of the economic reform programme.

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9

IMPLICATIONS OF CURRENT POLICIES AND PRACTICES ON FOOD SECURITY IN ZAMBIA

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INTRODUCTION

Major objectives of the Zambian government since independence in 1964 have included plans to: a) diversify the economy away from total dependence on copper; b) provide cheaper food to the Zambian people; c) promote import substitution; d) attain self-sufficiency in food and industrial raw materials; and e) create new employment and income opportunities, particularly for the rural areas, to arrest the high rate of rural-urban migration.

A number of policies were instituted to fulfill these objectives. The major ones were price controls for the major agricultural products and inputs, direct control or ownership of marketing institutions, institutionalization of subsidies on maize and agricultural inputs and the coupon system to supplement maize meal prices.

These measures were implemented and defended by the government as the only way to achieve regional and social equity and maintain food security in the country. Poor balance of payments and increasing levels of subsidies, contributing to high levels of budget deficits, Table 1, forced the government to institute measures aimed at liberalizing the economy. The measures were started in the early 1980s and have gained momentum in the last two years. A serious attempt has been made to decontrol prices, reduce subsidies and privatize marketing of all agricultural products.

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Table 1 GOVERNMENT BUDGET DEFICIT AND MAIZE SUBSIDY IN ZAMBIA

Year	Budget Deficit (Kwacha) (Million)	Total Maize Subsidy (Kwacha) (Million)
1980	160.3	154.0
1981	155.7	87.1
1982	658.1	138.0
1983	288.6	124.7
1984	284.8	81.6
1985	280.4	134.0
1986	1025.7	565.0
1987	2146.8	638.4
1988	1531.2	1413.0
1989	3699.0	1585.6
1990	2801.4	3363.9

Source: NCDP, Lusaka, 1990 and maize Sector Study Planning Division, Lusaka, 1990, p. 15.

The impacts of these new measures have not been evaluated. They have just been established and are still undergoing reforms. The subject matter can, however, be dealt with in terms of how it is likely to affect household food security.

This paper, therefore, has the following objectives:

a) To briefly review major current policies and practices and how they pertain to food security. Emphasis will be on price policies for food products. The historical role of price policies and practices will be briefly presented. This information has well documented by such scholars as D. Jansen, (1987, 1988, 1990), A. Wood, (1988), Kydd, (1988), GRZ, (1990, 1991), and I. Ndalamei, (1990).

b) To predict the implications of the current policies and practices on household food security. The predictions will not be based on any empirical model due to lack of data. In addition, the policies currently are undergoing reform. Economic theory, however, will guide the predictions supported by empirical data where available.

PRICE POLICIES

Agricultural prices include producer prices, input prices, into-mill prices, and retail prices as well as marketing costs such as transportation, storage, processing and packaging and retail. However, price policies in Zambia normally are discussed relative to the maize, the single most important commodity to the country. The crop covers 70% of all cultivated land, generates 70% of total crop value and is consumed by a large majority of people both in the urban and rural areas. Traditional crops such as Sorghum, Cassava and Millet are important only in few areas. However, the future role these commodities will have in food security is recognized in this paper.

Maize price controls started as early as 1936 when European farmers, facing competition in the marketing of maize from the African farmers, sought protection from the government. They also wanted protection from lower producer prices. A maize control board was established to facilitate price discrimination and control. The board was given the function of purchasing and selling all maize at fixed prices in the old line of rail -- Livingstone to Mufulira. Most of the marketed maize was produced in this area at that time. The rural areas were producing traditional crops like Cassava, Millet and Sorghum. The fixed producer prices were set on the basis of the cost of production. Consumer prices then as now, were designed to supply the urban consumers with cheap food.

PRODUCER PRICING

From 1964 to 1971 the government maintained some form of regional price fixing policy. Nominal prices generally have been increasing since 1964. Real prices, however, have shown a stable trend. Nominal prices were considerably higher in outlying areas with a deficit supply position than in areas with surpluses and along the old line of rail. This policy reflected the fear by the government that market forces alone would bypass a significant sector of small scale (subsistence) farmers. It was feared that these farmers would not be absorbed into the market economy, thus lag behind in development.

This policy was the driving force behind the uniform pricing system introduced in the 1974/75 crop season. The government introduced the uniform floor price to ensure a "fair" compensation to all the farmers, especially those in the remote areas. The uniform price failed to reflect transport cost under this new price control system. Pan territorial prices have been in operation in the country since 1975. Currently, a uniform farmgate floor price is the policy.

Prices (including producer floor prices) are fixed by the government in consultation with the Commercial Farmers Bureau (CFB). The criteria used include:

(i) the cost of production of maize;
(ii) export and import parity;
(iii) crop profitability; and
(iv) "fairness" to produeers and consumers.

The maize producer price is then pegged at 100% above the cost of production plus a management allowance. The cost of production is considered over three categories of farmers. A weighted average is calculated with the commercial farmers weight at 30%, the emergent farmers at 40% and the subsistence farmers at 30%. The cost of production is assumed to be uniform throughout the country.

Of the criteria used, the one aimed at appeasing the politically sensitive urban group appears to have dominated and has effectively kept the producer price down. Producer prices, in general, have been below import parity and free market prices (Jansen, 1988).

The uniform producer pricing system has not achieved the equity goal. The policy has encouraged maize production primarily in remote areas such as the Eastern and Northern provinces (Jansen, 1988, Muntanga, 1984). The controlled prices of maize have tended to set the floor price for maize even in rural parallel markets for grain. Rural parallel markets also have been under the influence of village political party authorities.

Rural prices are influenced by several other factors, e.g., the supply and demand situation in the local area at a given time, the price and availability of industrial mealie-meal, the cost of rural milling, the incomes of the rural population and the volume for transaction. Table 2 shows the rural prices for the grains per kilogram obtained from an on-going study "Rural Trade and Processing of Traditional Crops in Zambia" (Maleka et. al. 1991).

Generally, parallel market prices have been found to be at least twice the level of the official price for maize. For net food buyers this has contributed to food insecurity. The prices are lower in the surplus Northern Province and monthly changes are negligible. Preliminary indications show higher prices and more within year deviations in the Western province. This reflects poor grain supplies and small transaction volumes. The traditional crops are used for beer and may be pre-germinated making it difficult to compare parallel market prices with official prices.

Pressure to abandon uniform pricing and its related large government subsidies was re-enforced in the early 1980s. The pressure was building due to the more frequent occurrence of maize and maize meal shortages. Further, subsidy levels have had adverse effects on the government budget, as shown in Table 1. The subsidies have surpassed the total budget deficit. Since these deficits have contributed to the high inflation rate, international lending agencies such as the World Bank and the International Monetary Fund (IMF) have been pressuring the government to change policies. The major subsidy went towards market coordination activities. Transportation has been and continues to be the major expense in marketing.

Table 2: AVERAGE GRAIN PRICES FOR SELECTED DISTRICTS

Province	District	Price Per Kilogram of Grain (Dec-May Average) (Standard Deviation in Parentheses)				
		Maize	White Sorghum	Red Sorghum	Bulrush Millet	Finger Millet
Southern	Choma	7.7 (2.2)	55.8 (11.9)	89.1 (102.2)	17.3 (17.9)	n.a.
Southern	Kalomo	11.6 (5.4)	n.a.	n.a.	27.1 (2.1)	n.a.
Western	Senanga	16.9 (22.7)	24.2 (14.8)	20.2 (17.5)	24.5 (10.6)	n.a.
Western	Sesheke	9.2 (3.7)	14.8 (2.1)	26.5 (31.9)	19.0 (11.2)	n.a.
Northern	Kasama	6.3 (2.2)	45.7 (13.0)	n.a.	n.a.	25.8 (22.9)
Northern	Luwingu	6.6 (2.1)	7.2 (1.4)	n.a.	n.a.	10.6 (1.2)
Copperbelt	Ndola Rural	8.5 (2.8)	9.2 (4.7)	6.5 (0.2)	n.a.	22.7 (12.0)
Lusaka	Lusaka	39.2 (18.7)	104.9 (26.6)	104.9 (26.6)	104.9 (26.6)	104.9 (26.6)
Official Producer Price 90/91		3.2				

Source: Maleka et al. forthcoming 1991.

TRANSPORTATION COSTS AND RATES

The final product price needs to cover all of the costs involved. One of these costs is for transporting the commodity several times before it reaches the consumer. It is estimated that about 70% of the marketing cost for maize in Zambia is transportation, Table 3. The major transportation cost involves the movement of maize from rural depots to storage and milling facilities.

Table 3: COSTING OF ONE BAG OF MAIZE BOUGHT IN DIFFERENT PROVINCES, AUGUST 1991 ESTIMATES

	Chipata to Lusaka	Kasama to Ndola	Mkushi to Ndola
Cost of maize	800	800	800
Transport	600	780	300
Interest for six months	184	184	184
Handling up to holding depot from buying point	200	300	200
Storage loss @ 3%	24	24	24
Cost of empty bag	17	17	17
SUB-TOTAL	1152	1466	815
Administration charges @ 7%	72	91	51
SUB-TOTAL	1897	2196	1576
Profit @ 5%	55	70	39
GRAND-TOTAL	1952	2266	1615

Source: Ministry of Agriculture, Planning Division.

Maize transportation involves bicycles (especially for smuggled mealie-meal to neighboring countries), ox-carts (10-20 bags), tractor and wagon, rail, and various sizes of trucks (1-30 tones). Ox-carts are widely used by farmers to move maize from their farms to the depots, particularly in Southern, Central, Lusaka and Eastern provinces. Opportunities exist for Primary Societies (to which over two-thirds of the small scale farmers belong) and farmers to transport maize to milling facilities by ox-cart at low cost.

Table 4: AVERAGE NUMBER OF OX-CARTS OWNED BY MEMBERS OF PCS BY PROVINCE

PROVINCE	AVERAGE NUMBER OF OX-CARTS	PCS MEMBERSHIP	% OF MEMBERSHIP OWNING OX-CARTS
Lusaka	21	426	4.9
Central	22	622	3.5
Northern	03	356	0.8
North-Western	05	343	1.2
Southern	22	970	2.3
Eastern	18	870	2.1

Source: Forthcoming Report - Sipula.

However, this mode of transportation is not fully utilized by Primary Cooperative Societies' membership who own ox-carts. Table 4 shows the average number of ox-carts owned by primary cooperative society members in selected provinces and the average membership of each society.

Most of the maize from the rural depots is moved by trucks to district/provincial storage facilities. The maize is normally moved by the Cooperative Movement, Private Transporters (TAZA members) and Contract Haulage (a parastatal company) using controlled transportation rates.

Transportation rates have generally been determined through negotiation among TAZA, Contract Haulage and the Ministry of Power, Transport and Communications. The rates set take into account average operational costs (TAZA and Contract Haulage estimates) and a profit margin of 33%. The cost of empty runs are also considered in the cost calculations.

There are two major weaknesses in the determination of transportation rates.

(i) They lack per unit cost of transportation; and
(ii) No differentiation in rates is made between good (tarmac) and bad (gravel) roads even though depreciation and incidence of breakdowns are higher on poor roads. The result is that truckers avoid the poor roads or only haul short distances on rural roads.

Transport rates for maize are quoted on a distance, weight basis. Table 5 shows the rates per km per ton existing in June, 1991 and the rates proposed for August, 1991.

Table 5 OFFICIAL TRANSPORT RATES 1991

DISTANCE (KM)	EXISTING K/TON/KM	PROPOSED RATES (K/TON/KM)
1-50	11.60	18.00
51-100	9.50	15.00
101-200	8.10	13.00
>201	7.80	11.00

Source: Ministry of Transport and Communications, 1991.

Transportation rates in Zambia have had little relationship to producer or retail prices. Transport services increase the value to the commodity by creating a place utility. Due to pan-territorial pricing, place utility has not been reflected in the prices of the commodity. Subsidies have covered the net price differentials.

Since maize is a bulky, low value commodity, transportation costs are a large part of the total cost. Pan territorial pricing policies have involved heavy government subsidies in moving maize from surplus areas to major consumption areas including Lusaka and Copperbelt provinces which annually consume 3.2 and 4.7 million bags respectively. The country consumes 10.0 million bags of marketed maize. The copperbelt produces less than a million bags.

A transport subsidize of K852.00 per 90 kg bag was required in 1990 to move maize from Chipata to Lusaka a distance of just under 600 kilometers. This represented about 44% of the total millers' cost in Lusaka. Costs for other areas included a subsidy rate of K1166.00 from Kasama to Ndola K575.00 from Mkushi to Ndola.

Applying these subsidy rates to the least cost maize movement for 1990, as calculated by Mulwanda (1991, p. 55), the government needed a minimum of K150 million for transportation for these regions alone, representing slightly over half of the maize movements for the year.

Transportation costs provide signals for improving resource allocation in a competitive market. Muntanga, employing a linear programming transport model, came to the conclusion that Lundazi and Katete (Eastern Province in general) should not have produced surplus maize given the 1978 and 1981 price conditions (1984, p. 79). The same conclusion was reached for the 1987/88 and 1989/90 seasons (Mulwanda, 1991, p. 72). Eastern Province apparently has a comparative disadvantage in maize production.

Unsubsidized free market determined transportation costs will be a major factor in changing the crop production patterns in the country and will directly affect food security. Western Province is the most disadvantaged of the deficit provinces. The province has poor soils and transportation costs are high. The role traditional crops can play in maintaining food security under a free market system to this province needs to be studied. In comparatively disadvantaged regions, such as Western, N'western and Luapula provinces, traditional crops will become more competitive with maize. In the short run, these regions are expected to experience decreased incomes, especially for those producing maize as a cash crop. The pace at which production patterns will change in favor of traditional crops will depend on input prices.

INPUT PRICES

Uniform pricing for fertilizers was introduced in 1975. It existed until early 1991 when liberalization was attempted. The fertilizer price, determined by the government, took into account the average cost per metric ton of the total quantity to be supplied and the amount of subsidy available. The average cost per metric tonne considers import parity prices plus a margin to cover local production costs. These include all costs incurred from the point of production to the retail point. Imports are bought on c.i.f. basis, Lusaka. Imports (including donations) account for over 90% of the total fertilizer supply in the country. Ninety percent of all the fertilizer consumed is for maize production.

Nominal fertilizer prices have increased substantially in the last two years as subsidies have been reduced, Table 6.

Table 6 PRODUCER PRICE OF MAIZE, AND FERTILIZER PRICES UREA AND D-COMPOUND, 1980/81 TO 1990/91

Year	Maize Producer Price (Kwacha)	Urea Price (Kwacha)	D-Compound Price (Kwacha)
1980/81	11.70	11.65	11.60
1981/82	13.50	9.65	9.60
1982/83	16.00	10.95	11.75
1982/84	18.30	14.95	14.95
1984/85	24.30	24.10	24.10
1985/86	28.32	26.75	26.75
1986/87	55.00	63.00	80.00
1987/88	78.00	63.00	98.25
1988/89	80.00	71.00	71.00
1989/90	125.00	447.00	447.00
1990/91	800.00	1601.00	1572.00

The government introduced fertilizer subsidies in the early 1970s. In 1972 the subsidy covered 30% of the landed cost. By 1982, the average rate of the subsidy was 60% (Jansen. 1988. p. 93). Subsidies have played a major role in providing peasants with affordable inputs to increase their effective incomes.

Unlike the fixed producer price which had taxed farmers, the fertilizer price has helped increase the consumption of the input. On a regional basis, however, it favored the old line of rail farmers. In 1975, 84.9% of the fertilizer was consumed in the old line of rail. In 1987, only 60.5% was utilized in this region. Commercial farmers based, on size, benefitted more than the emergent and subsistence farmers (Jansen, 1988, Ndalamei, 1989, Wood, 1988).

The government's new policy of economic pricing for fertilizer resulted in the price being pegged c.i.f. Lusaka plus transportation to the consumption area. The price has, therefore, changed from a fixed rate of about K500.00 per 50kg bag to over K1500.00. The increase was generally over 170%.

Although not officially stated, the fertilizers used mainly on maize were supposed to be sold at K800.00 with the government subsidizing Nitrogen Chemicals of Zambia (NCZ), the monopoly, by 50% of the retail price (GRZ study, 1991, p. 61). The

fertilizers involved include Urea, Compound 'D,' and 'X' and Ammonium Nitrate. Other fertilizers are supposed to fetch import parity prices.

Reducing or eliminating fertilizer subsidies is expected to have severe adverse effects on maize production. Many small scale farmers will have no access to the input. Productivity will decline, increasing the vulnerability of the producers to food insecurity. Net food buyers may face food shortages or high prices. Surplus maize areas, such as the Eastern and Northern provinces, will be most affected.

Even under total liberalization, it is unlikely that the farmers will be able to pass on their input costs to urban consumers because of the high transportation cost. Thus, in the long run, farmers are expected to produce enough maize for local consumption, then switch to crops with a comparative advantage, such as groundnuts and tobacco, in the Eastern province.

Seed, unlike fertilizer, has remained a low cost input. Only about 5% of the total cost of production is attributed to seed. Seed pricing had been set by the monopoly Zambia Seed Company (ZAMSEED). Their prices, however, have been subject to government approval effectively limiting their price flexibility. However, for the 1991/92 season, the Seed Company has set its price without government involvement. Seed prices have been set below import parity and generally have been accepted on the market.

Cooperatives have been distributing over 70% of the seed. The cooperatives have obtained seeds on credit, but by July 1991, they owed ZAMSEED over K60 million from previous seasons' deliveries. This year, the company will attempt to distribute its seed on a cash basis through parastatal retail shops. There are about 115 retail outlets well scattered all over the country (but still less than the PCSs). This year's maize and sorghum seed prices are shown in Appendix 1. The prices do not reflect transportation cost to different areas. Future seed prices will reflect import parity prices.

It will be difficult for other companies in Zambia to penetrate ZAMSEED's seed market since its operation has been reliable and required investments are large. This lack of competition may fail to reduce the rate of increase of seed prices. Seed prices in the short run are expected to have little impact on the production of maize despite the ZAMSEED's market power. Productivity may be affected by poor information dissemination because the retail shops have no direct relationship with the farming community and ZAMSEED is not involved in the extension services.

Other inputs had little direct government price control in the 1980s. However, commercial farmers tended to benefit from imported inputs because of overvalued exchange rates.

CREDIT

A recent study reported that the agricultural credit system for small scale farmers in Zambia is in a state of financial disarray (GRZ, 1991, p. 1.0). This will curtail the production of maize. Repayment in the last two seasons has been very poor (below 50%). Reasons for such poor results range from drought, lack of adequate fertilizer, liberalization of the marketing system (resulting in poor market coordination), lack of payment to farmers for their output, inflation, etc. The report called for decontrolling interest rates to achieve positive annual real interest rates. The current nominal annual interest rate is 46% while the annual inflation rate is estimated at between 120% and 190%. This makes real interest rates negative and creates an excess demand for credit.

High nominal interest rates will discourage maize production, especially in the agronomically disadvantaged areas such as the Northern province. Transitory food insecurity is possible. In the long run, traditional and/or cash crops will regain their importance and household food security will improve.

INTO-MILL PRICING

Into-mill prices have been set by the government's Prices and Incomes Commission (PIC) which considers the major milling companies' cost of processing. All large commercial mills have been run by cooperatives and as parastatal companies since they were nationalised in December 1986. Table 7 shows into-mill prices, producer prices and maize meal retail prices. Into-mill prices were the same as producer prices in 1982 and 1984 indicating the presence of subsidies. In 1986, the into-mill price was even lower than the producer price.

Into-mill prices had increased by 1990. Yet retail prices of roller and breakfast meals had not. These price differentials indicate the magnitudes of the subsidy required. Downward pressure on retail prices also resulted from the 1986 and 1990 food riots.

Table 7 MAIZE PRICES 1981 to 1990

Year	Producer Price	Into-Mill Price	Retail Breakfast (K/25Kg bag)	Prices Roller (K/25Kg bag)
1981	11.70	10.21	4.10	3.75
1982	13.50	13.50	6.63	5.00
1983	16.00	16.00	7.25	6.31
1985	24.50	26.00	12.90	10.74
1986	28.32	35.00	19.15	14.85
1987	55.00	35.00	19.15	14.85
1988	78.00	35.00	19.15	14.85
1989 January	80.00	80.00	56.00	41.08
1990 August	125.00	160.00	114.50	82.30
May/June	284.00	442.00	269.00	198.00
Before May 1991	500.00	--		
May 1991	800.00	1100.00		
May 1992	1200.00	1800.00		

Source: Ministry of Agriculture and Prices and Incomes Commission, 1990.

*preannounced 1991/92 Market season prices: October 2nd 1991.

RETAIL PRICING

The government's control of the retail price of maize meal is aimed at providing cheap food to the urban population. The dependence of consumers on cheap maize, since pre-independence, has no doubt made the price of this commodity a sensitive one. Urban consumers do not expect maize meal to be a drain on their disposable incomes.

It cost K506.00 in August 1991 for a major milling company to produce a 25 kilogram bag of breakfast mealie-meal. The cost included the delivered cost of the maize, processing, packaging, and losses. The bag was officially wholesaling at K215.00. The retail price through the parastatal companies including transportation was just

over K220.00 in Lusaka. Fifty seven percent of the cost of mealie-meal was, therefore, paid through subsidies. This did not include the transport and storage subsidies paid by the government to get the maize to the millers' gate.

In July the government "decontrolled" the price of mealie-meal (statutory instrument number 97). An official statement followed stating that Miller's price levels would be monitored. (Times of Zambia, 31st July, 1991, p. 1). The monitoring was to allow a gradual increase of price, with Millers not supplying retailers who "overcharged." The instrument had no direct bearing on the coupon policy but price increases required higher levels of subsidy. The coupon system was introduced in January 1989 to facilitate a gradual removal of maize subsidies without jeopardizing the food security of the poor. The system has been unable to reduce the subsidy requirements and does not assist rural net food buyers.

Since "decontrol" of maize meal prices, a 25 kilogram bag of the commodity can fetch as much as K1500.00 in the deficit Western province. The price is more than the area's average monthly wage. Traditional crops will need to substitute if food security is to be achieved in such areas. Malnutrition is more prevalent in rural areas than in urban centers, since the later group has benefited more from subsidized food prices. Other beneficiaries have been consumers across the borders with access to smuggled subsidized mealie meal.

The removal of subsidies will result in increased food prices. Maize meal price may go up threefold given the inflation rate and the current level of subsidy. This will generate a push for higher wages, higher inflation and more unemployment. The food security situation will worsen in the short run. However, increasing the retail price will relieve the downward pressure on the producer price stimulating maize production in comparatively advantaged provinces such as Southern, Lusaka, Central and Copperbelt. Food supplies will improve and this will improve the food security situation. Since the country is capable of producing enough maize for domestic needs with a surplus for export, there, is little need to import maize even in drought periods.

A strategic reserve, currently planned for 2.5 million bags, can serve as a price stabilization instrument. Maize can be released on the market when prices become "too high" and can be siphoned out of the market when producer prices are "too low." Price stabilization together with improved food production and marketing institutions can insure food security for consumers and producers alike.

FOOD MARKETING INSTITUTIONS

In 1964, the Agricultural Rural Marketing Board (ARMB) was formed to supplement the existing Grain Marketing Board (GMB) in serving remote areas. The new maize marketing board was to encourage Zambian farmers to shift from subsistence to commercial farming in all regions. Cooperatives were also to be encouraged.

In 1969, the government merged ARMB and GMB to form the National Agricultural Marketing Board (NAMBoard) to eliminate the perpetuation of a dualistic agricultural sector. NAMBoard performed poorly and government switched its attention to Cooperatives. The role of Cooperatives in maize marketing expanded rapidly.

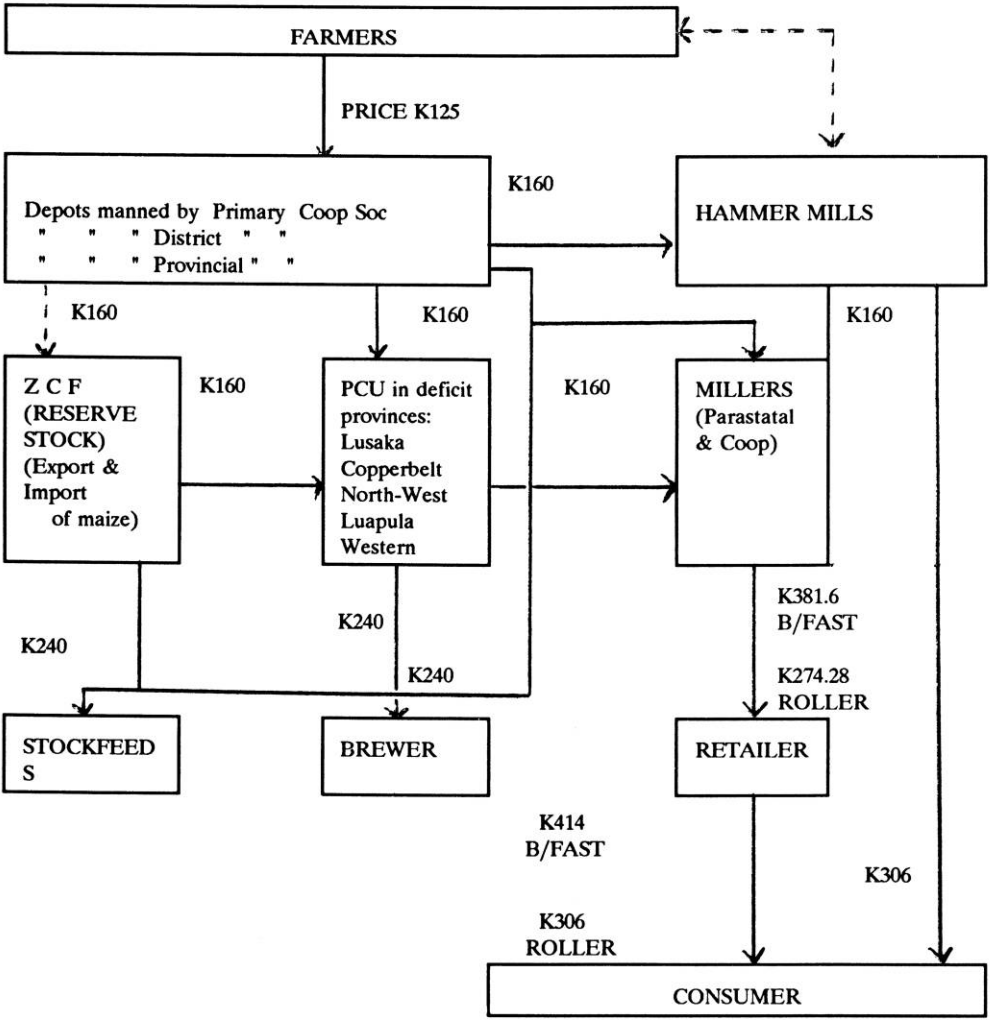
NAMboard was to withdraw from rural marketing between 1978 to 1981, and actually handed over some rural depots to Provincial Cooperative Unions (PCUs). These PCU's purchased maize and other produce from Primary Cooperative Societies (PCSs) arranging collection from PCS premises. The PCSs were paid a small commission for operating as collection points. The PCU's were free to transport and sell to millers within the province of origin. Inter-provincial trade remained the preserve of NAMBoard until August 1989 when they were abolished.

Before the market allowed private trading, market, coordination became more difficult and more dependent on subsidies. This defeated the purpose of encouraging cooperatives to take over marketing. The cooperatives encountered the same problems, e.g., farmers were paid late, maize was not collected from rural depots, transporters were owed money and unions became bankrupt. Eventually the marketing system collapsed, resulting in severe shortages of maize and maize meal. Food security was threatened through lack of maize availability and accessibility due to declining real income.

PRICING, SUBSIDIES AND MARKET STRUCTURE RELATIONSHIP

Prior to establishing the floor into-mill price in 1991, a typical maize movement and pricing arrangement looked like Figure 1. Between 1982 and 1984 the into-mill price was the same as the producer price. In 1985, the into-mill price was higher than the producer price. In 1986, the producer price was actually higher than the into-mill price by K20.00. The millers bought their maize at K55.00 from NAMBoard but received a K20.00 government subsidy.

FIGURE 1 MAIZE MOVEMENT AND PRICES 1989/90

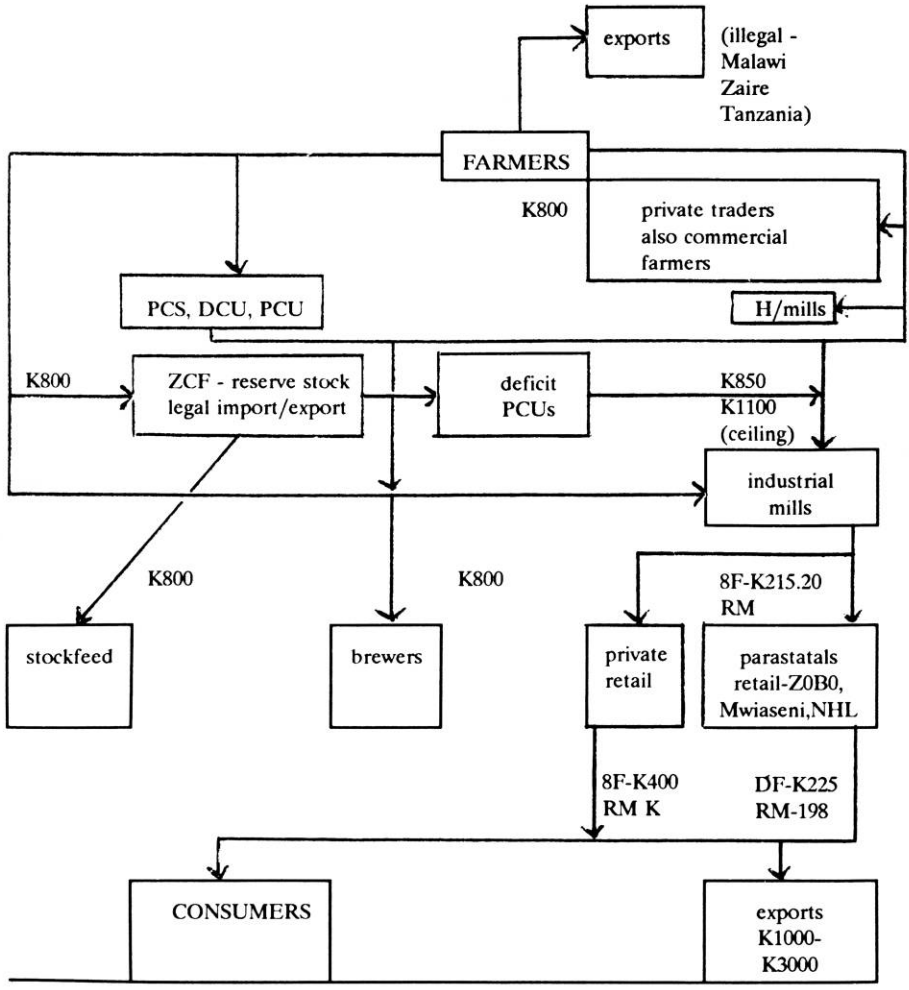


ALL PRICES ARE FOR A 90kg BAG.

The government was trying to switch the point of the subside from the marketing institutions to the millers, envisioning that it would be more cost effective. Millers took advantage of this arrangement effectively purchasing maize at K35.00 and reselling it for K55.00 to NAMBoard. This practice was common and the government lost a lot of money.

Figure 2 illustrates maize movement and price differentials for the 1991 situation. The marketing system has changed little from that shown in Figure 1. Farmers can now sell their maize to any willing buyer at a bargained price level. The government however, has provided a panseasonal, pan territorial floor price of K800.00 per 90 kg bag of maize.

Figure 2 CURRENT MAIZE MOVEMENT AND PRICES - 1991



maize is for 90kg bag.
meal meal is for 25kg bag.
rural meal cost K257/25kg bag

The Unions, ZCF and PCSs, as buyers of last resort, buy maize at the floor. ZCF is also buying maize directly from farmers, thus competing with the other levels of the cooperative movement. ZCF deducts a transport cost of K64.00 from the floor price for maize purchased within the Lusaka district. As a result, the farmgate price offered is lower than the floor price.

Prices received by farmers from private traders have been as low as K400. Sipula found that 46% of the farmers sold to private traders because of prompt payment (forthcoming). Only 10.3% sold to private traders because of a higher price. Proximity caused 43% sell to private traders.

Millers have been offering producers K850.00 for maize delivered to their gate. This price attracts maize from a radius of about 50 kilometers with a transport rate of K1.0 per kilometer per 90kg bag. However, some transporters are known to charge as much as K3.0 per kilometer per 90 kg bag of maize.

The ceiling into-mill price of K1100.00 kwacha is apparently offered for maize coming from further away. It appears that this arrangement is to facilitate subsidy payments to the miller from the government. The government will not refund K1100 for maize transported only a short distance. This is an indication of continued subsidies supporting a policy to perpetuate maize production far from major consumption areas. This practice also has prevented the entry of many private traders, even within a 50Km radius.

The private buyers identified are basically not middlemen, but processors with commercial farmers comprising the largest group. Sipula found that 56% of the farmers sampled sold their maize through commercial farmers who use the first grade maize for making stock feed. The use of first grade maize for stockfeed by commercial farmers presents another food security dilemma on the national level by resulting in less marketed maize. However, access to high protein foods such as meat and eggs, which results from the maize fed to the animals, is much needed.

Only 19% of the farmers have sold maize directly to millers. Local villagers constitute 19% of the buyers while marketeers comprise 6%.

New developments in the marketing of maize permits maize-meal to go through parastatal and private retail systems at a competitive level. Since coupons are honored only through parastatal retail shops, which sell mealie-meal at official prices, shortages are prevalent. A transport cost markup is allowed for private retailers and 25kg of breakfast meal may sell for up to K400.00 (220.20 official price in Lusaka). The mark up is attributed to the transportation cost. Shortages are less prevalent through this channel. Mealie-meal smuggled to Zaire fetches as much as K1000 per 25 kg bag. Into-mill price control implies that subsidies still exists whether the maize

goes through the parastatal channel or the private one. The commercial channel, controlled by parastatals and cooperative unions, still abides by the government rule, thus "controlling" the price of mealie-meal.

Private hammermill operations (both rural and urban) are mostly service oriented. They cater to persons who have their own maize. Thus, the rural millers' share of the urban market is virtually zero.

IMPACT OF CURRENT PRICE AND MARKETING POLICIES AND PRACTICES ON FOOD SECURITY--SUMMARY

Price policies and marketing arrangements have significant influence on the total amount of maize marketed and household food security. Some of the implications include:

i) The decontrol of producer fertilizer prices may not increase the marketed output of maize. For decontrolled input/output prices to influence marketed output and food markets (including those marketing substitute traditional crops), markets must work efficiently. Improved infrastructure, especially roads and storage facilities, are a must. Prompt payment to the farmers by the official channels, as buyers of last resort, will be needed. Low transportation costs will be needed in order to deliver maize to consumers at the lowest price possible. Generally market coordination must become economically efficient.

With the crop production pattern expected to change, maize prices will be relatively high in those areas with comparative advantage namely the Southern, Copperbelt, Central, and Lusaka provinces. Other areas will concentrate on other crops such as millet, sorghum, cassava and cash crops. Imports may be necessary and, in themselves, are not unwelcome as long as the country has a positive balance of trade and is at a comparative disadvantage in the production of the imported crop.

ii) Retail prices are expected to increase once the full liberalization of the economy occurs. Many households will not easily afford maize meal due to the decreased purchasing power of the local currency. The effects of higher wages, unemployment and inflation will no doubt make the situation uncertain in the short run. The need for some form of subsidy will be required for the people without purchasing power in the free market system. (The coupon system is to end in 1992). It will take time for prices to stabilize. A scheme for purchasing and releasing maize stocks to stabilise prices might be appropriate. In fact, the government has been planning a

reserve stock of 2.5 million bags of maize. This has not happened due to poor harvest, poor institutional arrangements and/or lack of storage facilities.

iii) Current policies are trying to restrict credit to farmers, contract the money supply and reduce the high rate of inflation. Less credit with high fertilizer prices may limit farmers access to important inputs and threaten their productivity. Low productivity also threatens farmers' incomes and food security.

iv) The removal of input subsidies will make traditional crops more competitive. With respect to food security, a rediscovery of consumer taste for the traditional commodities will be necessary. Transitory food insecurity may be a reality for many rural households.

v) Liberalization of the marketing system will not automatically result in an efficient market. This may be particularly acute in the Zambian situation because government involvement prevented the development of marketing skills in the private sector. The cooperative movement is particularly vulnerable.

The PCS's may be best placed to gather information, assemble maize and channel inputs (because of economies of scale). These institutions could become important not only in the short run, but also in the long run especially in the remote areas of the country. They can contribute to food security by linking surplus maize supply to deficit areas.

vi) The lack of an existing trader class will also retard progress towards "delinkaging" government from the marketing of crops. Investments in transportation and storage are costly. Fortunately, rural milling has been revived due to lack of a backward maize/maize meal linkage. With the removal of pan-territorial and pan-seasonal prices, transportation and storage will improve. This has happened in the case of beans where private traders locate, store (fumigate) and speculate in the commodity.

vii) The development of a trader class will not only improve the efficiency of the market, due to competition, but also generate employment. Employment opportunities will improve incomes and help contain the rural-urban migration.

viii) The pace of adjusting to the new reforms is expected to be relatively fast. The collapse of the existing market system has forced local initiative to develop. The 1990/91 drought has reduced maize supplies providing conditions for large marketing margins which are conducive to private trading.

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Appendix 1. 1991/92 AGRICULTURAL SEED PRICES

SEED TYPE	VARIETY	UNIT	RETAIL PRICE
Maize Seed	MM603/604	50Kg	2,265.00
	MM504/612	"	2,265.00
	MM752/601	"	4,220.00
	MM501/502	"	4,220.00
Sorghum	WSC 389	50Kg	900.00
	WSV 187	"	900.00
	MMSH 375	"	2,110.00
	MMSH 413	"	2,110.00

Maize seed and sorghum come in 50, 25, 10, 5 and 2Kg packs.

Source: Zambia Seed Company Limited.

10

STOCK MANAGEMENT: PROBLEMS AND POLICY UNDER MARKET LIBERALIZATION FOR GRAINS IN TANZANIA

H.K.R. Amani &
W.E. Maro[1]

INTRODUCTION

Market reforms were initiated in 1984, have continued through 1991 and are likely to continue into the future. The most recent (July 1990) reforms include the deconfinement of all producer prices, the deconfinement of wheat marketing and the transfer of the Strategic Grain Reserve (SGR) from the NMC to the newly established Food Security Unit within the Ministry of Agriculture, Cooperatives and Livestock Development. Market reforms have not encouraged traders to hold stocks for release in periods of food shortages. Except for food stock management at the national level, food stocks are held by producers.

This paper examines policy issues relating food security to stock management at the national and rural household levels. Food security reserve stocks at the national level and external trading will be considered jointly as they are interdependent, i.e., stocks are considered in relation to a trade strategy.

Stock Management at the National Level: The Strategic Grain Reserve

The Tanzania Strategic Grain Reserve (SGR) is a quantity of grain owned by the government and kept in addition to the commercial stocks of the Cooperative Unions/NMC. The SGR can only be released with the consent of the Minister of Agriculture, Cooperatives and Livestock Development on the advice of the Food Security Unit.

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The SGR in Tanzania began with the food crisis of 1973-74. Food worth more than 140 million US dollars was imported. Drought was the major cause of that food crisis but other contributing factors were poor stock control, rapid depletion of commercial stocks, the instability of the commercial market and the expansion of the unofficial market. A 1976 FAO mission recommended the establishment of a Strategic Grain Reserve to cope with emergencies beyond the NMC's normal support to market outlets. The main issue was what constituted an emergency from a food security point of view? Under a "genuine" emergency, food should be distributed at a discounted price or free, implying that the commodities would be distributed at a financial loss.

The government accepted the FAO recommendation to establish an SGR as one of its food security instruments during production shortfalls. Storage facilities to house the SGR were constructed in Arusha, Shinyanga, Iringa, Dodoma, Makambako and Dar es Salaam. The initial (1978) stock of 100,000 tons of food grains was provided by donors. There is no information on how the 100,000 tons figure was derived or how it relates to actual requirements during food crises. The 1973-74 food crisis mostly affected the urban population and the SGR was intended, at that time, to address the food security needs of urban areas.

By 1981, the initial reserve of 100,000 tons was exhausted through sales to cope with serious food shortages during the early 1980's, particularly 1980/81. Unlike the 1973-74 food crisis, the post 1980/81 food shortages also affected rural areas. Thus, the SGR whose target group was mainly the urban population had to be shared with deficit rural households. The SGR ceased to exist between 1981 and 1986 partly because sales by the NMC from the grain reserve were not fully compensated by cash deposits into the counterpart reserve fund. According to FAO (1986), in 1986 the Reserve fund stood at 55 million shillings compared to an estimated net 128 million shillings which should have been deposited. The 55 million shillings in the Fund could buy only 6200 metric tons of maize at the 1985/86 NMC ex-store price.

A follow-up FAO Food Security Mission in 1986 reviewed the SGR situation and came up with a number of proposals to rebuild and manage the SGR. The Missions' proposals were aimed primarily at ensuring that the SGR would only be utilized to meet emergency food requirements and that funds from sales from the SGR would be used to replenish the SGR following its drawdown.
The specific recommendations of the FAO Food Security Mission were (World Bank 1988, Tanzania government 1988a, 1988b and 1988c) that:

- the government be the owner of the SGR.
- the SGR be used only during emergencies,

- what constitutes an "emergency" is to be identified by the food security unit (FSU),
- SGR stocks only to be released on authority of the Prime Minister's office on recommendation of FSU,
- an SGR unit be established within the Ministry of Agriculture -- headed by a Food Security Officer,
- NMC continue to manage the SGR on behalf of the government in return for a reimbursement of all expenses resulting from the SGR operations, and
- a Food Security Reserve Fund be established within government accounts.

During the 1988/89 marketing year, the SGR was re-established by purchasing 112,000 tonnes of domestic maize. Twenty-nine thousand tons of maize was purchased during the 1989/90 marketing season bringing the total to its target level of 150,000 tons. Part of this stock however, was used by NMC to fulfil its own commercial targets. Thus, the government transferred the management of the SGR to the Food Security Unit of the Ministry of Agriculture partly because of NMC's mismanagement of the SGR and partly due to the government's decision to depoliticise NMC so it can act as a commercial entity.

Justification for the SGR

Is there a need for an SGR in Tanzania, a country which is not landlocked? It is justified as follows: First, the degree of climatic variability and the relatively small proportion of national grain production traded through the official channel can shift the domestic market rapidly from a surplus to a deficit position. Second, the country is still facing a chronic shortage of foreign exchange so that the availability of foreign exchange for commercial imports cannot be guaranteed at short notice when the need for imports arises. Lastly, while concessional food aid is normally available to meet emergency food requirements, there is a negotiation, contracting and delivery time lag for such imports of between 3 and 6 months.

Cost-Effective SGR

The costs of Reserve stockholding are substantial (Tanzania Government 1989a) due to the high cost of storage facilities, their maintenance and depreciation; substantial losses attributable to the decline of product quality, for stocks held for prolonged

periods; and high interest charges on capital tied up in grain. The government has decided to rotate part of the SGR via annual commercial purchases and sales by the NMC and to compensate the NMC for the costs of undertaking this stock-recycling.

A suggestion to minimize the costs, risks and operational problems of managing the SGR would have Tanzania splitting the reserve into a physical and a financial reserve of foreign exchange (Tanzania Government. 1987; Gray and Baker. 1988). A financial reserve has the advantage of earning interest and overcoming foreign exchange constraints. However, there are opportunity costs in maintaining a foreign exchange reserve. In the Tanzanian context, maintenance of a financial reserve is difficult for two main reasons. First, the country faces a chronic shortage of foreign exchange and it would be difficult to raise the hard currency for such a financial reserve. Second, there is the problem of maintaining the discipline required to eliminate the possibility of the financial reserve being diverted to other uses (Tanzania Government. 1987). Thus, for a country like Tanzania with a foreign exchange shortage, the opportunity costs of holding a financial reserve (in foreign currency) are high. It must also be remembered that a drawdown in the financial reserve requires replenishment in terms of foreign exchange. Even if the government could attract donor support for such a reserve, the opportunity costs of such support are likely to be high in view of other demands for foreign exchange.

However, a combination of physical stocks and a financial reserve could minimize costs of holding stocks and maintaining a financial reserve.

Important Issues Concerning the SGR

The problems of the SGR (its role, procurement and management) centre on its functions size and composition, and the mechanism by which the use of the Reserve is triggered. The functions of the SGR under market reforms are not clear. With a targeted level of 150,000 tonnes, it would appear that the function of the SGR is to deal with famine. The amount is too low to serve as an intervention (buffer) stock needed for effective implementation of price stabilization. However, the issue of price stabilization under the current decontrol policy is very important.

Since the 1988/89 marketing season, the NMC is no longer obliged to buy all crops purchased by cooperatives for its commercial operations. More recently, the government decontrolled all producer and consumer food prices[2] except the price of sugar. Prices of food, to a large extent, are determined by the market--imperfect as

[2] **The government fixes an indicative (floor) price for major food staples like maize, paddy and wheat. Cooperative are obliged to pay at least this price while private traders are not. This anomaly is yet to be corrected.**

it is. In order to stabilize both producer and consumer prices for food security purposes, the government needs to be the buyer and seller of last resort. To fulfil the responsibility of buyer and seller of last resort, the government not only needs a Strategic Grain Reserve for famine situations but also an intervention stock for stabilizing prices.

The problem of expanding the SGR to include a buffer stock for price stabilisation is lack of funds (Tanzania Government. 1988a). During the 1988/89 market season, the government spent about US $10.2 million to support (producer) maize prices in the remote regions of Rukwa and Ruvuma. These regions were excluded from the commercial maize operations of the NMC[3] and neither private traders nor the cooperatives were able to buy excess supplies of maize from these regions (Tanzanian government 1988b). Since then, the government has continued to buy maize for the SGR from these remote regions, high cost of transportation notwithstanding. As table 1 shows, the two remote regions were the main source of maize grain for the SGR. Others are the Iringa and Mbeya regions which are accessible transport-wise.

Table 1: Sources of Maize Grain & Paddy for Strategic Grain Reserve 1990/91

	Maize Grain		Paddy	
Region	**Quantity (tons)**	**% of the Total**	**Quantity (tons)**	**% of the Total**
Rukwa	22217	29.7	---	---
Ruvuma	17867	23.9	---	---
Iringa	17619	23.5	---	---
Mbeya	6970	9.3	260	4.6
Arusha	4000	5.3	---	---
Singida	3124	4.2	---	---
Dodoma	1600	2.1	---	---
Mwanza	---	---	2428	42.6
Shinyanga	1486	2.0	2261	39.7
Tabora	---	---	499	8.8
Kigoma	---	---	245	4.3
Total	74883	100.0	5693	100.0

[3] **Due to logistical constraints and high transport costs.**

Source: Ministry of Agriculture, Food Security Unit (1991) Unpublished information.

Given that these remote regions are the main producers of surplus maize in Tanzania, government purchases comprise only a fraction of the marketable surplus. The responsibility of buyer and seller of last resort was left to the respective Regional Cooperatives. Today these cooperatives, like those in other regions, are expected to buy all scheduled crops from farmers and to develop marketing strategies to dispose of the crops. Financial problems, together with marketing problems such as distant markets and high transport costs, have made it very difficult for cooperatives to perform the function of buyer and seller of last resort. This issue remains unresolved.

Size and Composition of the SGR

While there is no dispute about the need to maintain the SGR, the magnitude and composition of the SGR is an issue. The key requirement on the size of the stocks is to relate the SGR to circumstances for which imports are required. However, there is no simple relationship between stock levels and the need to import. A minimum level of the SGR, below which an order for imports should be placed, is difficult to define. The difficulty is that the appropriate minimum level varies with the prevailing market situation and the month of the year.

It has been estimated that, due to scarcity of foreign exchange and other structural problems associated with import procedures for processing food, the transportation and distribution of imported food will take between three and four months. To meet the per capita food requirements during a "normal" food crisis, a minimum of 150,000 tons of SGR is required (Tanzanian Government. 1987 op. cit.). In the event of severe famine, that amount may not last more than two months.

Related to the issue of the size of SGR is the question of its composition. The 1976/77 Household Budget estimates that about 80 per cent of the urban population cereal requirements is obtained from maize (53%), rice (24%) and wheat (2%). The rules governing the SGR do not specify what the composition of the stocks should be. However, due to processing problems, cassava, sorghum and millet are not included in the SGR. The costs of procuring and maintaining wheat and rice would make it prohibitive for the government to include them in the SGR. In addition, current consumption requirements for wheat and rice exceed available supplies. Should the SGR contain a substantial amount of these two food crops, pressure to divert them to meet current consumption would be irresistible. Thus, almost the entire SGR should be maize. Currently, some paddy has been purchased for the SGR, Table 1. Due to high transport costs from the main paddy producing areas to the main consuming areas, private traders have not responded significantly to the increased supply of

paddy. Thus paddy was purchased not so much for the SGR as for the purpose of relieving farmers of the huge stocks they could not sell.

Defining an Emergency

The problem is defining what constitutes an emergency for the purpose of triggering the release of the SGR. Currently, the SGR stocks can only be released on authority of the Prime Minister's Office (PMO) on recommendation of the Food Security Unit. To avoid misusing of the SGR, the conditions that constitute an emergency and the procedures by which the Prime Minister's office consents to the use of the SGR must be defined and strictly followed.

Stock Management: Household Level

Government policy on stock management, until now, has been directed toward a large national operation such as the SGR. There are no policies that would encourage stock management at village, district, and regional levels. Recent investments in storage facilities at the village level have nothing to do with stock management for food security purposes. Some villiage storage facilities[4] have been constructed with the objective of storing crops pending collection by Cooperative Unions/NMC. In this case, storage is considered as an extension of transportation. Because of a shortage of transport equipment, and/or due to seasonal nature of road conditions, storage is used to buy time until transport equipment is available or until the roads are passable. Village storage facilities are also used to store agricultural inputs and equipment. There is evidence to show that many of these village storage facilities are used only 3 to 4 months in a year (J. Coulter and P. Golob. 1991).
A major reason for ignoring the need for stock management at the village level or district level is the whole issue of rural-urban bias. Rural areas are assumed to be food secure and the probability of a severe food crisis low. Another reason is that, in the case of rural famine, the quantity of food that would be required for famine relief is low compared to what the requirements would be in urban areas. The small rural famine relief required, it is argued, could be supplied by the SGR, transport bottlenecks notwithstanding.

The current market reforms are inadequate to encourage private traders to invest in storage facilities to supply markets during food shortages or during the hungry season

[4] **About 960 village stores with an average capacity of 300 tons have been built. Funds for building them came from various donors.**

(the immediate pre-harvest period)[5]. Apart from the SGR, stock management takes place on-farm.

Data from a Household Food Security Survey in four regions, namely Arusha, Singida, Ruvuma and Mtwara[6] relates household food security under market liberalization to household level stock management.

Household Storage

About 70 to 80 percent of total grain production in Tanzania is kept at the household level in traditional storage facilities. (Tanzania Government, Marketing Development Bureau, various issues). Stocks held by rural households are meant to meet food requirements of the household and, in the event of need for cash, for sale.

The inability of Cooperatives to buy from farmers, and the refusal of private traders to buy from remote and low supply areas due to high transport costs, has forced some farmers to construct either permanent or temporary storage facilities. The following table shows construction of storage before and during a marketing season.

Table 2: Proportion of Households Which Constructed Storage Capacity Between March and September 1990, By Region

Type of Storage	Region				Row Total % (n = 1036)
	Mtwara % (n=222)	Ruvuma % (n=374)[a]	Singida % (n=198)	Arusha % (n=220)	
Permanent	29.3	49.6	83.8	48.6	51.9
Temporary	70.7	50.4	16.2	51.4	48.1
Column Total	21.8	36.8	19.5	21.9	100.0

a. The number of households in the sample was 240. However, some households have contructed both permanent and temporary stores.

Source: Computed from Survey data

[5] **See Amani and Maro. 1991. "Policies to Promote An Effective Private Trading System in Farm Products and Farm Outputs". Paper presented to the Seventh Annual Conference on Food Security in Southern Africa, 28th to 30th October, 1991.**

[6] **The survey was conducted in April and September 1990. Ruvuma and Arusha represent food surplus regions while Singida and Mtwara are food deficit.**

With the exception of Singida, the majority of the households in all other regions constructed temporary storage facilities. This reflects the high cost of building permanent storage facilities at the household level.

Permanent storage facilities include homesteads which are used both as homes and as stores, Table 3.

Table 3: Percentage of Households with Different Qualities of Storage Facility by Region: 1990/91

Quality of Storage	Mtwara (n=222) %	Ruvuma (n=374) %	Singida (n=198) %	Arusha (n=220) %	Row Total (n = 1036) %
1. Brick wall & iron sheets	8.2	8.0	7.2	4.1	7.1
2. Mud wall & iron sheets	18.5	2.8	8.2	8.3	9.6
3. Mud wall & thatched	29.0	34.0	4.3	35.3	27.6
4. Inside house	33.7	27.6	76.3	32.7	39.1
5. Outside House (covered)	0.9	18.5	1.1	0.0	6.1
6. Outside house (uncovered)	6.0	5.5	2.4	1.5	4.2
7. Other (specify)	3.7	3.6	0.5	18.0	6.3
Column Total	29.7	30.5	17.4	22.4	100.0

Source: Computed from survey data

In survey regions, many farmers hold stocks inside their homes, while a few store outside their homesteads. The probability of crop losses in the latter case is high. The traditional storage methods are low cost in terms of investment but may result in significant crop losses. When asked whether they have experienced any crop losses in storage, the households responded as in Table 4.

Table 4: Proportion of Households Which Experienced Crop Losses in Storage in 1990/91 Marketing Season, By Region

Response	Mtwara % (n=215)	Ruvuma % (n=214)	Singida % (n=135)	Arusha % (n=165)	Row Total % (n = 729)
Yes	39.2	31.8	25.9	27.3	32.4
No	60.8	68.2	74.1	72.7	67.6
Column Total	29.5	29.4	18.5	22.6	100.0

Source: Computed from survey data

The proportion of households which experienced crop losses is higher in those regions with more temporary storage facilities (Mtwara and Ruvuma -- compare tables 3 and 4).

The major causes of storage losses are insects, fire, theft and moisture. Insect damage is more serious than other causes of crop losses, Table 5. A combination of poor storage facilities and poor pest control strategies contribute to the losses. Heavy insect losses are found in those areas where farmers plant hybrid maize or seed obtained from the previous year's crop.

Table 5: Major Cause of Storage Losses; Proportion of Households Responding, by Region -1990/91

Cause of Loss	Mtwara % (n=84)	Ruvuma % (n=68)	Singida % (n=35)	Arusha % (n=45)	Row Total % (n = 232)
Insects	52.3	47.3	100.0	90.5	65.5
Fire	12.3	15.5	---	4.8	9.9
Moisture	---	9.3	---	4.8	3.4
Theft	20.0	15.5	---	---	12.1
Other (specify)	15.4	12.3	---	---	9.1
Column Total	36.2	29.3	15.1	19.4	100.0

Source: Computed from survey data

The 1989/90 production season was bad for most parts of the country. There was too much rain[7] in some regions, such as Mtwara and Arusha, and drought in other regions, such as Singida. In a normal production year, a single storage season lasts for about ten months (Golob 1986). Because of the poor production season, the average stock held and storage period were very low compared to the storage capacity, Table 6. With such low food stocks, many households were food insecure since low production also meant low incomes. Not only were the food stocks low but average losses due to storage were quite significant. In Mtwara, for example, average storage loss was 50 percent of the amount stored. Theft, insects and fire contributed to this high rate of storage loss.

[7] **There were floods in Mtwara (Masasi and Newala districts) and Arusha (mainly in Babati district).**

Table 6. Average Storage Period (months), Number of Months Profitable to Store, Average Storage Capacity (bags), Average Number of Unit (bags) Stored and Average Number of Units (bags) lost by Region: 1989/90 Season

Region	Average storage period (months)	Average storage capacity (bags)	No. of months profitable to store	Average no. of bags stored	Average no. of bags lost
Mtwara	1.8	19.3	2.2	1.0	0.5
Ruvuma	4.7	23.5	3.9	7.0	0.9
Singida	1.4	11.4	2.4	1.6	0.4
Arusha	4.9	21.2	2.4	9.3	0.1

Source: Computed from survey data

Household storage can be supplemented with village storage capacity if available. As table 7 shows, not many households in the survey had a nearby village store. Relatively high positive responses in Arusha and Ruvuma are explained by the recent deliberate decision to erect more village stores in the food surplus regions. Village facilities are available for use by farming households as show in Table 7.

Table 7. Does the Village Own Storage Facility?: Proportion of Households Responding, by Region 1990/91

Response	Mtwara % (n=215)	Ruvuma % (n=214)	Singida % (n=134)	Arusha % (n=166)	Row Total % (n = 729)
Yes	47.9	66.8	0.4	59.9	47.5
No	52.1	33.2	99.6	40.1	52.5
Column Total	29.5	29.3	18.4	22.8	100.0

Source: Computed from survey data

None of the households in Arusha and Singida region had used village storage facilities during the past three years, Table 8.

Table 8. Proportion of Households Which Have Used/Not Used Village Storage Facility in Past Three Years: By Region

Response	Mtwara % (n=215)	Ruvuma % (n=214)	Singida % (n=134)	Arusha % (n=167)	Row Total
Yes	20.0	25.7	---	---	13.9
No	80.0	74.3	100.0	100.0	86.1
Column Total	29.4	29.3	18.3	23.0	100.0

Source: Computed from survey data

In Mtwara and Ruvuma, 25% of the sampled households have used village storage facilities in the last three years. Reasons for using village stores include proximity and the availability of a village godown, Table 9.

Table 9. Reasons for Utilizing Village Storage Capacity: In Last Three Years

Quality of storage	Mtwara (n=43)	Ruvuma (n=55)	Singida (n=0)	Arusha (n=23)	Row Total (n = 121)
1. Close to me	20.9	5.5	0.0	0.0	9.9
2. Availability of Ready Market	0.0	16.7	0.0	0.0	7.4
3. Availability of storage space	79.1	77.8	0.0	100.0	82.7
Column Total	35.0	45.4	0.0	19.6	100.0

Source: Computed from survey data

Reasons given for not using the village storage capacity are shown in Table 10. Those households whose own storage capacity is inadequate, cannot entrust their own grain to a village store for fear of crop deterioration, theft and/or unauthorized sale by the union.

Table 10. Reasons for Not Using Village Storage Facility Region: Last Three Years

Quality of storage	Mtwara (n=43)	Ruvuma (n=55)	Singida (n=0)	Arusha (n=23)	Row Total
1. Insecure	11.7	0.0	0.0	14.5	6.7
2. Did not have much to store	2.2	7.3	0.0	16.2	6.4
3. Village has no storage	65.1	44.6	100.0	56.2	65.3
4. One storage is adequate	21.0	48.1	0.0	13.1	21.6
Column Total	28.2	26.1	22.0	23.7	100.0

Source: Computed from survey data

Conclusion

The impact of market liberalization on stock management is still emerging. Private traders do not hold stocks -- their trade is strictly on a spot basis. The market reform policies do not encourage private traders to specialize in stock management. Cooperatives, crippled by financial problems, are unable to manage stocks in rural areas.

The current centralized system of stock management is expensive and urban biased. Thus, a diversified pattern of government storage of food grains should include investment in and improvement of on-farm storage and storage by private traders and cooperatives. Household storage facilities for stock management are relatively cheap and emphasis should be placed on improving them.

The government should re-examine its policy towards the functions of the SGR. With the price decontrol for agricultural food crops, price and market stabilization may become a variable. The SGR may not be confined to emergency cases.

To minimize operational costs of that part of the SGR held in physical form, the government should seek donor support to establish a financial food security reserve that would be maintained as an external foreign exchange reserve.

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11

CHANGING MARKETING ENVIRONMENT, EMERGING PRICING ISSUES AND POLICY IN MALAWI

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INTRODUCTION

A number of studies and reviews exist on pricing policy regarding the smallholder agricultural sector in Malawi within the structural adjustment programme (SAP) of the 1980s. These especially pertained to input pricing and subsidy management; import-export parity and gross-margin pricing; fiscal and financial considerations; historical evolution of pricing policy; statistical estimation of supply responses; etc., (see bibliography). This paper focuses on: 1) reporting the extent to which changes in government, partial deregulation and pricing have altered the marketing environment using the data collected in the Food Marketing Liberalization Survey undertaken by the Centre for Social Research of the University of Malawi during 1990-1991; 2) discusses the potential for Government intervention to influence food grain markets and prices; and, 3) tests for the market-efficiency enhancement potential of market liberalization.

Overall Performance of Smallholder Production

A number of domestic and external forces and natural hazards have conditioned the performance of the smallholder subsector, but the differential outcome exhibited by various crops indicates that policies may have had a decisive role to play. The deadweight impact has been a depressed production in groundnuts and tobacco so that the balance of payments contribution of the subsector has not been satisfactory. The poor performance of maize production during 1984 - 87 was attributed mainly to the smallholder fertilizer subsidy removal programme which necessitated taking a cautious approach, given higher landed costs due to devaluations and inflated external transport costs. Although production has recovered, the structural problems of low fertilizer uptake and low proportion of hybrids to total production remain.

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The stagnation of the subsector is seen in the low growth in its contribution to Gross Domestic Product (GDP). Inspite of SAP measures, the subsector has been depressed since 1984. The contribution of the agricultural sector to economic recovery in the latter half of the 1980s decade was from the largescale subsector. Differential access to resources, technology and vulnerability to shocks are some of the factors responsible for differences in performance between these two subsectors.

A critical food security implication of the depressed productivity of the maize subsector is that domestic demand has persistently outstripped domestic maize production since 1985/86, excluding the refuge demand. (Estimated minimum consumption requirement is 945-1,000 kgs of maize per year or about one 90-kg bag per month for an average household of five). In general, Admarc regional net purchases show that the Southern Region tends to be a net importer of maize from the other two regions. It can be seen that the partial produce market liberalization introduced in 1987, the withdrawal of Admarc from unprofitable markets and our survey all have occurred during a tight domestic maize market. The survey was actually carried out against an 11% drop in maize production.

The Changing Marketing Environment

We examined the manner in which households and private traders responded to the 1987 marketing changes. Seventy four percent of the households interviewed in the Lilongwe Agricultural Development Division (LLADD) responded that maize has not been sufficiently available in the local markets in recent years. This percentage was lower in the other ADDs -- 49% for Blantyre ADD (BLADD) and 16% for Mzuzu ADD (MZADD). Admarc had closed about 50 percent of their markets in all areas. A majority to the respondents trade with Admarc (85%, 68.4% and 92.2% in LLADD, BLADD and MZADD, respectively). Admarc's closures did make a difference (86.7% in LLADD, 89.8% in BLADD, and 77.7% in MZADD). Fifty five percent in MZADD and 55% in BLADD claimed that it now was difficult to buy compared with only 6.6% and 12.7% who found it difficult to sell their produce. LLADD households, however, found the situation different as 43.3% found it difficult to sell while only 12.5% experienced purchasing problems with Admarc market closures.

Many households, however were looking forward to dealing with Admarc the following year -- 82.5% in MZADD, 76.5% in LLADD, and 67.3% in BLADD. The nature of the expected trade differed marketedly with BLADD households expecting to be net maize sellers to Admarc (65.8% selling with 24.5% buying). This 41% net selling position declined to 22.8% for the LLADD households with MZADD households expecting to be net maize buyers (32.4% as buyers and 11.8% as sellers). The percentages for MZADD households reflected the fact that 42.2% of the households expected to purchase inputs from Admarc compared to only 10% and 5.1% for LLADD and BLADD.

Those who did not expect to deal with Admarc in the following year (32.7% in BLADD, 17.5% in MZADD and 23.5% in LLADD) cited distance to Admarc market sites and unfavourable prices as the key deterrent factors. For instance, 70.1%, 41.8% and 39.5% in MZADD, LLADD and BLADD, respectively, thought Admarc market was too far away while 14.9%, 38.5% and 43.3%, respectively, thought that ADMARC's selling prices were too high or buying prices were to low. Only 3.5%, 7.6 and 5.7% of the households which did not expect to deal with Admarc in MZADD, LLADD and BLADD, respectively, thought that private traders offered better prices and services than Admarc.

It has been established empirical from econometric analyses that smallholders respond rationally to relative prices. Qualitative responses to this question showed that only LLADD households (61.8%), on average, expected to respond positively to expected producer prices. A majority in BLADD (53.6%) and MZADD (62.1%) did not expect to be influenced by expected prices in their crop production decisions. For a majority, input decisions turned out to be binding constraints, including land reallocations. Thus, non-price variables play an important role in smallholder's supply calculations.

Traders' Responses

The entry of private traders was quite substantial and favourable in the Central and Southern Regions. Unfortunately there was no private trader in the survey areas of Mzimba Central or South. In LLADD, of the 53 traders, more than 40% had been in the business of trading in agricultural produce for only three years at the time of the baseline survey -- more than half, for five years. Ten of the 53 traders had been in business for only one year. Another indicator of favourable response to liberalization is that 82.1% and 72.7% of traders in LLADD and BLADD, respectively, claimed that competition in produce marketing had increased. The level of education for traders is substantially higher than for households. About half of the traders belong to an elitist group holding some leadership position or belonging to some socio-ecomic commmittee in a traditional, party, religious or business association.

Planners question whether private traders are willing to trade in food deficit areas. In LLADD and BLADD, 76.5 % and 94%, respectively, of the traders thought that traders were generally willing to trade in deficit areas as sellers. Thirty-eight point five percent and 34.4%, respectively reported that they were already trading there. Moreover, 22% and 56.3%, respectively, were planning to begin selling in food deficit areas. Low demand for sales in food deficit areas was not a significant deterrent to selling there.

How have the regulatory changes affected traders? A general feature of the economic liberalization process in Malawi is that local government authorities, such as Municipal and District Councils, tend to control and/or institute additional controls on certain items that have been liberalized by the national or Central Government. Most traders,

appear to be well aware of the price regulations of the District Councils -- they think that they are not rigorously enforced and tend to be predictable. Sixty-seven percent and 52% of the traders in BLADD and LLADD, respectively, reported that these price regulations did not influence their choice of grain trading places. They avoided places where these regulations applied strictly. In LLADD 73.1% and 80.8% felt that these controls did not affect buying and selling prices of grain while the comparative figures for BLADD were 61.8% and 67.6%. The effect of these controls was stronger in BLADD than in LLADD with 23.5% and 17.6% of traders in the former ADD reporting that controls tended to make buying prices high while depressing selling prices.

Unexpectedly, local controls, Central Government pricing policy and the partial market liberalization seem to have had positive regional effects on the trading opportunities of private traders. The 1987 produce marketing reforms led to the introduction of two official prices, one being the official price traders receive when selling maize to Admarc at Admarc's divisional markets, a price higher than the producer floor price. The other price is the maximum consumer price traders are supposed to charge consumers -- a price higher than ADMARC's consumer price. This pricing arrangement is designed to get around the constraint imposed by the pan-territorial pricing structure. It is also intended to facilitate the flow of maize from rural areas to major Admarc depots and urban areas and back to rural areas during periods of scarcity. Changes in Government price policy affected half of the traders in LLADD and 58.8% in BLADD. It enabled 71.4% in each ADD to earn more profit. Twenty-eight point six percent of the traders in BLADD could buy more crops.

Traders' responses and opportunities, however, are constrained by liquidity and infrastructural factors. The dominant marketing constraints, cited by 38.2% of the BLADD traders, are lack of credit followed by unavailability of transport (23.5%). If transport costs are added, then transport accounts for 35.2%. For Lilongwe, lack of credit and transport (20.2%) were equally important -- with transport in general, 35.6%. These factors outweighed the storage constraint which was cited by only 10.6% in LLADD and 7.4% in BLADD. Being mostly "Spot Marketeers", cash and transport problems dominate.

The implications of these constraints are two-fold. First, although private traders do not seem to fear Admarc's as a competitor, the traders' potential is seriously undermined by Admarc relative superiority in access to liquidity with which to command resources and marketing logistics. Second, the credit/transport constraint may have significant implications for spatial or trans-regional market intermediation and integration by the private sector.

Production-Marketing Cycles and Price Movements

The seasonal cycle of maize prices, observed at the major urban markets, has created keen interest in food-security-concerned circles. The Department of Economic Planning and Development (especially its Food Security and Nutrition Unit or FSNU) is concerned about the lack of a precise explanation for the rise in maize market price in the face of the availability of maize stock at Admarc outlets (Food Security and Nutrition Bulletin, March, 1991, p.11). Their concern is motivated by the desire to protect low-income households against high consumer prices. They favour increased intervention to reduce market prices to official consumer price levels (Ibid, p. 12).

An examination of the maize price cycle reveals that prices start rising in the June-August period and continue to rise until they peak in December-January (sometimes February). Thereafter they fall until they bottom out in June-August. The harvesting and marketing season starts in April, with Admarc purchasing peaking during June-August and ending in October-November -- the planting period. The price decline starts in the pre-harvest period of January-March and its trough coincides with Admarc's peak purchasing period.

The survey carried out weekly collection of data on prices in some markets in rural areas and centres. Monthly prices were collected at Nguludi and Blantyre, and at Chimbiya and Lilongwe, respectively and matched with the official minimum producer price and the private trader official maximum consumer price (PTMCP). Rural market consumer prices also start rising when urban market prices start to rise. However, they continue rising into the pre-harvest period after the urban markets have peaked.

The seasonal food-security cycle, or maize depletion schedule, is related to the household maize price cycle. Survey data indicate that a quarter of the households interviewed, in all survey areas, harvest enough maize to reach the next harvesting season. About 32% of the households deplete their stocks during July-December, when prices are rising, while 39% (almost 47% in LLADD) deplete stocks during January-March when urban prices generally begin to fall.

It appears that demand pressures in the maize market start early, before official concerns about food insecurity are traditionally revealed. Heavy purchasing to accumulate stocks, together with and early distress selling by households to earn cash, may be contributory factors to apparent maize scarcities and the concomitant increases in price as early as July-September. The collapse of prices in urban centres, while rural prices continue to rise unabated, reflects the historical urban bias nature of the marketing system. Indeed Admarc has more purchasing points than selling outlets in rural areas. This reflects the failure of the marketing system to return sufficient stocks to the rural areas during the pre-harvest period.

This observed price cycle has some implications for price monitoring for gauging trends in market pressures. Price monitoring is useful for detecting price rebounds. This means that the exercise has to be continuous. In this respect, market pressures can be detected as early as July. Beyond that point, price monitoring *per se* may be misleading or inappropriate in some rural markets where maize is not available. Monitoring quantity or market activity rather than price is more useful. Counting the number of traders may be a meaningful gauge of scarcity. In areas where markets do not exist, therefore, other information collection mechanisms will have to be used.

Market intervention designed to reduce market prices to officially desired limits must start early and not be postponed to December-February when prices have already peaked. Prices in some rural markets tend to be above the officially stipulated private trader-consumer prices for much of the year. Large stocks would be required for effective intervention.

Grain Market Liberalization and Market Efficiency

One reason for encouraging increased private participation in produce marketing is to promote market efficiency. The advantages cited are associated with the characteristics of a competitive market system versus monopoly and/or state intervention. The effectiveness of liberalization, as revealed in market performance, is empirically tested in terms of spatial market unification/integration and allocative efficiency over time and reported here.

Spatial market integration is achieved when prices from different regions tend to converge or move in tandem, i.e., prices in exporting regions tend to be related to those prevailing in importing regions plus transport costs (Ravallion, 1987). Under conditions of severe market segmentation, deficit regions are unable to obtain surplus grains from surplus regions. This stifles commodity arbitrage maintaining scarcities in deficit regions and excess supply in surplus areas. This results in price divergence between regions.

To evaluate the impact of market liberalization on the potential for spatial market unification, the Southern Region of Malawi is defined as the deficit region importing surpluses from the Central and Northern Regions. Maize grain prices collected monthly by the National Statistical Office (NSO) at Blantyre, Lilongwe and Mzuzu city markets have been used. The period January 1984 to December 1986 represents the pre-liberalization phase and the January 1988-June 1991 period the post liberalization phase.

The concept of cointegration was used to test the long-run relationship of Blantyre market prices and prices in Lilongwe and Mzuzu markets. Two economic variables are cointegrated if the residuals from the static model are found to be stationary, i.e., exhibit

an order of integration equal to zero or I(o). Two tests were used, the Durbin-Watson which tests the null hypothesis of stationarity against non-stationarity (as used by Sargan and Bhargava, 1983) and the Dickey-Fuller procedure which tests the null of non-stationarity against stationarity. (Dickey and Fuller, 1981; Engle and Granger, 1987).

Weak cointegration emerged with regard to Blantyre and Mzuzu prices for the entire period and the pre-liberalization phase. (Tests No.4 and 5). Significant cointegration was found between Blantyre and Lilongwe market for both periods with the strength of significance increasing for the post-liberalization period, even for Blantyre and Mzuzu prices. These results indicate that markets seem to have become more integrated during the partial liberalization period.

Allocative efficiency over time refers to the extent that stock adjustment is used to influence prices over time. This measure is crucial in gauging the role of private traders in the determination of seasonal prices. An efficient trading system tends to be price stabilizing between periods of surplus and scarcity, ensuring a steady flow of food among seasons.

Monthly average stock adjustment was determined using survey data for LLADD traders. Stock adjustment refers to monthly stock accumulation or decumulation -- closing stock minus opening stock for the month. There was a general tendency for traders to be in selling positions, especially during January-March, although stock accumulation started to diminish much earlier.

To evaluate the effectiveness of market liberalization in enhancing intertemporal allocative efficiency, the relationship between increased private participation and price variations was examined. Market prices for Blantyre indicated that the amplitude of price fluctuations widened soon after June 1987, narrowed between mid-1988 and end of 1989, before rising again. This also was true for Lilongwe prices although the widening of the amplitude started about a year before market liberalization. For Mzuzu, it is clear that the seasonal amplitude has tended to increase throughout the post-liberalization phase.

The different measures of yearly variation for each year since 1984 are reported. On average, the degree of price variation was lower prior to liberalization for all the markets as measured by variance and standard deviations. The year of liberalization experienced the largest degree of price instability. However, the degree of instability measured by the coefficient of variation tended to decline during the post-liberalization phase (even for Blantyre) up to 1989.

A number of factors may have been responsible for the increased instability observed in the later years. First, it may have been a result of increased domestic scarcity leading to market uncertainties. Second, Admarc's withdrawal from the marketing scene may

have worsened the situation. Third, frequent official price revisions may have increased the sensitivity of market prices, e.g., the sharp increase in the mean prices after 1987 Indeed, cointegration tests between city market prices and official producer prices revealed significant cointegration of Blantyre and Mzuzu prices with official producer prices after 1987. The reverse however, was observed for Lilongwe prices. These analyses point to the potential of the private sector in stablising prices over seasons with official intervention influencing price trends. Liquidity and infrastructural constraints limit the effective private sectors' role in this regard. Survey data indicate that very few traders transact for more than three-four months or maintain stocks for extended periods.

Concluding Remarks

A number of observations emerge from the preceding discussion regarding the impacts of the 1987 reforms on households and traders. Constraints to emerging pricing policy in the food grain markets also are identified. We see from the households point of view that, although many households deal with Admarc, their perceptions of dependence differ across regions. Specifically, households in the MZADD seem to depend on ADMARC for inputs more significantly than households in BLADD and LLADD. The importance of prices also varies regionally with a majority of households in LLADD claiming to be more influenced by producer prices than BLADD and MZADD households. Non-price factors, especially inputs and land reallocation, are also important in their production decisions.

The response of traders to the reforms varied from being none in MZADD to a rapid response in the number of traders in LLADD. Competition in produce trading has reportedly increased. The traders appear venturesome and are prepared to fill the gap left by Admarc withdrawal from deficit rural areas even as sellers. The partial revision of panterritorial pricing affected trading performance and improved profitability positions of those traders positively influenced by the policy shift. Constraints to increased private traders' contribution are lack of credit, limited transport facilities and high transport cost. While these constraints are already familiar, there is some evidence to suggest that local government authorities' regulatory mechanisms may be constraining traders' responses to reforms in some areas.

The seasonal maize market price cycle reveals a bottoming out of prices during July-August-September when stocks kept by traders, and especially Admarc, are at high levels. However, urban market prices peak during December-January and start to fall during the pre-harvest period. In contrast, rural market prices continue rising unabated during the pre-harvest period. The early start in the price rise trend is due to heavy restocking of maize and distressed household selling -- both of these activities lead to withdrawal of maize from the market at an early stage. The marketing system's urban bias nature tends to exacerbate relative maize scarcities in the rural areas while

generating relative abundance in urban areas during the pre-harvest period. Nonetheless, urban prices stay above the official consumer ceiling prices which suggests the overall inadequacy of intraseasonal maize reserves.

Efficiency effects of market liberalization were gauged from tests on spatial and intertemporal market integration. Although the market intermediation mechanisms are not fully understood, urban markets in different regions show signs of increased integration. Furthermore, market prices have become more responsive to official prices since liberalization.

Policy wise, a number of suggestions can be offered. To enhance responses to the price mechanism, a supportive hand is required in the form of a significant reduction of non-price constraints, especially improvement of access to credit for both farmers and traders and transport capacity. There is also the need to eliminate or harmonize local government and national regulations where they are incompatible with market liberalization.

While intra-seasonal variations in prices are essential, efforts have to be made to reduce the urban bias which is historically built into the marketing system. Since produce prices start to rise soon after the peak of the purchasing season, intervention through stock management, which is designed to moderate overshooting of prices, has to start quite early before market prices peak. This is, however, dependent on holding substantial quantities of stocks throughout the September-June period. Monitoring of market pressures should be based both on price trends and observations of the extent of market activity. Since, in some rural areas, organized periodic markets and trading seems to be lacking, other mechanisms of collecting information pertaining to trends in food insecurity have to be explored. Furthermore, a supportive hand should be given to the establishment of a trading culture in such areas.

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IV

Food Entitlement -- Policy Alternatives to Improve Households' Access to Adequate Food and Income Growth

12

HOUSEHOLD FOOD AND INCOME SECURITY UNDER MARKET LIBERALISATION: EXPERIENCE FROM MALAWI

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INTRODUCTION

Macroeconomic Background

The economy of Malawi experienced rapid growth for over a decade after independence. This growth occurred mostly in the agriculture sector where estate production grew faster than smallholder output. Malawi's economic difficulties emerged in the late 70's and early 80's, mainly due to falling terms of trade; drought which reduced export volumes and necessitated the importation of staple food; disruption of the transport system through Mozambique forcing Malawi to use more costly alternative routes; an increasing debt service burden; and inefficiencies in many parastatals.

The government approved several sectoral policies and measures to alleviate these problems which included encouraging increased agricultural production and diversification; maintaining food self-sufficiency and diversification of exports through smallholder producer price incentives and a credit facility for the estate subsector; removing the fertilizer subsidy to the smallholder subsector; and the establishing of an estate sector management training and extension service.

It was recognised that the marketing structure of smallholder output was not conducive to growth. Trading in the sector was left primarily to the Agricultural Development and Marketing Corporation (ADMARC) and prices were kept deliberately low to meet other macroeconomic objectives. Government liberalized the market for smallholder output to overcome the problem of declining agricultural production by restructuring ADMARC and allowing private traders to transact in smallholder agricultural output.

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Restructuring of ADMARC

ADMARC was established in 1971, taking over the Farmers Marketing Board (FMB). Its main objective was to buy, store, process, adapt for sale, distribute, insure, advertise, and transport all products grown for sale on customary land. ADMARC was mandated to sell produce for domestic consumption at prices that covered marketing costs except where government felt that a lower price was in the national interest. The difference between the below cost price and the cost recovery price would be reimbursed to ADMARC by government.

During the 70's, ADMARC taxed smallholders by purchasing their produce, especially tobacco, below market value. The resultant profits were transferred to the estate sector and industry. In addition, these profits financed ARMARC's development role in the smallholder sector, i.e., subsidizing an extensive network of markets; defending pan-territorial prices for producer goods and inputs; cross-subsidizing producer prices between tobacco and food crops; and defending the subsidized consumer price of maize for urban dwellers.

ADMARC enjoyed good profits up to 1978. It then began to make losses, and by 1982, it could hardly finance the procurement of fertilizer for the smallholder sector. Factors contributory to this poor performance included heavy involvement into non-marketing areas; costly financing and management of the 180,000 MT strategic grain reserve; ever-increasing transport costs; deteriorating terms of trade; and the subsidising of inputs, especially seeds and fertilizer. ADMARC was instructed to operate commercially by closing down all uneconomic markets and to compete with private traders. Producer prices and ADMARC selling prices were increased and frequently reviewed. The corporation gave up most of its non -agricultural trading activities. The agriculture (General Purpose) Act in June 1987 was enancted to liberalise agricultural produce marketing.

The Agriculture (General Purpose) ACT

ADMARC essentially had exclusive rights, until 1987, to purchase maize from smallholders, export, import and resell to consumers. However, private trading flourished simultaneously, albeit at a small scale. The financial problems faced by ADMARC led Government to revise crop trading operations with a view to increasing marketing efficiency by allowing the corporation to compete with private traders. Only traders transacting small quantities and selling directly to consumers or in local markets had been operating, but the Act allowed big traders to enter the market for smallholder agricultural output.

The Agricultural (General Purpose) Act provides the legal basis for private trader operations and encompasses the following features:

(a) All traders must be licensed annually;
(b) They must operate in specified markets;
(c) Only Malawian nationals or businesses are eligible;
(d) Minimum prices are to be adhered to;
(e) Exports are to be controlled through the existing export licensing system; and,
(f) Monthly returns on volumes and values of the traded produce must be reported.

These reforms created some problems relative to smallholders' income and food security. The closure of ADMARC'S uneconomic markets created an unfilled gap as private traders did not immediately fill the vacuum for the same reasons ADMARC had abandoned them. The smallholder farmers in these remote, inaccessible areas were left without a channel either to sell their output or to purchase inputs.
Further, the licensing system proved to be unforceable with many traders buying at less than the stipulated floor prices and filing false purchase returns, making accurate national food security monitoring impossible. Furthermore, the shortage of credit for private sector investment and the historical influence of the quasi-public institutions in the economy has retarded the development of private trade. Many traders entering the market are insufficiently financed and have inadequate storage capacity and technical expertise. As a result, traders sell immediately after purchase, failing to take advantage of seasonal fluctuations in the demand for food. Attempts to store their purchases have failed due to lack of proper storage facilities. Private traders tend to buy from the rural areas where prices are low and sell in urban centers where they can fetch high prices. This affects the food security situation in the rural areas.

Objectives of the Study, Methodology and Study Area

The main objectives of this study were:

(a) to assess the impact of market reform on household income and food security;
(b) to assess the response of private traders to the new policy; and,
(c) to determine the constraints being faced by private traders.

This paper concentrates on the first objective.

The study was undertaken in three Agricultural Development Divisions (ADDs) for a period of 13 months. Blantyre ADD was chosen to represent a region of food deficit but with a relatively well developed private sector. Lilongwe represented a food surplus area with a growing private sector and Mzuzu was chosen to represent a food surplus area with few private sector activities.

The survey was undertaken in selected areas in each of the three ADDs. The following criteria were used in selecting these study areas:

(a) Where there is an ADMARC market still operating;
(b) Where there was an ADMARC market which is now closed; and,
(c) Where there has never been an ADMARC market within an 8 Kms radius.

Two Rural Development Programmes (RDPs) were selected from each ADD. Within each RDP, two Extension Planning Areas (EPAs) were chosen for focussed interviews over a twelve month period. Baseline information was collected from a sample of 1800 farm households. A sub-sample of 600 households was selected for monthly visits during which data on food consumption, income and expenditure were collected.

Limitations of the Study

The aim was to select food surplus and deficit rural development projects in each ADD. However, Malawi experienced a dry spell for three to four weeks during the 1989/90 growing season which greatly affected grain production. Total maize production in 1990 was estimated at 1342.8 metric tonnes which was 89 percent of the 1989 level. Areas considered to be food deficit fared better than those normally considered surplus because they received better rainfall.

CHARACTERISTICS OF THE SURVEY POPULATION

Population Covered

The study was to cover 200 households in each Agricultural development division for a total of 600 households. Only 567 households were covered during the first month 1990, but thereafter, the 600 target was surpassed.

The sex of household head by Agricultural Development Division is shown in Table 2.1. Overall, 17 percent of the households were headed by females. This ranged from only 10 percent in the Lilongwe ADD to nearly 32 percent in Blantyre ADD. The incidence of female headed households in our survey is lower than that reported in other surveys except for BLADD. A Ministry of Agriculture (MOA) survey reported that female headed households comprised 30 percent of total households ranging from 16 percent in Karonga RDP to 47 percent in Ntchisi RDP.

Table 2.1 Sex of Household head by ADD (Percentages)

	MALE	FEMALE
MZADD	87.0	13.0
LADD	90.0	10.0
BLADD	68.4	31.6
ALL ADDs	83.0	17.0

Source: CSR Field survey (Grain Marketing Liberalisation)

The majority (51.5%) of household heads were between 36 and 60 years old. Thirty one point five percent were below 36 years of age and 17% over 60 years old. A quarter of the BLADD household heads in the sample were over 60 years old compared with 12.7% and 15.6% for LADD and MZADD respectively.

The highest number of individuals surveyed was recorded in September 1990 (3,650) and the lowest in May (3,200). The average household size ranged between 5.4 persons and 5.8 persons study period.

Occupation

The occupation of the household head is given in table 2.2. As expected, the majority (89.6) of respondents are smallholder farmers with those in paid employment comprising 6.9 percent and businessmen/women, 2.5 percent of this total sample. There are some slight differences between ADDs with BLADD having the highest population (10%) of household heads in wage employment as compared to 9.5% for MZADD and only 3.4% for LADD. Nearly 78.6 percent of all businessmen/women sampled in the study were in Blantyre.

BLADD is the most constrained in terms of land. Households with very smallholdings or without land have to find gainful employment outside agriculture -- hence the relatively higher proportion for employees and business persons in BLADD.

TABLE 2.2 MAIN OCCUPATION OF HOUSEHOLD HEAD BY ADD

	MZADD	LADD	BLADD	ALL ADDs
	%	%	%	
Farming (own land)	90.5	93.6	82.9	89.6
Employed (outside agriculture)	9.0	2.9	9.9	6.5
Agriculture Labourer	0.5	0.5	-	0.4
Own Business	-	1.5	7.2	2.5
Unemployed	-	1.5	-	0.5

Source: CSR Field Survey (Grain Marketing Liberalisation)

Analysis of data on the occupation of all adults excluding those still in school, showed 39.9% claiming to be unemployed while 26.4% had no formal education or less than four years of education. Primary and secondary school leavers constituted a third of the total unemployed. The high rate of unemployment does not just reflect school leavers who want to get wage employment but may be a growing problem affecting everyone due to the declining size of land holdings.

Education

The education of the household head by sex is given in table 2.3. Nineteen percent of the male household heads have had no formal education -- 52 percent of the female heads never went to school. Since four years of primary education is considered the minimum required to enable one to acquire lasting literacy, nearly 52 percent of the surveyed household heads could be said to be illiterate -- 47.2% among males as against 75% among female heads.

Data on the educational level of all adults (15 years and above) show that 32% of the adults never went to school and 57.9% could be considered illiterate. The latter proportion for males was 47.7% as compared with 67% for females. Thus overall, the literacy rate is higher in the general adult population than among household heads but the differences between sexes are present in both cases.

The ADD statistics show marked differences in adult literacy. Twenty percent of adults in the Mzuzu sample never went to school while 34 and 42 percent respectively for Lilongwe and Blantyre ADDs never attended formal education. The illiteracy rates in the three ADDs (including those with 3 or less years of formal education) are 49, 64.6 and 60 percent for MZADD, LADD and BLADD respectively. The overall adult illiteracy is lower in MZADD than in the other ADDs. However, the female illiteracy rate (63.1%) is similar to that of other ADDs -- 75.2% and 62.7% for LADD and BLADD respectively.

TABLE 2.3 EDUCATIONAL LEVEL OF HOUSEHOLD HEAD BY SEX

	No Education %	Std. 1-3 %	Std. 4-8 %	Higher %
Male (N = 456)	18.9	28.3	46.7	6.1
Female (N = 92)	52.2	22.8	23.9	1.2
Both sexes (n = 548)	24.4	27.4	42.9	5.3

Source: CSR Field Survey (Grain Marketing Liberalisation).

The picture presented above shows that more than half (57.99) of Malawi's rural adult population can neither read nor write and that the situation is worse among female adults. For these, the majority of smallholder farmers, the only way of acquiring knowledge to help them improve their agricultural productivity would be through personal contact.

AGRICULTURE PRACTICES, INCOME AND EXPENDITURE

Crop Production.

Information on holding sizes has been analysed for Blantyre ADD only. Thus, the discussion on holding sizes centres on this ADD. During the first month when baseline data was collected, households were asked for estimates of their holding sizes. During the focused interviews, experts were deployed into the area to actually measure the gardens of the respondents. There is a big discrepancy between the estimates and the actual measurements, Table 3.1. The data shows that smallholder farmers tended to overestimate the sizes of their farms. The actual measurements are consistent with the results found by Ministry of Agriculture.

It is well documented that small land holdings are an indicator of food insecurity. In Blantyre ADD, most of the households deplete their maize stocks before the next harvest season. Thus the small holdings resulting from population pressure in Blantyre ADD, especially in the Shire Highlands RDP, result in a very serious situation.

The household estimates, Table 3.1, indicate that MZADD has larger plots since the area is not as densely populated as BLADD. According to the Food Security and Nutrition Monitoring Report of the Ministry of Agriculture, nationally, 56% of smallholder households have less than a hectare of land. LADD and MZADD figures are below the national average.

The major food crop being grown in Blantyre ADD is maize. However, 98 percent of the households grow the local variety demonstrating the lack of popularity of hybrid maize. Pulses, which are consumed together with maize as relish, is the major food crop grown in the area. The most prominent cash crop, competing with maize for scarce land and other resources, is cotton.

TABLE 3.1 **LANDHOLDING SIZES BY ADD (% OF HOUSEHOLDS)**

Holding Sizes	Household Estimates MZADD	LADD	BLADD	Actual measurements in BLADD
Up to 0.5 hac.	4.4	11.7	20.7	22.0
0.5 - 1.0 hac.	14.9	25.0	24.0	40.2
1.0 - 2.0 hac.	34.8	42.3	27.7	24.8
Over 2.0 hac.	45.9	21.0	27.6	13.0
	100.0	100.0	100.0	100.0

Buying agencies

Private traders' activities are relatively well developed in Blantyre ADD. A number of smallholder farmers sell their produce to private traders. Figure 2 shows the majority of cash crops transactions taking place between households. In April, 38 percent of the farmers sell to other households. In February and March, nearly 80% of the transactionsare between household. Households top all other buying agencies except for June and July.

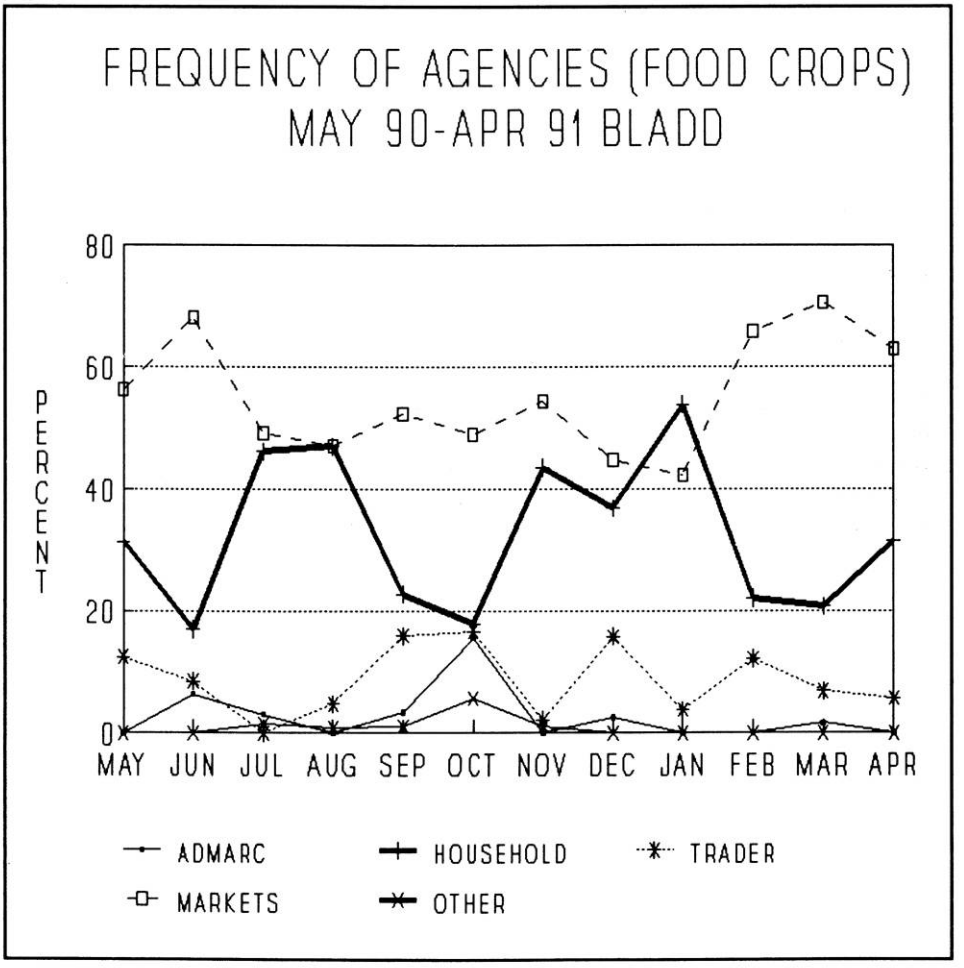
ADMARC is a significant buyer only four months of the year (May through August) when it buys cotton. The fact that ADMARC markets are closed to sellers during certain periods may increase inter-household activities. Direct sales by smallholder farmers in local markets is important from July to November when farming activities are slack and households have time to sell at the markets.

The study shows that private traders are relatively more active in BLADD than in the other two ADDs. Their transactions comprised more than 15 percent of the total during most of the study. Private trader purchases peaked in December when they dealt with 40 percent of the farmers.

For food crops Figure 3A shows that local markets are most important virtually throughout the year. They are followed by transactions between households. ADMARC buys few food crops from this area. Although private trader activity is less than 20 percent of all activity, it is significantly above ADMARC. This can be explained by two factors. First, ADMARC waits much longer after harvest before purchasing to ensure

that the water content in the crop reaches an acceptable level. Meanwhile, households need cash to pay for various mandatory expenditures such as School fees and the minimum tax. Private traders are willing to buy, but probably at a lower price, before ADMARC steps in. Secondly, ADMARC buys at a prescribed minimum price. But farmers can make more money dealing directly with households or selling in local markets because they use measuring units that result in a higher return than they can obtain from ADMARC.

FIGURE 3A


FREQUENCY OF AGENCIES (FOOD CROPS)
MAY 90-APR 91 BLADD
PERCENT
80
60
40
20
0
MAY JUN JUL AUG SEP OCT NOV DEC JAN FEB MAR APR
ADMARC
HOUSEHOLD
TRADER
MARKETS
OTHER

In LADD, direct purchase by households is the most important outlet. ADMARC is very active in cash crops between June and August and private traders between April and June. For Food crops, ADMARC is a significant buyer between May and November. Private traders transact in food crops throughout the year but they are most visible between November and June, Figure 3B

Except for the period between March and July, when some households transact with ADMARC in cash crops, practically all activities are between households. Private traders are essentially nonexistent. Looking at trading in food crops, Figure 3C, households are followed by local markets. ADMARC is only active between June and October.

Smallholder farmers sell most of their products directly to households within their community. Distances to ADMARC markets are long and private traders can't economically venture into the remote areas. Therefore, where ADMARC markets are closed, smallholder farmers have no option but to sell to households. Where ADMARC markets are available, farmers still may opt to sell directly to households because of a better return. Consumers prefer buying from farmers because they usually sell the local maize variety. Hybrid is common place at ADMARC markets.

FIGURE. 3B

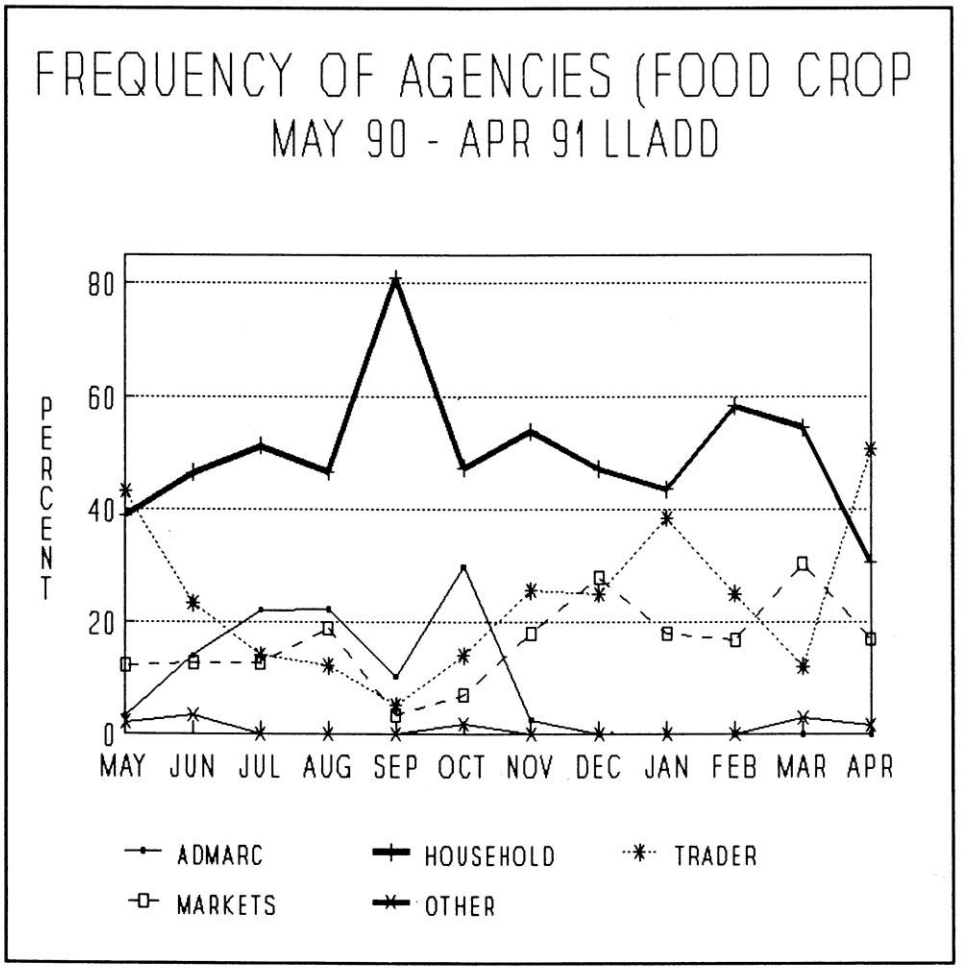
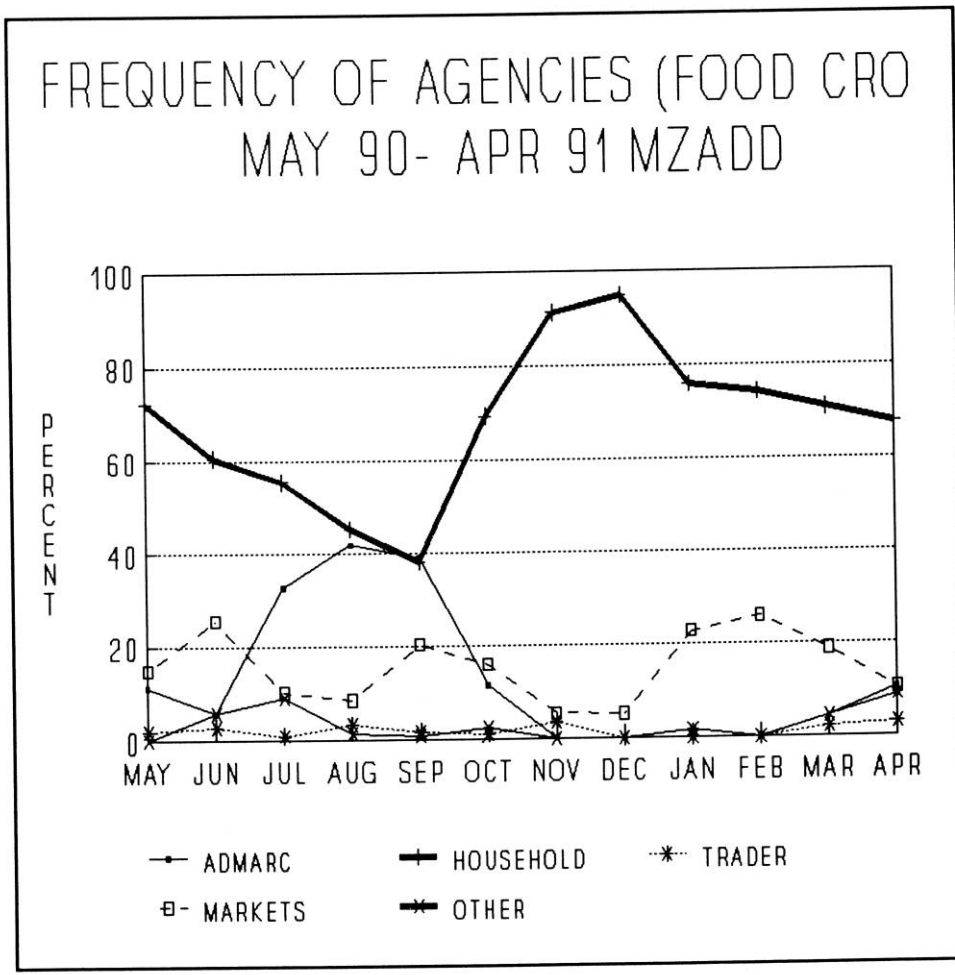

FREQUENCY OF AGENCIES (FOOD CROP
MAY 90 - APR 91 LLADD
PERCENT
80
60
40
20
0
MAY JUN JUL AUG SEP OCT NOV DEC JAN FEB MAR APR
ADMARC
HOUSEHOLD
TRADER
MARKETS
OTHER

FIGURE. 3C


FREQUENCY OF AGENCIES (FOOD CRO
MAY 90- APR 91 MZADD
PERCENT
100
80
60
40
20
0
MAY JUN JUL AUG SEP OCT NOV DEC JAN FEB MAR APR
ADMARC
HOUSEHOLD
TRADER
MARKETS
OTHER

In BLADD, where private trade is well developed, transactions between households and at local markets surpasses those of private traders. After 5 years, private trading has not overtaken other forms of trading. Markets liberalization was introduced without clearly identifying the characteristics of private traders. Most of them lack storage infrastructure, reliable transport and working capital. They tend to buy and sell before the next round of purchasing. To rectify this situation, Private traders should be provided assistance in obtaining working capital and infrastructure. Technical training in business practices should be made available to them to enable them to be successful businessmen who will impact the trading of agricultural output.

Household Income

Table 3.2 shows the average monthly household income for each ADD and its source. A very small proportion comes from agriculture in BLADD. The majority is from other sources such as employment, business and transfers. In LADD, most of the income is from the sale of agricultural output, especially during the marketing season. MZADD follows the pattern of LADD. Whether a higher proportion of respondents in BLADD were either employed or had their own business than in the other two ADDs was not determined. BLADD was chosen to represent areas close to Urban centres. Land holdings are very small and most of what is grown is for home consumption. Households must rely on sources other than agriculture for cash income.

In every month, except September, LADD had the highest average household income, peaking in July. Highest incomes occur during the marketing season, May to August. BLADD's average income reached K1,155 in July. BLADD has a more serious food insecurity problems with small land holdings and limited cash income.

Average total income in BLADD increases with the size of land holdings, Table 3.3. This implies that the near landless are more food insecure than those with more hectarage. The high population density makes reallocating land infeasible. Short of relocating people to the less populated areas in the north, off-farm income generating activities is the alternative for improving their welfare. The high proportion of households with very little land explains the trade in food items between households.

Table 3.2 **Average Household Income by source and month**, Malawi Kwacha

ADD	MONTH	FOOD CROPS	CASH CROPS	OTHER	TOTAL
BLANTYRE					
	MAY	5.35	2.33	40.72	48.40
	JUNE	20.43	12.14	48.53	81.10
	JULY	36.60	10.55	87.32	134.47
	AUGUST	13.93	21.11	93.96	129.00
	SEPTEMBER	2.12	21.41	73.85	97.38
	OCTOBER	6.38	26.49	83.15	116.03
	NOVEMBER	6.50	4.86	86.06	97.42
	DECEMBER	5.59	6.93	87.55	100.07
	JANUARY	7.32	4.52	92.31	104.15
	FEBRUARY	7.30	3.86	63.25	74.41
	MARCH	9.78	7.95	52.76	70.50
	APRIL	6.72	3.03	58.99	68.75
LILONGWE					
	MAY	49.06	230.14	120.56	399.85
	JUNE	33.55	208.45	306.24	548.24
	JULY	707.73	278.36	169.20	1155.28
	AUGUST	175.31	294.99	216.72	687.03
	SEPTEMBER	23.62	58.23	197.39	279.23
	OCTOBER	26.85	107.49	183.26	317.79
	NOVEMBER	15.65	49.53	265.32	330.50
	DECEMBER	28.10	37.00	162.49	227.59
	JANUARY	17.54	81.77	204.95	304.26
	FEBRUARY	27.16	37.69	168.92	233.77
	MARCH	1.64	32.75	136.08	170.47
	APRIL	10.73	42.22	107.09	160.04
MZUZU					
	MAY	35.24	9.17	84.16	128.57
	JUNE	78.15	10.40	148.90	237.45
	JULY	33.79	135.34	159.69	328.83
	AUGUST	25.84	288.55	147.99	462.39
	SEPTEMBER	37.64	180.84	176.29	394.77
	OCTOBER	17.18	66.17	165.84	249.18
	NOVEMBER	26.64	9.89	134.84	171.37
	DECEMBER	21.03	7.12	107.30	135.46
	JANUARY	19.19	13.50	105.56	138.24
	FEBRUARY	25.06	5.54	97.92	128.51
	MARCH	17.58	3.73	73.69	94.99
	APRIL	12.21	7.12	70.05	90.05

Table 3.3 **Average annual household cash income by Land Size,** BLADD

LAND AREA	INCOME FROM FOOD CROP	INCOME FROM CASH CROP SOURCE	INCOME FROM OTHER	TOTAL INCOME
<.5	47.12	6.67	102.55	156.34
0.5 -1.0	82.13	36.13	115.27	233.53
1.0 -2.0	88.89	101.18	189.13	379.21
2 +	127.30	326.25	1176.51	1630.07

HOUSEHOLD FOOD SECURITY SITUATION

Major Food Crops Grown

Table 4.1 indicates that a majority of the survey households grow local maize as their main staple crop. This is followed by beans, grown by (62.9 percent)and hybrid maize (32.9 percent). A recent Ministry of Agriculture (MOA) survey found that, with the exception of Blantyre/Shire Highlands and South Mzimba RDPs, all households used maize as their main staple food. Three percent and one percent for Blantyre and South Mzimba respectively, used other crops as their main staple (MOA, 1991).

Our survey reported a much higher proportion of the households growing hybrid maize, especially in the RDPs in BLADD and LADD, than the MOA survey, i.e., 29 and 25 percent of the households in LADD and BLADD respectively compared to the MOA's 11% and 13% for Ntcheu and Thiwi Lifidzi respectively in LADD and 3% and 8% for Mwanza and Blantyre/Shire Highlands in BLADD. The proportion of farmers growing hybrid maize in MZADD is similar in both surveys, 41 to 46 percent.
Differences between the two surveys may reflect the difference in time period reported. A campaign by the Ministry of Agriculture and the Party urging smallholders to grow quick maturing hybrid varieties, may have encouraged more smallholders to grow hybrid in 1990/91. The Ministry's estimate of 114,000ha planted to hybrid compared to 100,000 ha the previous season (FSNU, 1991) may be indicative. However, the area planted to hybrid maize is still a small fraction of total land under maize, i.e., 10%.

Increasing yields of maize has been a strategy for increasing national food security. It is also seen as the only way of increasing household food security. However, the production of maize appears not to have kept pace with the population. In 1980/81, Malawi produced a surplus of nearly 94,000 metric tonnes of maize. In 1990 there was an estimated deficit of some 274,000 metric tonnes. The gap between production and national requirements at the national level can only reflect the situation at the household level.

More smallholders might be willing to adopt hybrid maize -- note the increases in BLADD and LADD. However, the non-availability of adequate quantities of seed and fertilizers has frustrated a number of would be adopters. On average, the National Seed Company only managed to produce 0.71 kgs of seed per farming household per year between 1985 and 1990.

Hybrid maize is mostly grown as a cash crop. ADMARC's failure to buy all the hybrid maize in 1986 resulted in a 46 percent drop in the hectarage under hybrid. This year, ADMARC has failed to purchase all the maize farmers offered. Some farmers have had to spend several days sleeping in the open at a market to sell their maize. Such farmers have no incentive to grow hybrid next year, especially in those areas where they are dependent upon ADMARC. A hybrid variety that can be stored successfully under existing village conditions needs to be developed so that farmers can grow it for their own consumption.

Table 4.1 shows that the population is heavily dependent on maize as a staple food. Only in MZADD do households grow cassava and/or millet/sorghum. A major maize failure would mean no food unless it is available on the market and households are able to pay for it. This high dependency on one crop coupled with low rural cash incomes, may be the major reason the majority of the households can only afford one meal a day.

Table 4.1 Major food crops grown (percentage of households growing)

	MZADD	LADD	BLADD	ALL ADDS
Local maize	97.9	89.6	71.6	87.3
Comp. maize	2.1	1.8	3.2	2.3
Hybrid maize	43.3	29.0	24.7	32.9
Beans	89.7	46.2	49.5	62.9
Peas	11.6	10.4	59.5	25.3
Oth. pulses	11.2	14.9	24.7	16.5
G/nuts	44.6	22.6	8.9	26.6
Millet/sorghum	28.3	13.6	12.6	18.6
Cassava	18.5	2.3	11.6	10.9
Rice	0.4	0.9	0.5	0.6
Irish Potatoes	1.3	18.1	-	6.7
Sweet Potatoes	62.2	10.4	7.4	28.3

Source: CSR Field Survey (Impact of Marketing Liberalisation)

Food Depletion

Information was collected on storage with enumerators asked to measure the level of crop in storage or count the number of bags every month for 12 months. A household's stored food was depleted if the enumerator could not measure the storage or count any bags.

The data show that by August 1990, two months after harvest, 26.8 percent of the households had depleted their stored food. By December 1990, over half (58.4%) of the households had depleted their food stocks. The highest proportion was found in BLADD (74.3%). By the next harvest, March/April 1991, 85% of the households had run out of stored food.

The Ministry of Agriculture's Food Security and Nutrition Monitoring Survey found that, by December 1990, nearly three quarters of the households had depleted their food stocks. Over 86 percent of the households in MZADD had depleted their food stocks by December. Except for Karonga ADD, over 70 percent of the households had no food by December, 1990. Blantyre and Liwonde ADDs were hardest hit. By March 1991, nearly 94 percent of the households in BLADD, 69 percent in LADD and 92 percent in MZADD had depleted their stored food.

FIGURE. 4B

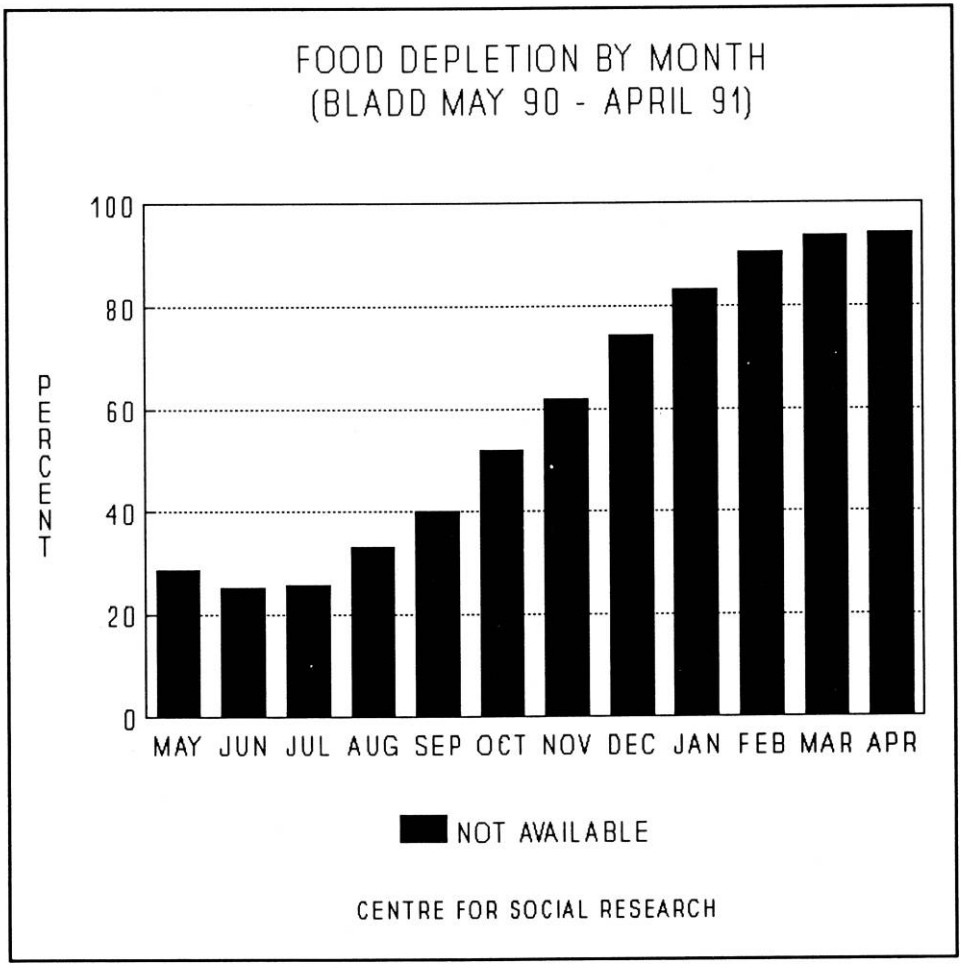

FOOD DEPLETION BY MONTH
(BLADD MAY 90 - APRIL 91)
PERCENT
100
80
60
40
20
0
MAY JUN JUL AUG SEP OCT NOV DEC JAN FEB MAR APR
NOT AVAILABLE
CENTRE FOR SOCIAL RESEARCH

FIGURE. 4C

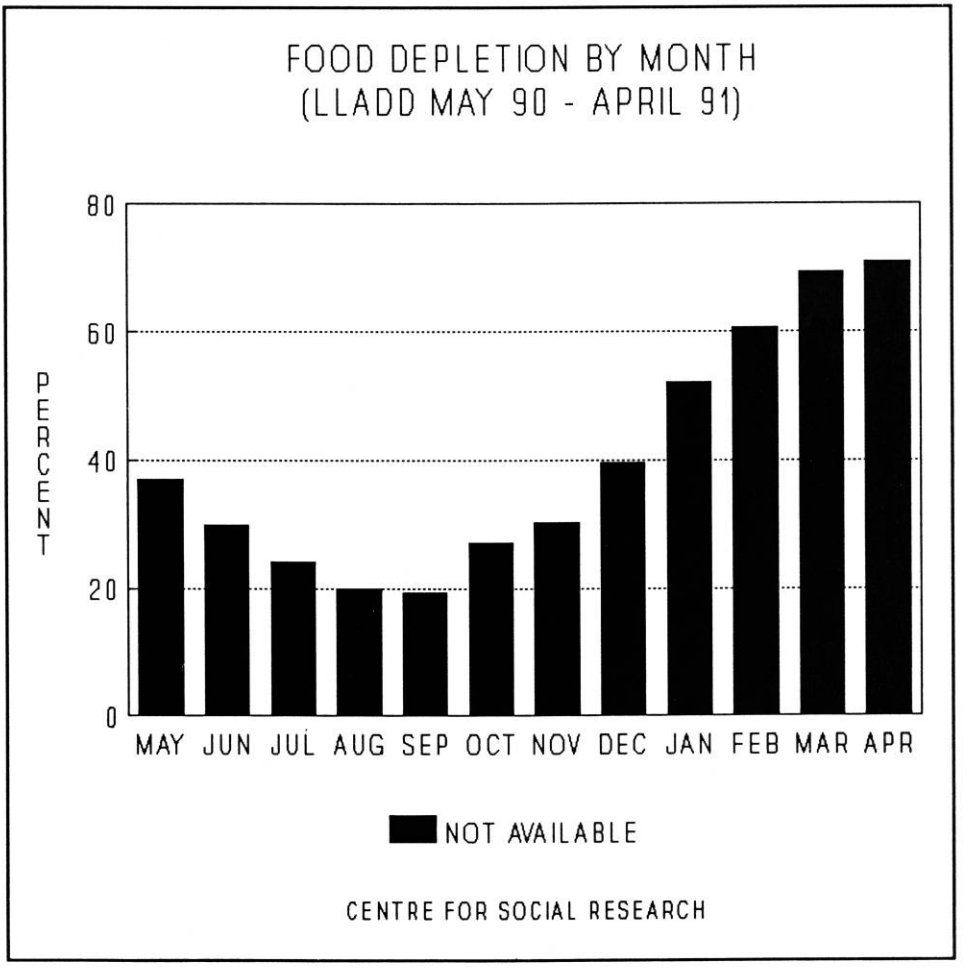

FOOD DEPLETION BY MONTH
(LLADD MAY 90 - APRIL 91)
PERCENT
80
60
40
20
0
MAY JUN JUL AUG SEP OCT NOV DEC JAN FEB MAR APR
NOT AVAILABLE
CENTRE FOR SOCIAL RESEARCH

Table 4.2 Percentage of households depleting food stock in CSR Survey RDPs

	June 1990	December 1990
MZADD		
Central Mzimba	4	87
South Mzimba	9	86
LADD		
Ntcheu	6	84
Thiwi/Lifidzi	6	56
BLADD		
Mwanza	20	70
Blantyre/ Shire Highlands	19	80

Source: MOA (1991) Food Security and Nutrition Monitoring Report -I

Since only 14 percent of the households had enough harvested maize in 1990 to last them to the next harvest, how did the other 86% of households manage to get their food? Was the food they got adequate? What survival mechanisms did they employ?

Coping Strategies

Information was collected monthly to record the meals consumed by each survey household and the source of the main ingredient. A total of 15,607 meals were recorded of which 14,395 or 92.2 percent were prepared from maize. The remaining meals were mainly composed of tea (3.2%) potatoes/cassava (2.1%) pumpkins (1.3%) and other (1.2%).

TABLE 4.3 **Main Meal Made From (As Percentage of all Meals)**

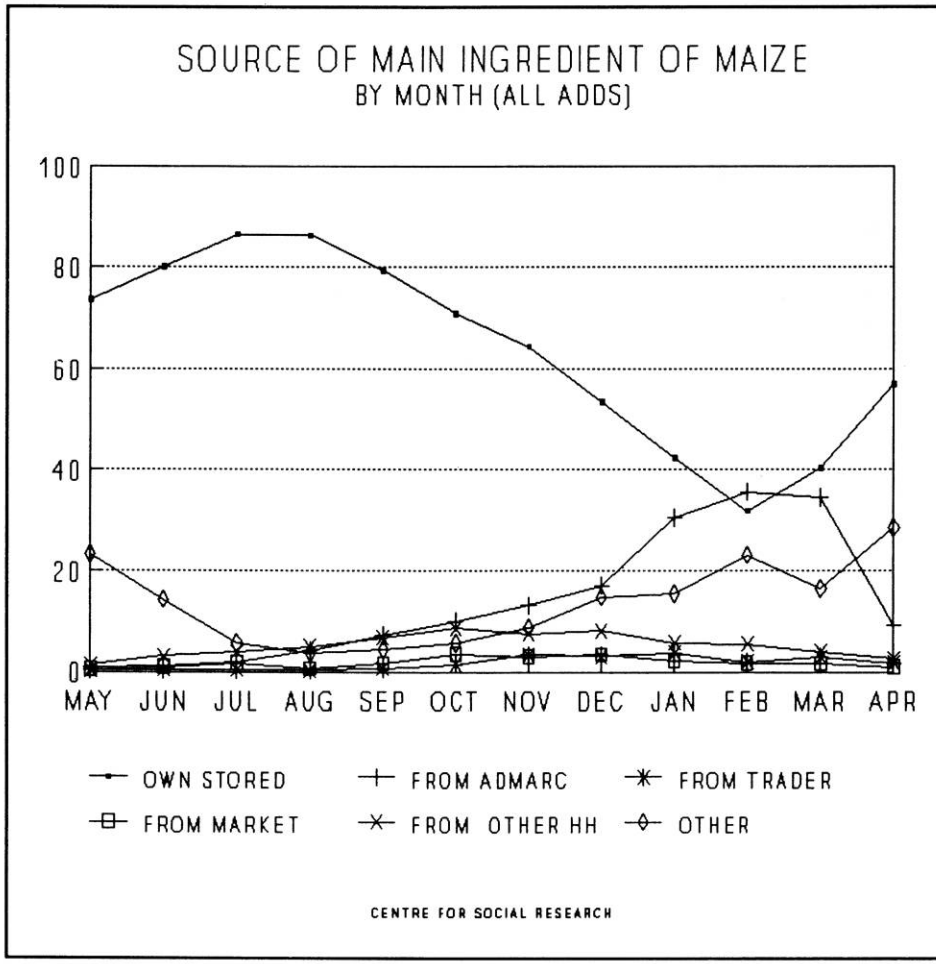
Nsima from maize	90.8
Maize	1.4
Tea (with bread)	0.6
Tea (without bread)	1.5
Pumpkins	1.3
Potatoes/cassava	2.1
Other	1.2
Total meals recorded	15.607

Maize is the main ingredient for almost all meals prepared by households. Figure 5 shows that own stored maize was the dominant source of calories during the months immediately following harvest. As the year progressed and households depleted their own stock and purchases from ADMARC, local markets and other households become more significant.

While 86.5% of meals prepared from maize and/or maize products in July 1990 came from own stored stocks, the proportion dropped to 32 percent in February 1990. Purchases from ADMARC, Trader and Local markets combined rose from 7.9 percent in July 1990 to 44.9 percent in February 1991. Dependence on ADMARC as a source of maize is highest in the Blantyre ADD. Fifty nine point five percent of all maize based meals in February came from ADMARC compared with 19.5% in LADD and 25.9% in MZADD. In these ADDs, other sources and buying from other households combined are more important than ADMARC. This confirms the finding in the baseline survey that, due to distances to ADMARC markets, more households in LADD and MZADD depended on ganyu labour for maize than in BLADD.

In May 1991, only 1.4% of the meals prepared were from maize bought from other households. This proportion rose to 8.1 percent in December but declined to 4 percent in March. During the hunger months, January to March, the bigger smallholders who maintain a maize inventory, run out.

FIGURE. 5


SOURCE OF MAIN INGREDIENT OF MAIZE
BY MONTH (ALL ADDS)
100
80
60
40
20
0
MAY JUN JUL AUG SEP OCT NOV DEC JAN FEB MAR APR
OWN STORED
FROM ADMARC
FROM TRADER
FROM MARKET
FROM OTHER HH
OTHER
CENTRE FOR SOCIAL RESEARCH

Private traders were not a significant source of maize. In May 1990, only 0.4 percent of the mealswere from maize bought from private traders, with the highest proportion 3.8 percent, bought in January 1991.

Meal Composition

The majority of meals prepared were nsima, mostly made from maize flour. When households have maize in stock, nsima made from refined flour dominates. As can be seen from table 4.4, nearly 72 percent of the meals prepared in June was nsima from ufa but the proportion declines to 62.4 percent in December and 47.1 percent in March. On the other hand, the proportion of meals prepared from "mgaiwa" flour increases from 9 percent in June to 27.4 percent in March.

TABLE 4.4. **TYPE OF MEALS EATEN YESTERDAY FOR JUNE AND DECEMBER 1990 AND MARCH 1991 -- % OF ALL MEALS**

	JUNE 1990	DECEMBER 1990	MARCH 1991
Porridge	8.1	8.9	5.8
Nsima (ufa)	71.7	62.4	47.1
Nsima (mgaiwa)	9.0	22.1	27.4
Nsima (madeya)	0.2	1.6	1.4
Other	11.0	5.0	18.3

SOURCE CSR field Survey 1990/91

There are marked differences in the proportion of "mgaiwa" meals between the three ADDs as shown in table 4.5. Nearly 43 percent of meals in March for BLADD were prepared from mgaiwa flour compared with 30.3% in LADD and only 6.8 percent for MZADD where 14.4 percent of meals were pumpkins.

TABLE 4.5. **PERCENTAGE OF MEALS FROM "UFA" AND "MGAIWA" FLOUR BY ADD**

	June 1990		Dec. 1990		March 1991	
	Ufa	Mgaiwa	Ufa	Mgaiwa	Ufa	Mgaiwa
MZADD	78.5	0.4	79.9	3.9	58.9	6.8
LADD	69.6	9.3	56.8	27.6	43.9	30.3
BLADD	66.5	18.5	51.6	33.6	39.6	42.7

Source: CSR Field Survey (Grain Marketing Liberalisation)

The high proportion of mgaiwa meals in BLADD and LADD results from two factors. First, as households run out of stored maize, they purchase maize, processing it to minimize wastage. Second, households that depend on the market, especially ADMARC, cannot always get local maize and have to buy hybrid which is not easily processed into 'ufa'. The households are, therefore, forced to "mgaiwa" because they cannot obtain local maize. In MZADD, households have to subsist on "non-traditional" staple foods, like pumpkins, because they do not have access to local maize and are unable to purchase hybrid from the distant ADMARC markets.

Households frequently use vegetables as relish with their meals followed by beans. Vegetables, beans and pulses account for 82 percent of all the relish in May, dropping to 71.3 percent in January, then rising again to 78 percent in March. The type of relish is influenced more by availability than by conscious choice. Relish collected from the wild accounts for 1.5 of all relish in May increasing to 10.3 percent in January when mushrooms become available.

Animal protein (livestock products and fish) is taken with 16.4 percent of meals in May and 25.4 percent in November, averaging 20.2 percent. Fish accounts for over 58 percent of this type of relish.

Table 4.6 presents the average number of meals prepared by households. The highest mean number of meals is 2.3 in May -- the lowest is 1.9 from December to February. Although the highest proportion of households depleting their stored food was in MZADD and BLADD, the highest average number of meals were recorded in BLADD followed by LADD.

TABLE 4.6. **AVERAGE NUMBER OF MEALS TAKEN YESTERDAY BY ADD AND MONTH**

	MZADD	LADD	BLADD	ALL ADDs
May 1990	2.3	2.3	2.4	2.3
June	2.2	2.3	2.1	2.2
July	2.1	2.1	2.2	2.1
August	2.0	2.2	2.1	2.1
September	2.0	2.2	2.1	2.1
October	2.0	2.0	2.1	2.0
November	1.9	2.1	1.9	2.0
December	1.8	1.8	2.1	1.9
January 1991	1.8	1.9	2.0	1.9
February	1.8	1.9	2.0	1.9
March	1.8	2.0	2.1	2.0
April	2.1	2.2	2.2	2.2

Source: CSR Field Survey (Grain Marketing Liberalisation)

Averages are not necessarily the best way to judge severity as they hide inter - household differences. Figure 7A shows the proportion of households eating only one meal a day by month and sex of household head. Only 7.4 percent of the households ate only one meal per day in May, but more than 27 percent did so in February. Over 40 percent of the female headed households prepared one meal per day in February.

Households in BLADD faired best while the worst situation was observed in MZADD. Income cannot be the explanation as average incomes are lowest in BLADD. One plausible explanation may be the better developed food marketing infrastructure and proximity to ADMARC markets. The average distance to place of food purchase in April was more than 12 kms for MZADD, 8.5 Kms for LADD and 3.1 KMs for BLADD, Figure 8. When ADMARC is purchasing produce, distances to places of purchase are shorter. As ADMARC withdraws from temporary markets, distances become greater.

FIGURE. 7A

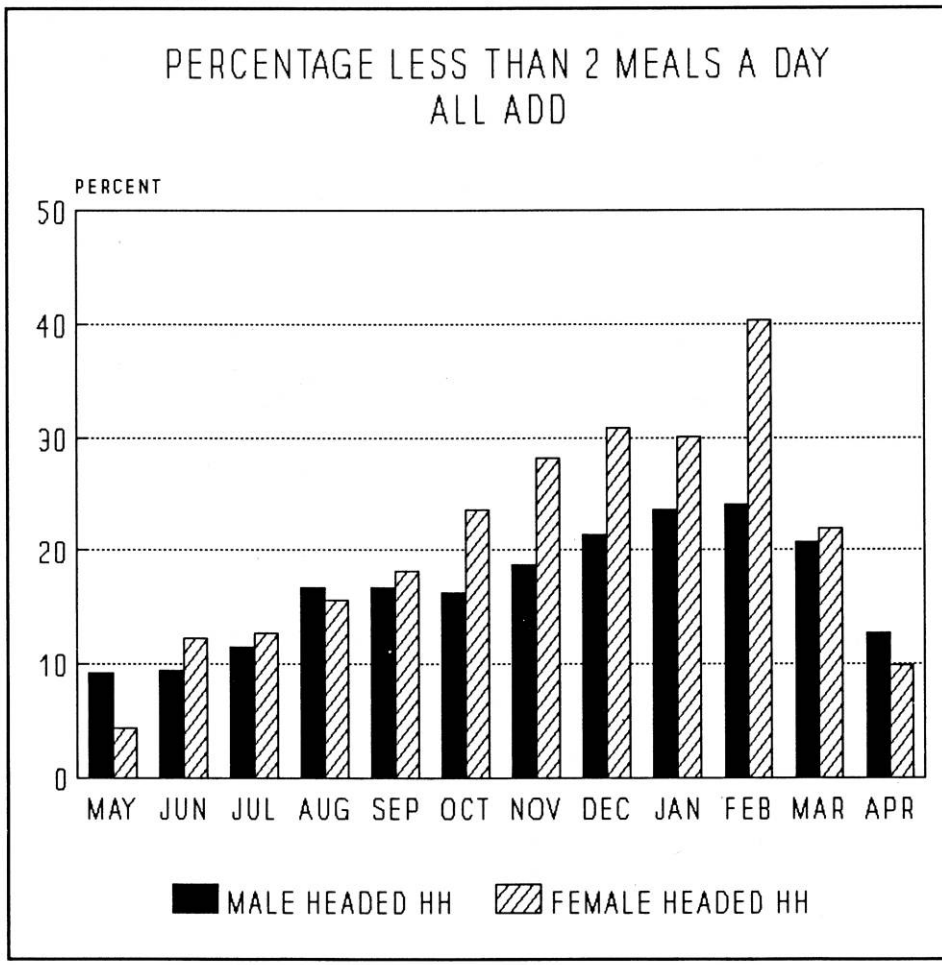
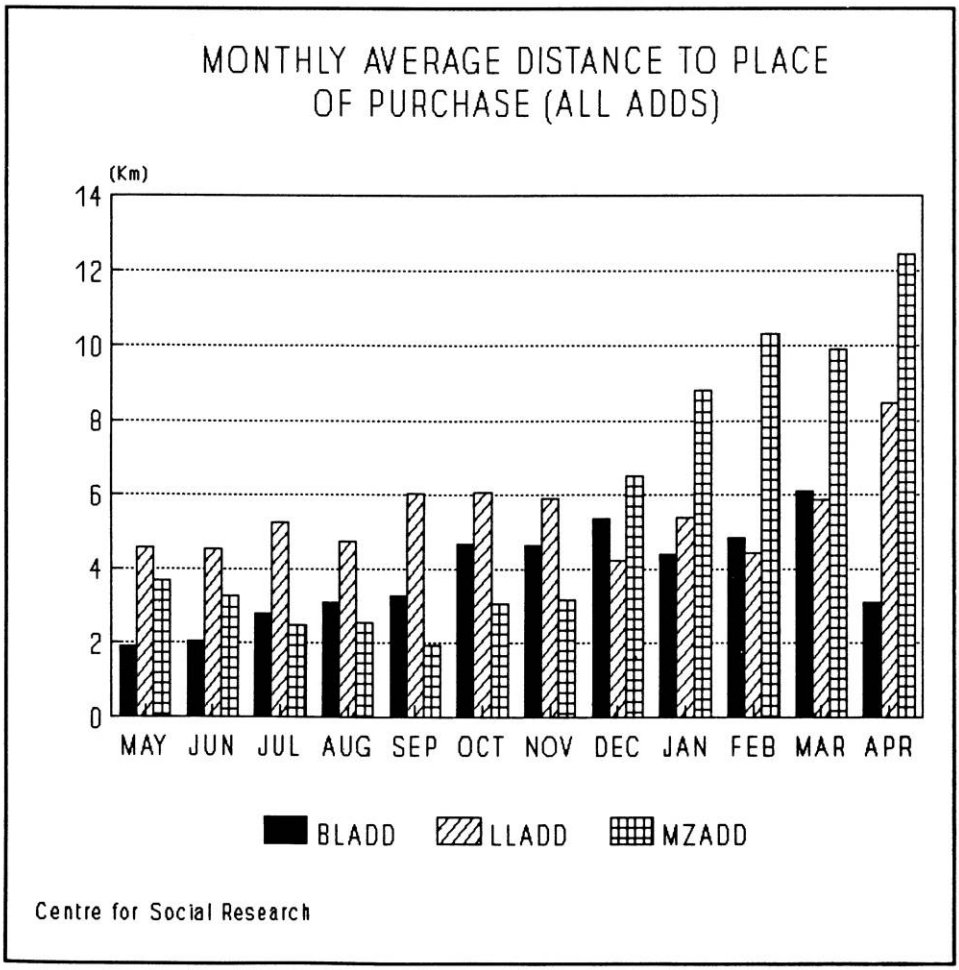

PERCENTAGE LESS THAN 2 MEALS A DAY
ALL ADD
PERCENT
50
40
30
20
10
0
MAY JUN JUL AUG SEP OCT NOV DEC JAN FEB MAR APR
MALE HEADED HH
FEMALE HEADED HH

FIGURE. 8


MONTHLY AVERAGE DISTANCE TO PLACE OF PURCHASE (ALL ADDS)
(Km)
14
12
10
8
6
4
2
0
MAY JUN JUL AUG SEP OCT NOV DEC JAN FEB MAR APR
BLADD
LLADD
MZADD
Centre for Social Research

CONCLUSIONS AND POLICY IMPLICATIONS

Major Conclusions

Market liberalisation and the welfare of smallholders are linked. Allowing private traders to get involved in the marketing of agricultural produce may not totally offset the effect of the closure of ADMARC markets which are not commercially viable. Although most household can dispose of their produce during a three to four months marketing season, households in remote areas find it difficult to obtain food after their own stocks are depleted.

All food offered for sale during the marketing season may not be surplus. The majority of households that sell part of their maize harvest do not produce enough for their own consumption. However, they sell some of their maize to meet immediate cash needs. With the closure of some of ADMARC's markets it was expected that private traders would fill the gap. However, private traders are not willing to operate in remote areas where ADMARC has withdrawn unless it is profitable. Even where private traders are most active, i.e., in BLADD, the movement of produce from remote rural areas to more urban centres is the mode. These traders lack basic infrastructure, capital and skills. Still, inefficient official markets result food crop transactions primarily between households and in local markets.

Because most households only produce enough food for 5 to 8 months, they had to employ certain survival mechanisms. These included eating less preferred food (mgaiwa) or inferior foods (madeya, pumpkins, green maize, roast cassava, etc.) and/or reducing the frequency of meals. During the hungriest part of the year, a quarter of the households manage only one meal a day.

More households in BLADD have two meals a day than in LADD and MZADD, even though their average cash income is the lowest among the three ADDs. A more developed "food trade" infrastructure appears to be the reason. Households in BLADD have better access to places where they can buy food.

Households growing hybrid maize in MZADD have more cash income but are worse off in terms of food security. Their preference for "nsima" made from ufa is part of the problem. However, the long distances to ADMARC markets, as seasonal markets close, is a factor.

Recommendations

(1) Where a land constraint exists, i.e., Blantyre and Liwonde ADD's, other income generating activities should be introduced and activities of the Malawi Mudzi Fund should be extended to cover all districts within the two ADD's.

(2) Most private traders now operating lack basic skills, working capital and other resources. A mechanism for helping private traders to overcome these constraints is needed.

(3) The present level of development by private traders in produce marketing does not serve remote areas adequately. The possibility of utilising farmers' clubs as cooperatives to buy and store produce for sale to members during the hunger season should be explored. Alternatively, prominent individuals in remote areas could be assisted in constructing acceptable storage facilities.

(4) It is our observation that Government is very slow to react to emergency situations. Although an early warning system is in place to help government take timely action when a serious food problem occurs, it does not appear to be working. A system capable of analysing the food security situation area by area to guide effective relief action needs to be developed. This can not be done if decision making is concentrated at the national level.

(5) There recently have been workshops on implementing the food for work concept. This concept needs to be put into practice.

IS GRAIN AVAILABILITY AN IMPORTANT DETERMINANT OF VARIATION OF NUTRITIONAL STATUS AMONG CHILDREN?

Preliminary evidence and policy implications from Zimbabwe's communal areas

Munhamo Chisvo and T.S Jayne[1]

INTRODUCTION

The plight of Zimbabwean women and children is receiving attention from a growing audience. This follows in part from a global recognition that survival, protection and development of children and women are rights, not privileges (UNICEF, July 1991). It is also the result of earlier national recognition that child nutrition problems are multifaceted and attempts to solve them need be multidisciplinary (National Steering Committee on Food and Nutrition. 1990).

Zimbabwe pledged, along with other countries at the World Summit For Children held at the United Nations Headquarters in New York in September of 1990, to develop a National Plan of Action for Children to achieve particular nutritional goals. Among these goals was the reduction by half of 1990 levels severe and moderate malnutrition among under-fives in the next decade (UNICEF, 1991). This presents Zimbabwe with two major challenges. First, Zimbabwe has made commendable efforts in support of child health and nutrition in the past decade. But the 30 to 35 percent level of stunting still being reported in some parts of the country indicates that progress has been slow (Greiner and Tagwireyi. 1991). Second, Zimbabwe's economic climate continues to be transformed by the Economic Structural Adjustment Programme (SAP). The tighter budgets of all relevant ministries inevitably restrain essential public sector investment in child health and development.

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[1] **Research scholar and Visiting Lecturer, respectively, Department of Agricultural Economics and Extension, University of Zimbabwe.** **The authors thank J. B. Wyckoff, Jeremy Jackson and Dr. Choto (UZ Medical School) for comments on an earlier draft.**

Thus, resource re-allocation and prioritization become pivotal to the success of Zimbabwe's future efforts to support child health. This entails reassessing and streamlining current national child health and development programs highlighting reforms needed to improve management, financing and coordination of health and nutrition activities. Analyses of the relative importance of and interactions between factors influencing child nutrition would help guide scarce government resources into activities of greatest benefit.

Food and nutrition policy makers in the country, either implicitly or explicitly, have questioned the role that food security plays in explaining stunted growth among children under five years and the extent to which grain marketing reforms can improve the nutritional status of children in communal area. This paper reports a study of the extent to which household grain availability explains stunting (low height for age measurements) relative to other factors among under-fives in Zimbabwe's communal areas. Activities that, on the basis of preliminary evidence, may cost-effectively enhance child nutrition and/or merit further research are suggested.

The paper is divided into five sections. Summary statistics on the prevalence of malnutrition amongst sampled children and a brief description of factors contributing to stunting are presented in the first section. The conceptual framework underlying the analytical technique used in this study is then described. In the third section, models used to examine factors explaining malnutrition are specified and results interpreted. These results are synthesised in the fourth section to emphasize the key observations made from the analysis. Policy conclusions drawn from these observations are discussed in the final section.

PREVALENCE OF MALNUTRITION IN ZIMBABWE

A child nutrition survey was carried out in selected communal areas in the Midlands Province during January and February of 1991 by the University of Zimbabwe Food Security Project in collaboration with the Ministry of Health. A total of 335 children under 5 years old were weighed. Valid height-for-age z-scores could not be determined for some of the children sampled because their birth dates were not recorded on health cards. In a number of cases the children were too young for height measurements to be taken (i.e., no height measurements were taken for children under six months of age).

Table 1 shows the prevalence of malnutrition by communal area. Gokwe communal area has the highest level of malnutrition. Interestingly, smallholder incomes were highest in this region. However, there is great variation among wards within Gokwe, ranging from food surplus households growing substantial amounts of cotton, to grain deficit, remote and low-income households in the drier northern parts of the communal area.

Table 1. Prevalence of Malnutrition by Communal Area, Midlands Province, January 1991

COMMUNAL AREA	TOTAL CHILDREN WEIGHED	HEIGHT FOR AGE MALNUTRITION < - 2SD	< - 3SD	WEIGHT FOR HEIGHT MALNUTRITION <- 2 SD	< -3 SD	WEIGHT FOR AGE MALNUTRITION < - 2 SD	< - 3 SD
	Number	%	%	%	%	%	%
MBERENGWA	64	6,3	1,2	1.2	0	16,4	5,0
RUNDE	60	13,3	8,3	1.4	0	11,4	2,9
SHURUGWI	30	13,3	3,3	0	0	4,9	2,4
KANA	21	14,3	0	4,5	0	13,6	0
GOKWE NORTH*	27	33,3	3,7	11,6	1,4	28,4	4,5
GOKWE SOUTH**	36	13,9	0	0	0	12,5	0
TOTAL	238	13,8	4,7	3,4	0,3	15,6	3,1

* Simuchembu and Chireya Wards
** Njelele and Nemangwe Wards

The higher levels of malnutrition in northern Gokwe requires some elaboration. A sample of nurses interviewed at local clinics identified seven major contributory factors:

1. *Early weaning due to pregnancy*: Many families have poor child spacing resulting in early weaning which disturbs the normal growth of child.

2. *Diarrhoea*: This is caused by poor sanitation and poor quality water. Most households rely on bush toilets and river water.

3. *Shortage of other foods to add to porridge and sadza*: Groundnut production is almost absent in Gokwe. Households rely on rural shops for their peanut butter, which is frequently in short supply and expensive.

4. *Lack of budgeting/poor management of financial resources*: Many households are headed by people who drink. Polygamy is also reputed to result in mismanagement of both financial and physical resources.

5. *Alcoholism/alcohol abuse*: This problem tends to be serious in Semuchembu where drinking and smoking is more of a tradition than just a habit for both men and women. Pregnant mothers who smoke and or drink risk giving birth to children who are under-weight because alcohol and smoke inhibit the flow of food from the mother to the child through the placenta. The survey data showed significantly lower birth weights among mothers who drank beer.

6. *Abject poverty*: Output from crop production is low in northern Gokwe and there is limited scope for local employment. Pressures on family members' time in productive uses may reduce their ability to participate in child nutrition schemes. For example, of 94 children registered for supplementary feeding by a school in Zarova area of Gokwe, households of only 35 of the children actually participated in the supplementary feeding programme.

7. *Inadequate health services*: Most people travel nine to ten hours to get to the nearest health centre.

METHODOLOGY

The conceptual framework guiding this analysis is underpinned by the theory of a health production function[2]. Variability in nutritional status of children (measured using child anthropometry) is explained by factors that are both endogenous and exogenous to the household. Endogenous factors are those controlled by the household and include income and available food (from own production or purchases). The household can allocate these among competing opportunities. For example, available income can be used to buy food for the child or to buy inputs for the next crop year. Similarly, available food can be sold or exchanged to acquire other goods and services with higher utility.

Exogenous factors, on the other hand, are external to the household. They affect household decisionmaking and resource allocation, thus the nutritional status of children. An example of an exogenous factor is the genetic potential of the child[3]. Community factors such as availability or access to health facilities, sanitary facilities and water quality are considered to be exogenous to the household.

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[2] **See "Household resources and child health in Zimbabwe", by Duncan Thomas. 1990. pp 2.**

[3] **Genetic potential of the child depends on both inherited genetic traits and the epigenetic factors that determine whether the child is going to realise its genetic potential.**

As in any production function, the output (child health) and certain inputs are jointly determined. For example, several studies have demonstrated a significant positive relationship between nutritional status and the incidence of disease -- acute respiratory tract infections and diarrhoea in particular. However, debate continues over the direction of causality. Health status and food consumption also appear to be simultaneously determined -- low levels of either factor tend to reduce the other.

To minimise simultaneity bias, two-stage least squares was used which accounts for the endogeneity of regressors. Instruments developed for endogenous factors, in combination with other explanatory variables, were used to specify the second stage equations which estimate the parameters underlying the production function. The regression coefficients estimated by the second stage equations are examined to identify determinants of child nutritional status. In both stages, multiple regression models tested the fit of data from a single cross-sectional household survey[4] of 209 households in the Midlands Province during 1991. Three hundred and thirty five children under five from these households were included.

The dependent variable, child height-for-age, is a measure of chronically inadequate food intake. Height-for-age scores are expressed as standardized values, or Z-scores, which are the preferred indicator of the World Health Organization.

SPECIFICATION OF MODELS AND INTERPRETATION OF RESULTS

1st Stage Models

In the first stage, two models were specified to estimate two endogenous variables: non-salaried income and net grain availability for consumption by the child. These instruments, in combination with other explanatory variables, were used to construct the model that examines factors associated with height-for-age nutritional status of children.

[4] As is true of most cross-sectional surveys, omitted variables affected the analysis. Difficulties in getting good explanatory power were anticipated for all the specified models.

Household income

Only non-salary incomes were estimated. Salaries were excluded because they are earned off the farm and imply a different control and expenditure pattern.[5] The proportion of income spent on child needs at the margin may depend to a larger extent on where the income is earned than on who earns it and the actual amount earned. Children staying on the farm, *ceteris paribus*, have greater access to income earned on the farm. This led to testing the affect of salaries on child nutrition independently of incomes from other sources.

To develop instruments for non-salary household income, a multiple regression model was fitted to the survey data using ordinary least-squares (OLS). Non-salary income encompasses farm sales: hence, the specification of the model was guided to some extent by production function theory. The value of farm sales depends on output market access and prices. Non-farming activities (although performed at the farm) such as handcrafting and beer brewing also are included.

In this study, inter-household variability of non-salary incomes was hypothesized to be explained by owned household resources (land, labour and equipment and draft), variable inputs purchased (fertilizer quantity applied), and locational or agroclimatic factors (location)[6]. The impact of factors missing in the model specification are aggregated in the error term.

The final specification of the model is presented below. The expected nature of association between the dependent variable and the explanatory variable in question is shown in parentheses.

(1a) $INCOME = b_0 + b_1(LOC1) + b_2(LOC2) + b_3(LAND) + b_4(LABOUR) + B_5(EQUIP) + B_6(DRAFT) + e$

where:

INCOME	=	Total household non-salary income	
b_0	=	Constant term	
LOC1	=	Low yielding location: (Dummy)	(-)
LOC2	=	Medium yielding location (Dummy)	(+)
LABOUR	=	Labour (Members above five years)	(+)

[5] **Most salaries are earned in urban centres where they are subject to different allocation decisions and expenditure patterns than incomes earned on the farm. All other things held constant, children are more likely to benefit directly from incomes earned on the farm than salaries earned in urban centres.**

[6] **For more detail on specifying the model for household income see "Determinants Of Rural Incomes In Communal Areas Of Zimbabwe: Household Food Security Implications" by Charles J.Chopak, 1991.**

LAND	=	Land owned (hectares)	(+)
EQUIP	=	Equipment owned (Z$)	(+)
DRAFT	=	Draft owned(cattle equivalents)	(+)
e	=	Error term	

Evaluation of the performance of the regression model shows that the independent variables explained nearly 31 percent (Adjusted $R^2 = 0.307$) of the variation of non-salary incomes of the surveyed households. The F-value of 18.25 was highly significant (0.00% level) for the linear relationship between non-salary income and the explanatory variables in the model.

A number of insights are provided by the estimated regression coefficients. First, the expected reliance of households on agricultural production for their non-salary incomes is confirmed by the positive coefficients on production-related resource variables: equipment ownership (statistically significant at the .01% level), cattle ownership (1%), and labour availability (.5%). Land ownership, was significant at the 10 percent level. The regression coefficients imply that: (i) a one acre increase in land owned by the household, *ceteris paribus*, is associated with a Z$12.61 increase in non-salary income of the household; (ii) an additional head of cattle owned by the household, *ceteris paribus*, is associated with a Z$27.89 increase in non-salary household income; (iii) an additional Z$1.00 worth of equipment owned, *ceteris paribus,* is associated with an increase in non-salary income of Z$0.41 for the household; and an additional household member above five years of age, *ceteris paribus,* is associated with an increase in non-salary household income of Z$52.39 per annum.

The importance of the productivity of the farm location to non-salary household income is confirmed by the statistically significant relationship between non-salary income and the dummy variable for medium-yielding location (5 percent). Non-salary household income is Z$723.19 higher in the medium yielding survey wards than in the low yielding wards.

Net grain availability

Net grain availability was calculated as an indirect measure of actual grain consumption by summing households production, monetary and non-monetary purchases, gifts and food aid received minus sales, gifts given and changes in storage inventory. This indirect indicator of household grain consumption provided a useful, albeit rough and imperfect, measure of household caloric intake from grains. USDA estimates that grains constitute about 50% of the average Zimbabwean's caloric intake although some observers believe it is much higher in the rural areas (Ramji, 1991).

To develop instruments for estimating net grain availability per child (NGA), a multiple regression model was fitted to the survey data using ordinary least-squares (OLS). Inter-household variation of net grain availability per child was hypothesized to be explained by owned household resources (land, labour, equipment and draft), variable inputs purchased (quantity of fertilizer applied), and exogenous factors that account for the influence of agroecological conditions (i.e., the location dummy variables). The amount of grain available is also determined by sales, purchases, gifts, exchanges and drought relief. These in turn are influenced by a variety of social and economic factors some of which were not measured and hence appear in the error term. Grain purchases and sales, for example, depend on household production, access to the market and grain prices, and reflect the priorities of family decisionmakers with regard to expenditure and resource allocation. Gifts and exchanges are also a function of complex social factors and inter-household relations. An additional dummy variable, for whether or not households brewed beer in the study period, was included in the model to test whether there was competition for grain between consumption and beer brewing. The final specification of the model is as shown below. Again, the expected nature of association between the explanatory variables and the dependent variable is shown in parentheses:

The regression model explained 12 percent (adj. $R^2 = 0.12$) of the variation of net grain availability to children of the surveyed households with an F-statistic of 3.978 significant at the 0.01 percent level. The low association between the predicted values and the observed values raises questions about the plausibility of the instruments generated by this model.

(1b) $NGA = b_0 + b_1(BEER) + b_2(LOCLOW) + b_3(LOCMED) + b_4(EINCOME) + b_5(SALARY) + b_6(LAND) + b_7(EQUIP) + b_8(DRAFT) + b_9(FERTQ) + e$

where:

NGA	=	Grain available per child for consumption	
b_0	=	Constant term	
BEER	=	Beer brewing (Dummy)	(+)
LOC1	=	Low-yielding Location (Dummy)	(-)
LOC2	=	Medium-yielding Location (Dummy)	(+)
EINCOME	=	Estimated non-salary income	(+)
SALARY	=	Total salary earned by household (Z$)	(+)
LAND	=	Land owned (hectares)	(+)
EQUIP	=	Equipment owned (Z$)	(+)
DRAFT	=	Draft animals (cattle equivalents)	(+)
FERTQ	=	Fertilizer quantity applied	(+)
e	=	Error term	

The estimated regression coefficients provide several interesting insights. First, the anticipated reliance of children on agricultural production for their food is confirmed by the strong statistical significance of production-related resource variables: equipment ownership (statistically significant at the .05% level), cattle ownership (5% level), and land availability (5% level). An unanticipated, result is the significant negative

association (at the 1% level) between both salary and non-salary income and the amount of grain available for consumption by the child. The result, may be plausible for places like Gokwe North which is poorly suited to maize production but well-suited for cotton production. Yet income generated from cotton is difficult to convert into grain because of local scarcity and poor grain distribution channels (Chisvo et al. 1990). This observation is consistent with observations made in other low yield areas where maize is the only source of both food and cash income and households just attain food self-sufficiency retaining most, if not all, of the grain they harvest for consumption at the expense of cash income (from grain sales). Salaries were expected to be higher for households that cannot raise crops, either because of poor agroecological conditions or because they lack certain necessary resources thus rely on off-farm employment. Grain availability, under these circumstances, was determined by grain prices and availability on local markets. Earlier surveys have shown that, in most grain deficit low-productivity areas, grain availability for purchase is seasonal and expensive forcing households to rely on purchased meal that is 30-35 percent more expensive than grain. In this case, even though households have high salaries, grain itself may not be readily accessible. The negative association between salaries and net grain availability could reflect basic consumer behaviour of shifting tastes from staple foods to non-food luxuries as incomes grow. The estimated regression coefficients imply that: (i) an additional Z$1.00 of salary and non-salary household income is associated with 0.02 kg and 0.57 kg less grain available for consumption by the child, respectively; (ii) a one acre increase in land owned by the household, *ceteris paribus*, is associated with a 9.22 kg increase in the amount of grain available for consumption by the child; (iii) an additional head of cattle owned by the household, *ceteris paribus*, is associated with a 15.22 kg increase in the amount of grain available to the child for consumption; and (iv) an additional Z$1.00 worth of equipment owned, *ceteris paribus,* is associated an additional 0.266 kg of grain available to the child.

The coefficients also demonstrate the importance of area productivity to grain availability for consumption. At the 10 percent level of significance, wards that yield 476-657 kilograms of grain per acre (also referred to as medium-yielding wards) are associated with 361 kilograms more grain available for consumption by a child.

Beer brewing and the amount of fertilizer applied to grains do not seem to have a significant association with net grain availability for consumption.

2nd Stage Model

Determinants of height-for-age malnutrition in under-fives

The literature fails to provide a sound theoretical base for the specification of a child nutrition model. Several different regression models therefore were specified using different combinations of explanatory variables. These alternative specifications were used to test the robustness of results obtained and the conclusions reached. Following Thomas (1990), five sets of factors are hypothesised to explain the height-for-age measurements of the surveyed children. These are: (i) household characteristics, e.g., asset ownership, type of latrine, marital status, grain available to the family for consumption; (ii) parental characteristics (i.e., height, drinking habits); (iii) community factors (i.e., water accessibility and quality; accessibility to health centres; (iv) child characteristics (i.e., age, sex, birth weight, height, weaning age, and child spacing); and lastly, (v) type and duration of illnesses.

A regression model was specified to examine the determinants of variations of height-for-age nutritional status among under fives.

The regression model's independent variables explained nearly 22 percent (adj. R^2 $=0.216$) of the variation of height-for-age z-scores (HAZs) of the survey children but the model was not significant.

(2) $HAZ = b_0 + b_1(SEX) + b_2(AGE) + b_3(MARITALS) + b_4(MARITALP) + b_5(BIRTH\_W) + b_6(NGA) + b_7(WEANED) + b_8(DIAR) + b_9(MEASLES) + b_{10}(COUGH) + b_{11}(EINCOME) + b_{12}(SALARY) + b_{13}(EDUCATM) + b_{14}(HEIGHTM).$

where:

HAZ	=	Height for age Z-score	
b_0	=	Constant term	
SEX	=	Gender Dummy (1 = male)	(+)
AGE	=	Age in months dummy (1 = < 16)	(+)
MARITALS	=	Marital status dummy (1 = single)	(-)
MARITALP	=	Marital status dummy (1 = polygamy)	(-)
BIRTH_W	=	Birth weight dummy (1 = < 2500 g)	(-)
NGA	=	Estimated grain availability (kgs)	(+)
WEANED	=	Weaning age in dummy (1 = < 14 months)	(-)
DIAR	=	Number of days child had diarrhoea	(-)
MEASLES	=	Number of days child had measles	(-)
COUGH	=	Number of days child had a cough	(-)
EINCOME	=	Estimated household income (Z$)	(+)
SALARY	=	Salary earned by household members (Z$)	(+)
EDUCATM	=	Years of FORMAL education of mother	(+)
HEIGHTM	=	Height of mother	(+)

SUMMARY OF RESULTS

The results indicate that the estimated relationship between grain availability for consumption by the child and the child's height-for-age nutritional status is sensitive to model specification. Whilst no significant association is shown by he results of the specified equation, other models have shown a positive association between grain availability and nutritional status at the 10% to 15% level of significance. Using the actual values for grain availability, positive association (10% significance level) results.

Several other variables appear to be associated with nutritional status regardless of the model specification: (i) the height of the mother (positive at the 10% level of significance); (ii) children past weaning age (negative at the 1% level); (iii) polygamous households (negative at the 5% level); (iv) the incidence of diarrhoea (negative at the 1% level), (v) the level of education of the mother (negative at the 10% level), and (vi) low birth weights (below 2500 gms) negative at the 10% level.

The coefficients imply that:

(i) children under 16 months (likely to be still breastfeeding), *ceteris paribus*, are associated with an increase of 0.69 in their HAZs;

(ii) a one year increase in the years of education of the mother, *ceteris paribus*, is associated with a decrease of 0.5 in the child's height-for-age z-score;

(iii) polygamous households, *ceteris paribus*, are associated with a decrease of 0.57 in height-for-age z-scores of under-fives in Zimbabwe's communal areas;

(iv) a one centimeter increase in the height of the mother, *ceteris paribus*, is associated with a 0.03 increase in the height-for-age z-scores of her under fives;

(v) low birth weight (below 2.5 kgs) is associated with a 0.72 decrease in HAZs. UNICEF reports that 70% and 53% of infant deaths occurred within the first month in two sample areas in 1983 and 1984 respectively (UNICEF, 1985, p.12). A regression analysis to identify factors associated with low child birth weights[7] identified the importance of main water sources further than 2km from home. A distance further than 2 kilometres to the most utilised water source, *ceteris paribus*, was associated with a fall in birth weight of 0.23 kg, significant at the 10% level. No significant relationship was observed between birth weight and type (or quality) of water source. Thus, proximity of water sources may be more important than type of source. It is generally understood that the quantity of water fetched and the number of uses to which a given quantity of water is put are more important in determining health (especially incidence of diarrhoea) than the water source itself (Choto, 1991). The quantity of water fetched is a function of distance from source, physical well being of the person fetching it and the opportunity cost of fetching water. In rural areas several activities compete with time spent fetching water, such as working in fields and fetching firewood. Reducing the distance to water sources, therefore, could increase the amount of water used and/or free up mothers' time for other activities, including the time devoted to caring for children. Other factors that were significantly associated with birth weight were (a) gender, males being significantly associated (at the 0.01% level) with an increase in birth weight of 0.34 kg, (b) marital status of household -- single parents (at the 5 percent level) being significantly associated with an increase in birth weight of 0.35 kgs.

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[7] **In the model specified, child birth weight was hypothesized to be explained by 11 factors: (1) mother's drinking habits; (2) mother's height; (3) type of latrine; (4) estimated non-salary household income; (5) water source and distance from water source; (6) Marital status; (7) Total household income from salaries; (8) child's gender; (9) Distance from health centre; (10) Years of formal education of mother; and (11) grain availability to the household(estimate).**

(vi) An additional day that a child suffers from diarrhoea, *ceteris paribus*, is associated with a decrease in HAZ of 0.004 -- hence, children who suffer from frequent and long durations of diarrhoeal episodes are likely to be stunted. The average number of days a child suffered from diarrhoea in the year prior to the survey was approximately 13 -- for severely stunted children (i.e., HAZ < -3.0) it was 66 days, for the less severely stunted (i.e., -2< HAZ< -3) the average was 15 days and children who were not stunted (i.e., HAZ > -2) had suffered from diarrhoea for an average of 9 days. A regression model specified to identify key factors contributing to the incidence of diarrhoea identified two main factors: a) absence of a latrine (or the use of the bush -- significant at the 0.07% level of significance) being associated with an increase of 16 days in the total number of days the child had diarrhoea; and (b) excessive drinking by parents was associated (at the 5% level) with an increase of 64 days that the child had diarrhoea in the previous year. Salary had a negative coefficient and was not significant. Non-salary income had a positive coefficient but was not significant.

Improving sanitary conditions by constructing pit latrines greatly reduces the incidence of diarrhoea which itself is associated with a deterioration in the nutritional status of children. Of the sampled households, sixty percent used the bush, 18 percent had a pit latrine with the rest having access to a blair or VIP latrine. Of those who did not have a latrine, about 40 percent were participating in sanitation projects in which they were constructing their own latrines with government helping provide essential raw materials such as cement. Almost all of those participating had fully dug a pit in anticipation of receiving their allocation of cement. Almost all of them indicated that failure to receive cement had stopped further progress. Latrine projects should be reinforced rather than terminated during structural adjustment in light of the above findings.

POLICY IMPLICATIONS

The results from this analysis suggest six important implications for child health and nutrition policy:

1. Returns to investments in diarrhoeal disease control and in nutrition and health education, specifically focusing on maternal and child care -- measured through improvements in child nutrition -- appear to be more strongly associated with child nutrition that additional grain consumption by households. The impact of the latter is determined, however, by effects of a dynamic process and is difficult to trace. For example, grain availability may affect mothers' food security, which in turn affects her productivity and time spent with children. These indirect effects were not captured in the model. Greater access to and affordability of staple grain contributes to a number of family objectives apart from child nutrition (e.g., income growth and security).

2. The analysis suggests that nutrition and health education should be viewed as an indispensable component of formal eduction and should be targeted to both parents. The above analysis shows that formal education, as such is less important than informing on practices related specifically to health education e.g., pre-natal practices of the mother, weaning practices and sanitation.

   Curricula for health and nutrition education should include the following:

   (i) importance of birth weight -- its relationship to the health, diet and workload of pregnant women;

   (ii) post-weaning child care and the control of diarrhoea;

   (iii) importance of adequate water and sanitation standards;

   (iv) the effects of inadequate child nutrition on productivity and future health risks; and

   (v) intra-household control of income and prioritization of expenditure including gender issues associated with child nutrition.

3. In the process of economic reform, the government may consider mechanisms to facilitate private investment in nutrition and health education in both rural and urban areas. For example, many rural households appear to have undertaken digging and construction of latrines and are waiting for cement to complete the latrines. The health impacts of and mechanisms to promote improved cement distribution in rural areas to encourage private investment in improved sanitation indirectly affects nutrition.

4. There appears to be a link between mothers' pre-natal behavior, low-birth weight and child stunting. Between 53% to 70% of all infant mortality in Zimbabwe occurs within the first month (about 35% within the first week), and is closely associated with low birth weight (UNICEF, 1985). Low birth weight, in turn, is associated with the condition of the mother during pregnancy, which is a function of diet, drinking, smoking, etc. Low birth weight also is associated with distance from main water source and polygamous households.

5. Preliminary evidence indicates that, holding other factors constant, polygamous families tend to have a higher proportion of malnourished children. Why this should be the case has not been established.

6. The relatively importance of the negative coefficient for salaries compared to the positive coefficient for non-salary incomes provide preliminary evidence that the value of a dollar of income relative to child nutrition depends on where that income is earned and who controls it. Income generated through local rural employment may, *ceteris paribus*, contribute more to nutritional well-being of rural children than income earned by family members in urban employment. Given the importance of agriculture as a source of rural income, improvements in farm technology and the promotion of rural home-based industries appear to provide greater potential benefits to children living in the rural areas than employment elsewhere.

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V

Policy Issues Related to Crop Mix, Technology and Food Security

14

THE EFFECT OF CASHCROPPING ON FOOD SECURITY, EMPLOYMENT AND INCOME IN SWAZILAND: PRELIMARY FINDINGS

Vincent Majozi Sithole[1]

Introduction

Satisfying man's food needs has always been a struggle for a majority of the world's population. Therefore the world's food problem is nothing new. Many people have "frequently, if not continuously, suffered from, at best, an inadequate food supply and, at worst, from hunger if not starvation" (Dilon, 1984:4). The difference is that today, hunger, actual or potential, is no longer seen as a natural part of the human condition because, due to improved technology, there is a general awareness of the problem and science and technology are now seen as capable of providing a solution.

Indeed, studies have shown that the world is able to produce more food than its inhabitants require. According to the World Bank, the "growth of global food production has been faster than the unprecedented population growth of the past forty years" (World Bank, 1986:1). However, despite this, some 34% of the population of the developing world -- excluding China -- still does not eat well enough to lead an active working life, and nearly half of these are barely subsisting on a minimum survival diet. Put in a different way, it means that about 730 million people do not have enough food. Amongst these, there are about 340 million persons who are acutely undernourished (World Bank, 1986).

The implications of the above are that, in the global sense and often in individual countries, inadequate food production is no longer the source of the food problem. Problems with food security do not necessarily result from inadequate food production. They also arise from a lack of purchasing power on the part of nations and households.

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Just as it is not necessary for a country to produce everything it consumes, neither must farm households. It may not be necessary and, infact, it may be inefficient for a farmer to meet all his food crop requirements through own production. Just as it is essential for a country to generate enough foreign exchange to be able to import goods and services required by its nationals, it may be efficient for a farm household to engage in other non-food production activities/enterprises which will generate enough income to enable purchase of food requirements. One such enterprise is cash crop production.

Cashcropping, or commercial farming, can be defined as growing a crop[2] with the purpose of selling it. A cashcrop, therefore, is a crop that is sold for cash -- Maxwell (1989:3) refers to this as the common sense definition. Marketed surplus at the homestead level and exported produce at the national level are thus defined as cashcrops.

The above argument easily holds for non-edible crops. For example, all cotton produced on the farm will be marketed and is therefore a cashcrop. When we follow this argument through for edible crops however, this would mean that, during a year in which high yields could be achieved due to, for example, favourable rainfall, many more farmers would be commercialized than in years with lower yields. In other words, the "normal surplus"[3] resulting from good yields, in what otherwise would be subsistence farming, is now referred to as a cashcrop, whereas in other ("below-average") years, the same crop would be a subsistence crop.

Any definition of cashcropping should take into consideration the deliberate aim of a farmer to produce a marketable surplus. This notion is taken from Testerink (1984), who has an elaborate definition. In the context of the effect of cashcrops on food security, it may be argued that the production of edible cashcrops, other than "luxury" food cashcrops such as sugar, reflects a situation of farm level self-sufficiency. There may be exceptions, however, in the case of the farmer who sells produce directly after harvest to satisfy short-term cash needs, or due to a lack of storage, only to buy food (often at a higher price) later. Another example would be a farmer who entered into a contract and is under an obligation to sell all or part of his food crop.

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[2] **It would also include raising livestock, but for the purpose of this paper, this aspect of commercial farming is excluded.**

[3] **The normal surplus constitutes the result of planned overproduction in subsistence farming in order to cope with the risk of variable rainfall (Testerink, 1984:2).**

Notwithstanding the above, for purposes of this study we exclude the production of edible crops as a cashcrop. We focus on those farmers growing cotton on Swazi Nation Land (SNL). Cotton has been selected because it is the major non-edible cash crop on SNL. Initially we planned to include tobacco growers. However sampling problems, due to the insignificant extent to which the crop is grown, led to it being discarded.
The purpose of this paper is to explore the impact of cashcropping on household food security, income and employment in Swaziland. Food security is defined as dependable access by all people at all times to enough food to be able to lead an active and healthy life. Such access can be attained through own production and/or ability to purchase needed food.

Section 2 summarizes the Swaziland government's attitude towards cashcropping together with an overview of cashcropping in Swaziland. Section 3 presents a literature review, whilst the research method adopted for this paper is presented under section 4. Section 5 presents discussion of the research findings. Based on the previous sections, the final section presents a summary and research/policy recommendations.

CASHCROPPING IN SWAZILAND

Swaziland Government Policy Towards Cashcropping

The government has emphasized cashcropping in the agricultural sector for a long time. According to the *Post Independence Development Plan,* one of the agricultural objectives was to "convert the Swazi farmer from being a cultivator eking out a subsistence existence supplemented by wage earning, to a full time profitable yeoman class of farmer" (Swaziland Government, 1969:67). The same objective is reiterated in the *Second National Development Plan, 1973-1979*, where the first aim of agricultural policy is listed as being "to assist Swazi farmers in making the transition from subsistence activity to semi-commercial and commercial farming" (Swaziland Government, n.d.:45). Such a transition was expected to be attained through increasing the marketed production of key food crops and cashcrops by Swazi farmers, primarily by raising crop yield per hectare and by introducing farmers to cash crop farming. The third and the fourth national development plans echoed this policy.

The main programme used to assist SNL farmers in making the transition to (semi-) commercial farming, has been the Rural Development Areas Programme. This integrated rural development programme was initiated in 1968. The programme, partly financed with British aid and World Bank loans, included physical reorganization of land use patterns, provision of improved infrastructure as well as the provision of extension services, input supplies and credit facilities. The results have not been impressive and implementation of the programme was stopped *per se* after 1983 when external funding for the programme came to an end. Since then, no further large scale rural

development programmes have been mounted. Aided development now takes place through *ad hoc* funded projects.

Characteristics of Cash Crop Production in Swaziland

The importance of cashcrops in Swaziland can be illustrated by listing a number of variables, such as its contribution to GDP, creation of employment opportunities, the number of farmers growing cashcrops, the area under cultivation of these crops and total output. An attempt was made to calculate the contribution to GDP, but the figures provided by the Central Statistical Office (CSO) on national accounts were so erratic and obviously wrong for most years, we decided not to pursue the issue further.

Data on employment in the cashcropping sector on SNL are not available. Some studies, however, give indications of labour hired by cashcroppers. A survey of 140 cotton farmers on the southern part of the Lowveld, carried out in 1980, shows that about 63% of the surveyed cotton farmers hire labour for harvesting, with an average 13.3 hired labourers (Sterkenburg and Testerink, 1982: 33-34). It has also been argued that labour shortages, particularly during the harvest period, form a constraint to increased cotton production (F.A.O., 1981: 37-38) thus indicating high (potential) employment opportunities.

Figures on the number of cashcroppers, over the years, are scarce. Cotton growers are concentrated in the Lowveld as shown in Table 1. This is probably due to favourable climatic conditions for cotton in that region, compared to the staple crop, maize. Two-thirds of the cotton growers are found in this agro-ecological zone whilst an additional quarter are found in the Middleveld. Furthermore, 22% of SNL farmers in the Lowveld grow cotton. In total, 8% of all SNL homesteads produce cotton and, for the purposes of this study, are classified as cash croppers.

Table 1. Regional Distribution of Cashcropping on SNL - 1983/84

Region	Cotton Growers		Non-Cotton Growers		All SNL Homestead	
	No.	%	No.	%	No	%
Highveld	127	3.0	14338	29	14465	27.2
	0.9		99.1		100	
Middleveld	1123	26.5	20910	43	22033	415
	5.1		94.9		100	
Lowveld	2699	63.7	9560	20	12259	23.1
	22.0		78.0		100	
Lubombo	288	6.8	4061	8	4349	8.2
	6.6		93.4		100	
Swaziland	4237	100	48869	100	53106	100
	8.0		92		100	

Source: Data from CSO Agricultural Census, 1983/84

The area under major crops on SNL is recorded in the Annual Statistical Bulletin of CSO (Swaziland Government, 1980-1987) and are the source of the data used here. However, there are some unexplained variations in the figures published in different years pertaining to the same growing season. It is, however, the only source that provides annual figures.

Table 2 gives a summary of the area under cotton and maize. From this table the reader can see that maize is clearly the most important crop in terms of area -- about three quarters of all cropped SNL land is under this crop in any given year. The area under cotton increased considerably between 1971/72 and 1978/79 from about 4000 ha (4.9% of cropped SNL) to 17709 ha (18%). However, the hectarage dropped to 6492 ha in 1983/84 (8.6%). Stagnating cotton prices, accompanied by an increase in the cost of production, may have shifted production towards maize. This is supported by a comparison of gross margins for maize and cotton, presented in a recent World Bank Report (1987: Table 7), reproduced here as table 4, and by the increase in the area under maize from 72.3% in 1978/79 to 84% in 1983/84, Table 2.

Table 2. Area under Cotton and Maize on SNL - 1971/87

Year	Cotton		Maize	
	Total area	% of total cropped SNL	Total area	% of total cropped SNL
	(ha)		(ha)	
1971/72	3933	4.9	62311	78.0
1972/73	3493	4.1	70555	81.9
1973/74	9666	10.6	68851	75.8
1974/75	11336	13.1	60999	70.4
1975/76	10130	12.2	59799	72.0
1976/77	7925	11.2	53902	76.3
1977/78	7013	10.1	53902	77.3
1978/79	17709	18.0	71145	72.3
1979/80*	17709	18.0	71145	72.3
1980/81	13035	16.9	55654	72.4
1981/82	11575	14.5	58936	74.1
1982/83	7536	13.2	44143	77.1
1983/84	6492	8.6	63582	84.0
1984/85*	6492	8.6	63582	84.0
1985/86*	6492	8.6	63582	84.0
1986/87*	6492	8.6	63582	84.0

Source: CSO Annual Statistical Bulletins 1980-1987, Cotton Board Annual Reports. * Estimates.

Assuming that cotton farmers are capable of producing maize as an optimum, the higher gross margin for maize may induce cotton growers, particularly in the middleveld where growing conditions are better than in the Lowveld, to shift to maize. The returns per man-day for maize (both intermediate and optimum) are substantially higher, warranting the shift for the middleveld farmer.

Another factor may be the government promotion of maize self-sufficiency in the early eighties, as stated in the *Third National Development Plan*, pushing (probably mainly Middleveld) farmers into maize production. A further explanation may be a shift to off-farm wage employment with higher earnings per manday than the E2.50 earned producing cotton. Off-farm wage employment may also provide a more secure income source (particularly in view of a drop in yield due to a severe drought simultaneous with a decline in hectarage under cotton). However, the decline in area under cotton is probably due to a combination of these factors. The recent decline in off-farm employment opportunities, however, may have created a situation where cotton production is again a good way of earning a cash income, particularly for Lowveld farmers.

Total cotton production and yield have fluctuated widely over the years, from a modest 2282 tones in 1971/72 to a record 14922 tones in 1980/81. Yields ranged from a low 580 kg/ha in 1978/79 to a high of 1692 kg/ha in 1977/78. These yield differences are most likely explained by variations in rainfall.

Methodology and Field Work Problems

The study used several sources of information to investigate the role of cashcropping in food security, employment and income. Secondary data were used for establishing the institutional environment, as well as the general background of the farming system on Swazi Nation Land. Primary data was collected at the household level. As the middleveld and lowveld are the only two agro-ecological zones producing both cotton and maize, the sample was selected from these regions. The sample was stratified (two clusters) with each region representing one stratum. In each of the two agro-ecological zones, both groups (i.e., cashcroppers and non-cashcroppers) of farmers were interviewed. Initially the idea was to have a third group consisting of households producing cotton under a contractual agreement. However, because of difficulties in obtaining a sampling frame from the cotton buyers, the idea was discarded. Thus, the sampled farmers were distributed as follows:

Middleveld	cashcroppers	30
	non-cashcroppers	30
Lowveld	cashcroppers	30
	non-cashcroppers	30

Table 3. Area under different crops, SNL, 1983-84

	Cashcroppers	Non-cashcroppers	All SNL
Mean cropped area (ha)	3.2	1.5	1.6
Mean % kept under maize	42.9	87.7	83.6
Mean area under maize (ha)	1.3	1.3	1.3
Mean % kept under cotton (ha)	49.3	—	4.3
Mean area under cotton (ha)	1.6	—	0.1
Mean % under other food crops	7.8	12.3	11.9
Mean area under other food crops (ha)	0.3	0.2	0.2

Source: Data from CSO Agricultural Census, 1983-84

One area per region was selected at random from a list of areas falling under proposed RDA status in 1982 and, with the aid of the population census enumeration areas, one area per region was selected at random. In the middleveld, the selected area was Mafutseni whilst in the lowveld the area was Elulakeni. The two groups of farmers were interviewed in each area.

Maps of the selected areas were used in the field for accurate boundary determination. Enumerators selected households by first locating a cotton producer and then selecting the nearest non-cotton producer. This was based on the assumption that there tends to be more non-cotton producers than cotton producers in both regions.

The field work was undertaken to cover a period of one year through four visits, Table 4. The questionnaire was designed so that the respondent was expected to recall events of the previous three months. However, some questions, particularly those pertaining to the nutrition section, required a recall period covering the previous 24 hours.

Table 4. SNL crop budgets, 1985 prices

	Yield[1] kg/ha	Total costs per ha	Total output value per ha	Man days per ha	Gross margin[2] E/ha	Return per man day E
maize intermediate[3]						
- Highveld	2,550	333	791	78	458	6.1
- Middleveld	1,770	259	527	65	268	4.1
- Lowveld	850	178	264	60	86	1.4
Maize optimum[4]						
- Highveld	4,250	563	1,318	50	755	15.1
- Middleveld	2,550	384	791	45	407	9.0
- Lowveld	1,275	270	395	40	125	3.1
Cotton	850	714	398	125	316	2.5
Tobacco air-cured	700	515	910	145	395	2.7

1 Gross yields less 15% for harvest/storage losses.
2 Including family labour.
3 Tractor-ploughing, ox-harvesting and sowing, hybrid seed, medium fertilization, hired assistance for weeding; improved storage, active farmers.
4 Commercial farmers on SNL (less than 10% of households), tractor cultivation, adequate fertilizer and weeding by herbicide.

Source: The World Bank, 1987 table 7.

The distribution of the visits and coverage is shown in Table 5.

Table 5. Field Work Visit and Coverage

Visit	Month Undertaken	Period Covered
First	December 1990	Sept-Nov 1990
Second	March 1991	Dec 1990-Feb 1991
Third	June 1991	March-May 1991
Fourth	September 1991	June-Aug 1991

Field Work Problems

A number of problems were encountered in sample selection in the field. Late rains made field work difficult. Some farmers had not yet started ploughing with some indicating that they actually might decide not produce anything this season. Secondly, some well known cotton producers in the middleveld decided that they would not produce cotton because of the late rains -- rather, they would produce only maize. The opposite occurred in the lowveld where farmers, who normally do not produce cotton, decided to produce some because they felt it would adapt better under the late/less rain conditions.

Many interviews had to be done in the evenings because of the absence of adult household members during the day. In addition, the timing of some of the field visits coincided with peak labour demand on the farm. Consequently, to get an interview, the enumerators found themselves having to show extra politeness by taking part in the field work, such as weeding and picking cotton.

Presentation and Discussion of Survey Results

We hypothesized that cashcroppers have a higher degree of food security than non-cashcroppers. This is because the former use and have greater access to extension services, agricultural inputs, and credit facilities. Also their households are headed by innovative heads (i.e., they are relatively young, more educated and predominantly male). We, therefore, tested the hypothesis using the data collected. In addition we hypothesized that cashcropping contributes positively to the creation of employment opportunities and to increased total household income.

Food Security

Maize is the major staple food crop in Swaziland. The agricultural cropping system centres around maize. Many crops are intercropped with it. Others are produced on the remaining land once enough land has been put under maize to enable a homestead to at least subsist. According to CSO data, maize occupies 67% of the total net area under crops in Swaziland. This share is as high as 87% in the highveld whilst in the lowveld, which is not suitable for maize, the share is 45%.

Maize is produced by virtually all SNL farmers. According to Sithole (1990:11), 90% of all SNL farmers produce some maize and Ristanovic (1990:1) reports that more than 95% of the maize produced is for direct human consumption. This shows the importance of maize in the diet of Swazis. Given the importance of maize in the diet and the proportion of land allocated to it, it seems proper to infer that there exists a direct relationship between production levels and degree of food security. Indeed a recent SSRU report, (using CSO data), demonstrates that the majority of SNL farmers

do not produce other food crops, Table 6. Our data presented in table 7, concurs with this finding. In this section of the analysis, we used the ability of households to produce enough maize as a proxy for food security. This is modified by examining the ability to purchase supplementary food. Other variables that are perceived to be influential in the food security status of households are examined briefly.

Table 6. Frequency of Production of Non-maize Food Crops on SNL

Crop	No. of Homesteads (n = 53 106)	%
Cowpeas	4562	9
Beans	4416	8
Groundnuts	5377	10
Jugobeans	3551	7
Pumpkin	15743	30
Sweet potatoes	6778	13
Potatoes	490	1
Vegetables	384	1

Source: CSO Census 1983/84

Table 7. Types of Crops, Produced by Type of Farmer

Crop	Cash Croppers		Non-Cashcroppers	
	No.	%	No.	%
Cotton	62	100	-	-
Maize only	36	58	40	63
Maize/peanuts/cowpeas	1	1.6	2	3.2
Maize/cucurbits	5	8	7	14
Maize/pumpkins/soyabeans	2	3.2	-	-
Maize/pumpkins/cowpeas	1	1.6	3	4.8
Maize/pumpkin	3	4.8	8	1.3
Cowpeas	3	4.8	1	1.6
Cucurbits	2	3.2	-	-
Sweet potatoes	2	3.2	-	-
Beans	1	1.6	2	3.2
Sorghum	1	1.6	1	1.6
Groundnuts	3	4.8	4	6
Jugobeans	3	4.8	6	10

Source: Survey Results

Not all SNL farmers produce enough maize to meet their consumption needs throughout the year. In a sample of 58 061 homesteads in 1983/84, the CSO found that only 16% are able to always produce enough maize, Table 8. This figure compares unfavourably with the more than 30% who never produce enough maize to last the whole year. The data support our hypothesis by showing that only 25% of cashcroppers never produce enough maize compared to 35% of non cashcroppers. Indeed more than 23% of the cashcroppers always produce enough compared to only 16% non cashcroppers.

Our data also confirms these findings. Table 9 shows that 66% of the farmers already knew by December 1990 that their remaining stock of maize would not last up to the 1991 harvest (May/June). The percentage is surprisingly higher among cashcroppers (69%) than the non-cashcroppers (63%). As shown in Table 9, only 25% of the farmers perceived that their maize stock would last till the next harvest. Of even greater concern is the fact that, with harvest at least five months away, 27% of the farmers were already totally out of own produced maize.

Table 8. Cashcropping and Maize Self-Sufficiency 1983-84

Production Level[a]	Cash croppers		Non-Cashcroppers		Total	
	No.	%	No.	%	No.	%
Always enough	1372	23.3	7501	15.9	8873	16.7
Mostly enough	1218	20.7	8716	18.5	9934	18.7
Sometimes enough	1818	30.8	14445	30.6	16263	30.6
Never enough	1489	25.3	16547	35.1	18036	34.0
Total	5897	100.0	47209	100.0	53106	100.0

Notes [a]: Always = 100% of the time Mostly = Greater than half of the time
Sometimes = Less than half of the time Never = Zero percent of the time
Source: Data from CSO Agricultural Census, 1983-84.

Table 9. Ability of households to produce enough maize by type of farmer (1989/90)

Particulars	Cash croppers		Non-cashcroppers		Total	
	No.	%	No.	%	No.	%
Enough maize	12	19	19	31	31	25
Not enough	43	69	39	63	82	66
Not sure	2	3	2	3	4	3
No maize in Stock by December	16	26	17	27	33	27

Source: Survey Results

Responses were obtained on the kind of strategies used when there is no money to purchase maize. Table 10 summarizes the strategies and the degree of usage. Up to 65% of the cashcroppers are always able to provide themselves with some maize compared to only 43% non cashcroppers. Up to 86% of the cashcroppers, who are not always able to provide themselves with enough maize, are able to borrow or barter from neighbours compared to half of the non cashcroppers. Since borrowing implies that latter they will return the items, in effect one could argue that these households also are able to provide for themselves.

Table 10. Ability of household to produce/purchase and strategies used to supplement shortages, by type of farmer (1990/91)

Particulars	Cashcroppers		Non-cashcroppers	
	No.	%	No.	%
Always able to produce/purchase	40	65	27	43
Borrow*	19	86	18	50
Receive from friends/relatives	11	50	23	63
Reduce meals	8	36	27	75
Wild fruits and vegetables	3	14	9	25
Less Variety	2	9	5	13
Inferior Food	1	5	9	25

Note: * The percentages from this item downwards are calculated based on households not always able to produce/purchase enough maize.

Asking from neighbours and/or friends is the second most popular strategy used by 50% of the cashcroppers and 63% of the non cashcroppers. It would be socially unacceptable for friends and neighbours who have produced surplus maize not to give a deficit friend or relative a bag or two of maize. The same argument holds for a neighbour. Indeed, cases of prosperous farmers neglecting poor neighbours are known to have bad repercussions. Elements of jealousy and attribution of prosperity to witchcraft are well documented. It is probably partly for this reason that the deficit neighbour can still rely on prosperous neighbours.

Another popular strategy involves reducing the number of meals per day. A large number of the farmers, 75% non cashcroppers and 36% cashcroppers, reported that such a strategy is used. This strategy may affect the health of the people.

Cashcroppers produced more maize during the 1990/91 cropping season than non-cashcroppers. Whilst their average maize output was 10.25 bags, non cashcroppers only produced an average 5.9 bags during the same period. Given the earlier figures showing that there is no significant difference in areas under maize for the two types of farmers, the output figures indicate that cashcroppers get higher yields. The cashcroppers higher ability to have enough food is due to the cashcrop itself. The gross income from cotton during the 1990/91 cropping season was an average of E3000 per farmer, with some having up to more than E10,000. This reflects a marketing infrastructure that is much better than that of maize. Other factors that contribute to cashcroppers' food security include better access to extension services and the qualities of the head of household.

Access to Extension Services

As shown in Table 11, our study confirms the inadequacy of extension - farmer contact. During the period covering the planting period (September-November), less than 5% of all the farmers had been visited by government extension workers. Amongst the cashcroppers, 8.1% were contacted compared to only 1.6% of the non-cashcroppers. This confirms the fact that extension workers, with the time and means, prefer to visit progressive farmers who respond more positively to advice.

However, as many as three out of five of the visited cashcroppers (60%) did not find the visit by the extension workers useful. The same claim was given by the only visited non-cashcropper. This implies that either the farmers already knew the techniques that the extension worker was promoting, or the latter was not convincing to the farmers.
In addition to on - farm visits, farmers are invited to attend extension services courses. Only 6.4% of the cashcroppers had attended such a course. Not a single non-cashcropper has attended. Amongst those who attended the course, half were heads of homesteads and a quarter were females. Given the dominance of males as heads of homesteads, and the dominance of women in agricultural activities, the scenario painted is that more training is presented to household members who do relatively less agricultural work rather than to those who dominate agricultural work. This tends to confirm the extension service bias against women noted earlier.

Virtually all farmers claimed that advice from government extension workers is not received on time. This corroborates the fact that the majority had not received extension visits when most needed i.e., during the planting time. Farmers who had not been contacted by extension workers, and those who normally do not get extension advice attributed this to several dominant reasons. As can be seen from Table 11, the most dominant reason across all types of farmers is that the extension workers do not visit farmers. Indeed 65% of cashcroppers and 68% of non-cashcroppers cite this reason. Another large proportion of farmers cite a lack of awareness of the availability of extension services.

Table 11. Access to Extension Services by Type of Farmer

Particulars	Cashcroppers		Non-cashcroppers	
	No.	%	No.	%
EXTENSION VISIT				
Yes	5	8.1	1	1.6
No	56	90.3	62	98.4
No response	1	1.6	0	0
EXTENSION COURSE ATTENDED				
Yes	4	6.4	0	0
No	58	93.6	63	100
REASONS FOR NOT USING GOVERNMENT EXTENSION				
Unaware of its existence	8	12.9	19	30.2
Ext workers never visit-	40	64.5	43	68.3
Ext workers cannot be contacted	13	21.0	6	9.5
Not needed	3	4.8	4	6.3
Poor services	1	1.6	0	0
ACCESS TO NON GOVERNMENT EXTENSION SERVICE				
Yes	14	22.6	9	14.3
No	40	64.5	49	77.8
No response	8	12.9	5	7.9
NON GOVERNMENT EXTENSION SOURCES				
ADAS	0	0	1	1.6
Cotona	11	17.7	2	3.2
Clark cotton	5	8.1	1	1.6
S.F.D.	1	1.6	4	6.4
None	43	69.4	55	87.3

Source: Survey Results

Apparently Swazi farmers still believe in the orthodox approach of providing extension information, i.e., farmers wait in their homesteads to be visited individually by extension workers. A small proportion showed that they had tried to contact the extension worker. The failure of extension workers to contact most of the farmers could be attributed to various reasons, the main ones being a high farmer to extension worker ratio and limited means of transport available to the extension worker.

As noted earlier, some farmers have access to other extension services. The study shows that 23% of the cashcroppers and 14% of the non-cashcroppers, over the period September-November, were able to receive extension services from other sources. The most popular source amongst the cashcroppers was the Cotona ginery whilst among the non-cashcroppers, it was the Swaziland Farmers Development which runs a number of projects in the country. Other sources included the Agricultural Development and Services (ADAS) and Clark Cotton. The interest of Cotona and Clark Cotton is obvious, limiting access to this source of non-governmental extension services to non-cashcroppers.

Credit

We also found that there is a greater use of and access to credit facilities by cashcroppers than non-cashcroppers. In the 1989/90 cropping season, 26% of the cashcroppers used some credit loans for their agricultural production compared to only 8% non cashcroppers. Amongst the various reasons given for not using credit by non-cashcroppers, lack of security was prominent. The popular reason among cashcroppers was that they did not need it.

During the cropping season 1990/91, up to 42% of the cashcroppers had already obtained loans during the first field visit compared to only 9% of the non- cashcroppers. Amongst the cashcroppers who had not yet received credit, some were waiting for the processing of their applications.

It is clear that cashcroppers have greater access to credit facilities than non-cashcroppers. These farmers know the credit sources. For a particular cashcrop, the buyers often provide financing. In addition, cashcroppers have the required assets to pledge as security. They can use the cotton as collateral for loans obtained from buyers whilst their high ownership of cattle allows them better access to other financiers.

Household Membership

The characteristics of the head of homestead are summarized in table 12. The majority of the homesteads are headed by males -- 87% and 81% of cashcroppers and non-cashcroppers respectively. Although there is no major difference, one could note that 19% of non-cashcroppers, compared to about 13% of cashcroppers are headed by females.

Table 12. Particulars of head of homestead by type of farmer

PARTICULARS	CASH CROPPERS		NON-CASH CROPPERS	
	No.	%	No.	%
SEX				
Male	54	87.1	51	81.0
Female	8	12.9	12	19.0
Average Age	53		50.8	
EDUCATIONAL LEVEL				
None	18	29.0	26	41.3
Sebenta	1	1.6	0	0
Below std. 1	4	6.5	17	27.0
Std.1-5	22	35.5	7	11.1
Form 1-3	3	4.8	3	4.8
Form 4-5	2	3.2	0	0
College	1	1.6	0	0
Don't know/no response	11	17.7	9	14.3
OCCUPATION				
Professional	2	3.2	2	3.2
Skilled manual	3	4.8	3	4.8
Blue collar	1	1.6	0	0
Unskilled manual	6	9.7	21	33.3
Self-employed farmer	20	32.3	9	14.3
Self-employed other	3	4.8	4	6.3
Not employed	8	12.9	7	11.1
Don't know/no response	19	30.6	17	27.0
Average Annual Income	E6 697		E5 906	

Source: Survey Results

The table shows that 73% of cashcroppers and 79% of non-cashcroppers have up to primary level education. The table also reveals that a higher proportion of non-cashcropper heads of homesteads have no formal education at all -- 41% compared to 29% of cashcroppers. Whilst some heads of cashcropping homesteads have attained matric and tertiary education, there is no head of non-cashcropping homesteads with this level of education.

A large fraction of the heads of cashcropping homesteads engage in farming on a full time basis. Thirty-two percent of cashcroppers, compared to 14% of non-cashcroppers, are self-employed farmers. The most popular occupation of heads of non-cashcropping homesteads is unskilled manual, which is associated with their low level of education. The average annual income from wage employment is higher for cashcroppers (E6697) than non-cashcroppers (E5906).

A surprising finding was that the average age of heads of non-cashcroppers is lower than that of cashcroppers. Based on the theory of innovation, we had expected the cashcroppers to be generally younger, thus more receptive to cashcropping strategies. Therefore the average age of 53 amongst the cashcroppers' heads and 51 amongst the non-cashcroppers' heads is difficult to explain. However we note that the difference is small.

We found no significant difference in household members between cashcroppers and non-cashcroppers. Cashcroppers have an average 10.8 members while non-cashcroppers have 10.9. However cashcroppers tend to have fewer children under 5 years; 1.7 compared to non-cashcroppers' 2.2.

Both types of farmers experience migration of labour to urban areas. Up to 60% cashcroppers and 78% non-cashcroppers have at least one absentee member. The average absentees are 1.2 and 2.0 for cashcroppers and non-cashcroppers respectively. Virtually all cashcroppers' absentees are engaged in wage employment, whilst this is not the case for non-cashcroppers. Only 15% of cashcroppers with absentees reported that they do not receive remittances from working absentees. The figure is higher, at 22%, amongst the non-cashcroppers.

Cashcroppers have more members of working age and fewer dependents. In addition, their members tend to be more resident with all those absent engaged in wage employment and many of them remitting. Such remittances are used on the farm to help augment agricultural production and ability to acquire food.

Employment

Cashcrops create employment directly in the field through forward and backward linkages, and indirectly, through multiplier effects of the related income and employment. In the field, cash crops require more labour input per unit of land than non-cashcrops. Hired labour input tends to be substantial for cash crops and non-cash crops.

The share of labour by gender may vary or change when cashcropping is introduced. Surprisingly, von Braun found that most labour in all crops is provided by men, even though it tends to vary by farm size, class and crop type. In the case of Swaziland, based on literature review, one would expect females to dominate farm labour.

Due to the higher input demand of cashcropping, substantial backward linkages are realized. Those industries producing agricultural inputs respond to increased demand for their product by increasing output through, *inter alia*, increased labour input.[4]. Forward linkages can be realized through increased labour input in the marketing and distribution of the cashcrop as well as in the processing industries. Labour migration in Swaziland has changed the pattern of labour availability at the homestead over the past decade. Whilst in 1981 de Vletter found 58% were adult male absentees and 28% adult female absentees, recent studies report 63% and 12% respectively. Thus the people remaining in the homestead are predominantly adult women and children. Resident women outnumber men by almost 3:1.

The absentees, however, do return with 70% returning at least monthly. The impact of these frequent visits is limited by the short, 2 days duration. Male homestead heads are more likely to reside on the homestead than other adult males. Adult women provide major agricultural labour in planting, weeding, and harvesting (Andrehn, et al. 1977; Nxumalo. 1979, de Vletter. 1981). Women predominate in collecting water and firewood, purchasing and preparing food, handicrafts, brewing beer and selling produce. The labour input of women in agriculture has been estimated to be three times that of men.

Direct Employment

Our research shows that both categories of SNL farmers have access to and utilize two sources of farm labour, viz., family labour and hired labour.[5] The shares of farm labour in the various agricultural activities, by gender, for the cashcroppers and non-cashcroppers are summarized in Table 13. It is clear that males dominate ploughing in both groups with the dominance marginally higher amongst cashcroppers than non-cashcroppers (67% compared to 63%).

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[4] **The magnitude of the increase in labour depends on the capital/labour intensiveness of the industries.**

[5] **The role of communal labour was found to be insignificant.**

Women in both categories dominate planting and weeding. The involvement of males is greater amongst cashcroppers. For instance, males do 40% of the weeding in cashcropping households compared to 33% among non-cashcroppers. Due partly to the large cultivated areas and the correspondingly high labour input demand, more family labour is involved in agricultural production for cashcroppers than non-cashcroppers.

Use of hired labour is not popular on SNL. However, we found that 25% of the cashcroppers hire some labour compared to 10% of thenon-cashcroppers. Cashcroppers who employed hired labour had an average of 5 workers per farmer compared to only 2 per non-cashcropper. The main activities undertaken by hired labour are weeding and, for the cashcroppers, the picking of cotton.

This supports the hypothesis that cashcropping creates more direct employment opportunities which are utilized predominantly by family labour. This reduces rural-urban-migration. It also creates employment opportunities for hired labour.

Table 13. Family Labour Share of Farm Activities by Gender

ACTIVITY	CASH CROPPERS		NON-CASHCROPPERS	
	males	females	males	females
Ploughing	67	33	63	37
Planting	48	52	43	57
Welding	40	60	33	67
Spraying	67	33	-	-

Source: Survey Results

Backward Linkages

Cashcroppers have relatively better access to extension services and rely heavily on recommendations for improved purchased agricultural inputs. The results of the survey reveal that cashcroppers spend relatively more money on inputs than non cashcroppers. Preliminary analysis indicate that whilst cashcroppers spend an average E53 on seeds, non-cashcroppers spend an average E33. Cashcroppers spend an average E76 and E112 on fertilizer and pesticides respectively compared to E46 and E0.71 by non cash croppers. Casual examination of the data shows that, even in similar crops, cashcroppers tend to use more fertilizer and pesticides than non-cashcroppers.

This has positive employment implications for agricultural input industries. This is particularly important in the seed industry because many are produced locally. Even though the impact on the fertilizer and pesticide industries[6] is not fully realized locally, such expenditures contribute to increased labour use in the marketing and distribution sectors.

Forward Linkages

Virtually all cashcroppers sell some crops. In addition to the cotton, they also sell other crops they produce. Their sales volume is larger than that of non-cashcroppers.

The higher commercial involvement of cashcroppers contributes positively to increased employment opportunities in the marketing and distribution sectors as well as in the processing industries. More local people are employed in maize and cotton marketing. The transportation sector, which is dominated by the private sector, thrives on the movement of agricultural products, even if its seasonal.

The processing companies, such as the National Maize Corporation, cotton gineries, the National Textile industry, all employ a large number of Swazis. Local cashcroppers are valuable contributors of raw materials to these processing industries.

Income

Such direct and indirect contribution to employment leads to increased incomes for locals and associated improved standards of living. For purposes of this paper, we used proxies to compare relative wealthiness of the two groups of farmers. Livestock and equipment ownership, as well as sanitation facilities, were examined. We have yet to assess total household income from both agricultural activities (gross margins for different crops as well as livestock income) and major non-agricultural activities. The contribution of the cashcrop to total income will be a main issue for consideration.

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[6] **The high usage of pesticides by cashcroppers, like other agricultural chemicals, may have negative environmental effects.**

Livestock and Implements

Using some wealth proxies, we found that cashcroppers are generally better off than non-cashcroppers. Livestock and implement ownership and holdings are summarized in table 14. Up to 68% of cashcroppers hold cattle compared to 57% of non-cashcroppers. In terms of ownership, the situation remains the same with 74% of cashcroppers owning cattle compared to 67% non-cashcroppers.[7] Even the average numbers held and owned are higher for cashcroppers than non-cashcroppers (25.6 and 22.3 compared to 17.1 and 12.3, respectively).

With the exception of goat ownership, cashcroppers dominate in terms of livestock ownership, holding and numbers.

The table shows that, in terms of implement ownership, cashcroppers are better off than non-cash croppers. Even though ownership of tractors is generally low across the board, cashcroppers' ownership is marginally better. More than 8% of cashcroppers own tractors compared to less than 2% among non-cash croppers. Up to 80% of those cashcroppers who own tractors also have tractor ploughs and tractor planters whilst 40% and 60% also have tractor cultivators and tractor carts.

Other indicators show that car ownership is also higher amongst cashcroppers. More than half of cash croppers own pickup trucks compared to less than 10% of non-cash croppers. Ox pulled implement ownership distribution also shows cashcroppers being better -- e.g., 63% and 41% ownership of oxploughs by cashcroppers and non-cash croppers respectively.

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[7] **The difference between holding and owning of livestock arises from the system of lending and borrowing livestock among SNL households.**

Table 14. Livestock and Implement Ownership by Type of Farmer

PARTICULARS	CASHCROPPERS		NON-CASHCROPPERS	
	No.	% average N = 62	No.	% average N = 63
CATTLE HELD				
Sucking calves	38	61 (4.1)	32	50.8 (3.1)
Weaning calves	29	47 (3.0)	26	41.3 (2.4)
Young adult cattle	27	44 (7.7)	28	44.4 (4.9)
Cows	40	64.5 (10.7)	35	55.6 (5.4)
Oxen	37	59.7 (4.6)	24	38.7 (4.0)
Bulls	15	24.2 (1.7)	12	19.0 (1.9)
Holding cattle	42	67.7 (25.6)	36	57.1 (17.1)
CATTLE OWNED				
Sucking calves	38	61.3 (3.8)	32	50.8 (2.3)
Weaning calves	28	45.2 (3.0)	27	42.9 (2.3)
Young adult cattle	26	41.9 (7.0)	27	42.9 (3.7)
Cows	41	66.1 (10.4)	38	60.3 (4.7)
Oxen	36	58.1 (4.7)	24	38.1 (3.5)
Bulls	12	19.4 (1.9)	11	17.5 (1.5)
Total owners cattle	46	74.2 (22.3)	42	66.7 (12.3)
GOATS AND SHEEP HELD				
Goats	31	50.0 (16.8)	29	46.0 (17.0)
Sheep	2	3.2 (12.5)	0	0 0
GOATS AND SHEEP OWNED				
Goats	33	53.2 (16.0)	35	55.6 (14.9)
Sheep	3	4.8 (9.3)	0	0 0
OTHER LIVESTOCK				
Pigs	8	12.9 (2.1)	8	12.7 (3.3)
Chicken	59	95 (20.0)	58	92.1 (19.9)
IMPLEMENT				
Tractors	5	8.1 (1)	1	1.6 (1)
Tractor ploughs	4	6.5 (1)	1	1.6 (1)
Tractor planter	4	6.5 (1)	1	1.6 (1)
Tractor cultivator	2	3.2 (1)	1	1.6 (1)
Tractor cart	3	4.8 (1.3)	2	3.2 (1)
Pickup track	8	12.9 (1.1)	6	9.5 (1)
Knapsacks	32	50.8 (1.2)	6	9.5 (1)
Water pumps	1	1.6 (1.0)	0	0
Ox planter	15	24.2 (1.1)	11	17.5
Ox plough	39	62.9 (1.1)	26	41.3 (1)
Ox cultivator	24	38.7 (1)	13	20.7 (1)
Ox wagon	1	1.6 (1)	1	1.6 (1)
Ox cart	3	4.8 (1.1)	5	7.9 (1)
Sprayers	7	11.3 (1)	0	0
Harrows	16	25.8 (1.3)	6	9.5 (1)
Wheel barrow	49	79.0 (1.2)	43	68.3 (1)

Source: Survey Results

Sanitation

Access to sanitation facilities by the different farmers is summarized in Table 15. The majority of the farmers get their drinking water from dams, ponds, rivers or springs. These sources collectively account for 74% and 70% of cashcroppers and non-cashcroppers source of water. Eleven percent of cashcroppers compared to only 9% of non-cashcroppers obtain their water from piped or public taps. This indicates that the rural water department under the Ministry of Natural Resources has reached only a few farmers. Given the distribution of the farmers and the fact that cashcroppers are not separated from non-cashcroppers by location, the better usage of piped water likely reflects individual household efforts.

A large share of the farmers reported that the quality of the water is poor. Only 16% of cashcroppers and 19% of non-cashcroppers felt the quality of the water consumed was good. With the quality judgement left to the respondent, it may reflect the knowledge and educational level of the respondent. A cashcropper could regard the water as being of poor quality whilst a non-cashcropper, using the same source, could regard the water as being good quality. Such subjective statistics must be treated with caution.

Despite the strongly held view that the water quality is poor, only 16% of cashcroppers and 11% of non-cashcroppers treat water before use. Attempts to get the treatment methods revealed that some boil, use jik, and some use a sieve (presumably to remove particles such as sand and twigs). The majority do not treat their water at all.

The data also reveals a marginally better awareness of hygiene by cashcroppers. Forty two percent of them, compared to 32% of non-cashcroppers use a pit for refuse disposal. However the most popular refuse disposal method for all types of farmers, is throwing refuse in the open.

Table 15. Sanitation Facilities Availability by Type of Farmer

PARTICULAR	CASHCROPPERS		NON-CASHCROPPERS		TOTAL	
	No	%	No	%	No	%
WATER SOURCE						
Piped or public tap	7	11.3	6	9.5	13	10.4
dam or pond	27	43.5	26	41.3	53	42.4
protected spring	2	3.3	3	4.8	5	4.0
river or spring	19	30.6	18	28.6	37	29.6
borehole or well	3	4.8	3	4.8	6	4.8
unprotected spring	3	4.8	5	7.9	8	6.4
no response	1	1.6	2	3.2	3	2.4
WATER QUALITY						
poor	39	62.9	40	63.5	79	63.2
average	12	19.4	11	17.5	23	18.4
good	10	16.1	12	19.0	22	17.6
no response	1	1.6	0	0	1	0.8
WATER TREATMENT BEFORE USE						
Yes	10	16.1	7	11.1	17	13.6
No	52	83.9	56	88.9	108	86.4
REFUSE DISPOSAL						
pit	26	41.9	20	31.7	46	36.8
open	34	54.8	41	65.1	75	60.0
burn	2	3.2	1	1.6	3	2.4
don't know	1	1.6	0	0	1	0.8
LATRINE AVAILABILITY						
Yes	26	41.9	23	36.5	49	39.2
No	35	56.5	40	63.5	75	60.0
no response	1	1.6	0	0	1	0.8
TOILET USED BY CHILDREN						
open/bush	33	53.2	40	63.5	73	58.4
concrete latrine	9	14.5	3	4.8	12	9.6
wooden latrine	2	3.2	4	6.3	6	4.8
no response	1	1.6	0	0	1	0.8
not applicable	17	27.4	16	25.4	33	26.4

Source: Survey Results

Latrine facilities are not available to most farmers. About 57% of cashcroppers and 63% of non-cashcroppers have no latrines. Indeed most of those homesteads with children have the latter using the open or bush.

CONCLUSION

The preliminary nature of the findings prevents us from drawing firm conclusions on the effect of cashcropping on food security, employment and income. However the general picture from the initial analysis confirms the hypothesis that cashcroppers tend to be relatively more food secure in terms of combined own production and ability to purchase. Cashcropping contributes positively to increased employment opportunities and income.

Besides producing the cashcrop, land set aside for maize production and other food crops is more or less similar, in size terms, with that of non-cashcroppers. The use of improved production techniques acquired from the relatively higher access to extension services, and the dominance of innovative and male heads, results in better output of food crops by cashcroppers than non-cashcroppers. The income raised from the sale of cotton and other crops is used as one of the various coping strategies for food shortages.

The high demand for labour input in cashcropping households contributes to direct employment opportunities on the farm. Related to this are the realized backward linkages. Cashcroppers, on average, spend more money on agricultural inputs. It is argued that agricultural input industries thus are able to increase their output through increased employment of labour. The relatively high commercialization of cashcroppers also results in forward linkages realized though increased employment in the marketing and distribution sectors.

Finally the data indicates that cashcroppers are relatively wealthy compared to non-cashcroppers. They own more livestock and implements and also have better access to improved sanitation facilities.

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15

INCOME VERSUS INSURANCE: PRELIMINARY FINDINGS ON THE CONTRIBUTION OF LIVESTOCK TO COMMUNAL AREA FARM HOUSEHOLD FOOD SECURITY

Christopher Zindi and Jayne Stack[1]

INTRODUCTION

Livestock form an important component of household food security in the communal areas, contributing to both household food availability through production and household food access through income generation. This analysis will examine the contribution of livestock to household food security via improved food access, both as a source of income and as a form of insurance.

Communal farm households derive income from many sources including crop and livestock sales, wages, remittances and small enterprises. The contribution of each source to total income, and its reliability, varies greatly between households. Factors contributing to this variation include agro-ecological conditions, wealth and income levels. The contribution of these factors' influence on livestock income and the extent to which livestock income is used to acquire food versus other types of expenditure is important.

Livestock also function as a store of wealth, thus serve as an insurance mechanism in poor years. When food stocks run out, in drought years or normal seasons, livestock can be liquidated and the resultant income used to purchase food. They can also be exchanged for grains during food shortages. The importance of this contribution depends on agro-ecological conditions, wealth and income levels.

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The most important livestock types in communal areas are cattle and goats, each of which serve different functions under different household circumstances. Cattle are generally regarded as an investment and a production input while small stock, especially goats, are viewed as a ready source of cash. All livestock species have the potential to contribute to both income and as insurance.

OBJECTIVE OF STUDY

The objective of this study is to examine how socio-economic status, agro-ecological zone and the level of livestock ownership affect the relative importance of livestock's contribution to income and insurance; hence to household food security.
The following research hypotheses will be examined:

1. Livestock are more important as a source of income than as insurance for wealthy households.
2. The relative contribution of livestock to insurance, as compared to income, increases as agro-ecological conditions become less favourable.
3. Livestock become relatively more important as an income source as the level of livestock ownership increases.
4. The contribution of goats to income is greater than the contribution to insurance, *ceteris paribus.*
5. The contribution of cattle to insurance is greater than their contribution to income, *ceteris paribus.*

STUDY AREA DESCRIPTION AND DATA COLLECTION METHODS

The study covers five communal areas in Manicaland Province. Each communal area was purposively selected to represent one of Zimbabwe's five agro-ecological zones. Fifty (50) households were sampled from each communal area to facilitate inter-regional comparisons. Sample households were selected using a stratified random sample design. Within each selected communal area, wards were ranked on the basis of high or low cattle ownership. Two wards, one of high cattle ownership and the other of low cattle ownership were randomly selected. Within each selected ward, two villages were randomly selected. In each village, 12 or 13 households were randomly selected, Table 1. Data collection commenced in April, 1991 and retrospective data, for the 1990/91 season are reported in this paper.

Livestock ownership groups

Households were divided into four groups based on the ownership or non-ownership of cattle, goats and sheep Table 2. Thirteen Percent of the households in the sample were non-livestock owners. These are likely to be the poorer households who are not able to invest in any of these key livestock types. On the other hand, 51.8% of the households own both cattle and small stock. Seventeen point four percent of the households own only cattle and 17.8% of the households own only small stock. Those households owning both cattle and small stock have higher mean cattle holdings (7.5) than households owning cattle only (6.0). Although 95.5% of the households own some poultry, households with no cattle or small stock have the smallest number of birds (6.1) compared to households owning both cattle and small stock (11.4), Table 2.

Table 1. Distribution of sample by communal area and natural region, Zimbabwe, 1991

Communal Area	Natural Region[1]	No. of Villages	No. of Households[2]
Holdenby	I	4	50
Chiduku	II	4	50
Buhera North	III	4	50
Marange	IV	4	47
Buhera South	V	4	50

Source: UZ/OU Project Survey, 1991

Notes:
1. Zimbabwe is divided into five agro-ecological zones with natural region I having the highest rainfall and natural region V having the lowest.
2. This preliminary analysis looks at 247 households

Table 2. Distribution of Sample by Livestock Group and Average Livestock Holding[1]

	No cattle or smallstock[2]	Small stock only	Cattle only	Cattle + Small stock	Sample %
% Households	13.0	17.8	17.4	51.8	100
Cattle (mean no.)	0	0	6.0	7.5	4.9
Goats (mean no.)	0	5.5	0.0	6.1	4.1
Sheep (mean no.)	0	0.1	0.0	1.3	0.7
Poultry (mean no.)	6.1	8.8	8.7	11.4	9.8

Source: UZ/OU Project Survey, 1991

Notes: 1. Livestock groupings are based on cattle, goat and sheep ownership. Smallstock refers to goats and sheep only. There are no pig owners in the sample. Only 5.7% of the sample households own rabbits. Poultry is owned by 95.5% of the households.

2. Households in this category will be referred to as non-livestock owners.

Patterns of livestock ownership and distribution vary across and within Zimbabwe's natural regions (Christensen and Zindi. 1991). The distribution of livestock ownership groups in the sample villages also varies across natural region, Table 3. Although non-livestock owners are found in each natural region, the percentage of non-livestock owners is highest in natural region I (18.0%) which also has the highest percentage (52.0%) of non-cattle owning households. The percentage of non-livestock owners is lowest in natural region III (6.0%) followed by natural region IV (10.6%) and natural region V (14%).

Table 3: Percentage distribution of households in each livestock ownership group by natural region

Livestock Ownership Group	Natural Region				
	I	II	III	IV	V
No Cattle or Smallstock	18.0	16.0	6.0	10.6	14.0
Smallstock only	52.0	14.0	12.0	6.4	4.0
Cattle only	4.0	26.0	28.0	19.2	10.0
Cattl e plus Smallstock	26.0	44.0	54.0	63.8	72.0
Total	100	100	100	100	100

Source: UZ/OU Project Survey, 1991.

Table 4. **Percentage distribution of households in each livestock ownership group by Wealth Quartiles[1]**

	Lowest 25%	2nd Quartile	3rd Quartile	Highest 25%
No cattle or smallstock	40.3	8.1	1.6	1.6
Smallstock only	50.0	16.1	3.3	1.6
Cattle only	6.5	14.5	29.5	18.0
Cattle plus smallstock	3.2	61.3	65.6	78.8
Total	100	100	100	100

Source: UZ/OU Project Survey, 1991

Notes: 1. The wealth function was derived from the summation of the current value, as perceived by the farmer, of household assets such as stoves, radios, generators, bicycles, cars, tractors, ploughs, planters, scotchcarts and livestock. Ranges for wealth quartiles are as follows in Z$: Lowest 25% (up to 599); 2nd quartile (600-1874), 3rd quartile (1875-3433) and highest 25% (3434-34883. In future analysis, the wealth indicators will be improved by including data on incomes, etc.

Sample households were divided into wealth quartiles based on farmer valuation of assets and livestock, Table 4. The largest proportion of non-livestock owner households is found in the lowest wealth quartile, Table 4. The percentage of households owning small stock only decreases across wealth quartiles whereas the percentage of households owning cattle tends to increase across wealth quartiles. For example, only 9.7% of households in the lowest income quartile own cattle compared to 95.1% and 96.8% of households in the top two income quartiles respectively.

The highest percentage of households in the lowest wealth quartile is found in natural regions I (38%) and II (26.0%) whereas the largest percentage of households in the highest wealth quartile is in natural region 3 (48%). Natural regions I, II and IV have higher percentages of households in the two lower wealth quartiles whereas higher percentages of households in natural regions III and V are in the two higher wealth quartiles.

RESULTS AND DISCUSSIONS

The preliminary analysis reported in this paper examined:

1) Farmer perceptions of the role of livestock in contributing income and as an insurance mechanism in poor years -- this analysis covers all households whether or not they currently own livestock and 2) looks at the actual contribution of livestock to household food access during the 1990/91 agricultural season -- this part of the analysis is restricted to livestock owning households only.

Table 5. Distribution of households in each wealth quartile by natural region

Wealth Quartile	Natural Region				
	I	II	III	IV	V
Lowest 25%	38.0	26.0	18.0	21.3	22.0
2nd Quartile	30.0	34.0	8.0	31.9	22.0
3rd Quartile	20.0	26.0	26.0	25.5	28.0
Highest 25%	12.0	14.0	48.0	21.3	28.0
Total	100	100	100	100	100

Source: UZ/OU Project Survey, 1991

Farmer perceptions of the role of livestock

Farmer perception of the importance of livestock may differ from the actual contribution observed, particularly where the level of livestock ownership is less than that considered optimal. Actual contributions can also be misleading if events in a given year are atypical. Farmer perceptions of livestock's contribution to the following aspects of household food security were recorded:

a) Livestock contribution to cash income,
b) Reliability of livestock as a source of cash income, and
c) Relative importance of livestock sales versus other income sources used to purchase grains/mealie-meal when households are faced with food shortages.

Contribution of livestock to household cash income

Communal area farm households derive cash income from the following key sources: crop sales, wages, remittances, small enterprises (e.g. beer brewing), livestock sales and the sale of garden produce. Forty-four point nine percent of the households indicated that crop sales contributed the largest amount to total household cash income. The percentage of households ranking other income sources as most important was as follows: wages (15.4), remittances (10.9), small enterprises (10.1), livestock (9.7) and gardening (8.9). Thus, overall livestock was ranked fifth. Although only 9.7% of the households identified livestock as their most important source of cash income, 24.3% of the households ranked livestock as the second most important income source and 16.6% ranked livestock as the third most important cash income source, Table 6. Thus, 50.6% of the households ranked livestock as one of the top three sources contributing to household cash income.

Table 6. Contribution of livestock to household cash income by natural region

Rank of Livestock income	% households	Natural Region				
		I	II	III	IV	V
1st	9.7	2.0	8.0	12.0	21.3	6.0
2nd	24.3	10.0	8.0	26.0	12.8	64.0
3rd	16.6	14.0	14.0	24.0	23.4	4.0
4th	14.6	34.0	12.0	2.0	14.9	10.0
5th and below	34.8	40.0	58.0	32.0	27.6	16.0
Total	100	100	100	100	100	100

Source: UZ/OU Project Survey, 1991

Livestock was not perceived as being the most important source of cash income in any natural region. The percentage of households ranking livestock as the first or second most important cash income source increased from high rainfall to low rainfall areas, Table 6. For example, only 12-16% of households in natural regions I and II ranked livestock as the first or second most important source of cash income compared to 70% of the households in natural region V.

The highest percentage of households ranking livestock as the most important cash income source was in natural region IV, Table 6, whereas the highest percentage of households ranking livestock as a secondary income source was in natural region V. This is consistent with agro-ecological factors and livestock ownership patterns since natural regions IV and V are unfavourable for crop production and have the highest percentages of households owning both cattle and small stock. The results suggest that the contribution of livestock to income increases as agro-ecological conditions become less favourable.

The percentage of households ranking livestock as the first or second most important cash income source increases across wealth quartiles from the poorest to the wealthiest households, Table 7. In the top wealth quartile, 48% of the households ranked livestock as being either the most important or the second most important cash income source compared to only 21% of the households in the lowest wealth quartile. This is expected since livestock are a household's main store of wealth.

Among the livestock owning groups, only 9.1-11.7% of the households ranked livestock as the most important income source, Table 8. The percentage of households ranking livestock as the second most important income source was highest among the households owning both cattle and small stock. Of the households owning only cattle or small stock, 21-30% ranked livestock among the top two most important sources of cash income. This compares to 44% of the households owning both cattle and small stock. In the non-livestock owning group, 19% of the households ranked livestock as the second most important source of cash income indicating that poultry sales are an important cash income source.

Table 7. Contribution of livestock to household cash income by wealth quartiles

Rank of livestock income	% households	Lowest 25%	2nd Quartile	3rd Quartile	Highest 25%
1st	9.7	3.2	11.3	11.3	13.1
2nd	24.3	17.7	22.6	22.6	34.4
3rd	16.6	14.5	11.3	17.7	23.0
4th	14.6	19.4	22.6	1.6	6.6
5th and below	34.8	45.2	32.2	46.8	22.9
Total	100	100	100	100	100

Source: UZ/OU Project Survey, 1991

Table 8. Contribution of livestock to household cash income by livestock groups

Rank of livestock income	% households	No cattle or smallstock	Smallstock only	Cattle only	Cattle plus small-stock
1st	9.7	-	9.1	11.6	11.7
2nd	24.3	18.8	11.4	18.6	32.0
3rd	16.6	9.4	15.9	23.3	16.4
4th	14.6	15.6	27.3	11.6	10.9
5th and below	34.8	56.2	36.3	34.9	29.0
Total	100	100	100	100	100

Source: UZ/OU Project Survey, 1991

Notes: 1. Households can also derive income from the sale of poultry

Reliability of livestock as a source of cash income

In terms of reliability, 25.7% of the households ranked crop income as the most reliable. The percentage of households ranking other income sources as being the most reliable were as follows; livestock (22.9), small enterprises (22.2), wages (16.7), remittances (12.2) and gardening (10.2). The fact that 22.9% of the households ranked livestock as the most reliable source of income, compared to 9.7% of the households who ranked livestock as the most important source of income, suggests that the reliability of income from livestock is perceived to be more important than its actual contribution to household cash income.

The percentage of farmers ranking livestock as the most reliable source of income rises across natural regions with 31.9% of the farmers in natural region IV and 50% in natural region V identifying livestock as the most reliable income source, Table 9. The results suggest that livestock are important as a form of insurance for households in the less favourable agro-ecological zones.

Table 9. Reliability of livestock as a source of cash income by natural region

Rank of Livestock income	% households	Natural Region				
		I	II	III	IV	V
1st	22.9	6.0	12.0	14.0	31.9	50.0
2nd	16.3	4.0	8.0	30.0	27.7	12.0
3rd	12.7	18.0	10.0	22.0	2.1	10.0
4th	12.2	28.0	6.0	10.0	-	16.0
5th and below	35.9	44.0	64.0	24.0	38.3	12.0
Total	100	100	100	100	100	100

Source: UZ/OU Project Survey, 1991

The reliability of livestock as an income source increased across wealth quartiles for households ranking livestock as being either the most reliable or the second most reliable source of income, Table 10. For example, 24.6-37.7% of the households in the two lower wealth quartiles ranked livestock among the two most reliable compared to 46.8-47.5% of households in the two highest wealth quartiles. The results suggest that livestock are more important as a form of insurance for households in the two top wealth groups.

Table 10. Reliability of livestock as a source of cash income by wealth groups

Rank of livestock income	% households	Lowest 25%	2nd Quartile	3rd Quartile	Highest 25%
1st	22.9	14.8	26.2	19.4	31.1
2nd	16.3	9.8	11.5	27.4	16.4
3rd	12.7	11.5	16.4	6.5	16.4
4th	12.2	13.1	11.5	16.1	8.2
5th and below	35.9	50.8	34.4	30.6	27.9
Total	100	100	100	100	100

Source: UZ/OU Project Survey, 1991

Fifty percent (50%) of households owning both cattle and small stock ranked livestock among the two most reliable sources of income, Table 11. Forty percent of the households owning cattle ranked them among the two most reliable sources of cash income compared to 16.3% of the households owning only small stock. Twenty-five precent of the non-livestock owning households ranked livestock among the top two most reliable income sources suggesting that poultry enterprises are important for households which have neither cattle nor small stock. The results indicate that livestock are ranked highly as a form of insurance by households owning both cattle and small stock compared to households owning either cattle or goats only.

Table 11. Reliability of livestock as a source of income by livestock groups

Rank of Livestock income	% Households	No cattle or smallstock	Smallstock only	Cattle only	Cattle plus small-stock
1st	22.9	12.5	9.3	19.0	31.3
2nd	16.3	12.5	7.0	21.4	18.8
3rd	12.7	12.5	14.0	9.5	13.3
4th	12.2	43.8	7.0	11.9	6.3
5th and below	35.9	18.7	62.7	38.2	30.3
Total	100	100	100	100	100

Source: UZ/OU Project Survey, 1991

Relative importance of livestock sales versus other income sources used to purchase grains by households facing food shortages

Farmers were asked whether they had experienced any food shortages in the last five seasons. If so, the income sources[2] they used to purchase grains in the years of food shortages were identified. No food shortages had been experienced in the last five seasons by 15.4% of the households. Of the 84.6% of the households who experienced food shortages, 53.4% indicated they had used income from the sale of garden vegetables for grain purchases, Table 12. Forty point one percent indicated they had used livestock income to purchase grain. Households deriving income for grain purchase from the other income sources used: local labour sales (37.7), beer sales (36.4), fuel wood sales (25.9), craft sales (21.9) and off-farm work (8.9).

Table 12. Frequency distribution of major income sources used for purchasing grains[1] by households facing food shortages in the last five seasons

Income Source	% Households[2]
Selling garden vegetables	53.4
Selling livestock	40.1
Selling labour locally	37.7
Brewing beer for sale	36.4
Selling fuelwood/thatching grass	25.9
Selling crafts	21.9
Seek off-farm work	8.9

Source: UZ/OU Project Survey, 1991

Notes:1. Includes the purchasing of mealie-meal.

2. A better indicator of the relative importance of the different income sources would have been obtained from the actual amounts derived.

A large percentage of the households in each natural region used income from the sale of garden produce to purchase grains. The highest percentage of households using livestock income for grain purchases was found in natural region V -- whilst the lowest in natural region II, Table 13. Seventy ttwo perccent of the households in natural region V had used income from livestock sales to acquire grain in the last five seasons,

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2 Income generated from remittances is missing in this preliminary analysis. Future analysis will incorporate the role of this potentially important income source.

compared to 14% in natural region II. Thirty six to forty percent of the households in natural regions I, III and IV used livestock income to buy grain in poor seasons. Livestock appear to be an important form of insurance for households in the driest agro-ecological zone.

Table 13. Relative importance of livestock sales as a source of income to purchase grain by natural region in the last five seasons

	Natural Region				
	I	II	III	IV	V
% Households					
Selling garden vegetables	38.0	40.0	64.0	51.1	74.0
Selling livestock	36.0	14.0	38.0	40.4	72.0
Selling labour locally	22.0	20.0	48.0	36.2	62.0
Brewing beer for sale	10.0	28.0	64.0	21.3	58.0
Selling fuelwood/ thatching grass	28.0	12.0	20.0	34.0	36.0
Selling crafts	22.0	22.0	26.0	6.4	32.0
Seek off-farm work	18.0	4.0	10.0	8.5	4.0

Source: UZ/OU Project Survey, 1991

Livestock income was used to purchase grain primarily by households in the top three wealth quartiles, Table 14. Over 50% of the households in the upper wealth quartile used livestock income to buy grain in poor seasons. Forty to forty seven percent of the households in the second and third wealth quartiles used livestock income to acquire grains compared to 22.6% of households in the lowest wealth quartile. Livestock are an important form of insurance for households in the top three wealth quartiles.

Livestock appears to be an important form of insurance for households owning both cattle and small stock. Fifty one point six percent of the households owning both cattle and other livestock used livestock income when faced with food shortages, Table 15. Local labour sales and beer brewing seem to be of greater importance, compared to livestock sales, among households owning either cattle only or small stock only. Poultry are an important income source during food shortages for non-livestock owning households with 18.8% using livestock income to buy grain in poor seasons.

Table 14. Relative importance of livestock sales as a source of income to purchase grain by wealth quartiles in the last five seasons.

% households	Lowest 25%	2nd quartile	3rd quartile	Highest 25%
Selling garden vegetables	45.2	54.8	51.6	62.3
Selling livestock	22.6	46.8	40.3	50.8
Selling labour locally	45.2	45.2	35.5	24.6
Brewing beer for sale	43.5	33.9	35.5	32.8
Selling fuelwood/ thatching grass	30.6	30.6	19.4	23.0
Selling crafts	25.8	27.4	9.7	24.6
Seeking off-farm work	12.9	11.3	8.1	3.3

Source: UZ/OU Project Survey, 1991

Table 15. Relative importance of livestock sales as a source of income to purchase grain by livestock ownership groups in the last five seasons

% households	No cattle or smallstock	Smallstock only	Cattle only	Cattle plus smallstock
Selling garden vegetables	53.1	47.7	52.4	56.3
Selling livestock	18.8	38.6	23.8	51.6
Selling labour locally	43.8	40.9	35.7	35.2
Brewing beer for sale	53.1	27.3	38.1	34.4
Selling fuelwood/ thatching grass	18.8	38.6	19.0	25.8
Selling crafts	18.8	29.5	16.7	21.9
Seeking off-farm work	15.6	18.2	7.1	4.7

Source: UZ/OU Project Survey, 1991

ACTUAL CONTRIBUTION OF LIVESTOCK

The incidence of livestock income among sample households during the 1990/91 season indicates the contribution of livestock to household food access[3]. Fifty-one point six percent of the sample households actually generated income from the sale of livestock in the 1990/91 agricultural season. Over 50% of these households in natural regions III-V derived some livestock income compared to 26% and 42% of farmers in the more favourable natural regions II and I respectively. Eight percent of the households in natural region V, indicated that they had received some livestock income.

The percentage of households generating livestock income increases from 30.6% in the lowest wealth quartile to 67.2% in the highest wealth quartile. The percentage of households generating livestock income increased across livestock ownership groups from 28.1% in the non-cattle or small stock owning households to 62.5% in the category of households owning both cattle and small stock.

Uses of livestock income

Livestock owning households used their livestock income to purchase grains or mealie meal (40.8%), Table 16. School fees rank second with 32.5% of the households indicating that they used livestock income for this purpose. A few households used livestock income for the payment of lobola.

Table 16. Main uses of livestock income in the 1990/91 season

Main Uses	% of Households
Buying grains/mealie meal	40.8
School fees payment	32.5
Buying clothes	10.8
Buying farm inputs	9.2
Payment of medical expenses	4.2
Payment of lobola	2.5
Total	100

Source: UZ/OU Project Survey, 1991

[3]Surveys during the 1991/92 season will quantify actual contribution of livestock to household income.

Livestock income is an important insurance mechanism against food shortages for households in natural region IV and V. In natural region III, and to a lesser extent natural region II, it is more important as an income source, Table 17. For example in natural region IV and V, 40.6 to 61.6% of the households indicated that they used livestock income for the purchase of grain. In natural regions II, livestock income was mainly used for buying clothing (30.7%) whilst in natural region III, it was used for school fees (61.5%). In natural region I, where the level of livestock ownership is relatively low, livestock income was used for the purchase of grain by 66.7% of the households.

Table 17. Livestock income use by natural region 1990/91 season

Main Use	% Households	Natural Region				
		I	II	III	IV	V
Buying grain	40.8	66.7	23.1	11.5	61.6	40.6
School fees	32.5	-	23.1	61.5	23.1	37.8
Buying clothes	10.8	5.6	30.7	-	7.7	16.2
Farm inputs	9.2	16.7	15.4	15.4	3.8	2.7
Medical expenses	4.2	11.0	-	7.7	3.8	-
Lobola payments	2.5	-	7.7	3.9	-	2.7
Total	100	100	100	100	100	100

Source: UZ/OU Project Survey, 1991

Livestock income appears to be an important income source to purchase food by poor households with over 54% of the households in the two lower income quartiles purchasing grains or mealie-meal. Only 28-35% of the households in the two upper income quartiles bought food, Table 18. Households in the lower wealth quartiles did not rank livestock high in terms of cash income reliability. However these households sold to generate income to purchase food.

Table 18. Livestock income use by wealth quartiles, 1990/91 season

Main Use	% Household	Lowest 25%	2nd Quartile	3rd Quartile	Highest 25%
Buying grain	40.8	54.5	60.0	35.0	27.5
School fees	32.5	27.3	26.7	30.0	42.5
Buying clothes	10.8	9.1	10.0	15.0	7.5
Farm inputs	9.2	-	3.3	15.0	10.0
Medical expenses	4.2	9.1	-	5.0	5.0
Lobola payments	2.5	-	-	-	7.5
Total	100	100	100	100	100

Source: UZ/OU Project survey, 1991

Sources of livestock income

Households generating income from the sale of livestock indicated they derived livestock income mainly from the sale of goats 26.5%. Twenty-one point two percent of the households sold oxen. Poultry provided income for 18.8% of the households. Very few households (1.2%) disposed of steers. The relative importance of the different livestock types as income sources varies across natural regions and wealth quartiles.

Goats are an important source of livestock income for farmers in natural region III and to a lesser extent in natural regions I and V, Table 19. Seventy-three precent of the farmers in natural region III derived livestock income mainly from goats compared to 53 and 31% respectively in natural regions I and V. The sale of goats are not important in natural regions II and IV where over 60% of the households derived livestock income mainly from poultry and oxen sales, Table 19.

Table 19. Source of livestock income by natural region 1990/91 season

Source of income	% Households	Natural Region				
		I	II	III	IV	V
Goats	36.5	53.3	-	72.7	21.0	31.4
Oxen	21.2	-	-	-	63.2	17.1
Poultry	18.8	46.7	60.0	18.2	5.3	8.6
Cows	14.1	-	40.0	-	-	28.6
Bulls	8.2	-	-	-	10.5	14.3
Steers	1.2	-	-	9.1	-	-
Total	100	100	100	100	100	100

Source: UZ/OU Project Survey, 1991

The relative importance of goats as an important source of livestock income decreases across wealth quartiles, Table 20. Farmers in the lowest wealth quartile, where 66.7% of the households indicated that they derived livestock income mainly from goat sales, compared to only 28% of the households in the top wealth quartile. The relative importance of cattle as an income source increases across wealth quartiles with the highest percentage of households deriving income from livestock in the top wealth quartile, Table 2O. Poultry are not an important income source for households in the middle wealth quartiles. Goats are an important form of insurance for households in the lower wealth quartiles.

Table 20. Source of livestock income by wealth quartiles, 1990/91 season

Source of income	% households	Lowest 25%	2nd Quartile	3rd Quartile	Highest 25%
Goats	36.5	66.7	40.0	32.3	28.0
Oxen	21.2	11.1	15.0	16.1	36.0
Poultry	18.8	11.1	30.0	25.8	4.0
Cows	14.1	11.1	10.0	16.1	16.0
Bulls	8.2	-	5.0	9.7	12.0
Steers	1.2	-	-	-	4.0
Total	100	100	100	100	100

Source: UZ/OU Project Survey, 1991

FREQUENCY OF LIVESTOCK SLAUGHTER DURING FOOD SHORTAGES

Of the 17.3% of the households who slaughtered livestock during food shortages, 63% slaughtered oxen or cows whilst goats were slaughtered by 28.9%. Poultry and steers were slaughtered by 5.3% and 2.6% of the households respectively. This suggest that it is more common for households to slaughter mature cattle or small stock rather than steers when faced with a food shortage.

Only poultry was slaughtered in natural region I, when households were faced with a food crisis, Table 21. In natural regions II-IV, 20-30% of the households slaughtered oxen and cows. Goats are an important secondary animal in natural regions III-V where at least 30% of the households indicated that they slaughtered goats, Table 21.

Table 21. Types of livestock mainly slaughtered during food shortages, 1990/91 season

Type of livestock	% Households	Natural Region				
		I	II	III	IV	V
Cows	31.6	-	50.0	41.7	20.0	27.3
Oxen	31.6	-	50.0	16.7	50.0	27.3
Goats	28.9	-	-	33.3	30.0	36.3
Poultry	5.3	100.0	-	-	-	9.1
Steers	2.6	-	-	8.3	-	-
Total	100	100	100	100	100	100

Source: UZ/OU Project Survey, 1991

The relative importance of goats as a slaughter animal during food shortages decreases across wealth quartiles. One hundred percent of the households in the lowest wealth quartile slaughtered goats compared to 16.6% of the households in the top wealth quartile. Cows and oxen are mainly slaughtered by households in the two top wealth quartiles, 27.3-45.4% respectively, Table 22.

Table 22. Types of livestock mainly slaughtered during food shortages by wealth quartiles, 1990/91 season

Type of livestock	% households	Lowest 25%	2nd Quartile	3rd Quartile	Highest 25%
Cows	31.6	-	-	45.4	38.9
Oxen	31.6	-	50.0	27.3	33.3
Goats	28.9	100.0	50.0	18.2	16.6
Poultry	5.3	-	-	9.1	5.6
Steers	2.6	-	-	-	5.6
Total	100	100	100	100	100

Source: UZ/OU Project Survey, 1991

SOCIO-ECONOMIC CONSTRAINTS ON CONTRIBUTION OF LIVESTOCK TO FOOD SECURITY

Marketing policies

Livestock income plays an important role in enabling households to access food during food shortages. This underscores the importance of the role which both formal and informal livestock markets can play in enhancing the food security status of communal area farmers via food access. Farmer perception of the livestock marketing system in communal areas many inhibit the role of livestock in household food security. Promoting household food access should take into account the necessity of developing an efficient market system for livestock in the communal areas.

Thirty percent of the households who sold cattle did not experience any marketing constraints. Forty-two percent and 16.7% of goat and sheep sellers indicated that they had not experienced marketing problems.

Of the 70.3% of households who experienced cattle marketing constraints, 76.9% indicated that low prices are the main constraint, Table 23. The results suggest that, given the 'right prices', farmers might actually be prepared to sell their cattle. The current government determined beef prices have both floor and ceiling price levels. The removal of the ceiling price whilst maintaining the floor price might result in prices which motivate cattle owning farmers to increase production and sales. Thirteen point five percent of households selling cattle indicated that they had problems in identifying potential buyers. This problem might possibly be solved by communal farmers in a given area grouping their cattle at central points to be transported by private traders to the C.S.C depots or sale points. The issue of distant sale pens or markets was reported by 7.7% of the farmers. The lack of transport was not widely seen as an important constraint to cattle marketing being reported by only 1.9% of the households.

Table 23. Livestock marketing constraints in the communal areas of Zimbabwe 1990/91 season - % households

Marketing Constraint	Livestock Type		
	Cattle	Goats	Sheep
Low prices offered	76.9	23.4	20.0
Difficulty in finding a buyer	13.5	72.3	80.0
Sale pens/market too far	7.7	-	-
Lack of transport	1.9	4.3	-
Total	100	100	100

Source: UZ/OU Project Survey, 1991

Cattle off-take rates in communal areas are very low, i.e., 1 to 3% compared to 18 to 23% in the commercial farming sector (A.M.A., 1989). If 'right prices' were in place, this might provide an incentive for farmers to sell their animals. This would likely enhance household food access. Market accessibility should play a positive role in promoting household food access with farmers able to dispose of their animals without problems in finding buyers. The National Livestock Development Policy (Ministry of Lands, Agriculture and Rural Resettlement, 1988) notes that some farmers are having to travel up to 60km to get to sale pens. The policy document aims at attaining the ideal ward to sale pen ratio of 1:4 as compared to the present ratio of 1:8. Sale pen construction is widely seen as a means of promoting communal area cattle sales. The long distances to sale pens likely act as a disincentive for farmers intending to sell their livestock.

The main constraint experienced by households marketing small stock was identifying buyers, Table 23. Over 72% of small stock owners identified this as a major problem. This problem could be solved by private buyers going out into the communal areas and purchasing small stock. Thirty-six point five percent of the households mainly derived their livestock income from goat sales. Over 20% of small stock owners identified low prices as a marketing constraint in the communal areas. Only 4.3% of goat selling households identified the lack of transport as hindering goat marketing.

Most of the operating sale pens cater mainly for cattle marketing. The current marketing system needs to be re-invigorated to enable communal farmers to have easy access to the Cold Storage Commission (CSC) goat marketing facilities. Lack of suitable transport of small stock has been singled out as affecting the viability of the CSC small stock purchase programme (CSC, 1989). The CSC Small Stock buying scheme does not appear

to have had a major impact in small stock buying in the communal areas. In 1988, the CSC only managed to purchase 46% of the target small stock figure (CSC, 1988). The failure to attain the target was attributed partly to communal farmers anticipating a price increase. In a bid to improve the CSC's off-take of goats and sheep, producer prices for small stock were raised. In 1989 the CSC bought 66 176 small stock from the communal areas which represented a 40.7% increase the 1988 figure (CSC, 1989). Studies carried out in Zimbabwe have noted a positive supply response to an increase in goat prices in some communal areas (GFA, 1987). Price incentives are likely to result in farmers disposing of their small stock with the derived income used for purchasing grains. The development of any marketing system is also dependent on the development of a good road infrastructure to ensure easy accessibility to both buyers and producers.

Credit policy

Farmers who purchased livestock used income sources other than formal loans. This may imply that little attention has been focused on the provision of livestock credit to the communal farmers. The Cattle Finance Scheme (CFS), managed by Cold Storage Commission (CSC), is a credit facility for livestock development which has mainly benefited large scale commercial farmers. Only recently have lending conditions been relaxed to give communal farmers the opportunity to utilise this fund

Communal ownership of land

In most survey areas, farmers are faced with the problem of lack of grazing. This was particularly highlighted in natural region I where farmers identified this as the main constraint to livestock ownership. Government policy concerning livestock development in the communal areas has been based on the premise that overstocking and overgrazing is leading to environmental degradation and that the individual land tenure system is an obstacle to improved management (Cousins. 1987). The establishment of grazing schemes has formed a central part of government livestock development strategies for communal areas. The central aims behind the establishment of grazing schemes include the following: a) improving livestock productivity in communal areas through, e.g., breeding, conserving vegetative cover in communal areas (thereby halting environmental degradation), b) protection of crops from stray animals, and c) reducing labour constraints to the community (thereby releasing labour for other activities), (Cousins. 1987; Chinembiri. 1989).

If the condition of the veld improves with the establishment of grazing schemes, it is likely that livestock productivity will rise in communal areas. One possible outcome of an increase in livestock numbers might be that farmers will have more animals for sale. During periods of food shortages, communal farmers can sell off the extra animals and use the income for purchasing grains.

CONCLUSIONS AND ISSUES FOR FURTHER RESEARCH

Some of the characteristics identified in the survey areas that may be of interest to policy makers concerned with the contribution of livestock to household food security are summarized below:

- Although non-livestock owners were present in all natural regions, the percentage was highest in natural region I which also has the highest percentage of non-cattle owning households.
- Although few households identified livestock as their most important income source, 50.6% of the households ranked it among their top three.
- The contribution of livestock to household income increases as agro-ecological conditions become less favourable for cropping -- it also increases across wealth quartiles.
- The percentage of households ranking livestock income as the most reliable income source was greater than the percentage of households identifying it as the most important income source. This highlights the role of livestock as a form of insurance.
- The importance of livestock as a form of insurance increased from high rainfall to low rainfall areas. The role of livestock as a form of insurance was appreciated across all wealth quartiles.
- In natural regions I, IV and V, income derived from livestock sales was predominantly used to purchase grain or mealie-meal whereas in natural regions II and III, livestock income was more commonly used for other purposes such as buying clothing and payment of school fees.
- The main marketing constraint identified by cattle sellers was that of low prices.
- Small stock sellers identified difficulties in identifying buyers as the main marketing constraint.

FUTURE RESEARCH

This preliminary analysis has used cross tabulations to examine the data set to see if there is evidence to support the stated hypotheses. It is anticipated that the survey data set for 1991/92, currently being collected will facilitate testing the hypotheses and extend the depth and breath of the analysis. For example, income data will quantify the actual contribution of livestock to household income and the contribution of livestock to food availability. Since communal farmers are not a homogeneous group, future analysis will examine variations within the livestock holding groups which arise due to differences in the number of livestock owned.

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CROP MIX, TECHNOLOGY TRANSFER, AND RELATED POLICIES AS THEY AFFECT HOUSEHOLD FOOD SECURITY

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INTRODUCTION

In the mid-1980s, communal Area farmers were encouraged to diversify into oilseed production in the high potential areas (Natural Region II) and from maize production into moisture-stress and drought tolerant crops (small grains) in the low rainfall areas (Natural Region IV and V) as a possible means to improve income levels and household food security. Farmers, however, have not changed their crop mix at the expected rate and reasons for their limited response are not clearly understood. The analysis reported in this paper seeks to uncover the reasons farmers are not changing their crop mix in addition to the general problems identified in previous studies which include the lack of seed, credit, management knowledge, transport, appropriate soils and adequate rain.

The paper is composed of three sections. The first discusses the dominance of grain crops in marginal area farming systems. The second discusses how the availability of technology influences farmers' decisions on which crops to grow and the third highlights some of the requirements for improving household food security through changing crop mix and improving technology transfer.

This paper synthesizes the research findings of the research undertaken in three communal areas, Mutoko and Mudzi in Natural Region (NR) IV and Buhera in NR V, under the UZ/MSU Food Security Research Project, 1987-89. The sites in NR IV had predominantly maize producing farmers with millets and oilseeds as minor crops, while in Buhera, the sites were dominated by production of millets and groundnuts.

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FACTORS DETERMINING CROP PRODUCTION AND ENTERPRISE MIX

Food Self Sufficiency and Food Markets

Grain crops, particularly maize, dominate farming systems in low and high potential areas in terms of are a planted and output per capita. More than two thirds of the cropped area in Mutoko/Mudzi and Buhera was planted to grain crops, Table 2.1. Oilseeds are minor crops in terms of land allocation. The importance attached to different crops was also indicated by the location of the crops with respect to soil fertility. Maize and bulrush millet (mhunga) were planted on the best soils in Mutoko/Mudzi and Buhera, respectively.

Table 2.1 Distribution of Crop Production, Mutoko/Mudzi and Buhera Districts, Zimbabwe, 88-89

Crop	Mutoko/Mudzi (N=163)			Buhera (N = 134)		
	% grow	% area	Area (ha)	% grow	% area	Area (ha)
Pearl Millet	83	33	.90	92	49	2.36
Maize	97	32	.88	85	19	.91
Finger Millet	13	1	.04	25	3	.17
Sorghum	24	3	.08	40	9	.44
Sunflower	45	12	.32	13	3	.14
Groundnuts	39	4	.10	50	7	.34
Roundnuts	13	>1	.02	42	5	.25
Other crops		14	.38		5	.25

Source: Food Security Surveys, 1987 - 89.

Food markets in marginal areas are very uncertain. Local food is expensive because of high marketing costs. Farmers find the option of producing cash crops to buy back grain or mealie-meal unattractive because food prices are relatively high compared to producer prices for cash crops. A study by Jayne (1991) shows that such an option is highly unlikely when mealie-meal and maize purchase prices are high. Farmers attach high opportunity costs to the production of food crops as a strategy that ensures them some level of food security at least cost.

Asked to rank the relative importance of different crops, farmers in Mutoko/Mudzi ranked maize number one followed by pearl millet, Table 2.2. In third and fourth positions were sunflower and groundnuts, respectively. Food crops were more important than crops grown solely for cash. Farmers in Buhera ranked pearl millet number one, Table 2.3. Maize was second followed by roundnuts, then groundnuts, finger millet, sunflower and sorghum. Sunflower was less important in Buhera, compared to

Mutoko/Mudzi, because of the lack of markets and seed.

Table 2.2 Ranking Order of Importance Among Crops in Mutoko/Mudzi, Zimbabwe,

Rank	Crops							
	Maize	P Millet	F Millet	R Sorghum	W Sorghum	Rice	Groundnut	Sunflower
1	**78**	23	0	0	0	3	1	0
2	15	**51**	6	0	5	15	12	9
3	5	20	20	3	**33**	21	27	**30**
4	1	5	7	13	23	**38**	**33**	21
5	1	1	20	26	13	17	18	21
6	0	0	17	**36**	12	3	9	14
7	0	0	**28**	3	13	0	0	5
8	0	0	2	16	3	3		
9	0	0	0	3	-	0		
TOTAL	100	100	100	100	100	100	100	100

Source: Food Security Surveys, 1987 - 89

Table 2.3 Ranking Order of Importance Among Crops in Buhera, Zimbabwe, 1989.

Rank	Crops							
	Maize	P Millet	F Millet	R Sorghum	W Sorghum	Ground nuts	Sunflower	Roundnuts
1	36	**48**	6	15	**20**	2	5	1
2	**45**	32	6	15	14	10	0	6
3	11	9	17	17	18	30	10	**39**
4	5	7	10	**25**	8	**41**	13	33
5	2	3	**29**	9	14	15	29	15
6	1	1	17	12	13	2	**32**	3
7	0	0	10	8	13	0	11	3
8	0	0	4	0	0			
9	0	0	0	0	0			
TOTAL	100	100	100	100	100	100	100	100

Source: Food Security Surveys, 1987 - 89

Maize was the most important crop in Mutoko/Mudzi, because while it was grown primarily for food, it was also important in earning household cash, Table 2.4. Millet was important for the same reasons but in addition was also good for beer. Groundnuts were primarily grown for food with surpluses sold. Sunflower was a cash crop with very little on-farm use.

Table 2.4 Reasons for Growing Crops in Mutoko/Mudzi, Zimbabwe, 1989.

REASONS	CROPS														
	MAIZE			P MILLET			F MILLET			R SORGHUM			W SORGHUM		
FOOD	**61**	16	4	**66**	18	12	**59**	25	31	**75**	0	0	**95**	2	0
CASH	2	**56**	7	3	**29**	8	2	32	**35**	22	7	0	3	**42**	8
FOOD AND CASH	35	3	2	18	1	6	7	0	0	0	0	0	2	2	0
SUITED TO SOIL	1	18	16	6	26	9	2	6	0	0	**71**	0	0	33	0
SUITED TO RAIN	1	2	20	3	16	12	0	3	0	0	15	50	0	8	23
PEST RESISTANT	0	0	2	1	1	11	0	3	8	0	0	0	0	6	0
BEER BREWING	0	0	**22**	2	6	**42**	30	**35**	27	0	7	50	0	0	15
EASY PROCESSING	0	5	16	1	2	3	O	0	0	0	0	0	0	0	0
LIVESTOCK FEED	0	1	11	0	0	0	0	0	0	3	0	0	0	0	**54**

Note: percentages in each column sum up to 100
Source: Food Security Surveys, 1987 - 89.

In Buhera, NR V, farmers ranked pearl millet as the most important crop in their farming system, Table 2.5. Pearl millet was both a food and cash crop. Further pearl millet was more suited to the agro-ecological conditions of low and uncertain rainfall.

Maize was preferred because it was resistant to pests and diseases and did well in suitable soils. Groundnuts, a food crop, also was used in exchange for other goods (grain) and services (labour). Roundnuts was an important cash crop for farmers in Buhera. Roundnuts were sold in Rusape to Cairns, an agri-food company. When the company has enough stocks it offers reduced prices. This makes the crop important both for food and exchange.

The above discussion suggests that farmers emphasize own food production as shown by area allocated to crops and the reason for growing these crops. Farmers place priority on grain crops rather than cash crops as a strategy for food security. Cash crops are secondary because of a high opportunity costs of relying on the market.

Grain and Flour Preferences, Processing Technology and Crop Choice

Farmers' crop selection is also influenced by their preference for both the grain and the flour made from that grain. Farmers were asked their preferred composition of 10 bags of grain. Farmers in Mutoko/Mudzi preferred that an average of 4.4 bags be maize and 2.6 bags pearl millet, Table 2.5. They preferred maize grain because it was easy to process into flour and farmers were used to consuming it. Pearl millet grain was good for beer and it stored well. Farmers' preference for sorghum and rapoko grain was low because the flour had an inferior taste.

Table 2.5 Grain Preferences in Mutoko/Mudzi, Zimbabwe, 1989

REASONS FOR PREFERENCE	MHUNGA	MAIZE	RAPOKO	WHITE SORG	RED SORG	RICE
Proportion of grain preferred (%)	26	44	8	6	3	13
Used to it	20	32	2	8	2	3
Tastes good	13	20	8	29	6	65
Available locally	4	0	2	3	5	0
Don't like taste	5	3	37	41	58	14
Easy to process	1	41	1	1	1	0
Hard to process	14	0	2	7	7	8
Stores well	22	3	0		0	1
Do not store well	1	0	5	5	6	0
Beer brewing	24	0	46	0	7	0
Never tasted it	0	0	2	2	1	2
Other	4	0				

Source: Food Security Surveys, 1987 - 89.

Preference for flour was the same as for grain but the reasons were different, Table 2.6. Maize flour was preferred because it tasted good and farmers preferred pearl millet flour for its heaviness as a meal. Farmers did not like flour from sorghum and finger millet because the flour had poor taste.

Table 2.6 Flour Preference by Farmers in Mutoko/Mudzi, Zimbabwe, 1989.

REASONS FOR PREFERENCE	MHUNGA	MAIZE	RAPOKO	WHITE SORG	RED SORG	RICE
Proportion of grain preferred (%)	29	43	4	2	8	13
Used to it	18	24	1	5	0	0
Tastes good	22	55	11	38	8	68
Available locally	4	1	1	1	1	0
Don't like taste	7	1	62	40	76	19
Easy to process	1	3	1	1	0	0
Hard to process	6	0	1	2	2	1
Stores well	13	3	1		0	0
Do not store well	1	0	1	6	6	0
Beer brewing	0	0	8	0	7	0
Fill me up	21	0	0		0	0
Never tasted it	0	0	0	2	2	5
Other	4	0				

Source: Food Security Surveys, 1987 - 89.

Grain preferences in Buhera show that maize is preferred most because it is easy to process, Table 2.7. The second choice was pearl millet because it tasted good and stored well. Rapoko and sorghum grain were only preferred in small quantities for beer but not as flour for sadza because of the taste.

Table 2.7 Grain Preference by Farmers in Buhera, Zimbabwe, 1989.

REASONS FOR PREFERENCE	MHUNGA	MAIZE	RAPOKO	WHITE SORG	RED SORG	RICE
Proportion of grain preferred (%)	33	38	9	6	2	13
Used to it	6	15	2	2	2	0
Tastes good	33	34	2	35	0	74
Available locally	0	0	0	0	0	2
Don't like taste	2	8	27	33	71	8
Easy to process	2	34	2	0	2	0
Hard to process	9	2	0	13	7	0
Stores well	15	0	0	0	0	0
Do not store well	1	0	0	9	6	0
Beer brewing	13	0	63	2	20	0
Fill me up	11	0	0		0	2
Never tasted it	0	0	2	2	0	0
Other	0	0	0			22

Source: Food Security Surveys, 1987 - 89.

The flour preference of farmers in Buhera was high for pearl millet, Table 2.8. The taste for pearl millet flour surpassed all other types. Second choice of flour was maize flour also because of its good taste. White sorghum flour was their third choice because it tasted good. Red sorghum flour had a poor taste while finger millet was only required in small quantities for beer brewing.

Table 2.8 Grain Preferences Farmers in Buhera, Zimbabwe, 1989

REASONS FOR PREFERENCE	MHUNGA	MAIZE	RAPOKO	WHITE SORG	RED SORG	RICE
Proportion of grain preferred (%)	37	30	6	14	2	11
Used to it	0	24	3	5	0	0
Tastes good	64	50	21	67	3	75
Available locally	0	2	09	0	0	0
Don't like taste	4	6	15	12	66	10
Easy to process	4	8	1	0	0	0
Hard to process	6	2	1	0	2	0
Stores well	13	0	1	0	0	0
Do not store well	1	2	1	0	6	0
Beer brewing	9	0	62	10	28	0
Fill me up	15	0	0	2	0	0

Source: Food Security Surveys, 1987 - 89.

Dissemination and establishment of dehulling services in marginal communal areas has been developing for the past three to four years. Farmers have had some relief but improvements in existing milling technology is required to produce a quality product. With more dehulling units being set-up, the services of a back up unit have been stretched. Most dehuller operators have experienced problems and assistance has come very late. This service has immediate impact on increasing consumption of small grains

but an increase in area planted to small grains is less likely to occur given that maize yields best.

Access to Production Resources

Empirical evidence shows that farmers do not have adequate access to resources (land, working capital, draft power, labour) for a diversified crop production system. A significant proportion (up to 40%) of farm households do not own draft power (Rukuni, 1984). These farmers access draft power late for planting long season growing crops such as groundnuts and cotton. Under the existing farming system, farmers experience labour bottlenecks during planting, weeding and harvesting. Increased production of labour-intensive crops like cotton and groundnuts tend to worsen labour bottlenecks. The bundles of farmers' resources cannot be stretched to diversify away from grain crops. Farmers invest their resources in the crop that yields a better return.

Crop Marketing Factors Affecting Crop Selection

The market for cash crops is not as attractive as that for food crops. There is a viable local market for food crops but not for cash crops. Farmers are generally within 50-60 km of a grain marketing depot. Markets for cash crops are located long distances from communal farmers and discourages production of cash crops. For example, farmers in Mutoko/Mudzi, until recently, had to transport cotton to a depot in Shamva, 160 km away. These conditions encourage farmers' to embark on a strategy that ensures them a product they can sell, can consume or sell locally.

Improving rural market infrastructure would reduce acquisition costs for goods as well as production inputs. Farmers in marginal areas respond significantly to improved markets. Rohrbach (1989) noted that farmers increased maize production mostly because of the availability of markets. Improvement in market opportunities resulted in increased sales. Chigume (1988) found that farmers closest to the marketing point sold more than farmers more distant. Easy access to product markets influences farmers' behaviour with respect to crop choice for production and marketing.

Technology Availability and Crop Choice

Farmers in Mutoko/Mudzi and Buhera applied general farm technologies such as early planting, winter ploughing, fertilizer, improved seed, early weeding, etc., more on maize than other crops. This reflects the relative profitability in applying these technologies to maize compared to other crops given limited cash and other resources. The return to the application of selected technologies on other crops was low, probably because of the absence of improved and certified seed, particularly for sunflower and groundnuts.

Table 2.9 shows that improved maize varieties were adopted by more than 95% of the

farmers in marginal areas. For other crops, the situation was completely different. Although improved seed for sunflower and sorghum exists, they are not generally available in marginal areas. Farmers continue to use stored seeds from previous harvests for sorghum and sunflower.

Recommended production practices for maize were best known, tried and adopted relative to other crops by farmers in both Mutoko/Mudzi and Buhera. Table 2.9 shows that a significant proportion of farmers in Mutoko/Mudzi adopted all but two maize recommendations. Lack of money prevented them from applying the recommended levels of fertilizers. It also was difficult to source the fertilizer.

Farmers in Mutoko/Mudzi had adopted only two recommended production practices for sorghum, i.e., use of grain insecticide and harvest timing, Table 2.10. Other practices they were aware of were not followed. Farmers in Buhera were less knowledgeable and had not tried many of the recommended production practices for sorghum. Farmers' reasons for not adopting these recommendations were that seed was difficult to find and cash was inadequate for them to purchase fertilizer and pesticides.

Table 2.9 Patterns of Recommended Maize Production Practices' Awareness, Trial and Adoption in Mutoko/Mudzi and Buhera, Zimbabwe, 1987-89.

Recommendations	Awareness		Trial		Adoption	
	M/M	BUH	M/M	BUH	M/M	BUH
1. Variety	93	98	85	92	85	93
2. Spacing	49	34	31	29	26	26
3. Superphosphate	b	b				
4. Cmpd D Levels	38	20	22	b	b	
5. AN Levels	41	20	25	b	23	
6. Rotation	50	48	37	45	31	43
7. Cmpd D Timing	60	27	47	b	40	
8. AN 1st Application	58	25	40	b	29	
9. AN 2nd Application	46	b	25		b	
10 Insecticide	73	b	36		36	

Source: Food Security Surveys, 1987-89.
b percentage is below 20.

RECOMMENDED CROPPING PRACTICES

MAIZE

1. Plant variety R201 mostly, R215 and R200
2. Space between rows 90cm and 30cm within rows
3. Apply 25kg/acre Single superphosphate

4. Apply 33kg/acre Computed D
5. Apply 33kg/acre Ammonium Nitrate
6. Plant legumes before planting maize on the same plot
7. Apply Cmpd D in rows before planting
8. Apply 2/3 of AN at knee height (4-6 weeks)
9. Apply the remaining 1/3 at tasseling (8-10 weeks)
10. Prevent stalkborer by applying Dipterex or Thiodin (1-2 kg/acre)

Table 2.10 Pattern of Recommended Sorghum Production Practices' Awareness, Trial and Adoption in Mutoko/Mudzi and Buhera, Zimbabwe, 1987-89

Recommendations	Awareness		Trial		Adoption	
	M/M	BUH	M/M	BUH	M/M	BUH
1. Variety	51	33	b	b		
2. Spacing	26	20	20	b	b	
3. AN & Cmpd D levels	b	b				
4. Cmpd D Timing	41	b	b			
5. AN Timing	39	b	b			
6. Insecticide	41	b	b			
7. Harvest Timing	71	76	59	60	59	60
8. Pesticide	57	44	39	b	33	

Source: Food Security Surveys, 1987-89.
b percentage is below 20

RECOMMENDED CROPPING PRACTICES

SORGHUM

1. The best crop varieties are Segaolene, SV1 and SV2
2. Space between rows 75-90cm and 12-25cm within rows
3. Apply 75-125kgs/acre Cmpd M and 25kg/acre of AN or apply 50--75 kgs/acre Cmpd D and 25-50 kgs.acre AN
4. Apply Compound D or M at planting in rows
5. Apply Ammonium Nitrate 4-6 weeks after germination
6. Prevent stalkborer by applying Dipterest twenty days after germination
7. Harvest when grain is ripe and dry
8. Prevent grain weevils by applying grain protectants.

Improved varieties have just been realeased for the other small grains but they are not yet available to marginal area farmers. Thus, adoption is low. However, farmers do

•plant a wide range of local millet varieties.

Farmers' level of awareness, trial and adoption of recommended groundnut production practices was second only to maize, Table 2.11. But the technologies adopted were those that required little additional cash outlay. Gypsum was continually applied by less than 20% of the farmers in Mutoko/Mudzi. Cash was inadequate and farmers could not purchase fertilizer and insecticide to apply on groundnuts. Farmers reported that some of their soils were clayey and they had no choice but to remove all weeds by hand with inadequate labour. Farmers' awareness of basal fertilizer, seed dressing, ridges, rotations and inoculants was very low and additional training is needed.

Table 2.11 Pattern of Recommended Groundnuts Production Practices' Awareness, Trial and Adoption in Mutoko/Mudzi and Buhera, Zimbabwe, 1987-89.

Recommendations	Awareness		Trial		Adoption	
	M/M	BUH	M/M	BUH	M/M	BUH
1. Soil type	95	94	57	24	50	24
2. Plant of ridges	b	b	33		24	
3. Rotation	b	b	60	28	59	28
4. Variety	48	42	b			
5. Seed dressing	b	b	22		b	
6. Use Inoculants	b	b	b			
7. Cmpd D Levels	b	b	b			
8. Gypsum Levels	42	b	32		30	
9. Weeding	63	32				
10. Insecticide	30	b				

Source: Food Security Surveys, 1987-89.

A significant proportion of the farmers in Mutoko/Mudzi were aware of most recommended sunflower practices but adopted only half. They were aware of the use of seed dressing and fertilizer but did not apply them, Table 2.12. Farmers did not have enough cash to buy fertilizer to apply on sunflower. Farmers in Buhera were less aware of the recommended practices and considerable extension effort would be required to train these farmers.

Table 2.12: Patterns of Recommended Sunflower Production Practices' Awareness, Trial and Adoption in Mutoko/Mudzi and Buhera, Zimbabwe, 1987-89.

Recommendations	Awareness		Trial		Adoption	
	M/M	BUH	M/M	BUH	M/M	BUH

1. Variety	74	39	57	24	50	24
2. Use certified seed	67	b	33		24	
3. Planting Time	75	31	60	28	59	28
4. Seed Dressing	21	b	b			
5. Spacing	35	b	22		b	
6. Cmpd D Levels	31	b	b			
7. AN Levels	35	b	b			
8. Weeding	44	b	32		30	

Source: Food Security Surveys, 1987-89.
b percentage is below 20

RECOMMENDED CROPPING PRACTICES

SUNFLOWER

1. The best seed variety is Masasa
2. Buy certified seed annually
3. Plant to harvest after rains
4. Use seed dressing before planting
5. Spacing between rows is 90cm and 30cm within row
6. Apply 25kgs/acre Cmpd L in rows at planting
7. Apply 25kgs/acre AN six weeks after germination
8. Avoid weeds in the first two months after germination

More fertilizer was applied on maize than on other crop because returns were higher. Results of a study done by the MLARR Farm Management Section (1989), confirms that farmers decision to plant maize in marginal areas is rationale. The returns to land, labour and cash were higher for maize than for other crops (both early and late planted maize). In his study of the economics of groundnut production in Mangwende, Makombe (1990) found that it was not profitable to apply fertilizer on groundnuts. Chiduza (1989) also found similar results with sorghum in the Sebungwe region. Mudhara's (1981) study of the economics of maize production and farmer management strategies in Mangwende and Mudzi, showed that returns to both early and late planted maize were significantly higher than for those crops recommended as alternatives or for late planting.

Credit can be used as a vehicle for technology adoption. Credit use is, however, limited to maize and cotton in all NRs except NR V. Credit is not advanced for other crops because the lending agency does not perceives it to be economic. There is no credit

assistance for purchasing a crop input in NR V because cropping in these areas is generally considered too risky. Available credit assistance has strengthened the position of maize as a dominant crop in the farming systems with little effort directed at assisting oilseed producers in marginal areas. Seed packages should be given on credit to promote adoption of improved sunflower and sorghum, even in marginal areas. The current credit package of seed and fertilizer should be reviewed given that farmers perceive the application of fertilizer to be unprofitable on crops other than maize.

Pest and Disease Resistance

Maize is less disease and pest prone than groundnuts and cotton. The only maize pest problem is the stalkborer which is an easier pest to manage than aphids and other cotton pests. Millets and sorghum have a disadvantage in the control of pests, particularly birds, and farmers find pest control to be too labour intensive.

The general level of farm household income in marginal areas is very low. Increased productivity and marketing improvements of non-grain crops remains fundamental to improving the well being of these households. Cash crop production significantly influences household food security. The highest income groups in both Mutoko/Mudzi and Buhera frequently marketed maize, millets, roundnuts, sunflower and groundnuts. Lower income groups marketed only millets. Current government policy that supports local consumption of small grains worsens income positions by lowering the real producer price for millets. Stimulating industrial demand for millets has potential benefits for the low income groups of farmers in marginal areas.

Technology can facilitate changes in crop mix in the short run when available. Appropriate maize production technologies exist. Therefore intervention should address constraints related to technology adoption at the farm. Better dissemination of existing profitable technology will improve productivity. The extension system needs to make a significant effort to train farmers in the use of effective technology and credit to alleviate cash constraints. This will have an immediate impact on household food security. Future productivity gains on millets and oilseeds are expected from ongoing research in improved varieties.

The potential impact of technology on food availability cannot be divorced from existing marketing problems. Improvement in the marketing of inputs will lower production costs making available technologies more profitable.

Deregulation of oilseeds marketing would improve opportunities to sell to different outlets at competitive prices.

Removal of grain movement restrictions, facilitation of grain movements through improved transport and roads and privatisation of grain marketing is likely to improve grain flows into marginal areas, thereby reducing food acquisition costs. Such improvements in the efficiency of food markets will impact the ability and willingness of farmers to diversify into oilseeds production.

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VI

Six Years of Food Security Research in Southern Africa-- Is The Job Completed?

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SIX YEARS OF FOOD SECURITY RESEARCH IN SOUTHERN AFRICA: IS THE JOB COMPLETED

J. Dhliwayo[1]

Mr Chairman, I am deeply honoured by the invitation to participate in this special Conference. To me, and I believe to many of you present here, this conference has become a tradition -- an annual event that has to take place to review a process of developing a strategy to address an issue that is central to human existence, i.e., food security.

As such, Mr Chairman, this conference has become a true reflection of the recognition of the importance of food security, by us, our SADCC governments and institutions and by citizens and governments of countries outside the SADCC region who have provided financial, material and human resource support.

I quote " The drought and famine in Africa are but symptoms of a massive economic, social and ecological crisis throughout the continent.... Africa is the only part of the would where per capita food production has declined over the part two decades. It has the world's lowest incomes, the lowest growth rates, and the lowest levels of employment, literacy and life expectancy. It also has the highest rates of population growth and child death. Malnutrition and starvation touch the lives of millions each year even when there is no drought". The statement just quoted describes a situation of the "lowest" positive and "highest" negatives. I wonder if there is any one here who would like to challenge or dispute its contents?

It was against this gloomy background that the programme of Food Security was developed and accorded very high priority by the countries of the SADCC region. These "lowest" and the "highest" mentioned in the statement above are all key components, or indeed a manifestation, of the food insecurity problem -- lowest incomes, lowest

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economic growth rates, lowest levels of employment, literacy and life expectancy on the one hand and "highest" population growth rate and "highest" child death rates on the other. These key components demonstrate the diversity and complexity of the food security issue. Mr Chairman, I am sure we all recognise the magnitude of the task with which The Food Security Research programme has had to deal. Recognising the critical important of this issue, SADCC Government established a programme for Food Security that was designed to develop and implement projects aimed at improving food production and supply in the region. To tackle this broad and complex issue of food security, there was need for a research programme that would simultaneously develop and lay a solid foundation for the development and implementation of the food security programmes and projects. Programme development and implementation must, of necessity, be preceded by intensive and extensive efforts among members of different economics, social, political and academic groups to develop a basic understanding of the problems.

The Food Security programme was established to develop basic understanding of the nature of the problem of food security among SADCC governments and citizens. One of the objectives of the Food Security Research programme, initiated and spearheaded by the University of Zimbabwe in conjunction with Michigan State University, was to carry out and promote a thorough review and analysis of the prevailing food security policies in the region and of the economic, social and other factors that have a direct bearing on food supply, availability and access.

Mr. Chairman, I can confirm that this research programme was born out of a strong conviction by our governments that the shaping of policies concerning food and agriculture has to be based on a solid knowledge and understanding of the factors that impinge on food security. In other words, our policies should be guided by the analytical strength and efforts of the situation in which we find ourselves. This indicates a recognition that the formulation and implementation of these policies are the responsibility of all SADCC citizens (from both the private and public sectors) and not the domain of civil servants and politicians alone.

I believe, Mr Chairman, that this makes sense. I say this because Governments cannot, on their own, bring about food security or even general development. That is not possible. It is realised that food security requires progress in many sectors and sub-sectors of the economy such as health, family planning, education, environmental protection and management, production, storage, marketing, transportation, trade, nutrition, community organisation, and business investment to name a few. The importance of a research programme to analyse and establish the linkages and inter-dependencies among these sectors and sub-sectors can not be overemphasised. It is a vital stage in the process of development.

The UZ and MSU, with the support of the Food Security Technical and Administrative Unit (FSTAU) and funds from USAID, developed a programme that sought to establish and strengthen links among the citizens, governments and institutions of SADCC member States. The programme sought to foster a working partnership in research among SADCC researchers, to share experiences and, together with planners and policy makers, to develop strategies for reducing the problem of food insecurity in the region to the minimum level possible.

Mr. Chairman, we should congratulate the founders of this programme, UZ and MSU, and in particular, Dr. M. Rukuni and Professor, C. Eicher not only for initiating such an important programme but for the achievements the programme has accomplished. Over the past six years, which in a research activity is a very short period, significant advances have been made of great importance to food security. These have included topics from food production and marketing to trade, technology and exchange rate policy. I have attached a list to this paper of the 27 projects undertaken. The programme has successfully brought social and technical scientists from institutions within and outside the SADCC region together to meet with SADCC civil servants to generate a climate of discussion on research findings, policy approaches and development strategies in the region. These groups have met every year to review the programme and determine new themes and areas for further research. We all agree that this process has worked.

Allow me, Mr Chairman, to inform you and the meeting of my own personal experience regarding my old relationship with some of the founders of the programme. From 1981 to 1985, before the Food Security Research programme was initiated, my relationship with Mr. Mudimu and Dr. Rukuni was strictly social. No formal technical or professional business existed between us, particularly when it came to the exchange of information. They were at the University doing their own thing and I was in the Ministry providing my civil service work. The system had expected us to behave that way. But through this programme, today I talk to Mr Mudimu and Dr Rukuni as equal partners sharing a common responsibility to address a common problem. This is a great achievement, an important step in the process of establishing a comprehensive strategy for developing and implementing food security projects and programmes.

Mr Chairman, it is my belief that the Food Security Research Programme is, of necessity, a grassroots research programme. As such it offers valuable signposts and identifies key priority areas where attention and resources need to be concentrated. The research programme generates and offers governments, and all productive sectors of the economy, some important insights that will guide their plans and activities. To achieve this takes time and patience.

Food Security Research provides:

- A new awareness that the burden of food security is not the individual's problem but that of the nation as a whole and its future generations.
- A recognition that the flow of development assistance will increasingly be directed to areas where the social, economic and political environment generates the highest social and economic rate of return. Therefore, continued disregard for the neglected majority and of the sectors serving the majority, is detrimental not only to the individuals but to the nation as a whole.
- A recognition that there is a need for a well targeted strategy to assist governments in drawing on the right resources in establishing a realistic balance between consumption and investment and in focusing their effort on the most crucial areas and sectors to ensure that resources are invested for those who most need them.

Mr Chairman, I believe that research plays a very important role in enabling a country to reach this crucial stage in the development process. With this in mind, let me now attempt to answer the million dollar question that I was invited to answer: "After Six Years Of Food Security Research in Southern Africa, Has The Job Been Completed?"

Forging A Research Partnership and A Policy Analysis Network

Mr Chairman, I have already indicated that the programme was established to try and answer a large number of complex questions that affect a vast region with over 70 million people. The programme has successfully conducted 27 investigations and analyses on a wide range of issues and factors that impinge on food supplies, their availability and people access. Although most of these puzzles are common in the region, some tend to be country or area specific in nature and impact.

When the Programme started in 1985, it covered only one country -- Zimbabwe. It was not until 1987, upon recognition of its importance, that it was expanded to cover Tanzania, Malawi and Botswana. In 1989-90 the programme was further expanded to encompass Swaziland, Lesotho, and Mozambique. The programme has not yet had a chance to initiate country-specific research in Angola and Namibia. Mr Chairman, the objective of establishing an extensive research network throughout the SADCC region has not yet been fully accomplished.

Adoption and Adaption of Research Recommendations

One of the ultimate goals of any research programme, and a measure of its success, is the participation of a large number of community members in the development and implementation of programmes established as a result of the research. In other words, the adoption of research recommendations by the majority and the use of the results to further refine and adapt the policies being pursued, is an important outcome. As this

happens, the policies of Government can be said to truly reflect the development vision of the majority and exhibit the confidence that governments have in the talent, vision and commitment of its citizens.

The Food Security Research in Southern Africa project has, through its program of policy research, analysis and networking, initiated this long but necessary process for establishing a comprehensive strategy for agricultural development and food security. While I can say quite confidently that the research initiated has been effectively executed, more work remains to be done if we are to fully realize the benefits of the achievements made thus far.

A Review of Research Activities: Time for Reflection

It may also be possible that there was some tenuousness in the prelimary research activities and their conclusions. This was to be expected considering the complexity of the subject matter, attitudes, traditions, tastes, etc., most of which change slowly over time. Food Security itself has short-term and long-term dimensions and is sensitive to the changing economic, social and agro-ecological conditions. Only long-term research programmes can monitor responses to changing situations.

Sharing a Regional Responsibility

An important function that was identified through this programme is the importance of establishing centres of excellence within the region to carry out studies on important and specific food security issues. Each centre would specialise in certain fields and offer technical assistance to governments and other relevant institutions in the formulation of development strategies and food security policies. Zambia's experience in abolishing the NAMBOARD, Malawi's restructing of ADMARC and Tanzania's efforts to privatise Grain Marketing have not yet revealed all of their impacts on household food security. Zimbabwe's fledgling effort to restructure its grain marketing is just beginning.

The point is that the food production and marketing systems throughout SADCC are dynamic and research to assess the impact of change and to guide policy must be ongoing. Thus, while we are indebted to USAID for providing the financial support to this time. I can assure them that we in the region think it was money well spent.
it is of great importance to this group that a way be found to facilitate a continuing food security research program within the region.

May I, again express my personal gratitude for the UZ/MSU "connection" and to all of you for the knowledge I have gained from our interaction over the years.

RESEARCH PROJECTS UNDERTAKEN

Food Security in Southern Africa Projects.

1. Costs and Returns of a Regional Grain Reserve

2. An Analysis of Alternative Policy Interventions to Increase Food Security in Malawi

3. Evolution of Agricultural Policy in Zimbabwe: 1965-1986

4. Factors Affecting Food Production: The Interaction Between Technology, Institutions and Policy for Maize Production

5. Household Food Security: Grain Storage, Consumption and Marketing Decisions

6. Analysis of Maize Pricing and Storage Policies

7. The Potential for Increasing Communal Maize Yields

8. The Wheat Subsector

9. The Groundnut Economy: Constraints on Expanding Production in Communal Areas

10. The Sorghum Subsector in Zimbabwe

11. An Assessment of the Potential for Crop Diversification to Promote Rural Household Income and Food Security in Low and High Rainfall Areas in Zimbabwe.

12. An Analysis of Price and Non-price Barriers to Agricultural Marketing and Trade in Southern Africa

13. Policy Strategies to Stimulate Technology Adoption in Low Rainfall Areas in Zimbabwe

14. Household Grain Marketing Strategies and Policy Options in Low Rainfall Areas of Zimbabwe

15. An Analysis of Grain and Grain Meal Distribution Channels in Zimbabwe: Implications of Market Decontrol on Household Food Security in Low Rainfall Areas.

16. National Grain Price, Stock and Trade Policy Strategies to Promote Food Security in Zimbabwe

17. Household Grain Production and Marketing Behavior in Zimbabwe: A Synthesis of Various Studies

18. Effects of Trade and Exchange Rate Policies on Crop Diversification and Food Security in Zimbabwe

19. Determinants of Household Food Security in Low Rainfall Areas of Zimbabwe

20. An Analysis of Alternative Nutrition Interventions to Promote Food Security in Low Rainfall Areas of Zimbabwe

21. Maize Marketing Policy in Zambia

22. Impact of Credit on Food Security in Different Smallholder Systems in Tanzania

23. Staple Food Market Control Alternatives: The Case of Two Regions in Tanzania

24. The Impact of Market Policy Changes on Food Security in Tanzania

25. The Effects of Smallholder Agricultural Produce Market Liberalisation on Household Food Security in Malawi

26. Cash Cropping and Food Security in Swaziland

27. Rapid Appraisal of Production and Marketing Systems for the Main Agricultural Crops in Selected Districts of Mozambique

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