

SOUTHERN AFRICA: FOOD SECURITY POLICY OPTIONS

Correct citation:

Mandivamba Rukuni and Richard H. Bernstein, eds. 1988. *Southern Africa: Food Security Policy Options*. Proceedings of the Third Annual Conference on Food Security Research in Southern Africa. 1-5 November, 1987. University of Zimbabwe/Michigan State University Food Security Research Project, Department of Agricultural Economics and Extension, Harare.

Library of Congress # HD9017.567

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ACKNOWLEDGEMENTS

This proceedings of the Third Annual Conference on Food Security Research in Southern Africa is the product of close cooperation between social scientists, technical scientists, government officers, and donor agencies in Southern Africa. The studies reported in the proceedings are part of a comparative analysis of food security in Sub-Saharan Africa that is directed by Michael Weber of Michigan State University's Department of Agricultural Economics. The UZ/MSU food security research programme is being carried out through a sub-contract with Michigan State University.

In the Ministry of Lands, Agriculture, and Rural Resettlement, we acknowledge the generous support provided by Sam Muchena and John Dhliwayo who are responsible for the close collaboration between the food security research project and the SADCC Food Security Technical and Administrative Unit--responsible for developing and managing SADCC's Food Security Programme. They have been particularly helpful in identifying relevant research themes that complement the SADCC programme.

The research supporting the preparation the proceedings papers was financed by the U.S. Agency for International Development, Bureau of Science and Technology; Bureau for Africa; and the Southern Africa Regional Programme; under a *Food Security in Africa* cooperative agreement (DAN-1190-A-00-4092-00) with the Department of Agricultural Economics, Michigan State University and a sub-contract with the Department of Agricultural Economics and Extension, University of Zimbabwe. We are grateful to the following present and former USAID officials for their support to the project's efforts to strengthen indigenous research capacity for food security policy research: Don Anderson, Curt Reintsma, Thomas Mehen, Calvin Martin, David Atwood, Ernesto Lucas, Michael Yates, Roy Stacy, Dale Pfeiffer, Pamela Hussey, and Janet Schulman. We are particularly appreciative of the support provided by Allison Herrick, Eric Witt and Joshua Mushauri of the Southern Africa Regional Programme, Harare.

We convey special thanks to Thembi Sibanda for an excellent job in organizing the Third Annual Conference, and to the many individuals who helped to make the conference a success: Murie Hutchison, Lovemore Nyabako, Maxwell Chiwashira, Samson Maguhudze, George Nyamatemba, Ronald Sagwete, Pete Hopkins, and Andrew Barnes.

We are especially indebted to Mrs. Corinne Smith for her patience, skill, and dedication in word processing the numerous drafts of the chapters included in this proceedings. Her persistence in mastering the word processing and laser printer technology has been exceptional.

Finally, we thank Chris Wolf and Elizabeth Bartilson for providing technical support for the laser printing technology used to print the proceedings.

**COMMUNAL MAIZE PRODUCTION,
STORAGE, AND MARKETING IN
ZIMBABWE: IMPLICATIONS FOR
POLICY MAKERS**

THE GROWTH OF SMALLHOLDER MAIZE PRODUCTION IN ZIMBABWE (1979-1985): IMPLICATIONS FOR FOOD SECURITY

D.D. Rohrbach¹

INTRODUCTION

In 1980, over 40% of the population of Sub-Saharan Africa suffered from calorie deficiencies, as indicated by consumption levels below 90% of FAO/WHO requirements. Consumption levels below 80% of FAO/WHO requirements threatened one-quarter of all Africans with stunted growth and serious health problems² (World Bank, 1986:17). Yet per capita food production further declined in two-thirds of the Sub-Saharan countries over the next five years (FAO, 1985a). African cereal grain imports increased to record levels (FAO, 1985b). By 1987, three-quarters of the countries in Sub-Saharan Africa required concessionary food aid. In the SADCC region, every country except Zimbabwe required net food imports (USDA, 1987).

Zimbabwe's recent cereal production record stands in sharp contrast to these African trends. Between 1979 and 1985, Zimbabwe registered an 80% increase in per capita cereal production². Production of maize, the country's basic staple which provides 70% of the cereal calories and 45% of all calories in the average Zimbabwe diet (FAO, 1984), more than doubled. By the end of 1986, Zimbabwe had amassed a record maize stock of almost 2 million mt-20% larger than the previous year's total domestic maize consumption. Although Zimbabwe initiated a large domestic food aid programme in response to widespread drought during the 1986-87 season, the country could still export 500,000 mt of maize to other countries in the region.

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²CSO (1985a) and CSO (1986b) provide two basic listings of Zimbabwe agricultural statistics employed herein.

Remarkably, smallholders contributed most of Zimbabwe's post-1979 maize production gains (Figure 1)³. During the 1970's, smallholder crop production was broadly characterized by low productivity and slow growth. Maize production, the smallholder sector's principal farm enterprise, was stagnant. Yields averaged one-seventh those obtained by the commercial farm sector (Figure 2). While planting two-thirds of the country's maize area, smallholders harvested only one-quarter of the total maize crop (Figure 3). Smallholder maize sales accounted for less than 5% of total deliveries to national markets (Figure 4). These farmers made up 95% of the producers, yet earned less than 10% of the agricultural income derived from crop and livestock sales through the marketing authorities (CSO, 1986b).

During the six years from 1979 to 1985, the smallholder maize subsector rapidly expanded. Maize production more than tripled as area increased by 90% and yields roughly doubled. By 1985, smallholders produced over one-half the country's maize supply. Sixty percent of the production gains were delivered to national markets. As a result, the smallholder contribution to Grain Marketing Board (GMB) intake rose to over one-third of total maize deliveries. These successes led the government to project a 7% annual growth rate in smallholder harvests over the 1986 to 1990 period (Zimbabwe Government, 1986).

This paper identifies why smallholder maize production and market sales increased so rapidly after 1979 and examines the implications of these gains for national food security (see Rohrbach 1987, 1988 for more details). The analysis is based on a review of aggregate smallholder production and market data and 13 months of farm-level survey work in two smallholder farming regions. One survey region, Mangwende, situated in Mashonaland East Province, was chosen to represent Zimbabwe's high-potential farming regions. The second region, Chibi, in Masvingo Province, was chosen to represent a maize producing region in the low-potential farming regions.

This paper first reviews the major factors underlying the smallholder maize production and market gains. Second, the relative response of smallholders to price, institutional, and technological interventions is assessed.

³In 1983, Zimbabwe's agricultural sector encompassed roughly 5,500 large-scale commercial farmers, 8,600 small-scale commercial farmers, and 800,000 communal or smallholder farmers (CSO, 1985a). By 1986, the nascent resettlement areas held approximately 31,600 farmers (MFEDP, 1986). Over 90% of Zimbabwe's maize is produced by large-scale commercial and communal farmers.

FIGURE 3 MAIZE AREA
1970-1986, ZIMBABWE

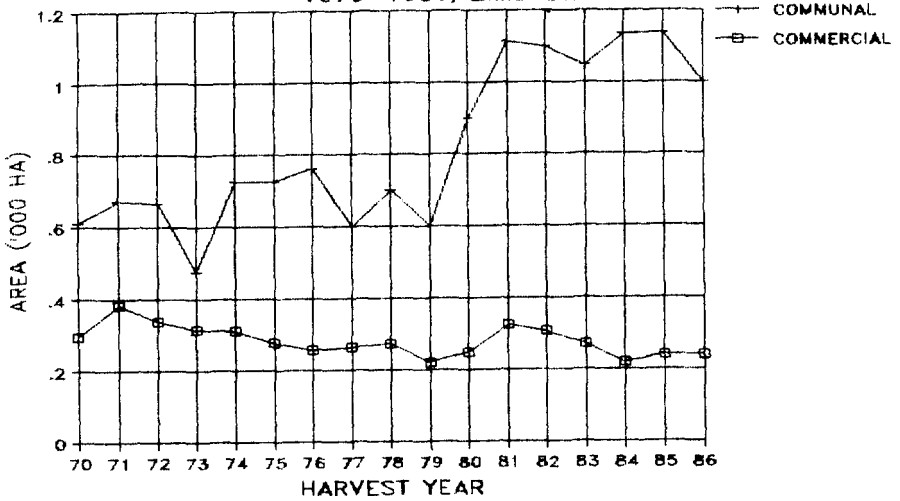


FIGURE 4. MAIZE SALES
1970-1986, ZIMBABWE

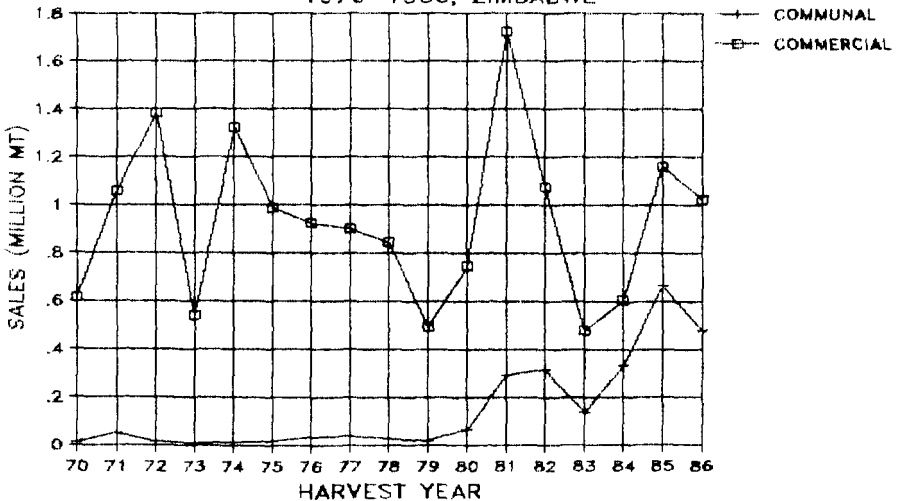


FIGURE 1. MAIZE PRODUCTION
1970-1986, ZIMBABWE

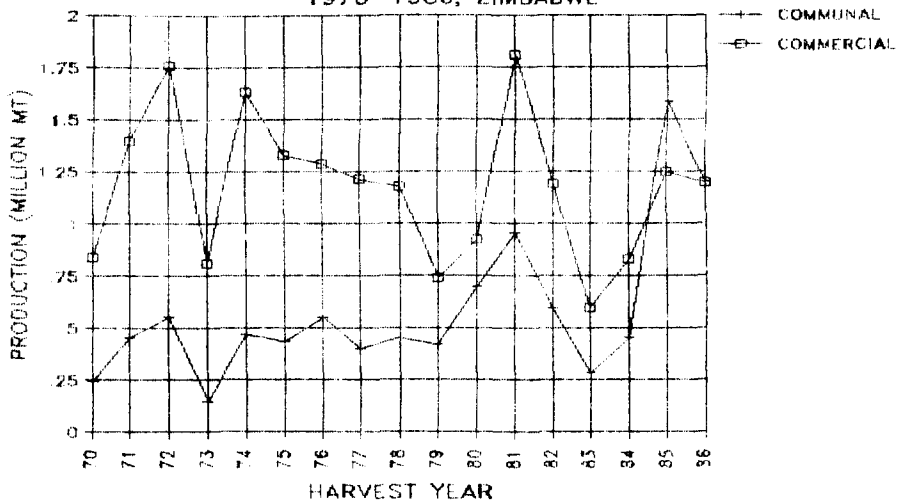
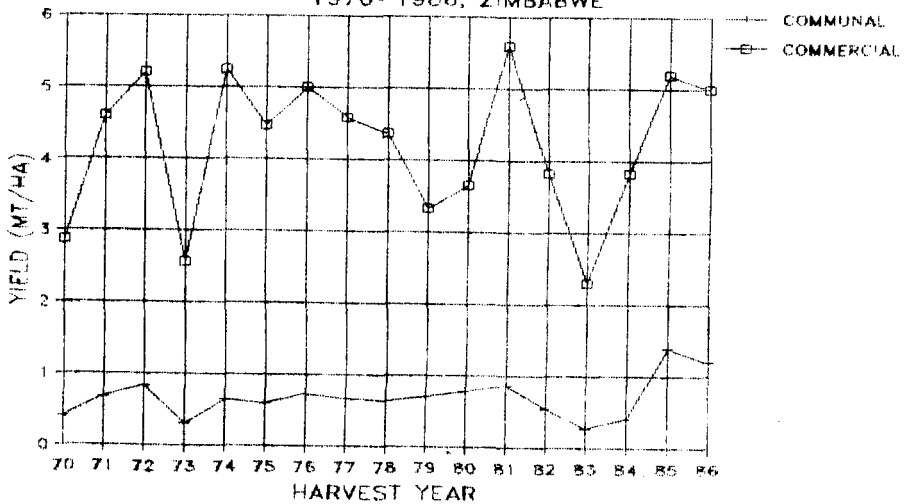


FIGURE 2. MAIZE YIELDS
1970-1986, ZIMBABWE



Third, the breadth of participation in the smallholder production and sales trends is examined and the principal characteristics distinguishing major participants are cited. Fourth, the constraints and opportunities for replicating these gains across alternative smallholder crops and across countries in the SADCC region are briefly noted. The discussion concludes with a comment on the implications of the growth in smallholder production for Zimbabwe's food security.

CAUSES OF SMALLHOLDER MAIZE PRODUCTION GROWTH

The growth of smallholder maize production between 1979 and 1985 can be largely attributed to five factors: the ending of the independence war, the expansion of product and input market infrastructure, the availability of a proven set of maize technologies, the establishment of a smallholder credit programme, and the sharp 1980 and 1981 increase in maize producer prices.

The ending of the war

The independence struggle in Zimbabwe widely disrupted smallholder agriculture, particularly during the mid-to-late 1970s. As violence in the rural areas escalated, agricultural support institutions provided to smallholders were destroyed or abandoned. Extension workers were withdrawn, dip tanks were razed, and isolated government buildings were demolished. More importantly, communal farmers abandoned distant fields, fewer new holdings were created, and many farmers left their holdings altogether. After independence, the government estimated up to one-third of the smallholder sector required resettlement. While survey data indicate this figure may be high, a substantial loss of production likely occurred. Aggregate estimates of communal production during this period do not fully reflect this loss, possibly because the extension workers responsible for making these estimates were withdrawn from many areas.

At the end of the war, the area in smallholder maize increased sharply. This resulted from both a sudden increase in the number of smallholder farmers and an expansion of the area planted by those who had continued farming during the war. Survey evidence from Mangwende and Chibi reveals many younger families took advantage of the peace to establish new holdings. Older households replanted abandoned fields and further expanded their holdings (Table 1). The area of all major crops, except bulrush millet, increased, but the largest gains occurred in maize area.

Expansion of market infrastructure

After independence, the limited input and product market infrastructure serving the smallholder sector rapidly expanded. Many shopkeepers in the communal areas began stocking seed, fertilizer, insecticide, and farm equipment. Stores based in urban centres established rural outlets. The fertiliser and agrochemical companies began promoting agricultural inputs with village based sales and demonstration trials. The growth of input markets was particularly strong in high-potential regions such as Mangwende.

The GMB was established in 1931 with sole responsibility for buying all major grain and oilseed crops sold beyond district borders. Until 1980, this institution concentrated its activities in the large farm sector. Thereafter, the GMB invested heavily in establishing depots and collection points in the smallholder farming areas (Table 2). Concurrently, private sector investors established GMB authorised approved buyer facilities and farm-to-market transport operations. Small shopkeepers registered with the GMB to purchase crops and smallholders, themselves, bought lorries. In Mangwende, for example, a GMB depot had been established in 1977, but the first approved buyer serving survey farmers set up operations in 1982. A series of collection points were established by the GMB in 1985. The number of locally based transporters serving survey respondents increased from two in 1980 to 18 in 1985. In Chibi, two GMB collection points were established in 1985. An approved buyer started operations in 1986. However, crop sales were insufficient to stimulate the establishment of locally based transport services.

The expansion of input markets reduced the cost of input transport and increased input availability. The expansion of product market facilities reduced farm-to-market transport costs, thus raising farm level prices. Together, these interventions increased the net returns to maize production and the incentive of producers to expand their maize hectareage. Greater quantities of inputs were purchased and many smallholder began selling maize on the national market for the first time. For example, the proportion of Mangwende farmers selling maize to the GMB increased from 22% in 1980 to 80% in 1985. In Chibi, 85% of the farmers selling crops to the GMB, made such sales for the first time 1985.

Table 1. Sources of increase in maize area in Mangwende and Chibi, 1974-1975 to 1985-86, Zimbabwe.

	Mangwende		Chibi	
	1975-1981	1981-86	1975-81	1981-86
Proportion of maize area gain resulting from:				
Increase in number of farmers (%)	71	40	86	69
Increase in area per existing farmer (%)	29	60	14	31

Source: Mangwende and Chibi survey.

Table 2. Expansion of GMB buying points, 1975-86, Zimbabwe.

	1975	1980	1981	1982	1983	1984	1985	1986
Total depots	32	34	37	41	43	44	45	51
Communal depots	1	3	6	10	12	13	14	20
Collection points	0	0	0	0	0	0	135	57

Source: GMB

The availability of improved technology

While the expansion of market infrastructure improved the economic returns to all major smallholder crops, only maize production increased significantly³. The historical development of improved maize production technologies gave this crop a competitive advantage over alternative smallholder enterprises. Before 1980, most agricultural research had been geared to the needs of the large-scale commercial sector. Yet, some results were also applicable to smallholders. Decades of breeding research produced hybrids adapted broadly to high and low-potential zones. Fertilizer trials provided recommendations roughly attuned to the agroecological conditions of the small farm sector, particularly the higher-rainfall regions.

Between 1979 and 1985, hybrid maize seed sales to the smallholder sector increased roughly fivefold (Table 3). By 1986, roughly 85% of the smallholder maize area was planted with hybrid seed. Smallholders increased their fertilizer purchases for maize by 400% (Table 3). Much of the sharp increase in 1980 input sales resulted from the distribution of free inputs under a one-year refugee resettlement programme. Thereafter, most of the sales gain can be attributed to the expansion of input market infrastructure, improved maize returns, and the establishment of a smallholder credit programme.

The establishment of a smallholder credit programme

Smallholders first gained access to government agricultural credit in 1958, although less than 1% of these farmers received loans. By 1962 only 4,000 short-term loans had been granted, most to small-scale commercial farmers (Johnson, 1964). In 1978, The Agricultural Finance Corporation (AFC), historically a major lending body for large-scale commercial farmers, established a major new small-farm credit programme. By 1985, roughly 10% of smallholders received loans. In the two survey regions covered by this investigation, credit provided the principal basis for fertilizer investments. In Mangwende almost three-quarters of all fertilizer purchased in 1986-87 was bought with credit, though only 37 of the region's farmers received loans. In Chibi, the 5% of the farmers receiving credit purchased almost 90% of the fertilizer applied. In both regions, all loans were granted for maize.

³Smallholder cotton production also increased sharply, though the increase in maize area was five times greater than that to cotton.

Table 3. Hybrid maize seed and fertilizer deliveries to the smallholder sector, 1974-85, Zimbabwe.

Cropping Season	Fertilizer Deliveries (mt)	Seed Deliveries (mt)
1974/75	24,000	2,350
1975/76	19,000	3,950
1976/77	20,000	2,700
1977/78	25,000	3,700
1978/79	25,000	4,250
1979/80	27,000	4,300
1980/81	90,000	9,650
1981/82	96,000	13,950
1982/83	98,000	16,900
1983/84	106,000	17,300
1984/85	127,664	19,500
1985/86	130,000 (est)	20,250 (est)

Source: Windmill (1987); Seed Cooperative (1987)

Producer prices

Between 1979 and 1981, the government increased the real producer price of maize by 80% (Figure 5). The ratio of the producer price to the price of maize fertilizer increased 50% (Figure 6). Maize producer prices doubled relative to consumer prices (Figure 6). After 1981, the real maize price and producer-to-consumer price ratio sharply declined. The maize-to-fertilizer price ratio fell more gradually.

Commercial farmers quickly responded to these price changes. Between 1979 and 1981, the commercial maize area increased by 50%; commercial production more than doubled. When real maize prices began to decline, commercial production similarly fell. Between 1981 and 1985, commercial maize area and production declined by 30%. In contrast, smallholder maize production and sales rose throughout the post-war period. Between 1981 and 1985, when real maize prices were falling, smallholder production increased by 60%.

FIGURE 5. REAL MAIZE PRICE INDEX
1971-1986, ZIMBABWE (1975=100)

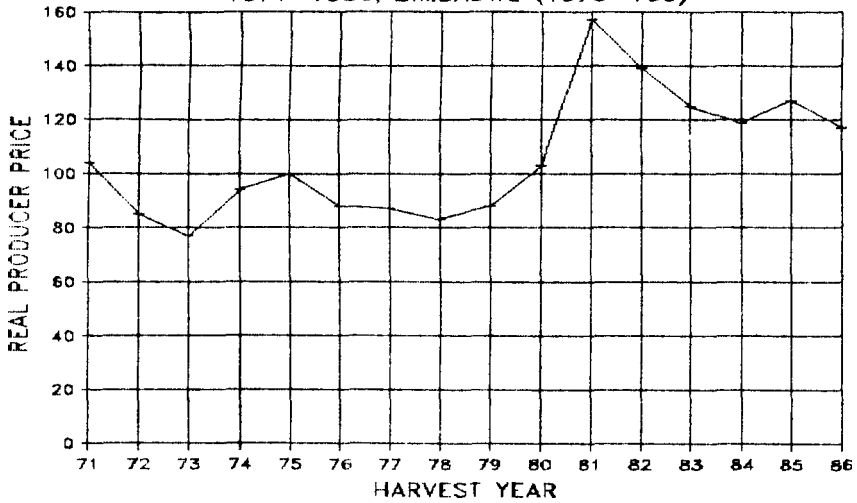
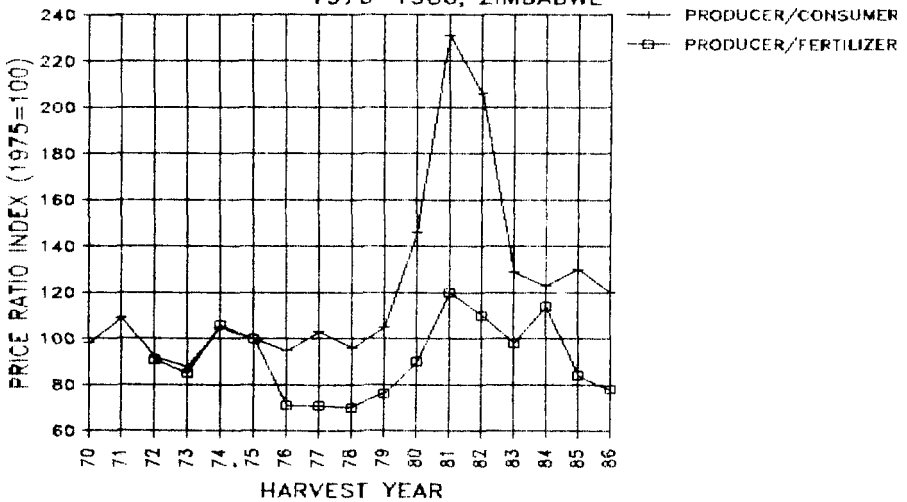


FIGURE 6. RELATIVE MAIZE PRICE INDEX
1970-1986, ZIMBABWE



Smallholder maize sales more than doubled. In both Mangwende and Chibi, the largest increase in market deliveries occurred after 1981. During this period, the expansion in smallholder access to national markets, improved availability of inputs, and growth of agricultural credit offset the impact of the decline in administered prices.

The 1979 to 1981 price gains provided a post-war stimulus to smallholder production. In high-rainfall Mangwende, these gains helped prompt the expansion of market infrastructure and promoted greater use of improved technologies. Yet, infrastructural and institutional changes may, ultimately, have had a much larger impact on producer decision making than the level of administered prices. Before 1980, smallholders remained largely unresponsive to input prices and fluctuations in government guaranteed producer prices. The post-war sales trends in the two survey regions are most closely correlated with the expansion in each area's market infrastructure.

PRICE INCENTIVES, TECHNICAL AND INSTITUTIONAL CHANGE

Theoretical models of supply response emphasize the importance of either price policy and market liberalization, or structural change encompassing the expansion of market infrastructure and improved technology. The World Bank stands prominently as a major advocate of price and market reforms. In a 1984 strategy statement for Africa, the Bank cited price distortions and market inefficiency as the major constraints to agricultural production (World Bank, 1984). The Bank argued for removing administrative controls on input and product prices, encouraging greater private sector involvement in agricultural markets, and the more "businesslike" operation of parastatals. These prescriptions assume the short-run elasticity of aggregate agricultural production is high and technological and infrastructural constraints are not immediately limiting.

Advocates of institutional and technological change (eg., Eicher, 1982, 1986; Delgado and Mellor, 1984) argue that aggregate supply is relatively inelastic. This perspective emphasizes the constraints embodied in limited market infrastructure, the lack of improved location-specific technology, low levels of human capital, and poor institutional management. Adjustments in producer prices will not substantially affect production levels without the removal of these constraints. Relative prices are still viewed as important. However, the effectiveness of price incentives depends on their incidence at the farm level and the capacity of farmers to respond. Without institutional and technological reforms, the impact of price policy will be limited. However, institutional and technological reforms on their own can have a potentially large impact on smallholder production.

Zimbabwe gained independence with a relatively efficient set of market institutions. Maize prices had historically fluctuated between import and export parity. GMB storage losses were less than 1%. The large-scale commercial sector's response to market incentives was strong. In contrast, the responsiveness of small farmers was strikingly weak. The principal reason for this disparity was the concentration of most public sector support in favor of large farmers. Credit, research, and market institutions had largely been built to serve the commercial sector. Major increases in smallholder productivity did not occur until the early 1980s when these institutions and infrastructure were expanded to serve small farmers.

Before 1980, the main smallholder cropping strategy was to produce enough food for family consumption while seeking off-farm employment for cash income. Some farmers adopted improved technologies such as hybrid seed and fertilizer to increase their labour productivity and food supplies. However, they did not invest extensively to produce a maize surplus. Over the 1980 to 1985 period, the smallholder's strategy changed. Following the war, the producer price increase and refugee relief programmes stimulated greater interest in participation in the national market. Yet, longer term production gains can be primarily attributed to infrastructural and institutional improvements. These fostered continuing increases in maize production when the refugee relief programmes had ended and real producer prices had declined.

The largest increases in production occurred in regions where location-specific maize production technologies yielded the highest returns. While higher producer prices and the expansion of market infrastructure improved farm-level prices of most smallholder crops, the largest increases in area and input investment occurred in maize; the crop for which profitable new technologies were readily available. In effect, producer prices offered a necessary, though insufficient means to promote smallholder maize production. Institutional and technological changes were required to make the producer price adjustments effective.

The post-1980 decline in world maize prices now limits Zimbabwe's ability to export grain. The smallholder maize production experience shows that further growth in market deliveries can be stimulated through a variety of non-price interventions. If real prices continue declining, smallholders will still expand their maize production--if provided with additional improvements in production technologies, reductions in transport costs, and improved market access.

DISTRIBUTION OF SMALLHOLDER PRODUCTION GAINS

Data showing the provincial distribution of smallholder maize plantings indicate that small farmers throughout the country have participated in the expansion of maize production--the principal crop grown by roughly 80% of Zimbabwe's smallholders. Extension workers have estimated that maize area gains were registered in every province. These were distributed roughly according to population levels, except in Matabeleland which experienced smaller gains.

Differential levels of participation become evident in the examination of provincial data for maize yields. While yields have increased throughout the country, the largest gains occurred in the higher-rainfall zones. This difference resulted, in part, because the improved maize technologies (particularly fertilizer) were better suited to the higher-rainfall zones. In addition, the survey data reveals a large disparity in institutional support for the high and low-rainfall regions.

The first GMB depot was established in Mangwende in 1977. By 1985, Mangwende survey respondents had gained three approved buyers, a collection point, and a rapidly expanding transport system. Two cooperatives purchased crops between 1981 and 1984, but found they could not compete with the services provided by other buyers. Market operations were relatively efficient. By 1986, 67% of the farmers had participated in AFC credit programmes and 60% had received help from extension agents. Survey farmers could purchase fertilizer from at least five local suppliers and from sales agents of fertilizer companies.

By contrast, Chibi farmers did not have a locally based GMB depot. In 1985, the GMB established two collection points in the region. However, there are still no locally based truckers. By 1986, only 5% of farmers had received credit and only 27% received extension assistance. Only one local retail outlet stocked fertilizer. The differential level and evolution of institutional support in Mangwende and Chibi reinforced initial differences in agroecological potential.

The advantages of high-potential zones are reflected in the regional distribution of growth in maize sales. The one-quarter of the smallholder population based in high-rainfall regions (Natural Region II) accounts for almost 60% of smallholder maize sales when rains are good throughout the country (e.g., 1984-85). When rains are poor (e.g., 1983-84), these farmers account for over 80% of smallholder maize sales.

The survey data reveal that the concentration of maize production and sales within each agroecological zone is as large, if not larger, than that between the different regions. In both Mangwende and Chibi, the top 20%

of producers harvest at least 50% of each region's maize and market at least 55% of all maize sold (Tables 4 and 5). The bottom 40% of Mangwende and Chibi farmers harvest 6-12% of each region's maize. Despite favorable rainfall in Mangwende, 12-24% of these farmers are net maize purchasers.⁴ In Chibi, 24% of households are net maize purchasers in good years and 60% stated their need to purchase maize following the 1985-86 drought-affected season.

The combination of aggregate and regional survey information provides a basis for estimating the distribution of maize production and sales across the smallholder sector. The data suggest the top 10% of smallholder producers, concentrated in the nation's high-potential zones, are responsible for over 50% of smallholder maize production and three-quarters of smallholder maize sales. The concentration of production and sales increases in drought years.

These observations indicate that producers facing the smallest food security risks are the greatest beneficiaries of government policy changes and infrastructural investments designed to promote smallholder production. Producers facing frequent or consistent production shortfalls have benefited least. The majority of smallholders still face basic food security constraints. To improve the circumstances of these poorer producers, the government must target future assistance strategies toward resolving the unique constraints facing these farmers.

SMALLHOLDER INVESTMENT PRIORITIES

The reason for the disparity between the top 20% and bottom 40% of producers in each region merits further investigation. Several relationships in the Mangwende and Chibi data suggest these differences are not simply the result of a concentration of resource ownership. Rather, the most productive farmers in each region have explicitly decided to make greater investments in the maize enterprise.

As the war ended, smallholders throughout Zimbabwe expanded their maize area. Many of the largest producers in 1985 had expanded their plantings the most. Part of this gain resulted from reclaiming fields abandoned during the war. These farmers also sought additional allocations from lands previously designated as grazing areas (land in the smallholder farming areas is allocated by regional chiefs, ward councilors, and village headmen).

The better farmers in both Mangwende and Chibi also took greater advantage of the expansion of input markets, and particularly, the availability

⁴The lower figure corresponds with the exceptionally good 1984-85 season. The higher figure corresponds with the average 1985-86 season.

Table 4. Distribution of maize production in Mangwende and Chibi, 1984-85 and 1985-86 seasons, Zimbabwe

Quintile	Proportion of total maize harvest (%)			
	Mangwende		Chibi	
	1984-5	1985-6	1984-5	1985-6
Top	54	49	54	67
Second	19	21	21	17
Third	15	20	14	9
Fourth	9	7	8	5
Bottom	3	2	4	1

Source: Mangwende and Chibi surveys.

Table 5. Distribution of maize sales in Mangwende and Chibi, 1984-85 and 1985-86 cropping seasons, Zimbabwe.

Quintile	Proportion of total maize sales (%)			
	Mangwende		Chibi ^a	
	1985	1986	1985	1986
Top	54	59	84	100
Second	24	26	15	0
Third	14	12	1	0
Fourth	7	3	0	0
Bottom	0	0	0	0

^aDrought occurred in Chibi during the 1985-86 season.

Source: Mangwende and Chibi Surveys

of agricultural credit. In Mangwende, loans have been made available to two-thirds of the region's farmers. Yet over the 1984-85 to 1986-87 period, the number of recipients declined. Only 20% of these farmers consistently accepted loans during this period. While some recipients were forced to dropout of the loan programme due to repayment difficulties, others simply declined to accept more credit. Almost 60% of the households which have continued to participate in the loan programme are headed by men who primarily live and work elsewhere. Despite this, these farmers are among Mangwende's top producers. In Chibi, only farmers with the most land in maize have taken agricultural loans. However, this bias may reflect the tendency of credit-granting AFC agents to consider these producers as the best loan risks.

The average Mangwende and Chibi household earns 20-40% of its income from sources other than field crop production, excluding vegetable crops. Forty-four percent of the male household heads in Mangwende and one-third of those in Chibi work off-farm. Yet most of this income is not getting re-invested into crop production, and much of the income earned from crop sales is invested elsewhere. The largest single investment expenditure of most households is school fees. Yet many farmers are also investing in a broad range of consumption items and alternative enterprises including beer, clothes, improved housing, record players, sewing machines, retail shops, and lorries. While most smallholder households face severe resource constraints, greater cash, labour and land resources were rapidly and broadly committed to maize after 1979. The survey evidence indicates that some farmers simply decided to make greater investments in enterprises other than crop production.

REPLICABILITY OF THE MAIZE PRODUCTION GAINS

A key constraint on the replication of Zimbabwe's maize production gains across a broader range of crops is the lack of improved, location-specific technologies. Smallholders have proven their willingness to adopt improved technologies if these are perceived as profitable. The adoption pattern of maize recommendations suggests smallholders have discriminated between technologies yielding higher returns and those offering questionable gains. Hybrid seed has proven its profitability in high and low-rainfall zones. Fertilizer has proven its effectiveness in higher-rainfall regions, though only a small number of farmers are beginning to accept the risks of fertilizer application in low-rainfall zones. Credit recipients have tested insecticide and found the returns to this investment do not justify even the limited cost. In Mangwende and Chibi, farmers only purchase insecticide for maize as re-

quired in loan packages. Similarly, Mangwende farmers have tested herbicide in agrochemical company demonstration trials and rejected this technology.

Farmers in Mangwende and Chibi have consistently rejected recommended technologies for sorghum, millet, and groundnuts. Without technological improvements, smallholders will continue to produce these crops primarily for home consumption. Following the incidence of mid season dry spells and drought during four of the first six cropping seasons following independence, extension workers have encouraged farmers in Chibi to reduce their maize production and plant more drought-tolerant crops such as sorghum and millet. Yet, despite the likelihood of drought, Chibi farmers perceive the returns to maize production to be higher than the returns to the recommended alternatives. While they still plant sorghum and millets, acknowledging their relative drought tolerance, maize remains the preferred food and cash enterprise. Until the yields of these alternative crops can be increased, maize will continue to dominate these cropping patterns.

The implications of the maize production and market gains for other countries in the region depend on each nation's farming circumstances. Several factors make the Zimbabwe situation unique. Much of the increase in production, particularly that associated with area gains, resulted from the ending of the war. The resolution of rural instability and violence stimulated a return of refugees to farming, reclamation of fields once abandoned, and expansion of holdings. Second, the new Zimbabwe government initiated a well developed set of agricultural institutions which could be readily expanded to better serve the smallholder. Discrimination against communal agriculture in the past had limited this sector's productivity. Once this discrimination ended, the improved access of smallholders to existing technologies and national markets stimulated immediate gains. If these institutions had to be newly built, the transition would have been substantially slower.

Nevertheless, the Zimbabwe experience highlights a number of important characteristics of a successful smallholder development strategy. It shows the complementary impact of a combined set of agricultural interventions. Maize production grew because available technologies increased the profitability of this enterprise well above most competing crops. Production expanded for the market, not simply when producer prices increased, but particularly when market access improved. The increase in farm-level prices corresponded with a reduction of input costs associated with improved input availability and the attainment of access to credit. Further, the structure of market institutions allowed the private sector, including farmers, to make investments which were complementary to those offered by the government.

FOOD SECURITY IMPLICATIONS

In a paper leading off the 1986 Conference on Food Security on Southern Africa, Rukuni and Eicher (1987) explained that food security requires food availability as well as food access. This distinction is important in judging the gains Zimbabwe has achieved by tripling smallholder maize production. The country and the smallholder sector as a whole have clearly benefited from both the increase in smallholder productivity and the associated growth of national maize stocks. The nation's food security has improved. Yet this analysis highlights the difference between increasing average per capita food supplies, or food stocks, and the more difficult task of improving the productivity and consumption levels of those households facing the greatest food security risks.

The largest gains in production and largest contributions to national maize stocks were achieved by those smallholders facing the lowest risks of encountering consumption deficits. The food insecure have benefited from the expansion of support for smallholder agriculture. The widespread dissemination of hybrid maize seed has lifted these farmers' yields. The rise in productivity of the larger producers has helped reduce local maize prices, particularly in drought years. The growth of smallholder maize production has also increased per capita retentions to the levels attained during the mid-1970s. The large maize stocks provide a basis for the more timely, and perhaps more generous, delivery of food aid. Yet, these gains remain small relative to the needs of farmers continuing to face food security risks.

The growth of smallholder maize production provides an example of the advances in smallholder production which can be achieved. To broaden these advances, future agricultural development strategies must increasingly focus on relaxing the constraints faced by different segments of the smallholder population. One of the most severe constraints facing the majority of smallholders situated in Zimbabwe's semi-arid regions is the frequent incidence of drought. While large national maize stocks offer one means to offset these risks, these are costly to maintain. The distribution of food aid is also an expensive undertaking. Additional investments in expanding market infrastructure or agricultural credit will not necessarily benefit these farmers. Instead, they will require further improvement in low-cost agricultural technologies, and most likely, the expansion of income-earning opportunities from sources other than crop production.

The poorer farmers in the high-potential zones require less input-intensive technologies. These farmers can benefit from input recommendations which simply increase returns and productivity above current levels, rather than maximizing production returns. This implies the need to develop

distinct low and high-input cost recommendations and place greater emphasis on improving crop management practices. Measures can also be taken to encourage complementary links between farm and non-farm enterprises.

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