Maize market reform in Zimbabwe

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A major constraint on the design and implementation of grain market liberalization throughout the world is governments' concerns with retaining enough influence over the evolving system to distribute prices and incomes to various groups in politically desired ways. This article considers the effects of alternative forms of maize market reform on various socioeconomic groups and the marketing board's operations in Zimbabwe. Based on results of a dual-market, spatial equilibrium model, partial and more complete reform create substantially different distributional effects. However, urban consumers and many rural smallholders would be better off with either consumers and many rural smallholders would be better off with either configuration of market reform consiprices. The full benefits of market reform require active government support for the development of private trade.

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The pace and extent of food policy reforms in Africa are likely to be circumscribed by uncertainty over their effects on important political and economic objectives. While governments may be increasingly aware of the costs of their grain policies in terms of budget deficits and food insecurity, they may nevertheless be reluctant to implement major changes without confidence in their ability to retain influence over supplies and prices and to protect vulnerable groups likely to be adversely affected by reform. These concerns put constraints on the design of market reform strategies.

Management of the reform process in Zimbabwe is proving to be difficult because of conflicting perceptions within the relevant ministries and at the highest levels of government concerning how the incipient private trading sector will respond to grain market reform. The slow pace of Zimbabwe's maize policy reform process – marked by very little change in the structure of the system even though the Structural Adjustment Programme is in its third year – is largely due to uncertainty about how the reforms should be designed and phased to develop viable informal markets without revoking the government's ability to retain influence over the system.[1]

This article estimates how deregulation of maize movement and pricing would affect regional producer and consumer prices, the Grain Marketing Board's (GMB) trading account, and national maize self-sufficiency. Results are based on a dual-market, spatial equilibrium model.[2] It appears that relaxation of movement controls on maize produced in smallholder areas causes changes in trade flows which result in lower maize meal prices in urban areas and higher producer prices in surplus smallholder areas near urban centres. Gross farm incomes in surplus smallholder areas would rise while grain prices in food-deficit areas would fall, thus promoting food security. While GMB intake from smallholder areas would decline moderately, demand for GMB maize would also decline, resulting in a slight increase in exportable surplus. The GMB's domestic trading losses would fall moderately due to a shift in the relative proportion of intake from high-cost smallholder areas to lower-cost commercial areas.

If pan-territorial pricing is eliminated in favour of unregulated prices, and movement decontrol is extended to commercial farmers as well, the results are substantially different: the commercial sector, because of lower transport costs to urban centres, generally replaces smallholder areas in fulfilling urban demand. Producer prices rise in commercial

[1]The design of the reform programme is further complicated by concerns over its potential distributional effects. Zimbabwe's farming system is bimodal, with about 900 000 African smallholders and 4000 large-scale 'commercial' farmers, mainly of

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tion, removal of subsidies, especially on fertilizers, and slowdown in the expansion of the estate subsector while trying to provide funding to improve access of smallholders to medium- and long-term credit. Economywide policy reforms have emphasized reduced public spending and a reduction in the size of the civil service, exchange rate adjustment to ensure competitiveness, restrained credit and rationalized interest rates, tax breaks and tax increases where necessary, and efforts to ensure the profitability of parastatal bodies. Some of these reforms have supposedly been carried out for more than 10 years but, as noted above, the economy is still largely dependent on foreign financing so that achieving the government's objectives has not proved simple.

farming areas and decline in most high-productivity smallholder areas, except those close to urban centres and along export routes. These findings are consistent with existing perceptions that, due to their proximity to major consumption centres, commercial farmers stand the most to gain from movement decontrol.[3] However, the results suggest that total movement deregulation and regionally differentiated pricing at GMB depots would improve its domestic trading account. Moreover, the GMB would generate substantially larger national maize surpluses due to a supply response in commercial and favourably located smallholder areas. Reform may thus offer an important benefit in the current environment of dwindling national maize supplies.

In the long run Zimbabwe's food price dilemma may be relieved by new farm technology, resettlement and/or the successful generation of employment and income growth. However, these gains do not appear to be on the immediate horizon, especially in Zimbabwe's semi-arid areas where the majority of smallholders live. In the short and medium run, efforts to reduce marketing costs, through development of competitive food distribution and milling systems, may simultaneously raise producer prices and reduce consumer prices.

Zimbabwe's maize marketing system

Zimbabwe's grain marketing system facilitates a number of important and often unrecognized transfers of income between groups. These income transfers occur through explicit subsidies, but often more importantly through regulations and policies inherent in the organization of the marketing system.

Market organization, uniform pricing and movement controls

To ensure a consistent flow of maize meal to urban consumers, the Zimbabwe government has influenced prices and distribution through a highly controlled system, featuring centralized storage and milling facilities. The system is dominated by a single-channel, one-way marketing system, providing preferential access to selected buyers and impeding the development of alternative marketing channels. Private maize trading within smallholder areas was never banned, but is nevertheless circumscribed by government controls on maize movement, selective access to official maize supplies, and subsidies within the official marketing system that squeeze the margins within which informal traders can operate profitably.[4]

These regulations create a situation in which the choice of market channel at the farmer–first handler level largely predetermines the subsequent flow and accessibility of grain at subsequent stages in the marketing system. It is not surprising that less than 2% of GMB's total maize intake since 1980 has been sold to end consumers or private traders. Large urban millers, stockfeeders and brewers have accounted for 77%, 8% and 6% of GMB sales respectively since 1980. The remainder has been used for food aid purposes. Stocks at GMB depots in town centres throughout the country normally have little effect on access to grain in distant rural areas.

The GMB's uniform pricing policy is essentially a policy of income transfers. The GMB's pan-territorial and pan-seasonal buying and selling prices offer subsidized storage and transport services to selective purchasers. By holding selling prices constant throughout the year and

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European descent, controlling 60% and 35% of the country's cultivated land, respectively; see William Masters, *Maize Market Reform in Zimbabwe: Optimal Intervention During and After Liberalization*, Food Research Institute Studies, Stanford, CA, forthcoming.

[2]This model is reported in T. Jayne and E. Nuppenau, 'Maize movement and pricing decontrol in Zimbabwe', in A. Valdés and K. Muir-Leresche, eds, *Agricultural Policy Reforms and Regional Market Integration*, International Food Policy Research Institute, Washington, DC, 1993.

[3]Grain Marketing Board, *Response from the Management of the Grain Marketing Board to the Economic Structural Adjustment Program*, Planning Unit, GMB, Harare, 1991.

[4]T.S. Jayne and M. Chisvo, 'Unravelling Zimbabwe's food insecurity paradox: implications for grain market reform in Southern Africa', *Food Policy*, Vol 16, No 4, August 1991, pp 319–329.

regardless of location, the GMB cross-subsidizes buyers later in the marketing year by taxing buyers early in the year, and cross-subsidizes buyers in deficit areas distant from production centres by taxing buyers relatively close to production centres. The ability of the GMB to practise pan-territorial and pan-seasonal pricing requires corresponding policies that control the private movement of maize.[5]

Movement controls, the milling sector and urban food security

Movement decontrol would also present serious implications for the maize milling industry. Currently, urban 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 millers.

Informal maize millers, by contrast, are restricted from procuring grain to mill in urban areas, because the GMB has in practice reserved its grain for the large industrial buyers, and because movement controls prevent informal traders from legally transporting grain into urban areas. As a result the government has conferred a *de facto* monopoly upon industrial millers, even though their margins are two to three times higher than those of small-scale millers.[6]

Lacking any threat of competition from informal millers, the industrial millers, whether by choice or circumstance, are able to operate a higher cost system without losing market share. While available data indicate that maize meal could be sold through informal channels for 10–15% less than the cost of industrial roller meal,[7] this option is blocked by policy to the majority of low-income consumers. 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.[8]

Major problems of the grain marketing system

Regulations block grain from moving directly between surplus and deficit rural areas. As a result, most surplus grain production is channelled into the GMB/urban commercial milling system. This creates a circuitous rural–urban flow of grain through a high-cost milling system in order to meet rural demand. The system perpetuates a wasteful use of transport and artificially high consumer prices, exacerbating food insecurity.

The unidirectional GMB system, while providing clear benefits to remote, surplus producers, cannot cost-effectively distribute grain to geographically dispersed and remote areas. Underdeveloped informal trading networks create a situation in which GMB stocks in town centres are largely inaccessible to consumers in remote rural areas.

Because grain cannot be transported informally from surplus to non-contiguous deficit rural areas, the system places increased emphasis on the industrial milling system to meet rural demand during drought years. This transfers income from grain purchasers and rural small-scale millers (along with any multiplier and employment effects) to urban

[5]While this paper does not explicitly deal with pan-seasonal pricing, it should be noted that the relaxation of maize movement without modification of GMB pan-seasonal pricing would create incentives for producers and millers to contract directly for early season deliveries, before storage costs bid the wholesale market price above the GMB selling price. Later in the season industrial buyers switch and attempt to buy from the GMB at its uniform selling price. With the loss of sales early in the year, when storage costs are low, the GMB would no longer be able to cross-subsidize buyers later in the year. In this environment it is doubtful that, without allowing spatial and temporal differentiation in its pricing, the GMB could continue to perform the politically crucial functions of national security stockpiling and price stabilization. Nor is it clear that these tasks could be immediately assumed by the private sector.

[6]T.S. Jayne and Lawrence Rubey, 'Maize market reform and urban food security: the case of Zimbabwe', *World Development*, forthcoming.

[7]Lawrence Rubey, 'Constraints to small-scale grain milling in the urban areas of Zimbabwe', consultant's report to USAID/Zimbabwe, Harare, 1992.

[8]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, evidence of demand for maize meal from informal mills is indicated from two recent consumer surveys in peri-urban areas of Harare and Chitungwiza: T.S. Jayne, M. Rukuni, M. Hajek, G. Sithole, and G. Mudimu, 'Structural adjustment and food security in Zimbabwe: strategies to maintain access to maize by low income groups during maize market restructuring', in J. Wyckoff and M. Rukuni, eds, *Toward an Integrated National Food Policy Statement*, Proceedings of the 2nd National Consultation Workshop, Department of Agricultural Economics and Extension, University of Zimbabwe, Harare, 1991; Rubey, *op cit*, Ref 7. These surveys indicate that whole meal (*mugayiwa*) would account for about 20–30% of the maize meal market, after taking into account its cost discount. These surveys also indicate that a portion of urban consumers are already consuming whole meal from urban maize plots in and around urban areas as well as from illegal shipments of maize from rural areas.

industrial 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 smallholder areas.

The share of the maize meal price accruing to producers has declined over the past decade. The producer received 44% of the full cost of roller meal (including subsidies) in 1991–92 compared with an average of more than 50% during the early and mid-1980s. Therefore social functions that inflate GMB margins at a time when subsidies are to be cut must come at the expense of lower real producer prices or higher real consumer prices, or both. Over the past decade the goverment has chosen to extract the cost of these social functions out of the producer price,[9] contributing to an erosion of the national maize production base. Commercial maize area is declining at an annual rate of 18 000 ha a year (ie 90 000 tons a year, given average yields). Meanwhile, smallholder maize sales to the GMB peaked in 1985/86.

The system encourages a pattern of regional self-sufficiency in grain production inconsistent with comparative advantage and income growth in the semi-arid areas.

Low-income urban consumers pay artificially high prices for maize meal due to controls on grain movement and resale which restrict informal traders' and millers' access to grain. Considering that urban unemployment levels currently stand at 30%, artificially high prices of the most important staple food in the Zimbabwean diet erode household food security among the poor. A subsidy on straight-run meal or support for informal millers would be self-targeting.

Perhaps the greatest difficulty with the present organization of the marketing system is that it is increasingly unsustainable. Without changes in pricing and market regulations, the GMB has two options: incur major budgetary losses, or widen the GMB margin to cover costs and lose market share on its profitable trading routes. A further widening of the GMB margin by 30–40% to eliminate subsidies will create additional incentives for private trade to contravene existing market regulations. The inability of most developing countries to suppress illegal informal trade when state regulations are no longer compatible with producer or consumer interests suggests that the existing system is becoming increasingly unsustainable. Apart from the desirability of market reforms, changes will become imperative in an environment of GMB subsidy reduction.

Modelling trade flows in a dual marketing system

The foregoing suggests that quantitative estimates of the impact of maize marketing reforms will require a model that captures interactions between the official and informal maize marketing systems. The results reported here are based on Roemer's market segmentation model,[10] expanded into a regional spatial equilibrium context by Jayne and Nuppenau.[11] The model is used first to examine official and parallel market trade flows, price levels and the GMB trading account under the current set of policy restrictions on grain movement and prices. The results from this base case (Scenario 1) are compared against those from two alternative scenarios: allowing private grain trade from smallholder to urban and commercial areas (Scenario 2), and allowing for free grain trade between all regions at equilibrium-determined prices (Scenario 3).

[9]Jayne and Chisvo, *op cit*, Ref 4.
[10]M. Roemer, 'Simple analytics of segmented markets: what case for liberalization', *World Development*, Vol 14, No 3, 1986, pp 429–439.
[11]*Op cit*, ref 2.

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Table 1. Estimates of maize trade flows and distributional effects resulting from selected policy reforms: normal weather scenario.

	GMB intake ('000 mt)			GMB sales to commercial millers for maize meal ('000 mt)				Smallholder maize sales ('000 mt)		Distributional effects relative to Scenario 1 on			
Scenario	Commercial farmers	Smallholders	Total	Urban	Rural	Total	Net GMB surplus ('000 mt)[a]	Informally traded and milled	Total (GMB + informal)	Urban consumers	Commercial farmers	Surplus smallholder areas	Deficit smallholder areas
1	493	576	1069	456	121	577	252	108	684	na	na	na	na
2	481	510	991	375	114	489	262	283	793	+	0	+	0
3	668	549	1217	275	113	388	539	174	723	+	+	+/−[b]	0

na : not applicable. [a]Calculated after subtracting demand for GMB maize from stockfeeders, brewers and drought relief (assumed constant at 240 000 mt).
[b]Depends on location; smallholders closer to urban areas will receive higher farm incomes while selected remote areas receive lower producer prices.
Scenario 1: the existing case of grain movement restrictions and pan-territorial prices on state-traded maize.
Scenario 2: relaxation of maize movement restrictions on smallholder maize, while maintaining pan-territorial producer and maize meal prices.
Scenario 3: full relaxation of maize movement on commercial and smallholder maize, and introduction of spatially differentiated prices according to supply and demand conditions.

The GMB may still maintain a role in Scenario 3 by buying and selling at market-determined prices. External trade is assumed to remain in the hands of the state in each scenario.

The model is essentially structured as follows: Maize supply functions are estimated econometrically for each producing region (13 smallholder areas and five commercial areas). The GMB producer price, chosen exogenously in Scenarios 1 and 2, determines GMB intake and influences the supply of grain in informal markets. The informal price, which is derived from local supply and demand conditions in each smallholder area, is nevertheless influenced by government pricing decisions in the official market. The government-determined price of industrial maize meal serves as a ceiling price in the informal market in Scenarios 1 and 2, but becomes unregulated (endogenous) in Scenario 3. When movement restrictions are in force, each region is in autarky, except for the movement of industrially milled meal to meet demand in deficit regions. When movement restrictions are relaxed, the model is similar to standard trade models where excess supply and demand curves are determined from the supply and demand curves in the respective regions. Excess supply and demand determine a unique informal price in each region, which is modified by relevant transport and processing costs. Sensitivity analysis on these margins is possible to examine the robustness of trade flows and prices to various assumptions about the competitiveness and efficiency of the informal market. Finally, by aggregating across regions, national supply to the GMB and sales of industrially milled meal can be derived. The residual, after adjusting for milling extraction rates and demand for GMB grain from stockfeeders and brewers (which is a relatively small part of the market and treated as a constant), is national surplus, ie end stocks plus net exports.

The impact of movement decontrol

In a model of the impacts of partial and full decontrol Jayne and Nuppenau found that full decontrol would benefit urban consumers and commercial producers whilst partial decontrol would benefit urban consumers less but have a positive impact on smallholder farmers.[12] The results are presented in Table 1.

Scenario 2

Decontrol of maize movement in smallholder areas and between

[12] *Ibid.*

smallholder and urban areas would result in low-income urban consumers paying lower prices for maize meal and cause an estimated 29% decline in total demand for industrial maize meal as consumption shifts to informally milled maize. The bulk of sales would still be in the form of industrial meal because it is preferred by most middle- and high-income consumers. Lower milling costs in urban areas are passed on to smallholder areas near urban centres in the form of higher producer prices. Because more urban demand requirements would be met through lower-cost informal channels, demand for industrial meal, and indirectly GMB maize, would decline.

Informal producer prices in most of the drier smallholder areas would rise moderately, as these areas would also experience increased demand from urban centres. Since the price of industrial maize meal serves as a ceiling on acquisition prices in informal markets, there is little or no change in the marginal price of grain for consumers. Furthermore, this scenario is estimated to reduce the GMB domestic transport and handling costs by 13%.

Scenario 3

The relaxation of all controls on maize movement into urban areas would substantially increase consumption of informally milled meal in urban areas. This meal is estimated to be about 20% cheaper than industrial roller meal (1991/92 prices). However, the major source of these supplies would be nearby commercial farms. The higher producer prices in commercial farming areas induce a supply response which increases total maize sales from this sector while total smallholder sales decline. The GMB's net surplus (intake minus sales) rises.

The bulk of urban maize meal consumption is still processed by the industrial millers due to preferences for the more refined meal among the majority of urbanites. Thus the industrial and informal milling sectors may be viewed as complements rather than substitutes for one another. Each sector appears to fill specific niches in the maize meal market.

Due to the potential for the lower-cost informal milling system to operate in urban areas, lower marketing costs are passed on to both urban consumers with a preference for informal meal and smallholders in surplus areas close to these urban centres who receive higher producer prices. However, producer prices fall in several high-productivity smallholder areas due to increased competition from commercial farmers.

Relatively little trade takes place from surplus to deficit smallholder areas. This is because of relatively high transport costs and poor road infrastructure linking smallholder areas to one another. Intra-rural commerce must often follow a 'V-shaped' pattern requiring transport into towns in order to go back out to nearby rural areas. The results suggest that improved road infrastructure may be necessary to exploit potential gains from trade among smallholder areas.

Because of generally lower consumer prices, national maize consumption would rise, relative to the existing controlled system. Higher prices in major surplus-producing smallholder regions and commercial farming areas result in greater supply. Lower marketing margins (from both more direct transport routes and a shift to lower-cost informal millers) may therefore stimulate national maize supplies without adversely affecting most consumer prices and household food security. Consumer

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prices for maize meal do rise, however, by up to 12% in selected grain-deficit smallholder areas. This would have an adverse effect on food security in these areas.

Conclusions and policy implications

The preliminary results presented in Table 1 support the conclusion that movement restrictions on maize are one of the most important income transfers in the organization of the grain marketing system. This restricts the supply of low-cost maize meal in urban areas, impedes private maize trade between surplus and deficit areas and induces a circuitous, transport-intensive and high-cost flow of national grain supplies. Furthermore, movement restrictions tend to force marketed grain surpluses in both commercial and smallholder areas into the GMB system, which consequently confines grain access mainly to the large industrial buyers. The combination of superfluous transport costs and relatively high milling margins of urban millers results in inflated prices for staple maize meal, especially in urban areas. This appears to be a major cause of food insecurity and loss of real income among grain purchasers.

Relaxation of movement controls would probably result in substantial trade between surplus smallholder areas and urban centres. Smallholders close to major urban centres would receive higher prices, while urban consumers with a preference for informally milled meal would pay lower food prices. Results also indicate that movement decontrol would also favourably affect the GMB's domestic trading account and increase national exportable surplus. Relatively little trade takes place between surplus and deficit rural areas. The existing weak road network results in high transport costs between most smallholder areas.

The major difference between movement decontrol of smallholder areas only versus full movement decontrol is that commercial farmers capture most of the benefits from full decontrol. Grain sales and incomes in surplus smallholder areas are appreciably lower in the latter case. Urban consumers would pay lower prices for maize meal in both scenarios.

The empirical results also pertain to a hypothetical system of competitive informal markets with the capacity to meet dramatic increases in volumes. The results therefore refer to *potential* gains to market reform. The ability to exploit this potential will require complementary government support for new entry and investment in private grain distribution, storage and milling. The nature and severity of other constraints to private investment not directly related to grain marketing policy must be identified and addressed if market reform is to result in market development.

Two independent surveys of rural and urban grain and meal traders indicate that government policy restrictions, ambiguous regulations and limited capital, transport and storage are major barriers to entry.[13] Shortage of working capital also hinders investment in vehicles and economies of scale in distribution. Inadequate foreign exchange allocations for engines has created long back orders of small-scale milling equipment.

A major implication of the foregoing is that the existing dominance of trade in maize meal rather than grain, while resulting in artificially high prices for consumers, overcomes constraints faced by traders. Many

[13]M. Chisvo, T.S. Jayne, J. Tefft, M. Weber and J. Shaffer, 'Traders' perceptions of constraints on informal grain marketing in Zimbabwe: implications for household food security and needed research', in M. Rukuni and J.B. Wyckoff, eds, *Market Reforms, Research Policy and Food Security in the SADCC Region*, Proceedings of the Sixth Annual Conference on Food Security Research in Southern Africa, November 1990, UZ/MSU Food Security Research Project, Department of Agricultural Economics and Extension, Harare, 1991; B.F. Kinsey, 'Private traders, government policies, food security and market performance in Zimbabwe', draft, International Food Policy Research Institute, Washington, DC, 1991.

traders have found commercial maize meal trading to be a convenient substitute for grain trading because (1) most commercial millers deliver their meal directly to traders' shops, even in rural areas, permitting them to earn a 9% mark-up (set by government) for simply stocking a product that is delivered to their doorstep; (2) many traders buy commercial meal on credit; (3) commercial meal is delivered monthly, relieving the trader of the risks and costs of storage; (4) the trader avoids the information and transaction costs of having to locate buyers within surplus areas and performing bulking functions that would be necessary with grain trading; and (5) the demand for commercial meal is guaranteed by controls on grain movement and by the extraction of grain out of rural areas by the GMB. The commercial maize meal distribution system thus eliminates critical transport, credit, storage and informational constraints that grain trading would present, entrenching incentives for traders to deal in commercial meal rather than grain. However, the system creates high costs to consumers.

The majority of traders engaged in assembly and wholesaling appears to be uncertain of the legality of grain trading.[14] While the ambiguity of trading regulations has not precluded the development of informal trade, such trade has been of lower volume and higher cost than would be the case if the rules were clear and the government took steps to actively support intra-rural trading activity.

These points suggest that policy reform, while necessary, is insufficient to induce the desired response by the private sector. Increased investment and new entry to develop rural grain markets requires active government support to relieve the transport, storage, credit and informational constraints associated with grain trading. Such government support could include:

- the allocation of foreign exchange for importation of small-scale milling equipment;
- promotion of local metal manufacturing industries that produce parts needed by small mills;
- removal of import restrictions and bureaucratic impediments associated with importing productive equipment and vehicles;
- assuring that grain is available for purchase at GMB depots by all individuals and/or businesses in any quantity above the current minimum of one bag; and
- allowing anyone to become a legitimate grain buyer or seller instead of requiring licences and prerequisites that restrict entry into grain trading.

These public investments and policy changes would be consistent with the Zimbabwe government's current initiatives to promote emergent small-scale businesses under the Indigenous Business Development programme. Once such milling and trading networks are in place to compete alongside the industrial milling sector, the costly subsidies on roller meal and super-refined meal could be removed, since low-income consumers would have access to lower-cost meal through informal channels.

[14]Chisvo *et al*, *op cit*, Ref 13.