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FOOD SECURITY RESEARCH PROJECT

**HOW WILL THE PROPOSED CROP
MARKETING AUTHORITY AFFECT
FOOD MARKET PERFORMANCE IN
ZAMBIA:**

**AN EX ANTE ASSESSMENT TO GUIDE
GOVERNMENT DELIBERATION**

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Important contributors to this research assignment were the members of the CMA Design Task Force, whose deliberations resulted in the submission of a Concept Note that was submitted to MACO, and which formed a first basis for discussion and further analysis.

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1. Background

Concerns about the poor performance of the smallholder agricultural sector of the economy has led to a proposal to create a parastatal organization to be known as the Crop Marketing Authority (CMA). A proposal was prepared that states that the CMA will provide crop marketing support in areas with commercial potential, in partnership with the private sector, and by administering reserve stocks, without imposing major costs on the treasury.¹

The major crop marketing problems faced by Zambia's small-scale farmers are perceived to be low prices and low production of staples, leading to problems of low real incomes of smallholder households and food shortages perceived to result from inadequacies of the markets for staple crops and agricultural inputs. The CMA is envisioned to help smallholders overcome perceived problems of (1) high costs of marketing, (2) poor access to markets, (3) market concentration leading to exploitative practices by traders, and (4) low prices that result from points 1 through 3.

CMA is envisioned to replace the Food Reserve Agency (FRA), which was mandated in 1995 to maintain strategic reserve stocks in support of the emerging private commodity trading sector. After six seasons of operation, the FRA is perceived as not having adequately addressed the above marketing-related constraints, even though its mandate was primarily related to maintaining a strategic food reserve. Therefore, it has been proposed that a new agency (the CMA) be created to replace the FRA with an explicit expanded mandate to redress these perceived problems of smallholder grain marketing.²

This paper aims to summarize the rationale and objectives of the CMA and the possible consequences of adopting the proposed legislation. We also identify where the proposal, in its current form, requires additional specificity in order to evaluate its ability to meet Government's objectives of enhancing food security and sustainable crop marketing.

Although the CMA Concept Note refers to food crops in general, and highlights the importance of not focusing entirely on maize, we realize that maize will inevitably be the biggest tradeable food commodity that the CMA will handle. For that reason, the analysis in this report focuses on maize marketing.

2. Key questions related to the proposed role and activities of CMA

According to the CMA Concept Note, the functions of the CMA under consideration would be as follows:

- a. Crop marketing: Its main functions would be to provide a market for food commodities, in partnership with the private sector, in areas where crop production and trade can occur on a commercial basis, without continuous

¹ For details, see "Concept Note on the Crop Marketing Authority", submitted to MACO by the CMA Design Task Force on 11 March 2003

² It may also be implied that the accumulated debts of the FRA will be wiped clean, thus absolving individuals who have yet to pay back their fertilizer loans to the FRA.

subsidies, and to provide market facilitation services such as market information and promotion of grades and standards. The intended benefits would be to provide smallholders with a market for their food commodities, in the process developing private sector capacity. Another benefit would be increased marketed output of food commodities for the supply of major consumption centers to meet expanding food requirements and enhanced producer incomes.

The CMA Concept Note specified that CMA's crop marketing activities would focus on providing crop marketing opportunities in areas with "*commercial potential*," where the private sector is not sufficiently active. Therefore, the apparent design of the CMA is not to provide a market for maize in every district in Zambia, but rather to cater for smallholders who can grow crops like maize profitably given realistic supply and demand conditions in the country, but are not being adequately served by the private sector. This assumes that there are unexploited commercial trading opportunities that CMA will develop in a profitable manner, without providing long term subsidies. The CMA Concept Note also specifies that in selecting commodities and purchase areas, "...the economic viability of production and marketing of specific crops will be considered, under competitive and commercial terms. Areas in which it is unprofitable for farmers to grow maize will not be selected, but in such areas alternative crops can be identified and considered, thus promoting crop diversification". This implies that the CMA will need to operate as efficient, or more efficiently than the private sector in terms of the marketing costs it incurs, such that it is able to offer competitive prices to farmers without accumulating trading deficits.

The concept note highlights the importance of CMA working in partnership with the private sector in order to develop its capacity, and mentions crop marketing support as being a "transitional" activity to be phased out as the private sector develops its capacity.³ The document further states that CMA will have "a presence" in each district, although it is implied that it may not necessarily be in the form of a buying depot, but in the form of playing a facilitating role, e.g. by providing local market information.

- b. Food reserve management: To maintain strategic reserve stocks sufficient to ensure market supplies in Zambia for three months. The intended benefits would include improved national-level food security and reduced inter-seasonal supply and price instability.

Given that the private sector also holds stocks this implies that CMA would only need to store the balance between what the private sector is likely to

³ This transitional role and mandate to support the private sector's capacity also characterized the Government's rationale for the FRA, the Agricultural Credit Management Programme, and all other forms of government involvement in fertilizer and maize marketing since the ostensible agricultural reform program in 1993.

stock and the estimated market requirements. It is highly possible, however, that private sector storage will be influenced by stockholding behavior of the CMA. According to the CMA Concept Note, the estimated CMA stockholding requirement is 100,000 MT, but this may underestimate actual requirements depending on how the CMA behaves in practice, how private traders reacts to this, and the extent to which the private sector is encouraged to participate in the market.

The Government proposal states that it will manage reserve stock separately from crop marketing activities. Stocks would be obtained from CMA itself as well as from commercial farmers.

- c. Input Distribution: Although the CMA Task Force has proposed not to include input and credit delivery as part of CMA's mandate, there are others who have insisted that it be included. This may include distribution of credit in the form of fertilizer.

The actual impacts of the CMA will not be clear until its broad conceptual mandate as specified in the Government Concept Note are translated into detailed implementation modalities. This task remains to be done. To assess the CMA's ability to meet its stated government objectives, we identify the following questions for analysis:

1. How will Government determine "areas with potentially profitable market opportunities but where private sector involvement is currently insufficient," and where are they located?
2. Where are the rural marketed volumes and where can crop buying centers be justified on commercial grounds?
3. If the CMA is to buy and sell at market prices to avoid incurring trading deficits (as implied in the CMA proposal), then to what extent will smallholders gain as compared to the current situation?
4. If higher-than-market-prices were offered, what additional production can be expected? Which smallholders would be able to respond to higher rural prices? What would be the impact of buying at higher-than-market-prices on the national treasury?
5. If CMA wishes to purchase sufficient volumes of maize to put upward pressure on producer prices in smallholder areas of Zambia, what effect would this have on wholesale and retail prices of maize and maize meal?
6. Can sufficient volumes of maize be procured from small-scale farmers to meet the needs of urban and rural deficit areas, or will national food security also require new Government approaches for stabilizing supplies from additional sources inside and outside of Zambia?

7. Are food reserve stocks a cost-effective route for stabilizing national food supplies and prices?
8. How will CMA be able to overcome the problems of patronage and interference that plagued NAMBOARD and FRA?

Clear answers to these questions depend largely on the CMA's implementation modalities, which have yet to be specified. Nevertheless, the remainder of this paper explores the potential implications of alternative forms of CMA operations, based on available data on maize production and market performance in Zambia.

3. Where are the potential geographical areas for increased marketed maize output by smallholders? Which of those areas are consistent producers and least vulnerable to adverse weather conditions?

One objective of CMA is to improve the level of grain production. Would a relatively small potential improvement in farm gate prices made possible by the CMA performing the marketing function expand the level of grain production? This section identifies districts that could potentially produce and supply enough surplus maize to warrant a CMA presence. Data is not available to directly estimate producers' supply response to prices. However, analysis of Post Harvest Survey data (1999/00 production year) on district-level maize production and marketing patterns of small- and medium-scale farmers provides some indication of where increased market potential might arise.⁴

For analytical purposes, we categorize Zambia's districts into the following four categories. First, producers in net-purchasing districts – i.e., districts where more maize is purchased than sold, implying an importation of maize into the district – already receive relatively high market prices since the sellers are competing with grain imported from outside the district. In these districts, a commercially-oriented CMA could not expect to increase prices to producers. Its impact on maize production would therefore be very limited. Second, districts where maize is not the primary staple crop in either production or consumption, and where little is bought or sold, are assumed to be in areas not well suited to grain production (otherwise they would produce more for their own use) or in areas where maize is culturally a less important crop. Third, districts that were self-sufficient and consumed relatively high quantities of maize per capita were assumed to have a proven capacity to produce grain and would become net exporters of grain with better market prices. Fourth, districts that are already net exporters are assumed to have clear capacity to produce grain and to be already connected to the market and could be expected to expand marketing activity even further with higher prices.

The country's districts were, thus, grouped into these four categories on the basis of maize production, consumption and net sales:

⁴ The PHS is an nationally representative annual survey of roughly 7,500 small- and medium-scale farm households in Zambia, conducted by the Central Statistical Office, Lusaka.

1. Net maize purchasing districts: districts where mean household maize and mealie meal purchases (the latter expressed as maize equivalent) were substantial. In this analysis, net purchases (and sales) of 100 kg (two 50 kg bags) or more were considered as substantial, based on the observed distribution of sales among smallholders. There were nine districts identified in this category from the 1999/00 crop season, six of which are in Southern Province and the remainder in Western and Northwestern provinces. In many of these districts, maize production is low due to climatic constraints and/or consumption preferences for a variety of other food crops.

2. Marginal producer/consumer districts: districts where, on average, smallholder households produce less than the national average of one metric tonne (MT), consume less than the national average of 0.9 MT, and have net maize sales between -100 and 100 kg (i.e. purchase up to two bags, or sell up to two bags). This category includes 25 districts where maize is not a major crop, either in the production system or in consumption patterns. These districts are primarily in Northern, Luapula, Western and Northwestern provinces.

3. Net maize selling districts: districts where mean household net maize sales were 100 kg or greater. There were 33 net seller districts in the 1999/00 crop season (the 2000/01 marketing year) that had combined net sales of 136,000 MT. Of this quantity, almost 90% originated from Southern, Central, Eastern and Copperbelt provinces. The remainder came from Northern, Lusaka and Northwestern provinces.

4. Maize self-sufficient districts: districts where, on average, smallholder households produce more than the national average of one MT, consume more than the national average of 0.9 MT, but have between -100 and 100 kg of net maize sales. This category includes three districts in Eastern Province - Chadiza, Mambwe and Nyimba - where maize production and consumption is high, and where expanded production for sale outside the district is conceivable.

The districts falling under each of the four categories are listed in Appendices 1 and 2. Appendix 1 presents those districts that have potential to expand production and supply to the market (net sellers, and self-sufficient districts). Appendix 2 presents the remaining two categories identified as having almost no potential to supply maize to the market (net maize purchasing districts, and low-producing-low consuming districts).

Production and outflow of maize produced by smallholders in 2001 and 2002 were lower than in 2000 because much of the maize from the 2000 crop was produced in high-risk areas such as Southern Province. If a CMA could provide incentives that would bring about production shifts to more climatically suitable areas with commercial potential, it would improve food security and price stability. Is this an appropriate role for a CMA?

National maize production has fluctuated widely, between some 1.1 million MT in 2000 and 600,000 MT in 2002. If we compare the production estimates from 1999/00 (a surplus season) and 2000/01 (a deficit season) by district, there are a number of districts that show little fluctuation and would seem most appropriate for promoting increased production of staple food crops (Appendices 1 and 2). Examples are Choma, Mazabuka and Namwala in Southern Province, all of which showed increased production levels in 2001, as compared to the 2000 harvest. However, further district-level analysis is required to incorporate additional

food deficit seasons, as some of the above districts have been negatively affected by drought, for example during the 2002/03 season.

4. Is access to markets a problem for smallholders and can it be addressed by the proposed CMA?

A major function of the CMA is to provide marketing services as a supplement to the private market to assure market access to smallholders. The perceived problem is that smallholder farmers in some areas do not have access to markets paying adequate prices. The question is whether the CMA could manage resources in a way that would provide market services to areas not served by the private market at higher prices considered adequate and still operate with out losing money. The question has several parts.

Do private traders miss opportunities to make a profit by offering to buy and move grain from many areas producing grain surpluses for the market? The answer would probably be affirmative. Lack of information about available supplies, and transportation bottlenecks are likely to lead to some missed opportunities. How big an opportunity is there for a CMA to profitably extend marketing services? We do not know for certain. In order to obtain an estimate, district-level data on smallholder market sales of maize were analyzed, whereby median maize prices received by smallholder farmers in each district were compared with median prices in every other district.⁵ Then a calculation was made to find out for how many districts was the difference in prices greater than the cost of transportation and handling cost making it potentially profitable to have moved grain from high to low price districts.

To do this, the cost of moving maize among markets/districts (estimated as the product of district-to-district road distances and unit transportation rates plus loading and offloading costs and CMA fixed costs per metric tonne⁶) and price differences between all district pairs were used to identify potentially profitable maize flow patterns and areas for possible beneficial intervention by the CMA. The result of this analysis – a list of districts with positive gross margins – is then combined with the information gained from the district categorization exercise (as presented in the previous section) to identify districts with both potential to produce and supply maize to the market and potential for the supplied maize to be shipped profitably to other markets.

According to this analysis, of the 36 districts with a potential for increased volumes of maize production (from categories c. and d. as described in previous section), 22 districts appear to be potentially able to supply maize to other districts at a profit (see Table 1). The existing positive price differentials suggests that some trading opportunities may have existed but were left unexploited. These 22 districts are mostly located in Central, Copperbelt, Lusaka,

⁵ Annual median prices were computed based on data obtained from the 1999/00 post-harvest survey of small- and medium-scale farmers by the Central Statistical Office. In the survey, each interviewed household was asked to state the price they received for the largest quantity of maize sold for cash. Thus, these prices reflect the peak marketing season, which falls somewhere around or just after harvest time. The authors opted to use the median prices, and not mean prices, because the farm-gate price data had too many outliers.

⁶ Distances, unit transport rates, and handling and CMA fixed costs per tonne were estimated from maps from the Roads Department, private transportation companies (Dubica, etc), consultations with private business people, and the Food Reserve Agency, respectively.

Eastern and Southern provinces (see Appendices 1 and 2), which is largely where the private sector has been known to concentrate its operations.

This seems to put an upper limit on the number of districts that would possibly support a CMA buying station without operating at a loss. Even then, the trading opportunities that we have so far assumed may not necessarily exist for the CMA in each of these districts. The CMA's costs may actually be greater than the estimates in our analysis reported largely from private sector sources. Operating at a profit requires substantial volumes and we have no data about the break-even volume a buying agent would handle in competition with private traders.

Table 1. Districts with profitable CMA maize trading potential and districts with maize supply potential where trade appears unprofitable

Province	Districts with potential to supply maize profitably	Profitable trade destination(s)	Districts with maize production potential but where trade is unprofitable
	(1)	(2)	(3)
Central Province	Chibombo	Southern, Copperbelt	Serenje
	Kapiri Mposhi	Copperbelt	
	Mkushi	Copperbelt, Southern	
	Mumbwa	Southern, Copperbelt	
	Chingola	Copperbelt	
Copperbelt	Chililabombwe	Copperbelt	Chingola
	Kalulushi	Copperbelt	Luanshya
	Kitwe	Copperbelt	Masaiti
	Lufwanyama	Copperbelt	Mufulira
	Mpongwe	Copperbelt	
Eastern Province	Nyimba	Southern, Lusaka, Central, Copperbelt	Chipata
	Petauke	Southern	Chadiza Katete Mambwe
Luapula Province			Milenge
Lusaka Province	Chongwe	Southern, Lusaka	
	Kafue	Southern, Lusaka	
Southern Province	Choma	Southern	
	Kalomo	Southern	
	Mazabuka	Southern	
	Monze	Southern	
	Namwala	Southern, Lusaka, Copperbelt	
Northern Province	Mbala	Northern	Kasama Mpika Nakonde
	Mufumbwe	Northwestern	Kasempa
	Mwinilunga	Northwestern	

The logic of the analysis is that without effective competition it would be expected that annual median prices, representing the typical prices for a district, would differ by more than the costs of moving grain between markets. The data indicate that for the 1999/00 crop year, there were 22 districts where price spreads were much higher than the estimated costs of moving grain between them. This suggests that opportunities to add a large competitor such as CMA were limited, as long as it operated with a hard financial constraint. Based on this preliminary evidence, it appears that the CMA would have limited scope to increase producer prices.

The remaining 14 districts with physical productive potential to supply maize to the market have negative gross margins, implying that the transfer and handling costs exceed the expected marketing margins. Under these conditions, these districts cannot foster a profitable maize business for the CMA. Alternative strategies other than direct government participation in buying and selling may offer better options. A threshold level of investment in infrastructure (such as roads and communications) and support institutions may be required to make these districts profitable suppliers of maize. The same is true for the remaining districts we judge as having limited maize production expansion potential without offering producer subsidies (categories a. and b. in previous section). The costs and benefits of offering subsidized producer prices is examined later in the paper.

Clearly, most small-scale farm households are very poor. Those able to produce grain for the market would be better off with higher maize prices. The question here is: Would smallholders be better off from policies to directly support producer prices vs. policies to improve profitability through reducing the costs of production and marketing. Lower costs of fuel (a 45% tax on diesel is currently being levied), lower costs of transportation from improved infrastructure, and policies to reduce taxes on imported capital equipment and spares are likely prospects for this cost reduction. Imperfect competition may also leave some farmers with prices below competitive market levels. The CMA proposal to provide market facilitating services could contribute to improved prices by facilitating transportation coordination and greater competition through monitoring and information. Perhaps if the CMA had the capacity to offer information about effective productivity-enhancing practices and other related services to stimulate production of a surplus for the market it could be a viable economic agent in the other districts. But that converts it to another type of agency raising another set of questions.

5. Rural marketing costs are high, due to low volumes and geographical spread. How will this affect CMA buying operations? Are there opportunities to benefit from a greater concentration of commercially oriented smallholders in selected areas?

Of the rural smallholders' maize surplus in 1999/00 (17% of total smallholder maize production), the majority (91%) originated from Central, Eastern, Southern and Copperbelt provinces, mainly servicing the Copperbelt and Lusaka markets.

For that crop year, 27% of all small- and medium-scale farmers in the country sold any maize (Appendix 3). Marketed sales were highly concentrated, with 10 % of these households selling 90 % of the maize marketed by the small- and medium-scale sector. It is not known for certain how much additional grain could be forthcoming from an increase in producer

prices. However, a survey of the supply response literature shows very low price elasticities of supply especially under conditions of weak infrastructure and input supply systems (Binswanger, 1990). Typical supply elasticity estimates are in the range of +0.2 to +0.4. If we assume that the CMA activities would be able to raise producer prices by 10 % in the major surplus regions of the country, then this might be expected to generate a 2% to 4% increase in national maize production and sales.

Appendix 1 shows the total net quantities of maize sold out of each net selling district from the 1999/00 crop. Because farmers sell maize over a number of months at different places within districts to a multitude of buyers (including neighboring households), the quantities handled by any one marketing agent would be very small. This has important economic significance since the costs of handling and transporting are much higher for small quantities. With small individual transactions and small total sales, relatively few buyers can profitably participate in a given area. Of very practical importance for implementing a program of district purchasing by a CMA is the question of how many of the districts have sufficient quantities to support a major purchasing agent in the district? The available data shows that during the 1999/00 production season, smallholders in only eight out of the 22 districts with maize trade potential made enough combined maize sales to fill at least one “CIDA shed” (sheds with a capacity to store 5,000 MT of grain, constructed throughout the country with CIDA funding during the 1980s). These eight districts are Chibombo, Mkushi, Mumbwa, Petauke, Choma, Kalomo, Monze and Mazabuka. All other districts had much more limited potential with combined sales of less than 5,000 MT. These already small quantities of marketed maize in a good crop year would have been strongly reduced during the 2001/02 season. The introduction of a CMA buying station intent on competing for enough grain purchases to break even, if successful, would appear to leave little room for large regional private market competitors in most districts.

This conclusion is consistent with the observation that it is relatively easy to enter the business of trading and transporting grain. It would be expected that informal traders would have lower labor cost than a parastatal organization. Before assuming that a CMA could operate effectively in competition with private traders resulting in higher prices offered to small holders, studies of comparative costs between private traders and a CMA would be in order.

6. Is commodity price support an option for CMA to promote production and income improvements for smallholder farmers?

Although the CMA Concept Note does not suggest that the CMA should operate its commodity market program in such a way that it would increase prices paid to smallholder farmers to provide higher than competitive market prices, there are others who believe prices received by smallholder farmers for commodities are often too low and would favor including a price support function or objective for the CMA, at least for disadvantaged and remote areas. Because it is likely to be a continuing issue, some of the problems with a price support program as might be operated by a CMA are examined.

First, any program intervention resulting in higher maize prices to sellers of maize would directly benefit only a small proportion of farmers. Appendix 3 shows that only 27 % of the small- and medium-scale farm holdings sell maize (sum of columns 1 through 3 in the last

row). Moreover, the smallholder maize market is also highly concentrated, with more than three-quarters (80 %) of the sales attributed to less than 30 % of the sellers (Appendix 4). A one-way analysis of variance (ANOVA) with household income as the dependent variable has shown, with more than 99 % confidence, that in general maize sellers are the better off farmers. When the quantity of maize sold is considered, an unambiguously positive relationship between household income and the quantity of maize sold can be observed (Appendix 5). Notice, for example, that total household income almost doubles between the 75th quartile and the 100th quartile.

Second, attempts to offer prices that would make maize production profitable in all areas of Zambia would pose major demands on the public treasury. The CMA proposal does not specify how it will support marketed maize production from disadvantaged and remote areas without incurring large treasury losses. Based on the available data, we feel there is very limited potential to support prices in selected rural areas without incurring trading losses.

Third, attempts to support prices can have an unsettling impact on commodity markets, possibly increasing marketing cost by creating additional uncertainty among private traders. Simply announcing a support price based upon an assumption of future funding by Government would change the plans of traders. If subsequently funding to support the announced price level failed to arrive those traders acquiring grain, based upon the announcement, would be left holding the bag. Traders in turn would be less inclined to participate in the market or would require a higher margin to deal with the increased uncertainty. Added uncertainty and the competition created by a government agency able to offer higher prices to farmers by incurring trading losses would be expected to drive at least some private traders out of the market. This could conceivably reduce competition and raise marketing margins for farmers other than those selling to the CMA.

A somewhat more technical discussion of problems associated with design and consequences of schemes to support farm prices, with implications for the CMA proposal, is included in Appendix 6.

7. Grain marketing policies need to recognize the sources of marketed maize and take into account the structure of the rural and urban maize market. Urban smallholders and commercial farmers combined are more important sources of maize supply to urban areas than rural smallholders.

The focus in the CMA proposal and the discussions about the policy seem to focus exclusively on the smallholder farming sector, paying little attention to the importance of production of staple crops by commercial farmers and urban growers. The production decisions of commercial farmers especially will influence and be influenced by any CMA actions affecting market supplies and prices. Because commercial farmers generally have greater capacity to respond to changes in incentives, they can be very important in any policy intended to deal with prices or production and supply instability. A good example is the 2002/03 maize harvest, where commercial farmers responded to market demand and produced 411,000 MT of maize, which is a significant portion of urban demand. In addition, some 50,000 MT of maize is estimated to be produced by urban smallholders.

The 1999/00 growing season was a season in which the maize crop met national demand during the subsequent marketing season. Based on this year, for production and consumption, the data below identify an estimate of grain marketed from that crop originating from rural and urban smallholder growers and from commercial farmers.⁷

Table 2. Maize Production 1999/00

Category of producers	Quantity produced (metric tonnes)
(1) Smallholder production retained by producers	662,700
(2) Smallholder production marketed within rural areas	42,700
(3) Smallholder production marketed outside rural areas	145,100
(4) Total production by rural smallholders	850,500
(5) Production by urban smallholders	56,200
(6) Production by commercial farmers	201,500
(7) Total maize production (4 + 5 + 6)	1,108,300

Assuming that all of the urban smallholder and commercial farmer production was marketed in urban areas, and that imports and exports evened out during the 2000/01 marketing season, the estimated rural availability of maize is 705,460 MT ((1) + (2)), and urban availability of maize is 402,801 MT ((3) + (5) + (6)).⁸

The rural surplus in 1999/00 of some 145,000 MT represented only 17% of total smallholder maize production, meaning that 83% of rural smallholder maize production was consumed within the rural areas. Although maize surpluses produced by rural smallholders are important, large-scale commercial production, urban agriculture, and imports account for the major sources of maize to feed the urban population and meet industrial requirements (roughly 64% in a good production year, and most likely more in a poor production year). If

⁷ The MACO/CSO Post Harvest Survey (PHS) provides maize production estimates for smallholders and commercial farmers. In addition, CSO's Living Conditions Monitoring Survey data were used to estimate smallholder production of maize in urban areas, not covered by the PHS. Using the 1998 LCMS data, the urban production as a proportion of rural production was projected over the 1999/00 PHS rural production estimate. Because urban LCMS respondents were not specifically asked whether their plots were actually located in urban areas, only plots smaller than 1 hectare (i.e. most conceivable to be located within the urban boundaries) were counted for this analysis.

⁸ However, based on information supplied by millers, urban supplies may be underestimated in this paper. Maize purchases by large-scale millers (as reported during a rapid appraisal by FSRP in 2002) during 2000/01 exceeded 450,000 MT, and unknown volumes of maize processed by urban hammer mills have to be added. The majority of meal produced by large-scale millers remains in urban areas, as only 13,000 MT of processed mealie meal from urban areas were purchased by rural households in 1999/00 (according to the CSO's 1999/00 Post Harvest Survey and Supplemental Survey). Therefore, it is possible that urban smallholder and large-scale commercial maize production are underestimated, although no data are available to verify this.

an improved and more stable urban food supply is the objective, these three sources of maize procurement should not be neglected.

Smallholder production estimates for the past two crops of maize were less than estimated smallholder consumption, suggesting net imports to smallholder households as a group. Functioning urban-to-rural market linkages become important during such deficit seasons. This raises a question of what the role of a CMA would be during years with such short crops?

8. The problem of inter-seasonal variations in production and food security, and the scope of inter-seasonal reserve stocks.

The second major function of the proposed CMA is to acquire and manage a commodity reserve stock. The objective of the national food security reserve as stated in the CMA Concept Note is “...ensuring cereal supplies in the country for a total of at least three months, which is the period that provides enough lead time to organise local or imported supplies in case of food emergencies”. In other words, once food emergencies are identified, CMA should be able to ensure that the country can be supplied with food for three months, while subsequent supplies are being arranged. A specific function of the reserve is also to “sell and buy stocks of selected crops as and when the market requires”, suggesting that the reserve is used as a market stabilization mechanism.

How do the food emergencies that CMA is expected to cope with come about? Food emergencies are part of the production instability problem, which is in turn caused not only by the weather, but also by market policies and input subsidies. If maize production is to become more stable, it should only be promoted in economically and agriculturally suitable areas. Crop production in general could be increased and much of the instability in production could be reduced by providing information on the economic and agronomic viability of alternative crops and practices. Increased production of groundnuts, cotton, sorghum, millets, sweet potatoes and cassava, and the rapid and widespread adoption of conservation farming technology are ongoing trends that could benefit further from informed extension messages based on field trial experiments in various regions of the country. Subsidizing fertilizer for use on maize in drought prone areas would be expected to contribute to production instability. Fertilizer is essentially free to those not repaying fertilizer loans, or it is artificially cheap for those paying 50% of the commercial value. For those farmers, little is lost from its use in drought years and production is increased in years of good rainfall. The result is more production and lower prices in good crop years. Full pricing of fertilizer would likely make application in drought-prone areas unprofitable in both cases and reduce instability. Another factor contributing to production instability is price risk. During a deficit season, prices increase and encourage more production. When the increased production the next year results in a surplus, there is a risk that prices will be depressed. In order to mitigate the risk of depressed market prices, which can be a subsequent disincentive to plant maize again the next season, farmers expect to have export opportunities for their maize in surplus seasons and require an assurance that any import subsidies or other interventions will not disadvantage them. This will only work if free imports and exports are consistently allowed. Although this is a national policy issue, its success depends on the region-wide implementation of the COMESA Free Trade Area, and the SADC Trade Protocol.

How have government, donors and the private sector coped so far, without the reserve facility that is proposed? Recent food emergencies have been dealt with by a combination of efforts by Government, private sector, and donors, without needing and using large physical reserve stocks. Despite the name, food emergencies do not occur overnight. They are identified well in advance, during the growing season, often with several months' notice. Therefore, the perceived necessity for CMA to ensure food supply for three months while imports are arranged seems redundant. Government, with the assistance of donors, typically intervene to cater for the needs of the vulnerable groups, mainly in rural areas. As indicated above, improved policies could actually reduce the number of households at risk. The needs of the market have been met through commercial imports by the private sector, sometimes in conjunction with Government. Again, improved policies and procedures could improve the private sector's commercial capability and market coverage. Hence, it seems that Zambia has the potential to become food self-reliant without the need to become food self-sufficient. A policy of food self-reliance would focus on the ability to meet any food shortfalls on the international market, while having the economic capacity to do so by producing the mix of commodities that maximizes agricultural growth and stability, thereby reducing the susceptibility to food security risk. Food self-reliance would therefore require little or no costly physical reserves, but rather a financial buffer as well as an active private sector, stimulated by incentives to operate to full capacity.

One of the biggest constraints at the moment is the limited presence of private traders who have the capacity to operate on the regional and international markets. Attracted by the seemingly consistent trade liberalization policies pursued by Government during the early nineties, the sector experienced a significant development of local and international private traders, operating in rural areas and across borders. Large international commodity trading firms such as Cargill, Louis Dreyfus, Glencore and Exatrade all participated competitively on the Zambian market. From anecdotal evidence we know that trading uncertainties such as export restrictions have caused all of these firms to eventually leave Zambia during the mid to late nineties, often after incurring trading losses due to depressed market prices and lack of export opportunities. Although it is often argued that the private sector does not have the capacity to perform crop marketing functions, it would be more appropriate to state that the private sector's capacity exists, but is not fully engaged due to disincentives in the form of high trading risks posed by government interventions. Inter-seasonal storage can be profitable and can be done by large private firms once they have confidence in the market. To achieve that, market uncertainties must be reduced and major trade barriers such as export restrictions and import subsidies have to be removed.

Administering reserve stocks in Zambia would not be a simple matter of buying in a deficit season and selling in a surplus season. Total production of maize in the 1999/00 season was considered just adequate for domestic demand. Maize production fluctuates greatly in Zambia, largely due to erratic weather. Maize production was as low as 480,000 MT in 1991/92 and as high as 1.4m MT in 1995/96. Since market liberalization in 1993/94, only the 1993/94, the 1995/96 and the 1999/00 seasons produced sufficient maize to meet domestic demand (between 1 and 1.1 million MT), with only the 1995/96 season producing a large surplus of some 400,000 MT. Unless reserve stocks are replenished by imported commodities, Zambia may not produce sufficient in good years to provide a quantity sufficient to continuously supply a storage program.

If Government requires some form of reserve, it could consider holding a financial buffer. If the objective is to secure and guarantee physical availability of maize outside Zambia, but within the region, the South African Futures Exchange (SAFEX) offers suitable instruments such as white and yellow maize futures contracts and options. If Zambia requires imports, the CMA would be in a position to purchase options for the supply of maize, with the possibility (but without the obligation) to buy the physical commodity later on, almost identical to an insurance.

Although the above arguments suggest market-led national food security management, could there still be a legitimate role for Government to facilitate market supplies? The marketing channels supplying small-scale traders, hammer millers, and retailers with maize grain, typically become very thin later in the season when local smallholder production becomes depleted. In recent years, import channels were not well designed to supply these informal channels, and imported maize was channeled exclusively through large mills (see FSPR Policy Synthesis no. 5 and no. 6). As a result of this, low-income consumers, who prefer hammer milled meal, had no choice but to purchase more expensive industrially milled meal. To meet the needs of the poor, there may be a legitimate role for government to facilitate the supply of maize to informal markets in small lots to supply the small traders and hammer millers. In deficit years, Government could facilitate the importation of maize, while in surplus years Government could facilitate local supplies, when needed.

9. Reducing unintended consequences through transparent and explicit operation modalities.

It is impossible to predict all of the consequences of a policy like the establishment of a CMA because of the large number of variables, many unpredictable, that can influence outcomes. Particularly important in this case is the fact that the performance of the CMA will depend on many operating decisions and practices that have yet to be specified. The details of implementation design will affect outcomes. Also important is the fact that organizations evolve responding to changes in the physical and political environment. Greater credibility and external support for the proposed CMA may occur when the details on the CMA's design and its implementation modalities are specified and made public. The CMA's ability to achieve stated Government objectives are likely to be considerably improved with explicit attention to how the CMA will avoid the political interference and financial arrears that have plagued the two previous Government marketing boards with similar functions -- the FRA and NAMBOARD. Recent history suggests that there will be great pressures on the CMA to respond to political pressures to act in ways not entirely consistent with its stated mandate. We propose that more detailed analysis of the CMA proposal be analyzed after the explicit operating modalities for the agency have been determined.

The proposed CMA policy is for the marketing function to operate without incurring financial losses. However, the hearings and debate on the policy revealed some strong advocates for price supports including making the CMA a buyer of last resort. When a marketing agency operates by artificially squeezing its trading margin and accumulating losses -- it erodes the trading incentives of commercial traders who cannot afford to squeeze their margins in this way. Under such a scenario, the CMA activities would cause an exit of commercial traders from the maize marketing system rather than nurture their development. There is abundant evidence from Eastern and Southern Africa showing that marketing board

operations have squeezed out the development of the private trading system (e.g, Pinckney, 1993; McKenzie and Chenoweth, 1992; Amani and Maro 1992, Smith 1995, Westlake 1994). If the development of commercial markets remains an important objective of the CMA proposal, we propose that Government aim to specify the modalities of CMA operation to enable *ex ante* evaluation of their effects on commercial market development

As we have seen with the planning of recent maize imports, it is extremely important for Government and CMA to make realistic announcements regarding upcoming market interventions. For example, if CMA has announced that it will purchase 200,000 MT of maize directly from farmers in rural areas, the private sector will largely remain absent from the rural marketing scene, and cannot reasonably be expected to participate at the last minute when CMA experiences funding constraints that would only allow it to purchase 30,000 MT.

Rather, CMA should announce planned interventions only to the extent that finances are in place. In the above example, it should announce arrangements only for the 30,000 MT it is actually able to purchase. That way, the private sector can plan its own activities that would complement those of CMA, thus reducing the potential vacuum that would otherwise develop.

The history of organizations similar to the proposed CMA may be instructive in considering the possible evolution of a CMA. What can we learn from past parastatal crop marketing experiences? NAMBOARD, ZCF, Lima Bank, CUSA, and now FRA have all incurred heavy losses and have not left behind a sustainable trade-based crop marketing system. Unprofitable transactions, mostly in the form of subsidies, as a percentage of the total Government budget, increased from 5.5% in 1984 to 16% in 1989. In that year, maize subsidies accounted for about 40% of the all-time high deficit of 35% of total Government expenditure. By 1990, maize subsidies were larger than the total budget deficit (Mwanaumo, 1994). Government was no longer able to sustain this subsidy system, which eventually resulted in dissolution of NAMBOARD and other parastatal organizations. Today, Government's cash budget would be unlikely to support large subsidy systems due to the limited availability of cash resources.

More recent experiences under FRA have shown that losses incurred by its input and credit delivery programs were re-paid by using the food reserve budget allocation. In 1999/00, this resulted in a loss of some US\$10 million, which was repaid by Government. In the process, FRA did not meet its original mandate of maintaining food security stocks.

10. Aspects of financing

To avoid unnecessary overproduction of maize, the limits of the market must be known, both domestic and international. The maize outflow by smallholders from rural areas in 1999/00 was about 145,000 MT, which could be used as a benchmark. The same would apply to commercial farmers, who supplied some 200,000 MT of maize in 1999/00, are likely to supply some 400,000 MT during the 2003/04 marketing season, and who appear to be the single most important source of maize for the urban market. Theoretically, CMA could handle between 345,000 and 550,000 MT of maize. However, if a well-functioning and sustainable marketing system is to evolve, the private sector should handle a substantial proportion of marketable surpluses from smallholders as well as commercial farmers.

Budget allocations from Government may become CMA’s constraining factor. The table below illustrates the capital required to purchase the following varying volumes of maize⁹.

Table 3. Crop marketing working capital requirements

Volume purchased (MT)	Volume purchased (50kg bags)	Working capital required (ZK billion)
20,000	400,000	17.0
50,000	1,000,000	42.5
100,000	2,000,000	85.0
200,000	4,000,000	170.0

Going by past budget allocations for FRA and the extremely limited disbursements that were actually made (rarely exceeding K10 billion in one season), CMA’s scale of operations in the first seasons may not exceed 50,000 MT of maize. The important implication here is that it is crucial for Government to encourage the private sector to participate in the market.

As with crop marketing, the availability of sufficient working capital is important for the establishment of a food security reserve. The table below illustrates the capital required to purchase the following varying volumes of maize and store it for 24 months¹⁰.

Table 4. Food reserve working capital requirements

Volume purchased (MT)	Volume purchased (50kg bags)	Working capital required (ZK billion)
20,000	400,000	24.4
50,000	1,000,000	48.8
100,000	2,000,000	97.6
200,000	4,000,000	195.2

This is working capital in addition to the working capital required for crop marketing, and it would be tied up for as long as the respective stock levels are maintained. Part of this capital may be lost, or profits can be made, as and when stocks are sold. It is outside the scope of this paper to estimate these potential gains or losses.

⁹ Assuming a purchase price of K25,000/50kg, plus the costs of transport, 6 months storage, insurance, CMA overheads and losses, totaling K42,500/50kg, or K850,000/MT.

¹⁰ Assuming that the food reserve unit within CMA purchases maize from the crop marketing unit for K42,500/50kg and stores it for 24 months, and incurs the usual costs related to storage and overheads, bringing the total cost to K61,000/50kg.

11. Is input and credit distribution the answer to increasing smallholder farmers crop production and incomes? Is it an appropriate function for the CMA?

A recent review of the fertilizer sector by MACO/FSRP (see FSRP Working Papers No. 4 and 5) suggested that fertilizer distribution alone is not the “silver bullet”. Furthermore, past experience has shown that input and credit delivery are a drain on scarce Government resources, and has the potential to divert those same resources away from CMA’s crop marketing capability as well as investments needed to develop the agricultural sector.

The review found that:

- a. Only 20% of smallholder farmers used fertilizer in 1999/00. These households were relatively better-off than households who did not use fertilizer. The government’s program was not significantly more likely to deliver fertilizer to poor farmers and remote areas than private firms. The recipients of government-subsidized fertilizer were better off, on average, than those who did not receive the subsidized fertilizer.
- b. Evidence suggests that the government programs created an un-level playing field for fertilizer trading and reduced the possibilities for private firms unaffiliated with the government programs to develop and expand the scope and scale of their services.
- c. Promoting fertilizer use in areas where its use is not profitable, would represent a loss in national income, not the elimination of a constraint to efficient use of fertilizer.
- d. Even in the districts where fertilizer use is the highest (e.g., Mazabuka, Chipata, Mkushi), the CSO’s national survey data indicate that no more than 50% of small-scale farmers use fertilizer despite the fact that it is available for purchase or swap by private traders. Small-scale farmers differ considerably in their resources, ability to make investments and take risks, and in their knowledge. These and other resource- and knowledge-related constraints of small-scale farmers (besides the cost of fertilizer) explain why so many do not use fertilizer despite its availability in relatively “high-potential” and “well-connected” areas. The limited use of fertilizer in Zambia’s small-scale farming sector is more complex than simply agro-ecology, infrastructure, and credit. Identifying these other household-level constraints and overcoming them will raise the value of using fertilizer to farmers and to the nation.

Fertilizer use is not profitable for many smallholders in Zambia. Recent research using on-farm and trial data in six areas shows that applying recommended amounts of fertilizer on maize was profitable only in two of six sites for which data was available from the Ministry of Agriculture (Donovan et al. 2002).

In areas where some of these adverse conditions prevail, the limited presence of private traders does not infer weak private sector response to policy reform, but it is a reflection of the more fundamental reasons why fertilizer use is unprofitable for many smallholders. These

reasons help to explain why 80% of the small-scale farmers in Zambia do not use fertilizer. The bottom line is that fertilizer on its own, without complementary practices and inputs, was found not to be cost-effective. It is very important to understand why the application of fertilizer on maize appears to be unprofitable for many small-scale farmers. There are seven main reasons:

- a. Inappropriate application rate recommendations
- b. Lack of availability of improved maize seed: The ability of fertilizer to benefit farmers depends on their use of seed varieties that are responsive to fertilizer application. Less than 50% of maize grown by smallholder was grown using hybrid seed in 1999/00.
- c. Highly variable farmer management practices: Better management practices could make it more profitable for farmers to use fertilizer. Many factors affect yield response of fertilizer application, including timing of application, seed spacing, row spacing, adoption of conservation farming practices, etc. This points up the need for better extension and management education.
- d. Output market price effects: As the proportion of farmers using fertilizer increases, crop production rises and prices fall. Effectively tackling some of the other problems mentioned here will help to reduce the costs of crop production and make the use of fertilizer more profitable for small-scale farmers.
- e. Poor rural infrastructure: High transport costs adversely affect fertilizer profitability in two ways: they reduce output prices and raise the cost of fertilizer.
- f. Poor soils and/or rainfall: some parts of Zambia are simply not suited to fertilizer application on maize at any realistic range of input and output prices. In other regions, fertilizer use might be economically viable in combination with lime application to promote the incomes and living standards of many of the 80% of households that are currently not using fertilizer.

Given that fertilizer and credit alone, without a full complement of additional inputs and production extension, the CMA should not include the distribution of inputs and credit as one of its functions. Such government sponsored distribution system for fertilizer and credit will create more problems than it solves, and will leave many smallholder farmers less well off. Recent history has shown how FRA's core mandate of maintaining a food reserve was never achieved due to the financial losses incurred by fertilizer distribution, which would suggest that input programs are best kept financially and operationally isolated from CMA.

12. Final comments

Based on the existing CMA proposal (which provides only a broad description of the CMA's mandate), many questions remain unanswered as to how the CMA will be able to promote the achievement of key Government objectives that the agency was envisaged to address.

Much remains to be specified in order to undertake a more detailed and comprehensive assessment. We propose that the CMA's operational modalities be more fully and explicitly worked out, and then subjected to a detailed cost-benefit analysis at that point before deciding on whether to bring the CMA into being.

We have discussed some of the potential problems that are likely to result from implementation of the CMA as currently specified. These issues should constitute the focus of the next stage in the CMA deliberation:

- a. On what basis will Government determine "areas with potentially profitable market opportunities but where private sector involvement is currently insufficient," and where are they located?
- b. Where crop buying centers may be justified on commercial grounds?
- c. If the CMA is to buy and sell at market prices to avoid incurring trading deficits (as implied in the CMA proposal), then to what extent will smallholders gain as compared to the current situation?
- d. If higher-than-market-prices were offered, what additional production can be expected? Which smallholders would be able to respond to higher rural prices? What would be the impact of buying at higher-than-market-prices on the national treasury and on incentives for private traders to continue their operations?
- e. If CMA wishes to purchase sufficient volumes of maize to put upward pressure on producer prices in smallholder areas of Zambia, what effect would this have on wholesale and retail prices of maize and maize meal?
- f. What will be the criteria used by a food reserve facility to accumulate stocks, sell off stocks, and rely on domestic markets vs. external markets to procure or sell grain?
- g. How will CMA be able to overcome the problems of patronage and interference that plagued NAMBOARD and FRA?

By all accounts, Zambia's grain marketing system can be developed considerably to enable it to better achieve important social and economic development goals in Zambia. There is much room for improvement. Government action is clearly required to improve grain marketing performance. Public policy is a process of selecting among alternatives uses of scarce resources.

The following are a few alternatives for consideration of scarce state resources to address the grain marketing problems of small-scale farmers:

- a. Undertake a range of public investments that reduce the costs of marketing in smallholder areas. These include road investments, supporting the development of the transportation sector through reducing taxes on fuel,

imported spare parts, and capital equipment. Other improvements involve helping to rehabilitate the railway system and integrate it with operations in South Africa and Tanzania.

- b. Make a greater commitment to collecting and disseminating reliable grain market information in the country. The existing commitment to the Agricultural Marketing Information Centre is weak. The Ministry staff assigned to AMIC are frequently moved to other positions after being trained in the operation and management of the system, which impedes progress and requires extra donor resources to keep the system functioning. The development of a reliable and efficient market information system is an important role for government in a market-oriented economy.
- c. Avoid undertaking activities that erode traders' willingness to invest in the grain marketing system. Unless government policy changes to one in which it attempts to directly handle the bulk of smallholders' grain marketing services, then the private sector's capacity should be promoted. Government operations that compete with the private sector but do so in a way that artificially squeezes the spatial and temporal price spreads that they face are likely to erode the private sector's participation in markets. Most important in this context: Reduce the use of *ad-hoc* export restrictions, that make investment in holding grain stocks or investing in marketing facilities too risky to undertake. It is also important to avoid announcing Government plans to import commodities to meet food security needs and later announce a change in plans due to budget constraints.
- d. The limitation on the economically efficient use of fertilizer seems to be lack of knowledge and lack of credit. Can a new institution be developed within the Zambian situation that would offer a combination of credit and knowledge about profitable fertilizer use combined with the means to assure repayment?
- e. Many of the food supply problems appear to be due to the selection of inappropriate cropping patterns and practices. Would investment in selected research, extension projects designed to identify and promote improved cropping patterns and practices return more than comparable investment in the CMA? Public support of agricultural research and extension systems is required to generate more fertilizer-responsive varieties and more appropriate application recommendation domains would help to reduce the costs of grain production by smallholder farmers. This would help to overcome some of the marketing problems that make maize production (and fertilizer use on maize) unprofitable in some areas of Zambia (e.g., Donovan et al., 2002; Govereh et al., forthcoming).

These are only examples of relevant questions. Raising these questions does not represent an argument for or against the proposed CMA, only an argument for an informed policy decision.

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Appendix 1. Financial viability of exporting maize from major maize-producing districts, 1999/00 agricultural season

Province	District	Maize production (MT)			Sales (MT)	Purchases (MT)	Net sales (MT)
		1999/00	2000/01	Output increase			
		(1)	(2)	(3)	(4)	(5)	(6)
Maize net selling districts		575,300	456,800	-21%	188,400	50,500	137,100
Central	Chibombo	43,800	34,100	-22%	22,000	4,000	17,900
	Kabwe Urban	3,900	2,500	-36%	900	300	600
	Kapiri Mposhi	13,000	7,100	-45%	4,200	1,600	2,600
	Mkushi	10,100	8,800	-13%	5,400	1,600	3,800
	Mumbwa	30,400	22,300	-27%	13,000	2,100	10,900
	Serenje	9,000	11,500	28%	2,800	1,200	1,500
Copperbelt		1,600	1,200	-25%	700	400	400
	Chililabombwe						
	Chingola	3,600	3,000	-17%	3,000	200	2,800
	Kalulushi	2,600	2,300	-12%	1,500	300	1,200
	Kitwe	1,000	700	-30%	600	400	200
	Luanshya	3,100	2,600	-16%	1,700	100	1,700
	Lufwanyama	10,800	6,000	-44%	4,000	1,000	3,000
	Masaiti	14,200	6,400	-55%	2,200	2,000	200
	Mpongwe	9,500	4,600	-52%	3,700	400	3,300
	Mufulira	900	800	-11%	400	400	100
Eastern	Chipata	66,800	41,700	-38%	8,600	4,400	4,200
	Katete	47,800	36,700	-23%	5,200	2,700	2,600
	Petauke	60,800	45,500	-25%	22,500	3,400	19,100
Luapula	Milenge	1,800	1,600	-11%	1,000	300	700
Lusaka	Chongwe	12,400	8,700	-30%	3,400	2,100	1,300
	Kafue	8,400	8,300	-1%	3,500	1,000	2,500
Northern	Kasama	4,500	2,300	-49%	1,800	400	1,400
	Mbala	10,200	12,300	21%	4,400	1,000	3,400
	Mpika	9,600	6,200	-35%	2,700	900	1,800
	Nakonde	3,300	2,500	-24%	1,100	400	700
Northwestern	Kasempa	7,000	3,800	-46%	2,100	200	1,900
	Mufumbwe	1,200	800	-33%	300	200	200
	Mwinilunga	1,700	2,600	53%	1,900	800	1,000
Southern	Choma	41,900	43,700	4%	14,400	3,900	10,500
	Kalomo	45,200	31,000	-31%	21,200	4,500	15,600
	Mazabuka	40,600	44,900	11%	16,100	3,000	13,100
	Monze	36,100	30,300	-16%	7,200	3,800	3,400
	Namwala	18,500	20,000	8%	4,900	1,500	3,500
Maize producing and self-sufficient districts		56,500	31,100	-45%	5,100	2,900	2,200
Eastern	Chadiza	22,000	13,000	-41%	1,900	1,000	1,000
	Mambwe	13,100	7,700	-41%	1,000	700	200
	Nyimba	21,400	10,400	-51%	2,200	1,200	1,000

Source: Authors' computations using post-harvest survey data, 1999/00, Central Statistical Office, Lusaka.

Appendix 2. Financial viability of exporting maize from districts that are either net buyers of maize or maize low-producing low-consuming, 1999/00 agricultural season

Province	District	Maize production (MT)			Sales (MT)	Purchases (MT)	Net sales (MT)
		1999/00	2000/01	Output increase (%)			
		(1)	(2)	(3)	(4)	(5)	(6)
Maize net buying districts		37,200	52,800	42%	4,000	13,400	-9,500
Northwestern	Zambezi	1,200	1,500	25%	200	800	-600
Southern	Gwembe	2,100	3,300	57%	100	600	-500
	Itezhi-tezhi	3,400	2,600	-24%	500	900	-400
	Kazungula	10,400	1,700	-84%	1,200	2,000	-800
	Livingstone	700	500	-29%	200	300	-200
	Siavonga	4,000	3,200	-20%	200	600	-400
	Sinazongwe	4,600	5,800	26%	500	1,900	-1,400
Western	Kalabo	3,400	1,800	-47%	900	1,900	-1,000
	Mongu	7,400	32,400	338%	200	4,400	-4,200
Maize low-producing, low-consuming districts		120,700	102,600	-15%	24,600	22,800	2,900
Eastern	Chama	10,800	8,600	-20%	700	100	700
	Lundazi	32,800	29,100	-11%	4,800	2,500	2,300
Luapula	Chienge	700	2300	229%	400	700	-300
	Kawambwa	3,100	2,900	-6%	1,600	1,400	200
	Mansa	2,000	1,800	-10%	900	600	300
	Mwense	2,800	2,200	-21%	500	700	-100
	Nchelenge	3,300	2,100	-36%	600	900	-300
	Samfya	900	1300	44%	400	1,500	-1,200
Lusaka	Luangwa	1,100	500	-55%	200	400	-300
Northern	Chilubi	100	200	100%	0	100	-100
	Chinsali	2,300	2,000	-13%	400	400	0
	Isoka	4,200	4,200	0%	900	700	200
	Kaputa	1,500	5,300	253%	600	1,300	-700
	Luwingu	2,000	1,200	-40%	600	100	500
	Mporokoso	2,100	2,400	14%	600	1,100	-500
	Mpulungu	1,300	1,000	-23%	600	400	200
	Mungwi	2,100	2,600	24%	1,200	400	700
Northwestern	Chavuma	400	500	25%	0	100	-100
	Kabompo	4,300	3,200	-26%	1,200	400	800
	Solwezi	6,700	6,400	-4%	1,200	2,100	300
Western	Kaoma	7,100	5,400	-24%	1,700	2,400	-700
	Lukulu	2,200	2,600	18%	900	1,100	-200
	Senanga	11,800	4,500	-62%	2,000	2,400	-400
	Sesheke	7,200	4,000	-44%	1,400	600	800
	Shangombo	7,900	6,300	-20%	1,200	400	800

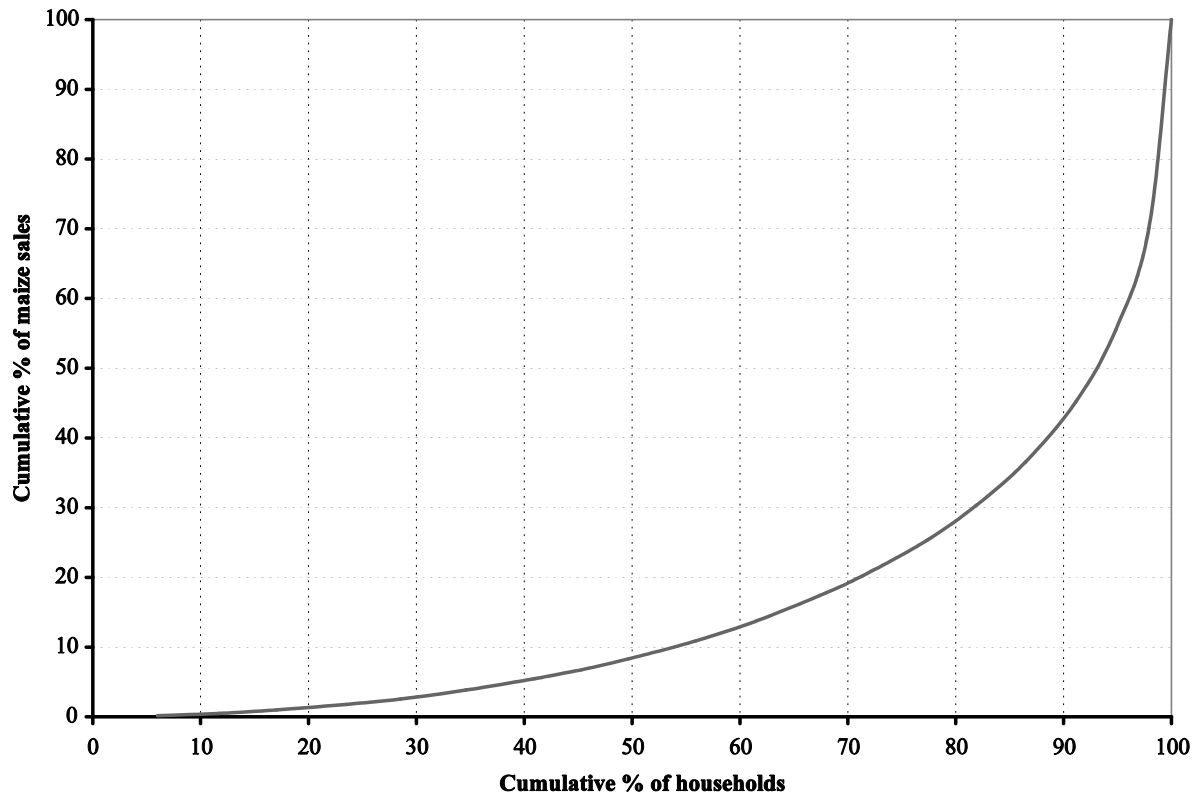
Source: authors' computations from Post Harvest Survey data, 1999/00, Central Statistical Office, Lusaka.

Appendix 3. Smallholder farmers buying and selling maize and mealie meal (as maize equivalent)

Province	Households that only sell and do not buy maize (%)	Households that sell more maize than they buy (%)	Households that buy more maize than they sell (%)	Households that only buy maize and who do not sell (%)	Households that neither buy nor sell maize (%)
Central	25.7	13.1	2.0	32.1	26.1
Copperbelt	25.7	20.9	5.5	34.4	13.3
Eastern	22.6	4.3	1.0	28.3	43.1
Luapula	10.4	2.9	1.2	39.1	46.4
Lusaka	23.4	10.7	2.3	50.7	10.4
Northern	16.2	2.8	0.8	26.6	53.3
Northwestern	22.1	6.7	3.2	26.0	40.7
Southern	24.6	6.9	2.8	42.3	22.4
Western	12.4	4.9	1.8	41.3	39.1
Zambia	19.3	6.0	1.8	33.8	38.5

Source: authors' computations from Post Harvest Survey data, 1999/00, Central Statistical Office, Lusaka.

Appendix 4. Concentration of smallholder maize sales among sellers, 1999/00 cropping season



Appendix 5. Relationship between household income and quantity of maize sold for maize-selling smallholders, 1999/00 cropping season

Province	Mean household income by quartile of maize sales				Overall mean
	25th	50th	75th	100th	
	-----US Dollars per household-----				
Central	255	397	493	1,004	588
Copperbelt	354	368	557	947	516
Eastern	272	374	398	979	423
Luapula	290	513	678	1,236	425
Lusaka	567	598	636	1,006	668
Northern	315	483	616	1,095	478
Northwestern	246	294	449	915	352
Southern	387	731	562	1,051	684
Western	264	370	563	897	385
Overall mean	305	433	512	1,014	499

Appendix 6. An additional note on problems and consequences of commodity price support

The consequences of a price support program depend upon the design of the program, especially on the means of supporting the price and the rules followed in selling or disposing of the purchased commodities, say maize, in Zambia.. If, for example, the CMA was mandated to pay support prices to farmers but to do it without cost to the Government budget, they could buy at higher than market prices would have been and break even by selling part of their acquired grain in international markets, limiting domestic market supplies enough to get prices high enough to support the subsidies. This would benefit the few farmer households receiving the higher prices but would cost the 40 % of smallholder households who are net maize buyers. Or the CMA, acting as an agent of the Government, could divert the necessary quantity of their supply to a program to feed poor people who would otherwise not buy the grain. That would require an agency to decide who would be designated as qualifying for “surplus” food and to find a way to insure that the grain did not get back into the regular market. Or the necessary quantity might be diverted to be use as animal feed. There are many variations on the programs that have been devised to support farm prices and incomes. Most of them end up as supply management programs or programs with losses paid for from the government or perhaps donors. In Zambia, any attempt to raise prices to smallholders would have to find a way to keep supplies from efficient commercial farmers from finding their way into the CMA system or it would become a price support benefitting mostly commercial farmers. The winners would be those getting the support prices and whoever ends up getting cheap food. The losers would be domestic consumers including the 40% or so of smallholders who are usually net maize buyers.

A particularly inequitable practice that has followed from some attempts to support prices, is for the marketing authority to sell its purchased grain exclusively to the large commercial millers. This pulls the marketed grain from the rural markets and diverts grain from urban retail markets reducing the whole grain available for processing by hammer mills. The result is to reduce the total quantity of maize meal, because of the difference in milling rates, and grain for home and local processing by rural net buyers. Poor urban and rural buyers of grain and meal share to costs of such programs along with the people contributing to Government revenues. Nutrition would suffer because of the lower nutritional value the meal compared with hammer milled meal.