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THE IMPACT OF ECONOMIC REFORM ON THE PERFORMANCE OF THE SEED SECTOR IN EASTERN AND SOUTHERN AFRICA

by

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RÉSUMÉ

Au cours de la dernière décennie, le secteur des semences a été inclus dans les programmes de réformes économiques de plusieurs pays de l'Afrique sub-saharienne mais on ne saurait dire si ces initiatives ont renforcé ou entravé les possibilités d'accès des petits exploitants aux semences améliorées. Ce document examine les aspects contrastés de cette question dans le cadre des expériences intervenues dans le secteur des semences au Malawi, en Zambie et au Zimbabwe. Face à une tradition économique et à un système de culture assez similaires, le rythme des réformes et leur application dans le secteur des semences diffèrent considérablement d'un pays à l'autre. Néanmoins, les données disponibles sur la production de semences, leurs coûts de fabrication et leurs ventes révèlent que, au moins pour le court et le moyen terme, les politiques de réformes types ont eu un effet défavorable sur la capacité des fabricants de semences à produire à bon marché des variétés améliorées et donc à fournir aux petits exploitants la possibilité de les utiliser efficacement. Ceci est surtout dû au fait que les principales réformes macro-économiques et agricoles n'ont pas su prendre en compte les causes structurelles fondamentales qui sont à l'origine des performances médiocres dans le secteur des semences.

SUMMARY

During the last decade, the seed sector has been included in economic reform programmes in a number of countries in sub-Saharan Africa but it is not clear whether these initiatives have helped or hindered the process of improving small farmers' access to improved seed. This study explores this issue using the contrasting experiences of the seed sector in Malawi, Zambia and Zimbabwe. Against a broadly common economic heritage and farming system, the pace of reform and the way it has been implemented in the seed sector have varied considerably between the three countries. Nonetheless the available data on seed production, costs of seed production and seed sales suggest that, at least in the short- to medium-term, reform-type policies adversely affect the ability of seed companies to produce improved seed cheaply and the ability of small farmers to make effective use of it. This is largely because general macro-economic and agricultural sector reforms fail to tackle the more fundamental structural reasons for underperformance in the seed sector.

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PREFACE

This study is part of a research project on "Technological Change in Developing Country Agriculture: Implications of the Changing Public/Private Sector Balance". The project has been undertaken in the context of the Development Centre's 1990-1992 research programme on "Developing Country Agriculture and International Economic Trends", headed by Ian Goldin.

The Centre's research on agriculture incorporates several components: a conceptual component to provide analytical guidance for the broader issues; a global general equilibrium model to analyse the overall trends and policy consequences; a component to analyse the links between economic reform and technological change in agriculture; and a series of country case studies to look more closely at the economic reform options for individual representative countries.

The work on technology seeks to determine whether the structural adjustment and liberalisation process — and, by implication, changes in the public/private sector balance — is enhancing or impairing the economic and institutional conditions conducive to technological innovation and greater productivity. In order to examine this hitherto unresearched issue, an eclectic approach has been adopted and a number of different types of study commissioned. These include: a conceptual study of the interaction between changes in economic policies and agricultural productivity; two commodity studies — of rice and cocoa; a study of biotechnology research developments with respect to these two commodities; a case study of agricultural research institutions in Brazil; a study of seeds supply and diffusion in three African countries. These provide different perspectives and angles on the relation between economic reform and technological change in agriculture.

Despite its obvious importance, the seed sector — and particularly seeds supply for small scale farmers — remains a somewhat neglected area of research. This study, contributed by Elizabeth Cromwell, is therefore of particular interest. It examines the impact of the economic reform in process on the performance of the seed sector in Malawi, Zambia and Zimbabwe.

The study concludes that the macro-economic reform process has failed to improve the economic security of the majority of small-scale, semi-commercial farmers and, consequently, has failed to provide new incentives to introduce improved seed. It also suggests that the problems of high retail seed prices and marketing gaps brought about by adjustment could be resolved by redirecting policies towards greater reliance on decentralised, farm-based seed production and distribution.

The lessons to be drawn from the project and the policy implications will be brought together in a synthesis volume edited by Carliene Brenner, to be published in the Development Centre studies series.

Louis Emmerij
President of the Development Centre
May 1992

1. INTRODUCTION

During the last decade, the seed sector has been included in economic reform programmes in a number of countries in sub-Saharan Africa, including The Gambia, Ghana, Côte d'Ivoire and Malaŵi, either specifically or as part of wider agricultural reform. In other countries, such as Mozambique, Tanzania, Ethiopia, Uganda and Nigeria, it has been decided to involve private enterprise in the sector to a greater extent, although not as part of reform programmes explicitly.

What impact is this having on the level and quality of seed services provided? Have the reform programmes helped or hindered the process of improving small farmers' access to improved seed? What are the alternatives and the supporting changes necessary for this to be successful? And what lessons does this provide for long term development of the seed sector?

The impact of reform on the seed sector has received little attention. This is largely because the seed sector has rarely been the subject of separate analysis or planning in the reform process. Frequently, changes in the seed sector have been the indirect result of initiatives to reform input distribution in general or to reform parastatal agricultural marketing authorities. In any case, the sector has rarely been the subject of sectoral economic analysis prior to reform: nearly all analyses have dealt only with the technical organisation of production or individual enterprise level issues.

Certainly, there is a strong theoretical case for improving seed sector performance. Improved seeds[1] are "small-farmer-friendly" as an agricultural input: they are easily divisible; they form a small proportion of the total costs of production; and they do not necessarily need other inputs or new techniques in order to increase production. They have enormous potential for contributing to the increase in small farm productivity that is so critically needed for national growth and development in many countries in sub-Saharan Africa, but national seed parastatals, the dominant form of seed enterprise over much of the continent, have had an extremely poor track record of inefficient use of resources and failing to reach farmers. The experiences of the Seed Multiplication Unit of the Department of Agriculture in The Gambia, which in 1984/85 recorded a turnover of less than 10 per cent of its D400 000 (US$89 600) expenditure at the same time as having `a very limited impact on the national seed supply position' according to a recent evaluation [Republic of The Gambia, 1987], and the Tanzania Seed Company, which made losses of around TShs5.8m (US$580 000) in 1982/83 in the process of supplying less than 14 per cent of Tanzania's estimated seed requirements [Budden, 1986], are by no means atypical.

This paper explores these questions of reform impact as a contribution to a wider OECD Development Centre study of the impact of structural adjustment on technological change in agriculture in developing country agriculture. It provides an impact assessment from the perspective of small farm households and with respect to the supply of an important agricultural input, in one of the least developed regions of the developing world, to complement other papers produced as part of the study, which focus on the international, macro-economic and sectoral impact of changes affecting output markets for rice, cocoa, soyabeans, wheat and sugarcane.

The paper uses as examples the contrasting experiences of the seed sector in Malawi, Zambia and Zimbabwe. Malawi's National Seed Company was controlled by the national agricultural marketing parastatal ADMARC until 1988, when the controlling interest was sold to Cargill, the world's largest grain trading company, which is active in the seed sector in a number of other developing countries. Malawi therefore provides an example of the kind of divestment typical of many economic reform programmes in sub-Saharan Africa.

Zambia also has a national seed parastatal, Zambia Seed Company, set up at the beginning of the 1980s, which is supposed to operate at arm's length from government, as a commercial company. It has not been the subject of reform itself, but its operations have been significantly affected by the liberalisation of the grain market in Zambia in 1990. It provides an example, therefore, of the effect of the partial liberalisation of agricultural markets which has also been common in the region.

Zimbabwe's seed sector is dominated by a very long standing seed producer co-operative, Seed Co-op, controlled by large-scale commercial farmers with monopoly access to new varieties released by public sector plant breeders (the only seed company in the region with a formal agreement with government providing for this), but otherwise independent of government. It provides an example of the kind of performance that might be expected in a competitive market situation.

These organisational differences contrast to the broadly common economic heritage and farming systems of the three countries. All three have maize-based small farm farming systems in which food crops dominate, but which include cash crops produced for export. All have been reliant on natural-resource based development and have pursued policies with a relatively high degree of control over the structure and operation of the domestic economy. They were all members of the colonial Central African Federation which functioned between 1954 and 1964. All three are now facing structural problems against a backdrop of high population growth, falling foreign exchange earnings and budgetary control problems, exacerbated by regional instability.

There are also important differences. Malawi is the poorest of the three and has always focused on agriculture, although for many years on the estate sector to the detriment of small farmer development. Its land-locked position, high population density and lack of diversification are major problems. Zimbabwe is the richest and is well diversified with a good economic infrastructure, but it has had to carry out much economic re-building after the end of the liberation struggle in 1980. In addition, it has implemented far-reaching structural reform: including land reform in the agricultural

sector in favour of small-scale communal farmers: during its first decade of Independence and this has inevitably limited the return to growth. Zambia chose to focus economic development around the minerals sector but has gone through a fundamental re-orientation towards agriculture in the last decade: it has a large agricultural potential which has been relatively neglected until recently. Domestic policy failures have been a significant constraint to economic growth.

Most interestingly, all three have pursued different approaches to reform. Malaŵi followed the IMF and World Bank approach and has had continuous donor-funded reform programmes since 1979. Zimbabwe has tried to remain independent of the major multilateral finance institutions and has developed its own reform programme. Zambia has had less consistent reform, marked by a lack of political commitment to externally imposed reforms and by a continued desire for heavy economic control.

By focusing on these three countries, we are able to assess a considerable range of different experiences both between countries and within countries over time, to draw more general conclusions about the likely impact of the current economic reform programmes on the seed sector in sub-Saharan Africa, and the extent to which current reforms coincide with the policy needs for longer term seed sector development.

After Chapter 2, which lays out the methodology for this assessment, Chapter 3 provides thumbnail sketches of the economies of the three countries, including recent economic reform policy and the way the seed sector is integrated with the rest of the economy. Chapter 4 assesses the performance of the three seed sectors over the last decade, according to a range of criteria that are critical for small farmer development and for national economic efficiency. Chapter 5 investigates the relative influence of government policy on this performance, to set the scene for Chapter 6 in which the lessons for reform are analysed. This includes investigations of the impact of reform on institutional issues, including public/private sector mix; on price levels and the impact on incentives to use improved seed; on the distributional implications for small farmers; and it also examines the factors which have inhibited the planned impact of reform on the seed sector.

2. METHODOLOGY

This study uses a broad definition of economic reform. This includes measures taken to stabilise economies in the short-run (fiscal corrections affecting expenditure, taxation, etc) and measures designed to re-structure economies over the long-run (changes in micro-economic incentives affecting prices, changes in the role of the state and other institutions with an important economic role). Economic reform programmes of this kind have been implemented in more than half of the 42 countries in the developing world, usually involving policy-based lending from the IMF and the World Bank. The measures used to achieve the programmes' objectives typically include:

- **trade and exchange rate policies** : devaluing domestic currency to `market' value; reducing foreign exchange and trade controls; introducing export incentives;

- **fiscal and monetary policies** : reducing government spending (staff cuts, budget cuts); reducing government domestic borrowing; increasing government tax revenue; increasing interest rates;

- **role of the state** : reducing the role of parastatals in domestic economic activity and re-structuring them for greater efficiency; increasing parastatal cost recovery; liberalising markets and encouraging private sector activity; increasing the role of market prices in allocating domestic resources;

- **agricultural policies** : increasing producer prices; removing input subsidies; reducing the role of the state and increasing the role of market prices.

Most recently, economic reform programmes have been planned and implemented with a concern for the social dimensions of adjustment, including complementary initiatives to protect the livelihoods of the poorest during the transition period. In addition, there has been increasing awareness of the need for attention to the sequencing of reform programmes and for sectoral programmes, designed to address the specific problems facing individual sectors of the economy.

In order to trace the impact of economic reform strategies on the seed sector in the three countries being studied, we used the following framework of analysis.[2]

The seed sector can be defined as those institutions linked together by their involvement in the multiplication, processing and distribution of seed, or by their influence on these activities — these linkages being a significant distinguishing feature of the seed sector. This framework approach to the seed sector is given in Diagram 1. Within the sector as a whole, there are four key organisational structures among these institutions: public sector, private sector commercial, farmers' organisations and informal sector activities — and four basic categories of seed user: large-scale commercial farmers, small-scale commercial farmers, small-scale semi-commercial farmers, and subsistence farmers.

The study is primarily concerned with the seed needs of small-scale, semi-commercial farmers,[3] cultivating less than 1 hectare of land (3 ha in Zimbabwe), and selling a part of their production but primarily oriented towards satisfying subsistence needs, as it is increasing the productivity of this group which is of critical importance both for poverty-alleviation and for national economic development.

Accordingly, we consider seed issues only for those food crops of significance to small farmers in the three countries: maize, groundnuts, food legumes, small grains and sunflower. To avoid complicating the economic analysis, we include only true seed of generatively propagated edible crops: not cassava or sweet potatoes, nor tobacco or cotton.

The seed sector can be expected to fulfil two main functions: a **national development** function, which we define as the delivery of the types and quantities of seed required by small farmers in a timely manner to appropriate locations at `affordable' prices; and a **firm-level efficiency** function, namely to do this in a way that allows the full recovery of the fixed and variable costs of multiplying, processing and delivering this seed.

The basic measure of the performance of the seed sector with respect to its national development function is the extent to which it meets the national requirement for improved seed, calculated as the amount needed to plant the area suitable for using improved seed adjusted for sowing rate, replacement rate, etc. The supplementary measures of seed sector performance with respect to national development are whether it provides varieties relevant to small farmers' needs and good quality seed in appropriate pack sizes; whether it distributes seed on time and in a way that makes it accessible to small farmers; and whether seed is sold at prices which small farmers can afford.

The basic measure of firm-level efficiency in the seed sector is whether, given undistorted `market' prices for raw material inputs and for products, seed firms are producing at a level where average revenue equals price, marginal costs and marginal revenue.

Four key sets of factors were found to influence performance with respect to these functions: the level of **internal efficiency** within the seed organisations, resulting from the structure of their ownership and control; agro-ecological and socio-economic **location-specific factors**; the strength of **linkages** between seed organisations and allied institutions (agricultural research, input delivery, etc.); and, particularly importantly, the national **policy framework** in which the seed sector operates.

A three stage methodology was used to assess the relative importance of each of these sets of factors.

First, an assessment was made of performance in the three countries with respect to both seed sector functions, using existing quantitative data, sample surveys

of small farmer seed users and interviews with key informants involved in the seed sector. Because of the difficulty with obtaining comprehensive quantitative data, the methodology was designed to rely on intuitive explanations, based on consensus, rather than on deriving correlations from regressions of key variables. A particular feature was the repetition of questions and discussions at different stages in the seed chain, in order to show whether significant differences of opinion existed as to the causes of performance problems.

The information obtained was then analysed to establish the extent to which performance is influenced by each of the four sets of factors.

Finally, this was used to generate both country-specific and more general conclusions concerning the scope for promoting improved performance in the seed sector through economic reform, and concerning the policy changes likely to be most successful in ensuring that the seed needs of small farmers are met efficiently and effectively.

The household context of small farmer seed users, and especially their resource endowment and the manner in which they interact with national factor and product markets (including constraints to this caused by market failures in the macro-micro linkages between small farm households and the national economy), are a critical influence on the ability of national seed programmes and projects to achieve the desired effects. This also has a significant impact on the potential of small farm households to respond to the opportunities provided by them. However this context, and the impact of other external shocks on the national economy and the agriculture sector, are too often ignored. Therefore the method used put particular emphasis on demand side issues in the seed sector, to provide an alternative perspective to that provided by the more usual supply-side, top-down approach to seed sector analysis.

The Malaŵi seed survey was carried out by the author in November/December 1990. 30 small farm households were interviewed in three different agro-ecological zones: Kabwazi in Lilongwe Agricultural Development Division (ADD) represented the mid-altitude maize/beans farming system in Malaŵi; Eswazini in Mzuzu ADD represented semi-extensive upland maize cultivation; and Bembeke, also in Lilongwe ADD, represented relatively high altitude beans/vegetables cultivation.

The Zimbabwe seed survey was carried out by an ODI Research Associate during late 1989. 70 households were interviewed in Silobela and Chiduku communal areas; the former in Midlands, the latter in Manicaland. Households were selected to represent the range of different soil types, farming practices and socio-economic conditions locally.

The Zambia seed survey was carried out by the GRZ Ministry of Agriculture Adaptive Research Planning Team between February and April 1990. 280 households were interviewed, located in all three of Zambia's agricultural zones; nearly 60 per cent were in the less commercialised areas.

Statistically, the Zambia seed survey results are the most representative; the Zimbabwe and Malaŵi surveys followed a slightly different approach of in-depth guided interviews, with the aim of developing an accurate understanding of the way small farmers use seed from a smaller number of respondents. All 3 surveys focused on small-scale semi-commercial farmers, although a proportion of larger more commercial farmers was included in Zambia. Notwithstanding these differences, there was close co-ordination between all 3 surveys concerning the overall method and approach so that valid comparisons can be made between their results.

As with all studies of this kind, we experienced the problem of establishing lines of causality in situations with limited quantitative data. Ultimately, it is extremely difficult to prove unequivocally that it was a certain policy that produced a given result, but we do have a very considerable amount of primary and secondary information about the macro economies and seed sectors in all three countries and we believe the analyses provide enough important results to have been worthwhile. In particular, we hope that, although it has not been possible to quantify categorically many of the observations, the analysis has brought to the fore the needs and constraints of small farm households in the process of economic reform. This would appear to be important given that one of the causes of poor performance in the past seems to be that generalised information and data has been relied on and the economic situation of these households has often not been investigated in detail during the design and implementation of reform initiatives.

3. ECONOMIC STRUCTURES

3.1 Malaŵi — World Bank model?

Malaŵi has the twin disadvantages of being land-locked and without any significant natural resources other than fertile land. Agriculture dominates the physical environment, covering 45 per cent of Malaŵi's land area, and it dominates the economy, accounting for 35 per cent of GDP, 80 per cent of export earnings and the incomes of 85 per cent of the population.[4] Industry has been given little protection and remains centred around processing food, tobacco and tea and has been characterised by relatively low capacity utilisation. Contrary to the popular image, at least until the mid-1980s, state involvement, through a few large, quasi-public institutions, has been substantial in many areas of the economy.

The economy grew rapidly, by up to 7.5 per cent a year, in the first decade after Independence in 1964. However, growth slowed down at the end of the 1970s, to less than 2 per cent a year. The chief causes were external: by 1980, Malaŵi's international terms of trade were less than 60 per cent of the 1970 level; because of the war in Mozambique, external transport costs had increased dramatically (now equivalent to 7 per cent of GDP) and Malaŵi became host to large numbers of Mozambican refugees, soon totalling some 10 per cent of Malaŵi's own population of 8.5 million. At the same time, migrant remittances fell as employment opportunities in neighbouring countries declined.

Domestic mismanagement also contributed to the downturn. The 1970s' external borrowing that had been made to cover the regular government deficit began to mature; there had been a number of financially unsound investments by the powerful quasi-public institutions; and Malaŵi's export base had been allowed to remain heavily concentrated on tobacco, tea and sugar, accounting together for 70 per cent of total exports, which all experienced rapid falls in international prices from the end of the decade onwards. This economic concentration had a strong negative effect domestically too when it became apparent that the indigenous agricultural estate sector, which had been officially encouraged with preferential access to credit during the 1970s, was badly over-extended and unable to weather these international pressures. This caused a near breakdown of Malaŵi's domestic banking system, as by 1980 lending to the estates comprised nearly 55 per cent of the commercial banks' loan portfolio. Thus, in 1991 Malaŵi is still a very poor country, with an average per capita GNP of US$180 that had been falling during most of the 1980s. Basic economic data are given in Table 1.

About 50 per cent of Malaŵi's total land area of 90 400 sq. km. is cultivable but, with population growth of 3.6 per cent a year, and rural population densities amongst the highest in sub-Saharan Africa, agricultural cultivation is already expanding into fragile environments. Malaŵi's sub-tropical climate and agro-ecology are both favourable for agriculture. Agriculture is predominantly rainfed and the major smallholder crops are maize, groundnuts, pulses and tobacco.

Table I: Malawi: development indicators

	1980	*1981*	*1982*	*1983*	*1984*	*1985*	*1986*	*1987*	*1988*	*19891990*
Gross National Product (current price) US$ m.	1 137.8	1 154.9	1 110.4	1 159.3	1 152.5	1 082.0	1 118.8	1 188.0	1 344.2	1 559.0
GNP *per capita* (US$) (current price)	180.0	180.0	190.0	180.0	180.0	170.0	160.0	150.0	160.0	180.0
Gross domestic product (average annual growth %)	0.5	-5.3	2.5	3.7	5.6	4.5	-0.5	2.2	2.8	5.23.6
Agriculture (% share of GDP) [a]	43.0					38.0				35.0
Industry (% share of GDP) [a]	20.0					19.0				19.0
Private consumption (% domestic absorption)	61.3	66.5	63.4	63.5	70.8	65.8	68.6	68.3	70.3	70.6
General government consumption (% domestic absorption)	16.9	16.9	16.5	15.3	16.0	16.7	19.4	17.4	13.3	13.0
Inflation (%)	21.5	16.4	9.7	11.2	12.5	9.4	13.0	22.5	26.8	18.4
Government deficit (-) (current price) US$ m.	-197.4	-153.8	-90.0	-86.6	-62.5	-94.6	-117.0	-102.4		
Government deficit (% of GNP)	-17.3	-13.3	-8.1	-7.5	-5.4	-8.7	-10.5	-8.6		
Exports of non-fuel primary products (% total exports)	88.8	88.6	89.1	94.2	93.6	92.8	83.9	84.8	82.9	
Exports of fuels (% total exports)	0.2	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	
Exports of manufactures (% total exports)	11.0	11.4	10.8	5.7	6.4	7.2	16.1	15.2	17.1	
Terms of trade index (1987=100, US$-based)	151.3	135.7	127.5	132.7	134.9	114.7	110.8	100.0	106.4	
Current account balance after off. trans (US$ m., BoP)	-264.4	-150.7	-121.4	-144.0	-52.9	-127.8	-92.9	-44.1	-53.0	-117.0
Exchange rate (annual average, local per US$)	0.8	0.9	1.1	1.2	1.4	1.7	1.9	2.2	2.6	2.8
Debt service ratio [b]	27.7			28.4	30.1	38.9	52.7	35.8	31.4	29.227.3
External debt (% of GNP) [c]	72.1			76.4	76.0	94.4	103.6	121.9	105.0	90.585.6
Concessional debt (% of total) [c]	33.8			41.6	49.8	50.4	57.8	62.1	68.4	71.473.0
Nominal interest rate (%) [d]		9.0	9.0	11.0	11.0	12.3	12.8	14.3	15.8	15.812.9
Real interest rate (%) [e]		-7.4	-0.7	-0.2	-1.5	3.0	-0.3	-8.3	-11.1	-2.612.9

Notes: Unless otherwise indicated all data are calculated from the World Bank, World Tables, 1990 update, diskette.
(a) World Bank; World Development Report, various editions;
(b) Total debt service to exports of goods and services;
(c) World Bank World Debt Tables 1991-1992;
(d) Treasury Bill Rate (IMF; International Financial Statistics, various editions);
(e) Nominal less inflation.

The agricultural sector has three distinct sub-sectors, reinforced by tenure law and other legislation demarcating the crops that can be grown by estates and by small farmers with users' rights to customary land. About 22 per cent of the cultivable area is used by large-scale commercial estates, primarily producing tobacco and tea. On the rest, there are a smaller number of commercialised smallholders with good access to credit, inputs and extension advice; and up to 1.2 million semi-commercialised small farm households, many of whom do not produce enough food for their own domestic needs, and who have largely not been able to benefit from the government's National Rural Development Programme. Amongst this group, holdings are tiny, with 50 per cent less than 1 ha. Sales are generally limited to production which is surplus to household food needs.

There has been organised seed production in Malawi for many years. The first locally bred maize hybrid started distribution in 1959. Seed was first distributed on an exchange basis then, from 1971, it was sold at economic prices, when the government decided the seed sector in Malawi should be organised on a commercial basis. In 1973, it was decided to establish a national seeds programme to integrate horizontally all seed activities. By 1978, certified seed was being produced for maize, groundnuts, beans, sunflower, grasses, pasture legumes and tobacco and, given the progress that had been made, it was decided to establish a national seed company, which would operate on commercial lines, as a self-contained autonomous subsidiary company of ADMARC, the national agricultural marketing parastatal. The National Seed Company of Malawi started operating in 1980.

Responsibilities for the different stages in the seed chain were allocated as follows: plant breeding and production of new varieties remained with the Department of Agricultural Research; variety evaluation and release went to NSCM and the Variety Release Committee; basic seed production went to NSCM, supervised by the Seed Technology Unit (now known as Seed Services); certified seed production went to NSCM using contract growers; quality control went to the STU; processing and storage went to NSCM; and distribution (except factory gate sales to large purchasers) went to ADMARC. Storage of the national seed reserve also went to NSCM.

The only major change to this division of responsibilities in the intervening decade has been the introduction of the Smallholder Seed Multiplication Scheme. The SSMS started operating in the mid-1980s, with the aim of reducing seed production costs and encouraging crop diversification by involving small farmers themselves in the production of quality improved seed for self-pollinated crops. It is organised and managed at ADD level.

There is no overall seed sector development policy in Malawi. The Permanent Secretary of the Ministry of Agriculture is the Chair of the NSCM Board. The MOA Inputs Section co-ordinates seed estimates and the quantitative aspects of seed distribution and the MOA Pricing Section deals with seed retail pricing. A Seed Technology Working Party, with representatives from the MOA Planning Division, the STU, the Department of Agricultural Research, the Department of Economic Planning and Development, Bunda College of Agriculture, ADMARC and NSCM, is the main vehicle for strategic planning although it does not have executive functions.

Total production of quality improved seed by NSCM and the SSMS remains modest compared to small farm cultivated area — NSCM's hybrid maize seed sales, for example, accounted for less than 5 per cent of the small farm maize area throughout the 1980s.

Malaŵi has had a continuous history of economic reform since 1979 and was one of the first developing countries to negotiate funding for structural adjustment from the IMF and the World Bank. Developments to date can be summarised as follows:

Table 2: Chronology of Malaŵi's economic reform

Year	*Facility*	*Major donor*
1979	Compensatory Financing Fac.	IMF
1980	Stand-by Agreement	IMF
1981	Structural Adjustment Loan	World Bank
1982	Structural Adjustment Loan	World Bank
1983	Extended Financing Fac.	IMF
1985	Structural Adjustment Loan	World Bank
1987	Enhanced Structural Adj. Fac.	IMF
1988	Trade & Industry SAL	World Bank
1990	Agric. Adjustment Credit	World Bank
in prep.	Labour and Capital Adj. Loan	World Bank

1987 was the watershed year when plans for a fourth Structural Adjustment Loan were abandoned in favour of sectoral adjustment loans and the government started taking an active role in the design of the reform initiatives by producing its own Statement of Development Policies [GOM, 1987].

The main objectives of agricultural policy reform have been: increasing producer prices, liberalising produce marketing (including restructuring of ADMARC) and removing fertiliser subsidies, all with the aim of encouraging smallholder production and creating more efficient resource allocation. The real value of producer price increases has been eroded by increased input costs. Private traders did not move into crop marketing as much as expected due to lack of credit and infrastructure; the effect of those that did was generally to increase inter-seasonal variation in parallel market prices. The fertiliser subsidy removal programme was suspended during the late 1980s. Overall, until the 1990 ASAC, the reforms failed to address the underlying structural problems in the agricultural sector and the basic problems remain of undiversified production and small farmers' lack of access to credit, extension, improved technologies and high value crops.

Other reforms affecting agriculture include: limiting government borrowing and moving to positive real interest rates; reducing the balance of payments deficit by

currency depreciation and increasing and diversifying exports and trade liberalisation; and reducing the budget deficit by broadening the tax base and controlling government expenditure. Malaŵi has been successful in moving towards greater macroeconomic balance over the last decade. Real rates of interest have become positive. There was some improvement in the trade deficit, although this was due mainly to currency depreciation and contraction in demand for imports and the deficit has subsequently expanded again in response to the 1988 trade liberalisation. And there has been some success in controlling government expenditure, although tax revenue has changed little. The general consensus is that by 1990 Malaŵi's economy was returning to growth, with estimates of 4.8 per cent growth in 1990 and projections of 4.1 per cent during 1991. Inflation was expected to rise only slightly on the 1990 figure of 11.6 per cent — mainly due to the increase in fuel prices following the Gulf war — although the balance of payments deficit is likely to reach US$214 million. Taxes on consumer goods and imports are being cut further and the IMF predicts further growth in the economy after 2 years of strict austerity measures.

It needs to be emphasised, firstly, that Malaŵi's reforms did not require any substantial departure from previous economic policy and, secondly, that the progress of reform has been drastically affected by external factors, particularly the war in Mozambique.

3.2 Zambia — a mixed experience

Zambia is eight times the size of Malaŵi but, at 7 million in 1988, has slightly less than the same population. Throughout the first decade after Independence in 1964, Zambia chose to base economic growth around its extensive minerals resources and copper sales have formed up to 90 per cent of export earnings. At the same time, the economy became heavily dependent on food and raw materials imports. Its main problem, since the mid-1970s, has been the terminal decline in foreign exchange earnings caused by declining international minerals prices, falling minerals production and increased minerals production costs. The fall in foreign exchange earnings had a particularly severe impact on the economy as a whole because of the dependence on imports. By 1985, only 10 per cent of Zambia's scheduled foreign debt was being serviced. The domestic economy was also stagnating and badly distorted. During the mid-1980s, annual inflation rates of over 40 per cent were not uncommon and by 1985 per capita GNP was one third of its 1964 level in real terms. Basic economic data is given in Table 3.

The initial policy response after the collapse in copper prices in 1975 was to increase economic controls, including foreign exchange allocation and price control on domestic goods.[5] This protected consumption but caused a sharp decline in investment. At the same time, economic diversification was promoted, including a new focus on small-scale agriculture.

Table 3: Zambia: development indicators

	1980	*1981*	*1982*	*1983*	*1984*	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*
GNP *per capita* (US$) (current price)	600.0	720.0	660.0	560.0	460.0	370.0	260.0	240.0	290.0	390.0	
Gross National Product (current price) US$ m.	3 594.1	3 895.6	3 635.1	3 070.0	2 453.2	2 022.1	1 376.7	1 740.9	3 593.8	4 983.3	
Gross domestic product (average annual growth %)	3.0	6.1	-2.7	-2.1	-1.0	1.5	0.5	2.5	5.9	0.1	2.0
Agriculture (% share of GDP) [a]	15.0					14.0				13.0	
Industry (% share of GDP) [a]	39.0					39.0				47.0	
Private consumption, *etc.* (% domestic absorption)	53.1	57.7	59.1	61.6	59.4	61.6	50.2	63.6	70.8		
General government consumption (% domestic absorption)	24.5	25.1	25.5	24.5	25.6	23.7	26.4	23.6	17.5		
Inflation	11.7	7.2	6.0	18.8	19.2	41.3	82.5	47.7	58.8	110.1	
Government Deficit (-) or Surplus (current price) US$ m.	-719.5	-517.0	-719.5	-259.9	-228.2	-334.8		-282.7	-352.2		
Government deficit (% of GNP)	-20.0	-13.3	-19.8	-8.5	-9.3	-16.6		-16.2	-9.8		
Exports of non-fuel primary products (% total exports)	97.9	97.8	97.8	97.9	97.6	96.4	96.7	96.9	97.5		
Exports of fuels (% total exports)	1.2	1.3	1.2	1.2	1.2	1.2	0.6	0.4	0.3		
Exports of manufactures (% total exports)	0.9	1.0	1.0	0.9	1.2	2.5	2.8	2.6	2.1	2.5	
Terms of trade index (1987=100, US$-based)	129.9	104.3	91.7	100.5	86.9	90.9	87.2	100.0	135.8		
Current account balance after off. trans. (US$ m., BoP)	-537.4	-780.3	-565.6	-270.7	-152.7	-407.6	-301.3	-147.0	-170.2	-132.2	
Exchange rate (annual average, local per US$)	0.8	0.9	0.9	1.3	1.8	3.1	7.8	9.5	8.3	12.9	
Debt service ratio [b]	25.3			29.6	25.3	16.1	50.1	17.0	13.1	12.4	12.8
External debt (% of GNP)	90.9	93.2	102.0	124.0	156.0	229.4	414.0	373.8	186.7	137.9	
Concessional debt (% of total) [c]	25.3			26.9	26.4	26.9	25.8	26.9	26.7	23.9	29.6
Nominal interest rate [d]	4.5	5.8	6.0	7.5	7.7	13.2	24.3	16.5	15.2		
Real interest rate [e]	-7.2	-1.5	0.0	-11.3	-11.5	-28.0	-58.2	-31.2	-43.7	-110.1	

Notes: Unless otherwise indicated all data are calculated from the World Bank, World Tables, 1990 update, diskette.
(a) World Bank; World Development Report, various editions;
(b) Total debt service to exports of goods and services;
(c) World Bank World Debt Tables 1991-1992;
(d) Treasury Bill Rate (IMF; International Financial Statistics, various editions);
(e) Nominal less inflation.

However, policy problems have compounded the effect of exogenous shocks through the failure to control exchange rates, wage levels and government expenditure and the failure to encourage agricultural growth successfully. Added to this, the heavy reliance on parastatals (currently responsible for 50 per cent of output) and the high levels of protection they have been given has led to further economic inefficiency. About 50 per cent of Zambia's population relies on agriculture for its livelihood. However, agriculture's contribution to GDP has remained unchanged at around 15 per cent throughout the last two decades. Agricultural export earnings have also been small — rarely above 2 per cent of total — and they have been falling. Domestic food self-sufficiency has been falling and by the early 1980s Zambia was heavily dependent on imported food. The consumer price subsidies provided for food have been large, and in recent years have been increasing dramatically, imposing a heavy national economic cost in terms of cushioning inefficiency in the food system and making budgetary planning and control very difficult. Between 1964 and 1980, the cost of the maize and fertiliser price subsidies combined increased 200 fold to ZK205 million annually.

Zambia is atypical of many sub-Saharan economies in that agricultural development was not a policy focus in the immediate post-Independence period. The main objective was to ensure a regular supply of cheap food for the copper belt and the urban areas (more than 40 per cent of Zambia's population is urbanised) and this was implemented by concentrating on large-scale commercial and state farms. However, a new policy of `agrarianisation' was instituted in the early 1980s, under the umbrella of the Operation Food Production Programme, to encourage small farm agricultural development as an alternative source of economic growth. But this has had limited success and has failed to generate the level of output (estimated at 30 per cent of GDP) needed for agriculture to replace mineral earnings.

The general consensus is that, although rural development was championed at the doctrinal level, small farmer agriculture has been neglected in practice: a decreasing proportion of GRZ fixed investment has been allocated to the agricultural sector (only 3 per cent by the early 1980s); the rural:urban terms of trade declined by nearly 75 per cent between 1964 and 1981; the government relied heavily on the inefficiently managed state marketing board, Namboard, and the Provincial Co-operative Unions, for agricultural marketing; and agricultural price policy has failed to encourage sufficient marketed production to supply the large demand for purchased food created by Zambia's large urban population and low consumer prices. At the same time, small farmers' needs were not a primary focus of the agricultural research and extension services.

Nonetheless, Zambia's agricultural potential is very substantial. Nearly 80 per cent of the total land area of 750 000 sq. km. is estimated to be cultivable but only 20 per cent is cultivated at present. Zambia has a moderate sub-tropical climate; much of the country is part of a high plateau of up to 1 370 metres. The moderate climate and substantial irrigation potential from Zambia's surface water resources provides significant agricultural potential.

470 000 semi-commercial small farmers form over half the agricultural population on plots averaging 0.6 ha. The small farm sector has a very wide food base focused around maize, pumpkins, groundnuts, beans, sweet potatoes and cowpeas. Small farm production accounts for a large proportion of the total for all crops except maize, wheat and soyabeans, which are produced also by the large-scale commercial sector. Although the large-scale commercial sector is, largely as a result of past agricultural policy, relatively capital-intensive, most small farmers still use hoes or animal-drawn implements.

Zambia has all the main elements of a formal seed sector in place and functioning: agricultural research, breeding and variety release procedures; a Seed Act regulating seed control and certification; a core of experienced seed growers, organised in the Zambia Seed Producers Association; a commercial seed company, Zamseed, to organise production, processing and primary distribution; and a nationwide seed distribution system through the Provincial Co-operative Unions and registered stockists.

Zambia Seed Company was set up in 1981 to produce all Zambia's agricultural and horticultural seed needs, as part of the national policy change towards greater emphasis on domestic agricultural needs, to supersede the separate activities of the ZSPA and Namboard, which had respectively taken care of seed production and distribution since Independence. It is a commercial company but ZIMCO and ZCF together control the majority of Zamseed's equity and so have a strong influence on policy. Other shareholders are ZSPA, Swedefund and Svalov, who are the managing agents. Bilateral aid from Sweden has been significant in the seed sector in Zambia over the last decade.

This contrasts with the situation in Malaŵi where ODA's direct support for the seed sector ended in the late 1970s and CDC sold their equity investment in NSCM to Cargill in 1988; and in Zimbabwe, where there has not been any donor support for the seed sector. (There has not been any multi-lateral involvement in the seed sector in any of the three countries.)

Seed is produced under contract by ZSPA members, who are all large-scale commercial farmers located in Zambia's main maize growing areas. The Seed Control and Certification Institute is responsible for quality control and certification. Seed is distributed through the co-operative unions: Zamseed sees itself primarily as a wholesaler. Seed prices are controlled by the government. Zamseed does not have a statutory monopoly but to date there has been no other large-scale seed activity in Zambia. However, the GRZ/SIDA Agricultural Sector Support Programme (1980-90) has also encouraged small farmer seed production, organised through the Department of Agriculture, and Zamseed has used small farmer growers for some self-pollinated crops since 1986.

70 per cent of Zamseed's sales are to the small farm sector although, according to the ARPT 1990 seed survey [ARPT, 1991], 85 per cent of the small farm cropped area is still planted with farm-saved seed.

Zambia has been engaged in economic reform activity throughout the 1980s, aimed at restoring financial balance. Between 1982 and 1985, the reform programme was supported by an IMF Standby loan and Paris Group funding and three multi-donor sector rehabilitation loans. But this has been fraught with problems: GRZ has failed to control expenditure on public sector wages; the foreign exchange auction system introduced in 1985 to revalue the kwacha was abandoned in 1987 before it had any real impact on foreign investment levels; and the de-control of food prices in 1986 resulted in nationwide riots and had to be abandoned in 1987.

This difficult process has been exacerbated by the government's unwillingness to give public political commitment to many of the reform policies, which have been seen as externally imposed. Zambia's relations with the IMF were suspended completely between 1987 and 1990, due to disagreement over the level of maize subsidies, fertiliser and fuel prices, interest rates, mining sector policy and public sector wages levels, and this created the added problem of radically reduced bilateral aid flows. During this period, Zambia re-imposed economic controls through its own Interim National Development Programme.

Most recently, however, Zambia has been one of the four countries in sub-Saharan Africa given special support by the IMF in recognition of its foreign debt problems. As a result of the rapprochement with the IMF, the Paris Consultative Group of bilateral donors pledged US$650 million of aid for Zambia at its April 1991 meeting. And the EC, Norway and IDA have funded a Social Recovery Project to help alleviate poverty during the restructuring period.

The latest reform programme, which was formulated within Zambia but approved by the IMF, contained plans for a new foreign investment code, simplified export procedures, privatisation of state-owned parastatals and better control of government expenditure. Agricultural marketing was liberalised in August 1990. However, this programme was suspended in September 1991 primarily because of fears that it could have a negative impact on the outcome of the much-delayed national multi-party elections to be held in October 1991. As a result of this and GRZ's default at the same time on loan arrears owed to The World Bank, payment of the second tranche of the economic recovery credit agreed in April 1991 was suspended.

With the peaceful transition to democracy achieved at the October 1991 election, when the Movement for Multi-party Democracy took power from the United National Independence Party that had ruled Zambia since Independence, Zambia entered what has been called its Third Republic with a considerable amount of goodwill from its international donors. The MMD has pledged that it will continue to implement economic reforms and it has already withdrawn consumer maize subsidies and started reforming the parastatal sector.

However, the outcome of its current negotiations with its donors is not yet clear and, in the mean time, its loans from The World Bank are being held in non-accrual status and the macro-economy remains in a critical state. The latest figures show a contraction of GDP by 1.5 per cent during 1991, annual inflation of 80 per cent, a

balance of payments current account deficit equivalent to US$150 million and a scheduled debt service ratio of 38 per cent of aggregate export earnings.

3.3 Zimbabwe — an independent approach

At Independence in 1980, Zimbabwe had a similar sized population to Malaŵi's now (9 million), growing at around 3.1 per cent a year, but 27 per cent is urban and the remainder has a land area of 390 760 sq. km. — more than four times as big as Malaŵi's. However, only 7 per cent of this land is usable for agriculture and, because of Zimbabwe's inherited agricultural structure, a tiny proportion of this is available to communal farmers (small-scale, semi-commercialised farmers).

Zimbabwe's economy suffered badly from destabilisation during the liberation struggle of the 1970s and it has many of the structural rigidities common in other developing countries. However, its basic physical and economic infrastructure was already well developed, including a relatively sophisticated domestic financial sector, and the domestic economy had benefitted from the self-sufficiency required of it during the years of international trade sanctions following UDI in 1967.

For most of the 1980s, real growth in GDP was positive, from Z$3 441 million in 1980 to Z$4 445 million in 1988, and growth in GDP per capita was also positive during the early part of the decade, despite a population growth rate of 3.1 per cent a year.[6] The post-Independence government has continued the policy of controlling the prices of basic domestic goods and services. Nominal interest rates remained static between 1982 and 1988 at about 9 per cent a year. These policies contributed to limiting domestic inflation. External trade has an important and increasing role in the economy, accounting for 50 per cent of GDP. In particular, Zimbabwe benefits from favourable trade arrangements with the European Community under the terms of the Lomé Convention. Zimbabwe has an international reputation for meeting its external debt repayment obligations, and the Zimbabwe dollar has been devalued regularly, by 23 per cent against the US dollar between 1984 and 1988. Basic economic data are given in Table 4.

Nonetheless, there have been a number of policy challenges to deal with: over the last decade, controlling inflation and rising unemployment (24 per cent of the adult workforce in 1990) have been the major policy problems facing Zimbabwe's new government, together with balancing the level of government social expenditure considered necessary after Independence against the mounting budget deficit. This has increased by nearly 80 per cent between 1983 and 1987 and is now equivalent to 10 per cent of GNP. External debt has also been rising, to Z$2.8 million, equivalent to 45 per cent of GNP, in 1988. And land reform has been a central issue. A Land Acquisition Bill was put before Parliament in February 1992, which would transfer a large proportion of the land currently used by large-scale commercial farmers to 110 000 communal farmers, with the aim of increasing the equity of land ownership in Zimbabwe and increasing land use efficiency.

Thus post independence economic policy has had two contrasting components: promotion of economic growth, prompt external debt repayments and avoidance of capital account deficits on the one hand; and on the other, increased government expenditure to redress inherited structural imbalances in the economy. So Zimbabwe has pursued a distributive rather than a pure growth development model.

Zimbabwe has three main agro-climatic zones: the lowveld in the North and South, which has a humid tropical climate; the highveld and the Midlands, at altitudes of 900-1 200m; and the Eastern mountains, reaching 2 595m. The last two have a semi-tropical climate. The main constraint to agriculture is the wide annual variation in rainfall which makes Zimbabwe prone to recurrent drought.

Although agriculture contributes less than 15 per cent of Zimbabwe's GDP, it is very important for employment (accounting for 70 per cent of the active population), domestic food supplies (in most years, Zimbabwe is self-sufficient in food) and provides 33 per cent of exports. Overall it is relatively technically and economically efficient and well diversified (again because of sanctions). However, as in Malaŵi and Zambia, the agriculture sector is clearly divided between the large-scale commercial farming sub-sector, which accounts for 90 per cent of marketed agricultural output and uses most the external inputs, extension advice and credit, and small-scale, low-input farming in the communal areas. Historically, nearly 50 per cent of the arable land, including the higher potential zones, were reserved for no more than 6 000 large-scale commercial farmers. Despite an active programme of re-settlement after Independence, population densities in the lower potential communal areas remain high, resulting in over cultivation and over grazing. Land-holdings average 3ha.

Although the area under cultivation increased by more than 75 per cent between 1971 and 1986, still only 0.2 per cent of the total land area is farmed. And although agricultural production increased by 28 per cent between 1980 and 1988, this did not keep pace with population growth and per capita food production fell by 7 per cent a year over the same period. The main crops grown are sugar cane, maize, wheat, tobacco, soyabeans, cassava and groundnuts. In the communal areas security crops such as sorghum, millet and bambarra nuts are also important.

During the 1950s and 1960s, an informal but extensive co-operation developed between government breeders and the various national seed associations. This co-operation was formalised in 1967 by the negotiation of a Tripartite agreement (for maize), and at a later stage Bipartite agreements (for sunflower, wheat, barley, soyabeans, groundnut and sorghum), between the government, the Commercial Farmers' Union and the seed associations. The central conditions laid out in the agreements are that all new varieties released by government are made available to the seed associations (the government retains plant breeders rights but licenses them free of charge to the seed associations for production) and that the seed associations' annual production schedule is negotiated in advance between the government, the Commercial Farmers Union and the seed associations. These agreements are unique to Zimbabwe, the original aim behind them being to create a state-controlled seed monopoly to serve the large-scale commercial farming sector whilst securing its efficiency by leaving production in private hands.

Table 4: Zimbabwe: development indicators

	1980	*1981*	*1982*	*1983*	*1984*	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*
GNP *per capita* (US$) (current price)	710.0	860.0	900.0	850.0	730.0	620.0	560.0	540.0	610.0	640.0	
Gross National Product (current price) US$ m.	5 281.7	6 256.2	6 590.7	5 979.7	4 991.2	4 178.3	4 751.4	5160.9	5742.5	5757.4	
Gross domestic product (average annual growth %)	10.6	12.5	2.6	1.6	-2.5	6.7	2.7	-1.4	7.0	5.5	4.1
Agriculture (% share of GDP) [a]	12.0					13.0				13.0	
Industry (% share of GDP) [a]	39.0					43.0				39.0	
Private consumption, *etc.* (%)	62.6	62.4	61.3	66.8	59.5	56.2	57.0	51.2	54.0	55.5	
General government consumption (%)	19.1	16.0	18.7	17.8	21.4	22.5	22.7	28.8	26.8	24.9	
Inflation	9.4	14.5	14.2	19.4	4.1	2.7	15.1	9.2	12.1	12.5	
Government deficit (-) or surplus (current price) US$ m.	-585.1	-379.0	-718.4	-388.6	-520.3	-317.9	-383.1	-588.4	-557.7		
Government deficit (% of GNP)	-11.1	-6.1	-10.9	-6.5	-10.4	-7.6	-8.1	-11.4	-9.7		
Exports of non-fuel primary products (% total exports)	70.4	75.4	74.2	68.6	67.5	64.1	63.0	59.1	59.5		
Exports of fuels (% total exports)	1.2	1.1	1.3	1.5	1.4	1.4	0.4	0.4	0.4		
Exports of manufactures (% total exports)	28.4	23.5	24.6	29.9	31.1	34.5	36.6	40.5	40.1		
Terms of trade index (1987=100, US$-based)	118.2	107.9	101.3	106.6	108.6	100.1	94.6	100.0	100.8		
Current account balance after off. trans. (US$ m., BoP)	-243.8	-637.6	-706.5	-458.7	-97.4	-78.1	6.1	44.9	57.0	-108.6	
Exchange rate (annual average, local per US$)	0.6	0.7	0.8	1.0	1.2	1.6	1.7	1.7	1.8	2.1	
Debt service ratio [b]	3.8			36.9	26.1	29.0	31.0	32.1	28.3	23.9	24.4
External debt (% of GNP)	14.9	20.0	28.0	38.7	45.2	59.0	56.9	56.4	46.3		
Concessional debt (% of total) [c]	2.3			9.0	11.9	16.1	20.2	25.6	28.8	29.6	29.7
Nominal interest rate [d]	3.4	5.7	8.5	8.5	8.5	8.5	8.7	8.7	8.4		8.4
Real interest rate [e]	-6.0	-8.8	-5.7	-10.9	4.4	5.8	-6.4	-0.4	-3.7		8.4

Notes: Unless otherwise indicated all data are calculated from the World Bank, World Tables, 1990 update, diskette.
(a) World Bank; World Development Report, various editions;
(b) Total debt service to exports of goods and services;
(c) World Bank World Debt Tables 1991-1992;
(d) Treasury Bill Rate (IMF; International Financial Statistics, various editions);
(e) Nominal less inflation.

As it was considered that the seed sector did function efficiently as a result, the agreements were renewed after Independence and the latest Bipartite agreement was signed in 1982. The division of labour between the government and private seed sector in Zimbabwe at present thus leaves seed multiplication, processing and distribution in private hands, while the state has taken charge of research, certification, quality and price control.

More than 90 per cent of the maize crop in the communal areas is now planted to hybrid seed but use of improved seed for other crops remains very low.

Seed Co-op, the largest seed company in Zimbabwe today, was born out of the merger in 1983 of the two largest seed associations. It is made up of large-scale commercial farmers. Since iIndependence, other private and public seed organisations have emerged, even though Seed Co-op has maintained its virtual monopoly status. Meanwhile parastatals such as GMB and ARDA have been involved in seed production and NGOs such as ENDA have also initiated seed programmes. However, the scale and scope of parastatal and NGO activities, whilst including direct involvement in the collection and multiplication of local seed varieties as well as simple distribution of improved seed, is very limited compared with that of private seed companies.

During the 1980s, Zimbabwe has sought to deal with its economic problems primarily through its own economic reform programmes, which have involved both international finance capital and domestic interests but not, until recently, multilateral support. In particular, it has tried to exert active control over its relations with the international financial institutions. For both these reasons, Zimbabwe has had a more mixed adjustment experience compared to its neighbours.

Within government, there has been conflict between the more radical policy pressure groups, which believe state control should be used to provide a basis for internal development, and the more pragmatic groups, within the Reserve Bank and the Ministry of Finance, which believe links with international capital should be strengthened in order to encourage export-based growth.

The former strongly influenced the contents of the Transitional National Development Plan (1982-85) which was intended to control inflation and to increase exports, employment and economic growth in general and in particular to stimulate the rapid development of the rural areas. But the mid-1980s drought, increasing domestic and regional instability and rising domestic expectations forced the replacement of this with the First Five Year National Development Plan (1986-90), which has been more in line with the latter perspective, including measures to encourage direct foreign investment and liberalise trade.

However, although the FFYNDP was in line with IMF objectives, it did not use IMF-preferred strategies to achieve them. Zimbabwe refused to have an IMF agreement because of the perceived national economic costs, particularly the social costs of adjustment, but it did comply voluntarily with many IMF conditions and continued to make debt repayments. The World Bank instituted an Export Revolving

Fund in 1983 but this was suspended in 1989 and GOZ and the Bank have been in disagreement over the need for Zimbabwe to have an overall plan for liberalising trade, prices and industry.

By the end of 1991, the increase in private investment and donor funds anticipated to result from the GOZ five-year economic reform programme had not materialised and, as Zimbabwe's current level of debt repayment, unsupported, is depriving the private sector of badly needed foreign exchange, the government finalised a US$400 million loan from the IMF in November 1991. This has been followed by a World Bank loan of US$125 million and an IDA credit of US$50 million, agreed in January 1992 to support the structural adjustment programme. GOZ is likely to have sought a further US$1 000 million in pledges at the February 1992 Paris group consultative meeting.

The main aims of the structural adjustment programme are to achieve economic growth of 5 per cent p.a. by 1995 and to create 100 000 jobs annually during this period. This is to be achieved by cutting the fiscal deficit through reducing the deficits of the parastatals and cutting the civil service; by liberalising trade; by creating a market foreign exchange allocation system; by lifting import restrictions on all goods; and by removing controls on domestic investment, prices and wages. Given the difficulty GOZ has experienced in the past with moving from a controlled economic system, it remains to be seen whether this programme will be achieved. In the meantime, the current account balance of payments deficit has doubled to US$900 million, partly as a result of the massive increase in imports following the 1991 trade liberalisation; the debt service ratio for 1992 is projected at 30 per cent, compared to the planned 20 per cent; inflation has doubled to 25 per cent; and interest rates, although increased to 17.5 per cent, are negative in real terms. Devaluations of over 90 per cent during the course of 1990 and static prices for controlled agricultural crops have contributed to a switch from maize, cotton and beef production to tobacco and horticultural crops. This in turn has prompted plans to be made for 100 000 tonnes of maize to be imported, in contrast to Zimbabwe's usual surplus position.

3.4 Conclusions

Malaŵi has implemented reform continuously since the start of the 1980s and, apart from the suspension of the fertiliser subsidy removal programme in 1986, this has had a real and direct effect both on price levels and on the structure of the economy — one of the most significant changes in this latter being the reduction in the role of ADMARC. NSCM will have been affected by the increased cost of imported raw materials resulting from devaluation and by the increased interest rates on money used to finance inter-seasonal seed storage; on the positive side, the reduced rate of inflation will have limited the increase in the cost of NSCM's domestically procured inputs. The affects on the other institutions with a role in the seed sector will have been most marked for the Department of Agricultural Research, faced with a declining government budget, and for ADMARC which is under increasing pressure to operate commercially, at the same time as being expected to continue to carry out certain development functions; the most significant with respect to its seed operations is the implementation of the maize seed subsidy. The incentive for small farmers to use

improved seed has almost certainly declined, in the face of declining real producer prices — especially for food crop non-tradeables; seed prices have also declined in real terms, but not to the same extent.

Zambia has had intermittent attempts to implement economic reform during the 1980s but unwillingness to risk political unpopularity has meant that many of the reforms have not been carried through. Thus, the new government elected in October 1991 has a range of serious macroeconomic problems to try to turn around. Zamseed has not been able to benefit from an improvement in macroeconomic performance in the same way as NSCM: inflation is still increasing rapidly and the currency is still over-valued — however, negative real interest rates will continue to provide relatively cheaper funding for seasonal seed operations. The increasing fiscal deficit has not been to the advantage of government agricultural research, which continues to face a shortage of operating funds. One of the reforms that has been implemented — the liberalisation of agricultural marketing in August 1990 — has had a direct and immediate negative effect on the ability of the PCUs to distribute Zamseed seed (see Chapter 5 for further discussion of this). This has limited farmers' ability to get access to improved seed, the incentive to do so having also been seriously undermined by the erosion of producer prices by inflation and rapidly increasing input costs.

Until recently, Zimbabwe's economy has performed better than most others in sub-Saharan Africa and the government has attempted to pursue independently a relatively modest adjustment programme which has emphasised monetary policy rather than market restructuring. It now seems, however, that mainstream economic reform will be implemented in Zimbabwe in the 1990s. Seed Co-op and the other seed companies will not yet have benefitted from a reduction in inflation and there are still major difficulties in obtaining imported raw materials. In addition, the recent substantial devaluations will further increase the cost of imported materials, although this will also make seed exports more competitive — a part of its business which Seed Co-op is seeking to expand. And as in Zambia, negative real interest rates will have been some advantage, as will Seed Co-op's continuing cost-plus seed pricing arrangement. Probably one of the most serious threats to Seed Co-op's future is the proposed land reform which, if implemented, would almost certainly take away a proportion of the Co-op's productive base (ie the land on which seed is cultivated by its members). It is also likely to see further re-negotiations of its past favourable seed pricing arrangements (see Section 5.3), as GOZ seeks to move to a more market price determined economy. So far, the government institutions on which Seed Co-op relies, such as the Department of Agricultural Research, have been relatively protected from direct staff and budget cuts — although budgets have been eroded by inflation — as government has continued its policy of deficit financing. This is certain to change in the near future, as the new structural adjustment programme is implemented. This will also affect the marketing services provided to small farmers, once cuts start to affect the parastatal sector, which includes the GMB responsible for providing these services to small farmers.

4. SEED SECTOR PERFORMANCE

4.1 NSCM, ADMARC and smallholder seed multiplication in Malawi[7]

The starting point for our analysis of seed sector performance in the three countries being studied is an assessment of the potential for certified seed use for the major small farmer crops and the extent to which this is currently being met. Table 5 presents the data for Malawi. It shows that only very small proportions of the potential market for certified maize and pulses seed are being tapped. The situation for groundnuts is significantly different; we present our interpretation of the reasons for this in subsequent sections, which investigate in turn the different factors that affect seed sector performance in Malawi.

Seed varieties

The attributes required of different crops by small farmers in Malawi are critically influenced by the economic and agronomic function of the crop in the farming system: high potential yield is important for crops often sold, such as hybrid maize, groundnuts and soyabeans; other attributes can be more important for crops that are primarily consumed domestically, such as local maize and beans. Overall, the range and blend of attributes required for each crop can be very complex, in order to fit specific niches in the farming system, so small farmers can require a wide range of varieties of individual crops.

However, work is only just starting to find out small farmers' variety preferences and Malawi's Variety Release Committee continues to operate a policy of limiting the total number of varieties of individual crops released for small farmers to choose from. Groundnut breeding work, in particular, remains directed towards producing high potential yield oil nut varieties and attaches low priority to small farmers' needs for confectionary nuts for on-farm consumption and local sale.

But regardless of the breeding work for groundnuts, beans and soyabeans, low incremental yields from using quality improved seed under current small farm management conditions for non-maize crops, and low incremental returns at current price levels, remain a major disincentive to small farmers.

The range of hybrid maize varieties NSCM produces is large but the absolute quantities of more profitable three way crosses are much greater than of single cross hybrids. Thus, regardless of the potential benefits, in practice small farmers often do not have access to their preferred MH12 hybrid maize varieties and have to use NSCM41 or R201/215 — and they do not have access to quality improved groundnut, bean and soyabean seed at all.

Seed quality

Small farmers' awareness of special seed selection and storage techniques is low. Most groundnut, bean and soyabean material used on-farm is grain. Bought-in

Table 5: Potential for Certified Seed use in Malawi

CROP/YEAR	*1984/85*	*1985/86*	*1986/87*	*1987/88*	*1988/89*
MAIZE					
Cropped area ('000ha)	1145.00	1193.00	1182.00	1215.10	1271.00
Area suitable for MVs	1030.50	1073.70	1063.80	1093.59	1143.90
MV seed need (tonnes)	25762.50	26842.50	26595.00	27339.75	28597.50
MV seed sales (tonnes)	1663.83	1626.12	1031.24	1593.00	1925.00
Market potential	6.46	6.06	3.88	5.83	6.73
GROUNDNUTS					
Cropped area ('000ha)	136.00	177.00	211.00	172.10	140.00
Area suitable for MVs	102.00	132.75	158.25	129.08	105.00
MV seed need (tonnes)	1836.00	2389.50	2848.50	2323.35	1890.00
MV seed sales (tonnes)	1933.16	2615.92	3212.62		2692.52
Market potential	105.29	109.48	112.78		142.46
PULSES					
Cropped area ('000ha)	80.00	117.00	152.00	149.00	215.00
Area suitable for MVs	40.00	58.50	76.00	74.50	107.50
MV seed need (tonnes)	640.00	936.00	1216.00	1192.00	1720.00
MV seed sales (tonnes)			27.30		22.44
Market potential			2.25		1.30

Notes: (1) cropped area from Ministry of Agriculture annual crop estimates data.
(2) area suitable for modern varieties assumed as 90% for maize, 75% for groundnuts and 50% for pulses.
(3) seed need calculated using sowing rate of 25kg/ha for maize, 90kg/ha for groundnuts and 80kg/ha for pulses and replacement rate of annual for maize and every 5 years for groundnuts and pulses.
(4) seed sales from ADMARC records (blanks = no record).
(5) market potential shows percentage of seed need met by current seed sales.

groundnuts are often of higher visual quality than those saved on-farm; the opposite is true for beans. All the soyabeans examined in the Malawi seed survey were of low quality.

The quality of hybrid maize seed reaching small farmers seems universally to be good, despite minor problems with weevilling and rotten kernels. In fact, the quality of both NSCM and SSMS seed is generally good, even though the latter receives 'approved' status only. In addition, small farmers appear to have good faith in the quality of seed provided at ADMARC selling points — even though from the available evidence it seems ADMARC could do more to minimise wastage and carry-over stocks. The main problem with regard to seed quality appears to be the over-stretching of Seed Services.

Seed prices

Subsidies on the retail prices for groundnut, beans and soyabean seed were removed in 1987; maize seed continues to receive a price subsidy of approximately 30 per cent. This is implemented by ADMARC selling seed cheaper than it buys it from NSCM; ADMARC is supposed to receive an annual subvention from the government for doing this. The difference in price between single and three way cross maize seed is atypically low in Malawi (usually the latter is around half the price of the former) due to the smaller difference in prices paid to contract growers, because of the smaller yield differential (1.5 tonnes/ha for single crosses and 2.2 tonnes/ha for three way crosses).

Small farmers' real returns to using quality improved seed have been lower than returns to using grain as planting material for non-maize crops until recently, because of the minimal incremental yield obtained from using such seed. The difference has now been reduced because retail seed prices and consumer grain prices (the opportunity cost of seed saved on-farm and the real price of non-seed planting material purchased off-farm) have converged. Maize seed prices increased substantially between 1989/90 and 1990/91. Because of this convergence, the influence of recommended seed replacement rates on relative returns to using seed compared to grain is minimal. However, in general, real returns to production for most crops have been declining during the 1980s as producer prices have reduced in real terms (see Table 6).

For all crops, the majority of survey households cited lack of cash to pay for seed as a constraint to use of quality improved seed although, in practice, this did not deter nearly two thirds of the households from buying hybrid maize seed (this is probably influenced by the price subsidy).

Thus, price levels appear to have a negative influence on the use of seed. But this influence is the result of the combined impact of the low levels of official producer prices pertaining in Malawi, the comparatively high input prices and the high cost of formal sector seed production and seed imports, rather than simply the result of high retail seed price levels in absolute terms.

Timeliness of seed delivery

The late delivery of the limited quantities of quality improved seed that are available for distribution to small farmers, primarily due to ADMARC's problems with co-ordinating transport from its regional depots to its field selling points, is a critically important disincentive to more widespread use of improved seed by small farmers in Malawi.

Table 6: **Agricultural Prices in Malawi, Zambia and Zimbabwe in 1984/85 — 1988/89 (maize)**

Constant Prices	*1984/85*	*1985/86*	*1986/87*	*1987/88*	*1988/89*
PRODUCER PRICE (US$/kg)					
Malawi	0.09	0.06	0.05	0.06	0.06
Zambia	0.00	0.09	0.05	0.04	0.05
Zimbabwe	0.15	0.13	0.12	0.11	0.11
SEED PRICE (US$/kg)					
Malawi					
Three way cross	0.00	0.00	0.00	0.30	0.24
Single cross	0.71	0.52	0.45	0.35	0.28
Zambia					
Three way cross	0.00	0.00	0.00	0.18	0.32
Single cross	0.00	0.00	0.00	0.35	0.57
Zimbabwe					
Three way cross	0.46	0.45	0.41	0.36	0.28
Single cross	0.93	0.90	0.83	0.72	0.78
FERTILISER PRICE (US$/kg)					
Malawi	0.22	0.20	0.17	0.17	0.07
Zambia	0.00	0.00	0.00	0.04	0.00
Zimbabwe	0.26	0.25	0.23	0.20	0.17

Sources: World Bank world tables 1990 update
Cromwell and Zambezi 1992
Friis-Hansen 1992
Erikson 1991 and Zamseed records

Notes: (1) LCU = local currency unit.
(2) fertiliser = calcium ammonium nitrate (28 per cent nitrogen) and for Zambia urea converted to comparable units of nitrogen.
(3) blank = no record.

Access to seed selling points

The 1987 ADMARC retrenchment has apparently had little impact in practice on the distances small farmers now have to travel to obtain seed. Most survey households do not in any case seem to consider distance to access points an important influence on their decisions concerning seed use. For preferred bean varieties, in particular, respondents travel up to 30 km to source seed, which is considerably in excess of average distances to ADMARC selling points.

Quantities of seed supplied

ADMARC seed sales still cover a tiny proportion of the total area cropped by small farmers: apparently no more than 10 per cent for hybrid maize and less than two per cent for beans (see Table 5).

The Ministry of Agriculture procedure for estimating quantities of seed required seems reasonable but the requests ADDs make are not always related to previous sales and allocations made by the Ministry of Agriculture do not always reflect the requests originally made by the ADDs — particularly for hybrid maize, which tends to be over-supplied, and composite maize seed, which tends to be under-supplied.

Not withstanding this, half the survey households consider hybrid maize seed is always in short supply, and more complain that even when seed is available it is often not their preferred varieties. However, only one third of households consider bean seed is always in short supply — although this assessment included availability from local non-ADMARC sources. Over half consider soyabean seed is always readily available. Groundnut seed availability seems to be a problem for the greatest proportion of survey households: over two thirds consider groundnut seed is always in short supply.

Given the apparent over-supply of groundnut seed compared to the area planted (see Table 5), this suggests that a proportion of groundnut seed is, in practice, purchased for consumption as food. The convergence of seed and consumer grain prices for this crop explains why this is an economic course of action for small farmers. Thus Malawi's experience would appear to substantiate the common perception that it is difficult to organise economically viable certified groundnut seed production and distribution in economies with controlled grain prices.

The seed supply problem in Malawi seems extremely severe and one of the major constraints to greater seed uptake. SSMS seed production is still very small and is at present mainly reserved for further multiplication. And NSCM is not producing any bean or soyabean seed for small farmers and provides groundnuts only as source seed for the SSMS groundnut schemes. NSCM is producing maize seed, and is the sole source for small farmers, but production continues to be lower than requests and problems continue with meeting both target yields and target hectarage set for contract grower production.

Pack size is an ancillary issue relating to the quantity of seed supplied. Interestingly, the 10 kg packs in which all maize seed is now supplied were considered by the survey households to be inconveniently small rather than too large. The minimum quantities in which seed of other crops is supplied did not attract the same comment; however, the 1 kg minimum quantity in which individual varieties of beans can be bought from ADMARC attracted complaints as a number of households wish to buy small quantities of a number of different varieties.

Preferred sources of seed

For groundnuts, more households actually use seed saved on-farm as their primary source than express a preference for this source. Of those using off-farm sources, ADMARC is the most commonly used source, conforming to expressed preferences. For beans, substantially more households actually use on-farm sources than cite this as their preferred source. Of the off-farm sources, local people and local markets are used by many households, conforming to expressed preferences, but, importantly, most households who source seed off-farm because of some kind of domestic crisis use ADMARC instead. For soyabeans, again more households source on-farm in practice than give this as their preferred source. Most of those using off-farm sources do use ADMARC, consistent with expressed preferences.

Thus, a greater proportion of households, very substantially so for beans, rely in practice primarily on seed saved on-farm than give this as their preferred source, suggesting there are practical constraints limiting the use of off-farm seed sources for some households.

Firm-level efficiency

NSCM has to pay relatively high prices to contract seed growers for seed production to compete with tobacco, the main alternative. Many seed processing costs have increased faster than the general rate of inflation but seed sales have been lower than anticipated when Malawi's National Rural Development Programme was planned and NSCM has stopped making groundnuts, beans and soyabean seed available to small farmers through the ADMARC distribution system. At the same time, seed retail prices were declining in real terms until 1987 and have been consistently lower than anticipated at appraisal. All these factors have contributed to NSCM's failure to cover its fixed and variable costs of producing maize, groundnut, bean and soyabean seed (although greater profitability has been achieved on other crops) and its failure to achieve its overall target 15 per cent rate of return on capital (see Table 7).

Prices paid to growers for SSMS seed provide a relatively high margin over normal commercial grain production valued at official prices (see Table 8), but for some crops, particularly groundnuts, this does not compete with producer prices offered by private traders. SSMS seed is not processed but other 'operating' costs, such as Seed Services field inspection and ADMARC handling and storage costs, are not provided for under an independent budget, and the practical operation of the Scheme continues to be severely hampered by this. Where SSMS seed is available for sale, prices are the same as for NSCM seed distributed through ADMARC. However, SSMS production remains very low at present.

Table 7: Seed price cost build-up in Malawi, Zambia and Zimbabwe (US$/kg at 1990/91 prices)

	Malawi		*Zambia*	*Zimbabwe*	
	Single hybrid	*3 Way Cross hybrid*	*All maize seed*	*Single hybrid*	*3 Way Cross hybrid*
Growers' costs	0.37	0.25	n/a	0.47	0.16
Price paid to growers	0.86	0.50	0.35	0.76	0.38
(Grower's margin (%))	(130.00)	(97.00)	n/a	(63.30)	(142.40)
Factory costs	0.35	0.21	0.15	0.11	0.06
Total seed company costs	1.21	0.71	0.50	0.88	0.44
Price paid to seed company	1.07	0.93	0.53	0.65	0.32
(Company margin (%))	(-11.57)	(30.98)	(6.00)	(-26.14)	(-26.10)
Distributors' selling price	0.71	0.65	0.60	0.85	0.42
(Distributors' margin (%))	(-33.60)	(-30.11)	(13.20)	(30.77)	(30.90)

Notes:

(1) Malawi factory costs include cost of field inspections paid for by NSCM

(2) Zimbabwe distributor margin is on shown as proportion of discounted price paid for wholesale purchases of small packs (this is lower than Seed Co-op's retail seed price and its prices for larger packs).

(3) n/a = not available

Sources: Cromwell and Zambezi 1992; Erikson *et al.*, 1989; Friis-Hansen 1992; World Bank world tables 1990 update.

Most seed for small farmers is distributed through ADMARC. Decisions about the quantities of seed to be sold to small farmers, its price, and its geographical distribution are all out of the Corporation's direct control and its main areas of responsibility are transport, handling and storage. ADMARC was re-organised in 1987but costs continue to increase per tonne of seed distributed and internal problems with seed transport, handling and storage continue: between 1982/83 and 1986/87, total seed distribution costs increased by 300 per cent but the total quantity of seed sold increased by only 200 per cent. However, external problems related to the difficulty and expense of contracting private hauliers to move seed also contribute to performance problems and the way the cost of the subsidy on maize seed is subvented to the Corporation does not provide incentives to improve internal performance. In part, this reflects the lack of attention to its seed distribution activities as these are small in quantity and value terms compared to fertiliser distribution and maize grain purchasing: maize seed distribution costs are less than 1 per cent of ADMARC's total maize trading expenses, for example.

Table 8: SSMS Seed Grower Prices 1987/88-1990/91 (nominal t/kg)

	1987/88	*1988/89*	*1989/90*	*1990/91*
Groundnuts[1]				
SSMS Grower Price	85	90	100	110
ADMARC Retail Seed Price	75	85	90	100
ADMARC Producer Price	75	85	90	95
Beans[2]				
SSMS Grower Price	89	95	100	110
ADMARC Retail Seed Price	90	90	100	110
ADMARC Producer Price	44	48	55	60
Soyabeans				
SSMS Grower Price	n/a	72	70	80
ADMARC Retail Seed Price	72	72	75	80
ADMARC Producer Price	45	47	50	60

Notes: 1. Chitembana, unshelled
2. All Recommended Varieties
n/a Not Applicable
all prices quoted in nominal values

Source: MOA Price Policy Document 1989/90 & 1990/91.

4.2 Zamseed and the PCUs in Zambia[8]

Table 9 shows the potential for certified seed use for two of the major small farmer crops in Zambia. The data show that, after some years of relying on imports to make up the amount of maize seed required, Zambia is now seed self-sufficient for this crop. The reasons for the dramatic expansion of sales in the later 1980s are discussed below. However, the situation for groundnut seed is less satisfactory, and has been deteriorating in recent years, and for beans no certified seed is produced at all at the moment.

Seed varieties

Zamseed produces seed for most small farmer crops except cotton and tobacco. This includes seven out of the eight maize varieties released during the last decade and 30 types of indigenous as well as exotic vegetable seeds. However, maize seed is the Company's main product and much of the other seed is made available only on an *ad hoc* basis through individual local and foreign NGO development projects.

Table 9: Potential for Certified Seed Use in Zambia

CROP/YEAR	*1982/83*	*1983/84*	*1984/85*	*1985/86*	*1986/87*	*1987/88*	*1988/89*
MAIZE							
Cropped area ('000ha)	454.50	546.70	581.00	588.49	593.00	596.00	596.00
Area suitable for MVs	409.05	492.03	522.90	529.64	533.70	536.40	536.40
MV seed need (tonnes)	10226.25	12300.75	13072.50	13241.03	13342.50	13410.00	13410.00
MV seed sales (tonnes)	8350.00	6200.00	6890.00	7305.00	8870.00	10405.00	13500.00
Market potential	81.65	50.40	52.71	55.17	66.48	77.59	100.67
GROUNDNUTS							
Cropped area ('000ha)	22.44	31.39	33.00	34.36	37.00	42.00	46.00
Area suitable for MVs	20.20	28.25	29.70	30.92	33.30	37.80	41.40
MV seed need (tonnes)	363.53	508.52	534.60	556.63	599.40	680.40	745.20
MV seed sales (tonnes)	44.00	10.00	12.00	12.00	9.00	10.00	12.00
Market potential	12.10	1.97	2.24	2.16	1.50	1.47	1.61

Notes: (1) cropped area from DANAGRO, 1987; Norrby, 1986.
(2) area suitable for modern varieties assumed as 90% for maize, 75% for groundnuts.
(3) seed need calculated using sowing rate of 25kg/ha for maize and 90kg/ha for groundnuts and replacement rate of annual for maize and every 5 years for groundnuts.
(4) seed sales from Erikson *et al.*, 1989. This includes imports of 1500 tonnes, 1500 tonnes and 4000 tonnes of maize seed in 1983, 1984 and 1986 respectively.
(5) market potential shows percentage of seed need met by current seed sales.
(6) calculations for bean seed not included because certified bean seed not produced by ZAMSEED.

Zambia's eight maize varieties are designed to provide stable, well adapted, high yielding varieties for early, medium and late maturity in each of Zambia's three main agricultural zones; they include single, double and three way cross hybrids and two open-pollinated varieties. These latter account for less than 10 per cent of maize seed sales, however, and the three way crosses MM603 and MM604 account for 60 per cent of sales.

This range of varieties has been an important contribution to increasing maize production in Zambia: Table 9 shows clearly the marked increase in maize seed sales following the release of these varieties in the mid-1980s (previously, there had been only one variety suitable for small farmers, the single cross hybrid SR52). However, this range also has disadvantages in terms of increasing Zamseed's production costs and increasing the need for marketing and extension advice for small farmers about the relative merits of each.

A majority of small farmers use hybrid seed for maize production. In the 1991 seed survey, vegetables, groundnuts and beans were the other main crops for which improved seed was considered necessary by small farmers. However, the main reason given for needing Zamseed seed was shortage of seed on-farm rather than the superior attributes of the improved varieties.

Seed quality

The seed quality provisions of Zambia's 1967 Seed Law have generally been implemented well and SCCI has provided an effective quality control service at a charge equivalent to less than two per cent of total costs per kg of seed produced by Zamseed. Farmers ranked seed quality second from last in the 1991 seed survey list of seed problems.

Timeliness of seed delivery

In contrast, late delivery was a major problem with maize seed. Small farmers need seed stocks to be ready on-farm by October and have little flexibility in sourcing seed if it is not available at the local co-operative depot due to lack of transport. However, Zamseed and the PCUs rarely manage to move all seed out to the stores by this time.

Access to seed selling points

80 per cent of all farmers are within 10 km of the nearest rural co-operative depot (deemed to be within acceptable walking distance), so seed should be easily available locally as these are the major access points for seed for small farmers. But maize seed is the only line sold in all nine Provinces in Zambia and most non-maize seed sales are made via a few local development projects, which severely limits its widespread availability. In addition, 65 per cent of maize seed goes to only three Provinces (Southern, Central and Eastern) and many varieties are available only in the higher potential zones. Thus physical access to improved seed is severely limited for many small farmers: many farmers in the 1991 seed survey were familiar with the names of the new varieties but had no information about their local availability.

Seed prices

The price of seed in not regularly directly subsidised in Zambia however periodically subventions are made by GRZ to Zamseed to avoid seed price increases. In 1987/88, for example, GRZ provided ZK8 million to Zamseed for this purpose.

The expense of improved seed was ranked as the second most important problem for farmers in the seed survey after poor physical availability. Although GRZ controls seed prices and takes farm input costs into account when setting them, the need to provide contract seed growers with an acceptable margin and to limit the impact on consumer food prices, often means retail seed prices provide farmers with little net economic benefit from using improved seed (see Table 6).

However, as in Malaŵi, it is not the price of seed alone but its comparison with other inputs costs and expected yield, which is considered to have the greatest influence on small farmers in Zambia. This was clearly illustrated in the 1970s when the maize variety ZH1 was released with the intention of providing farmers with a cheaper alternative to SR52. This failed to be taken up, primarily because farmers were willing to pay the additional cost of SR52 as this was judged to be sufficiently out-weighed by its additional yield.

Quantities of seed supplied

Zamseed plans seed production to provide the quantities specified in Zambia's Fourth National Development Plan (1989-93) and there has been a significant increase in the small farmer area planted with improved maize seed, from 30 per cent in 1981 to over 70 per cent in 1988. Zamseed can now meet all the effective national demand for improved maize seed and nearly 50 per cent of vegetable seed and, as a result, is actively investigating means of exporting seed.

In general, sales have failed to keep pace with production potential and effective demand is far below potential: the use of non-maize seed is still very low (see Table 9). Non-availability of improved seed at depot level was the single most important seed problem faced by farmers in the seed survey.

Nearly 60 per cent of the total volume of improved maize seed sold in Zambia is distributed in 10 kg packs. However, the seed survey found there is a clear polarisation in farmers' attitudes towards pack size: 70 per cent were happy with the 10 kg packs but 20 per cent stated they wanted to use larger 50 kg packs. Overall, however, few of the farmers interviewed visualised different pack sizes clearly and packaging was not specified as a major seed problem.

Firm-level efficiency

70 per cent of all Zamseed's seed sales, mainly maize, are to the small farm sector. The Company achieved a large increase in sales between 1980 and 1990, particularly in maize seed, which accounts for 60 per cent of income. Vegetable and pasture seed sales (8 per cent of income) are unlikely to have increased further without more active promotion and maize seed sales have been adversely affected by the 1990 agricultural market liberalisation (see Chapter 5) — falling to 7 000 tonnes in 1990, for example [SIDA, 1991]. However, sorghum seed sales may have increased significantly after the 1989/90 producer price increases. Profits have increased over the decade, to ZK9.9 million net of tax in 1988, equivalent to 18 per cent of revenue.

Zamseed has a 1,200 ha seed farm for pre-basic and basic seed production but all certified seed is produced by contract growers, 150 large-scale commercial farmers who are members of ZSPA for maize and some small-scale farmers supervised by the MOA for self-pollinated crops. Grower area has remained constant at 6 000 ha due to the limited attractiveness of seed production for large-scale commercial farmers. The heavy reliance on contract growers also makes production planning difficult and

yields are low as there has been little formal research into seed production techniques suitable for growers.

Zamseed processing facilities are dispersed at four locations around the country; although this reduces transport costs from grower to factory, it is also considered to reduce overall processing efficiency. Insufficient total processing capacity has further imposed constraints on Zamseed's operations.

The cost build-up for Zamseed's certified maize seed is given in Table 7.

The size of Zamseed's operating margins has been criticised. However whilst it is probably true that some of the Company's overhead costs could be better controlled (in particular, better use could be made of existing seed stocks and storage at district and provincial levels needs to be tightened up), Zamseed also funds a significant amount of agricultural research work and all the primary seed distribution exercise out of these margins (see Table 10).

And a number of the critical influences on Zamseed's efficiency and profitability are external to the Company: the range of crops and varieties Zamseed is expected to produce is probably too wide to be efficient; the problems with carry-over stocks are largely due to the PCUs overestimating demand; poor uptake of new seed varieties by small farmers is partly because of the lack of PCU marketing and MOA extension for them.

Zamseed seems to be an efficient and reasonably effective seed organisation and its overall impact has been significantly positive (see Table 12). According to a recent review, national seed sales have increased by 150 per cent to 15 000 tonnes annually; increased maize seed sales alone are estimated to have contributed up to 10 per cent to national maize production; average annual small farmer incomes are estimated to have increased by ZK250 per household; and the overall national benefits of Zamseed's operations are valued at around ZK100 million annually. A 1986 assessment of the distribution of benefits from Zamseed's operations concluded about 30 per cent went to small farmers, about 17 per cent to large-scale commercial farmers, just over 50 per cent went to food consumers and 2 per cent went to Zamseed's shareholders.

However, in overall terms, it has relatively limited responsibilities. In particular, all secondary seed distribution is done by the PCUs. And it has benefitted from ZK435 million of support from the Swedish aid programme over the last decade, covering variety development, Zamseed operations and technical assistance. Ultimately, it is difficult to easure Zamseed's performance against targets as few records have been kept and neither its own management nor its aid donors have ever had an operational plan for the Company.

Table 10: Zamseed Income Statements 1980/81-1988/90 (Mill. Kwacha)

Item	*81/82*	*82/83*	*83/84*	*84/85*	*85/86*	*86/87*	*87/88*	*18/89*	*Total*
Revenue									
Export	0.0	0.0	0.0	0.2					
Domestic	11.2	13.0	12.3	16.7					
Total Revenue	11.2	13.0	12.3	16.9	24.7	39.6	65.7	115.0	298.4
Costs									
Local production	6.8	8.0	7.6	9.1					
Imported goods	0.8	1.6	1.6	3.8					
GROSS PROFIT	3.6	3.4	3.1	4.0	7.2	15.7	12.6	35.3	
GROSS PROFIT %	32.1	26.2	25.2	23.7	29.1	39.6	19.2	30.7	
Other costs									
Labour	0.3	0.7	0.9	0.9					
Transport	0.3	0.6	0.6	0.6					
Building maintenance	0.0	0.1	0.25	0.2					
Sundry oper. expenses	0.1	0.3	0.3	0.3					
Research & Development	0.0	0.0	0.1	0.3					
Marketing & Administration	0.1	0.2	0.6	0.5					
Interest	0.2	0.3	0.1	0.4	0.9	0.6			
Depreciation	0.1	0.1	0.1	0.2	0.4	0.2			
Total Costs	8.7	11.9	12.1	16.3	20.0	31.8	54.0	108.2	263.0
PROFIT BEFORE TAX	2.5	1.1	0.2	0.6	4.7	7.8	11.7	6.8	35.4
PROFIT BEFORE TAX, % of revenue	22.3	8.5	1.6	3.6	19.0	19.7	17.8	5.9	11.9
Tax	0.6	0.3	0.0	0.0	0.6	1.0	1.8	1.0	5.3
NET PROFIT	**1.9**	**0.8**	**0.2**	**0.6**	**4.1**	**6.8**	**9.9**	**5.8**	**30.1**

Source: Erikson *et al.*, 1989

4.3 Seed Co-op as market leader in Zimbabwe[9]

Table 12 shows the potential for certified seed use for the major small farmer crop in Zimbabwe. This shows that, in the decade since Independence, Zimbabwe has succeeded in saturating the small farm maize area with certified seed. Comparable data for the other crops of importance in the small farm sector are not available. Table 13 shows, as an alternative, farmers' responses to seed survey questions about source of seed. From this information, coverage of certified seed is clearly much less for these other crops — ranging from one third to one half of area sown.

Table 11: Estimated impact of the Zambian seed programme (million kwacha)

	1981/82	*1982/83*	*1983/84*	*1984/85*	*1985/86*	*1986/87*	*1987/88*	*1988/89*	*1989/90*	*1990/91*
Crop										
Vegetables		-0.1	-0.1	.0	2.0	10.1	10.6	10.8	10.8	10.8
Potatoes	0.2	0.2	0.1	-0.5	-2.2	-0.9	-1.0	-0.8	-0.7	-0.6
Maize				3.00	103.50	113.00	114.00	115.20	128.40	142.10
Pasture						0.2	0.2	0.2	0.2	0.2
Sorghum									11.2	11.2
Zamseed net profit	2.4	0.9	-0.1	0.4	3.3	0.3	0.1	0.2	0.1	0.2
Total impact	2.6	1.0	-0.1	2.9	106.6	122.7	123.9	125.6	150.0	163.9
Reversal subsidies	0.1	0.2	0.2	0.2	1.4	3.2	3.3	3.1	2.8	2.7
ASSP support	2.3	3.3	3.6	4.9	7.6	20.3	14.4	10.6	8.7	5.9
Net benefits	0.4	-2.1	-3.5	-1.8	100.4	105.6	112.8	118.1	144.1	160.7

Source: Norrby, 1986

Table 12: Potential for Certified Seed Use in Zimbabwe

CROP/YEAR	*1982/83*	*1983/84*	*1984/85*	*1985/86*	*1986/87*	*1987/88*	*1988/89*
MAIZE							
Cropped area ('000 ha)	1100.00	1050.00	1136.00	1018.00	1000.00	900.00	920.00
Area suitable for MVs	990.00	945.00	1022.40	916.20	900.00	810.00	828.00
MV seed need (tonnes)	24750.00	23625.00	25560.00	22905.00	22500.00	20250.00	20700.00
MV seed sales (tonnes)	10550.00	15050.00	18150.00	18300.00	18850.00	24550.00	21400.00
Market potential	42.63	63.70	71.01	79.90	83.78	121.23	103.38

Notes:
1. data relate to communal areas (small farm areas) only.
2. cropped area from Friis-Hansen, 1992.
3. area suitable for modern varieties assumed as 90%.
4. seed need calculated using sowing rate of 25kg/ha and annual replacement.
5. seed sales from Friis-Hansen, 1992.
6. market potential shows percentage of seed need met by current seed sales.
7. data for other crops not complete.

Maize

Over time, Zimbabwe has developed a large number of hybrid maize varieties suited for a wide range of agro-ecological zones. Although these were first developed for the large-scale commercial sector, they have proved suitable for small farmers as well and there has beenstrong demand for them from this sector too. However, there is a statutory ban on the sale of open-pollinated maize, in order to maximise national food security through enforcing production using higher-yielding hybrid seed: this increases the cost of maize production considerably for communal farmers.

Table 13: Source of seed for communal farmers in Zimbabwe (% farmers using)

Source	*Maize*	*Sorghum*	*Sunflower*	*Groundnut*	*Cotton*
Farm-saved	2.1	56.1	50.4	71.5	3.0
Local farmer	-	8.8	19.5	11.1	1.5
Local trader	13.1	5.3	6.5	7.0	1.5
Local store	14.8	3.5	1.2	1.2	13.6
Co-op union	13.1	1.8	2.6	4.7	22.7
Urban store	25.9	-	1.2	0.6	7.6
Farmers co-op	25.4	5.3	2.6	1.7	13.6
GMB/CMB	-	14.0	-	0.6	36.4
Seed co-op/ AFC loan	5.5	-	1.7	-	-
Drought relief	-	5.3	14.3	-	-

Source: Friis-Hansen, 1992

Notes: GMB = Grain Marketing Board
CMB = Cotton Marketing Board
AFC = Agricultural Finance Corporation

As part of its Tripartite and Bipartite seed sector agreements, GOZ determines seed prices based on a production cost model which allows for a 10 per cent margin over production costs (see Table 14). This has been relatively successful: seed prices offered to wholesale distributors are highly competitive compared with similar prices in other African countries net of subsidy (see Table 7). At the same time, seed producer prices have been high enough to make seed production attractive for large-scale commercial farmers compared to other possible enterprises. However, seed prices at farm gate level are often considerably higher than the official maximum retail prices given in Table 6. The price difference between three way cross and single cross maize seed is larger than might be expected on the basis of the difference in yields (see Table 7).

The vast majority of communal farmers now buy hybrid maize seed annually and the market for this type of seed in Zimbabwe is saturated (communal farmers account for 90 per cent of total maize seed sales).

Table 14: Maize seed cost calculations 1982-89 (nominal Z$)

	82/83	*83/84*	*85/86*	*86/87*	*87/88*	*88/89*
Seed co-op						
TVC	795.50	932.43	n/a	1 327.93	1 458.85	1 630.57
Overheads	272.84	315.99	n/a	464.78	510.60	570.70
Cost of finance	222.33	240.52	n/a	119.51	131.30	146.75
Total cost/ha	1 290.72	1 488.94	n/a	1 912.22	2 100.75	2 348.02
Cost/pocket	43.02	49.64	n/a	63.74	70.03	78.27
Producer margin	4.30	4.96	n/a	6.37	7.00	7.83
Producer price	47.32	54.59	n/a	70.11	77.03	86.10
Seed co-op expenses	6.64	7.90	n/a	10.48	11.51	12.87
Total cost/pocket	53.61	62.49	n/a	80.59	88.54	98.97
Selling price	47.50	55.64	n/a	74.92	74.92	74.92
Net profit/pocket	-6.11	-6.85	n/a	-5.67	-13.62	-24.05
MLARR						
TVC	781.77	913.03	n/a	1 276.47	1 271.15	1 587.42
Overheads	291.77	160.51	n/a	446.76	514.90	555.60
Cost of finance	226.47	412.96	n/a	n/a	n/a	n/a
Total cost/ha	1 300.01	1 486.50	n/a	n/a	n/a	n/a
Cost/pocket	43.33	49.55	n/a	n/a	n/a	n/a
Producer margin	4.33	4.95	n/a	n/a	n/a	n/a
Seed co-op expenses	7.90	7.90	n/a	n/a	n/a	n/a
Total cost/pocket	55.56	57.45	n/a	66.20	71.14	n/a
Selling price	55.64	74.92	74.92	n/a	74.92	n/a
Net profit/pocket	0.08	17.47	8.72	n/a	3.48	n/a

Source: MLARR and Seed co-op.

Note: pocket = 50 kg; TVC = total variable costs.

Groundnuts

Most communal farmers still use retained groundnut seed, largely because suitable improved short-season varieties are not distributed in the communal areas as seed grower prices are too low to attract sufficient production; various public sector groundnut seed schemes have also been tried during the last decade without success. There is therefore an acute shortage of improved groundnut seed in the communal areas. At the same time, the effective demand for this seed is low as communal farmers can save seed themselves satisfactorily and using improved seed provides little real economic benefit at current producer prices.

Food legumes

Improved soyabean seed is available from urban wholesalers only and this has significantly limited its spread in the communal areas. Improved cowpea and bambarra nut seed is also available only in small quantities at district and province centres — even though both crops are important for domestic food security, for which there is currently a serious shortage of seed of local varieties following the droughts of the mid-1980s.

Small grains

Much small grain cultivation in communal areas has been displaced by commercial maize during the 1980s. The yields of the available improved millet and sorghum varieties can be up to six times higher than those of local varieties, but they are not as well adapted to low input management and to local end uses. In addition, there are no open-pollinated varieties available yet. And there has been considerable delay in producing seed of the improved varieties that are available. Retail prices have been high as private seed stockists have been unwilling to sell seed for which there has been little marketing in the communal areas.

Sunflower

Sunflower is well suited to cultivation in the communal areas as it can adapt to a wide range of soil and climatic conditions and it is not affected by witchweed, a parasitic weed which commonly affects maize. Two new hybrid varieties have been released since 1980, which are easier for communal farmers to handle than their own local open-pollinated varieties — as they have more uniform maturity — and which have considerably higher oil content. However, sales are only about 20 per cent of potential, primarily because marketing in the communal areas has been neglected. An additional problem is that the current producer price structure does not offer a premium for the higher oil content varieties, despite a national shortage of vegetable oil, so there is little incentive for farmers to pay the higher price for improved hybrid seed (in 1989, this was four times the cost of retained seed valued at the producer price).

Access to seed

The marketing of seed of crops other than maize has thus not been successful in Zimbabwe. On the one hand, purchasing seed of commercially insignificant crops such as sorghum, sunflower and legumes, has not been economically attractive to the private sector wholesalers and retailers who are responsible for seed distribution. On the other hand, the demand for such seed of these varieties has been low — because of insufficient extension information about their existence, combined with the release of varieties which have not fully taken into account the farming conditions facing small-scale farmers.

Firm-level efficiency

The basis for the operation of the seed industry in Zimbabwe is laid down in Tripartite and Bipartite agreements, which grant monopoly rights for production of government released varieties to one private seed company: Seed Co-op. From the point of view of maize seed production capacity, this agreement has been a success: Zimbabwe has never been short of maize seed (see Table 12). From the available evidence, Seed Co-op's performance has also been efficient in both technical and economic terms (see Table 7).

Competition between different private companies for seed of maize, sorghum and sunflower does exist in the Zimbabwe market, but not on any significant scale. Savanna Seed is presently the only private company challenging Seed Co-op, by offering South African released varieties. Savanna Seed does not compete on retail seed prices but does offer seed traders a higher mark-up than Seed Co-op. Savanna Seed has gained a market share of approximately 5 per cent. One effect of this competition has been that Seed Co-op has begun to be more active in marketing its seed to communal farmers.

The Bipartite and Tripartite agreements have thus been relatively successful in ensuring that sufficient quantities of quality maize seed are produced at reasonable prices, but they have not been able to deal with seed of non-maize crops in a way that maximises development impact.

4.4 Conclusions

In terms of national development impact, the seed sector in Malaŵi has performed poorly for maize seed — but this has been due to a combination of factors including the non-availability, until recently, of varieties suitable for small farmers and the poor seed:grain price ratio that has been maintained. It has also performed poorly for bean seed, but it has been more successful for groundnut seed. Zambia has made fast progress with maize seed, not least because of the release in the mid-1980s of varieties specifically designed to be small-farmer friendly, and it has also performed well for vegetable seed. Groundnut and bean seed have both done less well. In Zimbabwe, a mature maize seed market in the communal areas has been achieved in under a decade but there is still progress to made for seed of other important small farm crops, the majority of which have continue to receive relatively little attention from the formal seed sector.

It is difficult to assess categorically on the data available in the public domain the firm-level efficiency of the seed producing companies — at least in part because the companies have not to date had to justify their performance on these grounds to external authorities such as government and donors. From the data that are available, it is probably safe to assume that all are reasonably efficient producers and processors of seed: certainly none have the internal organisational problems of many other comparable seed companies such as, for example, Tanseed or, when it was still operating, Ghana Seed Company [Budden, 1986; Africa Economic Digest, October 1989]. The operating environment of all the companies is distorted to some extent by the direct and indirect intervention of government. NSCM, for example, does not have

to pay for the breeder seed it receives from the Department of Agricultural Research and much of its marketing risk is borne by ADMARC. Seed Co-op, as we saw above, benefits from monopoly access to new GOZ varieties and from its cost-plus pricing arrangement. Zamseed too has benefitted from substantial donor support and free access to SCCI quality control services. However, negative distortions also operate — such as the obligation to produce uneconomic varieties, and the substantial contributions that have to be made to research and/or quality control services in order to keep them operational — and it is ultimately difficult to determine the relative cost and benefit of these distortions.

The efficiency of the organisations mandated to distribute seed in the three countries (ADMARC in Malawi, the PCUs in Zambia and the private retail traders in Zimbabwe) is more questionable. As with the producing companies, the seed activities of these organisations have never been subject to detailed external scrutiny so it is not possible to present direct evidence concerning performance. Nonetheless, the indirect, evidence presented earlier in this Chapter, suggests that there is considerable scope for increasing the efficiency of seed distribution in all three countries.

As regards other issues affecting the performance of the seed sector, seed quality is apparently good but timeliness of seed delivery is apparently a major problem in all the countries, the latter particularly in Malawi and Zambia. However, the survey evidence has contradicted the widespread assumption (see, for example, Gerhart, 1975 concerning Kenya and ICD, 1987 concerning Pakistan) that the density of seed delivery points is a major determinant of seed uptake by small farmers.

Thus, three issues have emerged as of major importance for seed sector performance in the three countries. First, the need for seed varieties that are adapted specifically to the needs and constraints facing small farmers (this contrasts with the conclusions drawn by, for example, the study of rice varietal development [Evenson and David, 1992] conducted as part of the overall OECD research to which the present study contributes). This would appear to be one of the main factors explaining the differential uptake of hybrid maize seed in Zambia and Zimbabwe compared to Malawi (although Malawi, too, has recently released two flinty hybrids which have been developed specifically for small farmer needs).

Second, the need for agricultural price policy to take account of the direct effects on seed uptake of changes in producer and input prices. The general difficulty of creating a market-driven seed sector in economies with controlled agricultural prices has been illustrated clearly by the experience of all three countries. In Malawi, for example, we have seen how the convergence of seed and producer prices for groundnuts is apparently resulting in the consumption of groundnut seed as food. In Zimbabwe, we have seen in Chapter 3 the general movement in the communal areas out of the production of crops with controlled prices, such as maize, into production of tobacco and other crops without controlled prices. This demonstrates the wider problem for the seed sector of attempting to supply seed needs that are subject to substantial fluctuation caused by changes in the cropping pattern in response to changes in official producer prices.

Third, and more generally, we have seen the problem of reconciling small farmer seed needs with those of commercial seed companies. Zamseed and Seed Co-op have both performed well for hybrid maize seed, which has also been NSCM's major product by volume, but none of the seed companies in this study have performed well in supplying seed of self-pollinated crops of varieties acceptable to small farmers. Seed Co-op, for example, has been supplying groundnut seed, but only of varieties suitable for large-scale commercial farmers; NSCM has abandoned production of bean seed altogether, due to the high cost of producing seed in the dry season under irrigation, which is required in Malaŵi for beans in order to minimise disease.

5. THE INFLUENCE OF POLICY

5.1 Malawi

National Seed Company of Malawi

Although scope for marginal improvement in the Company's internal efficiency remains (in particular, greater involvement in marketing and distributing its own seed), many aspects of this are in any case already being dealt with by Cargill since they became involved in the Company in 1988, and it is factors external to NSCM that now have most influence on performance. Some of these, most importantly the strong competition between tobacco and maize seed production, which requires relatively high prices to be paid to NSCM's contract growers, and the prevalence of field and store bean pests in Malawi which require formal sector seed production to be done more expensively in the dry season using irrigation, stem from the Malawi's agro-ecology and so have to be worked around rather than dealt with.

The way NSCM's linkages with other organisations have worked, particularly with ADMARC and the ADDs, has also had an important influence. In particular, the Company's fear of amassing large, expensive carry-over seed stocks due to reliance on the ADDs' over optimistic seed estimates — which it did in the mid-1980s with disastrous consequences — caused it to limit seed production in the late 1980s, which has contributed to the difficulty small farmers face in getting access to quality improved seed. Delayed payments for seed by ADMARC have also often increased NSCM's seasonal finance requirements.

Nonetheless, although NSCM is vocal in recognising the fragility of its implicitly protected trading position, as the sole producer of certified seed in Malawi, and its consequent obligation to be sensitive to national development needs, in practice it seems to have been able to operate along relatively conventionally commercial lines. Most of the time, it has produced the quantities of seed that will minimise its carry-over stocks; it has produced more of the cheaper three way cross maize hybrids and less (none for the small farm sector in recent years) of the more expensive groundnut, bean and soyabean seed; and it has been able to share with ADMARC a very substantial proportion of its trading risk.

Other influential factors are the result of policy. For example, the decline in NSCM's retail seed prices in real terms over much of the 1980s (see Table 6), which was one of the factors limiting the Company's financial performance, resulted from ADMARC, in its then position as Chair of NSCM's Board, implementing the MOA policy of keeping seed prices for many crops as low as possible (this was also related to ADMARC's own internal objectives: retail seed prices could have been kept low by subsidies but, as ADMARC at that time had to bear the cost of seed price subsidies itself, it preferred to avoid subsidies by limiting NSCM's price rises directly. Agricultural policy more generally, via its influence on factor costs, producer prices and structural issues, was partly the cause of the much lower than anticipated sales of seed, which further limited NSCM's financial performance.

ADMARC

Although ADMARC is explicitly oriented towards providing a seed service geared to the particular needs of small farmers, internal organisational problems continue to add to the cost of its seed distribution activities and to reduce the quality of the service it provides, particularly with respect to late delivery of seed to field selling points. The re-organisation of the Corporation in 1987 considerably improved its performance in general terms, but a number of problems have still not been completely solved. Those that most affect seed distribution are the lack of central co-ordination of secondary seed movement from regional depots and parent markets to field selling points; inadequate communication and transport arrangements at these selling points; and delays in responding to seed needs that arise during the selling season caused by the bureaucratic organisation of ADMARC's management structure.

Many of these structural problems stem from the influence of wider development policy objectives on the way ADMARC was originally set up. As it was not expected to operate commercially and many development functions were added to its mandate over time, involving complex funding arrangements, until the reform programmes of the mid-1980s there was little reason for ADMARC to be concerned with its internal efficiency, and it was difficult for it to monitor this in any case.

The responsibilities assigned to it whilst it was majority shareholder in NSCM — for subventing NSCM's losses and carrying the major burden of risk associated with distribution of NSCM seed — further added to the cost of its seed activities in particular. This was a direct result of the major role in the seed sector assigned to it by seed sector development policy. The same policy also required it to bear the cost itself of providing NSCM seed nationwide at fixed, subsidised prices, of handling and storing SSMS seed and of supervising the distribution of seed on credit. Some of these arrangements have been re-organised in ADMARC's favour since 1987 but it still has to meet the costs of SSMS seed and to co-ordinate with the ADDs on credit distribution and there have been problems with the practical implementation of its new subvention for subsidising, transporting, handling and storing NSCM seed.

Added to this, the long-standing difficulty with obtaining sufficient cheap transport contracted from private hauliers has been an external factor with a substantial influence on ADMARC's seed delivery performance.

Smallholder Seed Multiplication Scheme

The creation of Malaŵi's Smallholder Seed Multiplication Scheme in the mid-1980s was an explicit policy response to the problem of producing quality improved seed of self-pollinated crops cheaply using NSCM. However lack of follow-through in policy development since its establishment seems very significantly to have hampered its internal performance and the service it provides to small farmers.

Thus, although from tentative estimates of the economic cost of SSMS seed it seems the operation of the Scheme could be financially viable (see Table 15), lack of funding and weaknesses in the organisation of the Scheme have meant that so far the quantities produced have been so small they have had little impact on the overall

Table 15: Mzuzu ADD costs and returns of SSMS production 1990/91

Costs				
144 ha groundnuts	@	MK149.60 each	=	MK 21,542
85 ha beans	@	MK342.60 each	=	MK 29,121
				MK 50,663
Returns				
144 ha groundnuts	@	MK700.00 each	=	MK100,800
85 ha beans	@	MK770.00 each	=	MK 65,450
				MK166,250

Net income MK115,587 or MK351 per hectare of seed produced.

Source: Author's calculations.

availability of quality improved seed to small farmers and the Scheme has been a drain on the general budgets of the ADDs operating it.

In this context, it seems that some relatively straightforward policy changes would make the most significant improvement in both the financial performance of the Scheme and the service it provides to small farmers. Nonetheless, external factors will continue to affect performance — particularly with respect to groundnuts — where the strong price competition from private traders for groundnuts produced by SSMS growers limits the attractiveness of the Scheme. And the scope for improving the Scheme's linkages with other organisations, particularly the method of payment for Seed Services field inspection work, would also need to addressed.

Sectoral issues

In addition to the individual impacts mentioned above, location-specific factors and government policy also affect the general conditions in which the seed organisations are operating and this must be recognised, regardless of whether or not it is feasible to address these more general impacts with sector-wide policy initiatives.

The basic problem with encouraging the increased use of quality improved seed amongst small farmers, that directly affects the success of all three Malawi seed organisations in meeting small farmers' seed needs, is the low potential incremental yield of the currently released improved varieties and selections of groundnuts, beans and soyabeans and the small real benefit from using these under current small farmer management conditions. Added to this, most of the varieties and selections provide a very limited range of the large number of non-yield attributes required by small farmers. This can partly be solved by encouraging breeders to develop varieties that yield well under low input/low management conditions and varieties that provide other attributes. But as long as good agronomic management of non-maize crops is made difficult by the competition of maize for scarce labour time and other resources, the incremental gain from this strategy is likely to be low.

The negative impact of the credit system on the availability of seed at field selling points is another general problem which affects ADMARC's and NSCM's performance. From the available evidence, it seems that the current credit system provides little benefit to the majority of small farmers, as they do not use, or do not need to use, credit to finance seed purchases, but it badly affects the smooth distribution of available stocks of seed from field selling points. This suggests the policy of providing credit for seed purchases needs reviewing, to establish the overall costs and benefits of doing so and to establish how better it might be targeted to reach chronically seed insecure households and those dependent on off-farm seed sources in times of domestic crisis.

And the continued difficulty with creating a policy environment that sufficiently encourages widespread participation in private trade outside urban areas has a knock-on effect on NSCM and, in particular, on ADMARC as seed distribution has to continue to be organised through the parastatal's market network, which imposes additional costs on both organisations if the objective of providing seed nation-wide is to be met. Where widespread active private trader networks exist in other countries in the region, for example in Kenya, seed distribution costs have in many cases been considerably reduced by handing over responsibility for some part of the distribution chain to the private sector [Gerhart, 1975]. However, this is unlikely to be feasible in Malaŵi in the near future and, in any case, it has not been successful in all cases, as we found with respect to Zimbabwe (see Section 5.3 below).

This problem with private trade is one example of the wider conflict between economic reform and the provision of seed services which meet the particular needs of small farmers. In many cases economic reform initiatives have increased the costs faced by the seed organisations at the same time as putting increased pressure on them to operate more commercially. Whilst the past protection from market forces did not necessarily mean that the seed service provided to small farmers was well oriented to their needs, this new set of pressures will almost certainly make it more difficult for the seed organisations to serve small farmers — unless seed sector policy is re-oriented to provide appropriate compensation, incentives and controls for these organisations.

5.2 Zambia

An external review of Zamseed conducted in 1989 for GRZ and SIDA [Erikson *et al.*, 1989] found the Company's organisational structure is good, reflecting its main functions and allowing adequate attention to be devoted to its main responsibilities, namely contract seed growing and seed distribution. Staffing levels are adequate, except for its marketing functions (in fact one of the main valid criticisms of Zamseed's performance is its low investment in seed marketing). Training is also generally adequate although there has been some `brain drain' of trained accounts staff to the private sector elsewhere in Zambia. Managerial, administrative, operational and maintenance procedures are satisfactory, although both stock-taking procedures need further development. However, a number of other factors have served to limit the effectiveness with which Zamseed has served the small farm sector.

Location-specific factors

The wide range of agricultural zones increases the number of varieties of each crop that need to be produced and this significantly increases seed production costs for Zamseed. At the same time, this also means that the individual quantities required of each variety are small so there are no economies of scale in seed processing and packaging.

The large size of the country also means that distribution is expensive as seed has to be transported long distances in order to reach all the many rural co-operative depots. Costs are further increased by the poor level of development of transport infrastructure, which is limited by the high budgetary cost of building and maintaining roads to serve all Zambia's provinces and districts.

The socio-economic conditions of the majority of small farm households also affect the demand for seed and the cost of supplying it. Demand is limited because the low level of management on many small farms, coupled with lack of extension advice and poor access to complementary inputs such as fertiliser, means yields are often significantly below potential (less than 1 tonne per ha for hybrid maize, for example, compared to 5-6 tonnes per ha on commercial farms) so there is little economic incentive to purchase improved seed. In addition, the complex farming systems of small farm households mean that those households that do purchase seed require small quantities of many different varieties.

On the supply side, the political and economic power of the large-scale commercial farmers prevents Zamseed from charging higher prices to this group to cross-subsidise seed for the small farm sector. And Zambia's large urban demand for cheap food limits the extent to which GRZ can increase agricultural producer prices to provide an incentive for small farmers to use improved seed.

Organisational linkages

On the positive side, the production of a wide range of well-adapted maize varieties by Zambia's public sector agricultural research institutions has made Zamseed much better able to supply varieties suitable for small farm farming conditions. This has been assisted by the significant donor resources allocated to Zambian agricultural research by SIDA and ODA. However, this is a relatively recent development and there is still a lack of suitable varieties for a number of crops, including rice. Furthermore, future prospects are not secure as there is no private sector agricultural research as yet and GRZ work remains heavily aid-dependent. Zamseed itself has taken responsibility for all multiplication of breeder seed in order to speed up variety release, at an estimated annual cost to the Company of ZK400 000 [Erikson *et al.*, 1989]. This is similar to the experience of Malawi, where the national agricultural research system received support from ODA until the mid-1970s and, from the mid-1980s, from USAID, the World Bank, the Rockefeller Foundation and CIMMYT. However, it is only recently that Malawi has established a nationwide adaptive research network specifically to improve the relevance of improved seed and other technology to small farmers' needs. In contrast, much of Zimbabwe's variety development work has been done without donor support.

Also on the positive side, the work of the Seed Control and Certification Institute, set up in 1985 with Swedish SIDA funding, has made a major impact on maintaining high seed quality standards within Zambia. However, the Institute suffers the same problems as Seed Services in Malawi and in Zimbabwe of lack of managerial and financial autonomy (it is run by the Department of Agricultural Research from its Mount Makulu Central Research Station and still depends of SIDA for half its operating budget). Recent work suggests that up to 80 per cent of its recurrent costs could be financed through fees payable by Zamseed for quality control work, if SCCI were allowed to keep the fees charged [Norrby, 1986]. And, furthermore, costs could substantially be reduced by using less import-dependent high-tech testing systems.

The MOA extension service is generally considered to provide the necessary amount and type of information on improved seed: 84 per cent of survey farmers had received extension advice on improved seed. Importantly, the Zambian extension system distinguishes between different varieties of the same crop [ARPT, 1991] and operates a ladder, or transitional, rather than a package system for improved seed adoption [DANAGRO, 1987].

However, Zamseed's linkages with the institutions responsible for secondary seed distribution, fertiliser distribution, credit funding and crop marketing have been less positive.

Zamseed uses appointed agents to sell seed to large-scale commercial farmers and also has private stockists for vegetable seed sales. However, it relies entirely on the nine Provincial Co-operative Unions and their 460 affiliated societies for all the secondary distribution of its seed to small farmers, as these are the only outlets in rural areas with suitable stores.

The PCUs place confirmed orders with Zamseed in the July preceding the start of the selling season together with a 50 per cent down payment on the order. This early down payment was in the past a major advantage for Zamseed's cash flow and it provides a significant subsidy for the cost of the expensive small farmer seed services Zamseed provides. However, the Unions are very inefficient operationally, in part because they were set up in the early 1980s under the central, government-controlled Zambia Federation of Co-operatives and, as organisations alien to most community structures, quickly became controlled by local elites as a source of patronage rather than as the rural marketing institutions they were designed to be. However, the August 1990 agricultural produce market liberalisation had a fundamental impact on the PCUs' seed operations, as described below.

The lack of reliable fertiliser distribution and credit funding systems within Zambia makes it very difficult for Zamseed to capitalise on potential seed sales or even to tailor supply to known demand accurately.

Macroeconomic policy

Macroeconomic policies which have kept the kwacha over valued have made the imported inputs on which the seed sector relies more expensive than necessary and further difficulties have been imposed by the bureaucratic foreign exchange allocation system and, domestically, by the extremely high annual inflation rates. Minimal government investment in agriculture and in maintaining national transport and marketing infrastructure has imposed additional costs, whilst the centralised, state controlled nature of retail trade in Zambia makes it difficult to rely on small-scale retail traders in rural areas as an alternative to the agricultural co-operatives.

Agricultural policy

Throughout the 1970s and early 1980s, GRZ's reliance for national agricultural marketing services on parastatals and co-operatives of limited internal efficiency, its policy of restricting consumer food prices and its general policy neglect of small farm agriculture imposed substantial economic costs on small farmer producers and served as strong disincentives to purchasing improved seed. In addition, the real value of producer prices have been badly eroded by inflation.

However, statutory restrictions on participation in agricultural produce markets were removed, with USAID backing, midway through the marketing season in August 1990 and this had a fundamental knock-on impact on the seed sector. It meant that as the PCUs could no longer provide the guarantee of being monopsony buyers of small farm produce, their credit lines from the commercial banks ended and, combined with a sharp fall in the quantity of produce they were able to buy, they were unable to provide the 50 per cent down-payment for seed to Zamseed. By November 1990, the PCUs had bought virtually no seed from Zamseed and the Company was ZK150 million short on its normal position, ZK85 million of which was needed to pay contract seed growers for 1989/90 production.

GRZ cannot renege on the liberalisation as it is a condition of the current IMF funding agreement. In the long run, it may have the advantage of ending high cost formal sector seed distribution to the more remote areas and encouraging cheaper, locally-based seed production. Zamseed's reaction has been to view church groups and other non-governmental organisations more favourably as channels for seed distribution: a number, such as Harvest Help and World Vision, have been buying seed direct from Zamseed to distribute in their project areas for some time. However, as yet there has been no official planning for managing this and subsequent seasons' seed distribution in the changed marketing environment. The seed survey results suggest that many small farmers have therefore sought seed from other, unofficial, sources or returned to retaining their own seed on-farm.

Seed sector development policy

Seed sector development work has been pursued in Zambia with some vigour and much of the necessary legislation is already in place, although there are no plant breeders rights as yet [DANAGRO, 1987]. In particular, Zambia has a two tier variety release procedure which greatly speeds up the availability of new varieties. However,

the lack of a specific, clear overall seed policy is a severe constraint to long-term development: seed issues are handled by individual departments and the Seeds Liaison Committee established in 1985 has no executive powers [Muliokela and Kaliangile, n.d.].

And Zamseed's structure as a commercial company makes meeting small farmers' seed needs difficult as they are high risk, low profit and difficult to quantify accurately. This leads to conflict, as in 1990 after the sudden liberalisation of agricultural produce marketing left Zamseed without the PCUs' normal assistance with its secondary seed distribution exercise: GRZ pressurised Zamseed to provide seed to the PCUs on credit as a temporary solution to the problems caused by the 1990 agricultural produce market liberalisation but, as a commercial company, Zamseed is unable to carry the kind of temporary shortfall this creates.

5.3 Zimbabwe

With the exception of GMB's handling of groundnut seeds, the internal efficiency of both public and private seed organisations appears to have been good. However, a number of external policy factors influence seed sector performance in Zimbabwe.

Good links between agricultural extension, research, credit and marketing institutions have been vital for the successful adoption of hybrid maize by small farmers. Links between government agricultural research institutions and Seed Co-op have continued to be strong; for example, Seed Co-op continues to provide testing facilities on its own 400 ha research farm for varieties developed by DR&SS — about half of the 4 000 trials conducted there annually involve DR&SS material. However, government budget cuts are undermining the capacity of public sector research institutions to contribute actively to research. This kind of direct private sector support for public sector agricultural research does not occur in the other two countries, although both NSCM and Zamseed are increasingly involved in breeder seed multiplication. In economic terms, the flow of support in Malaŵi and Zambia has been to date in the other direction, with supplies of breeder seed and laboratory tests provided at nominal charge to the seed companies by the public sector institutions.

One important on-going process is the re-orientation of formal agricultural research from serving only large-scale commercial farmers in the more favourable agro-ecological zones, to including the needs of small farmers in communal areas in marginal agro-ecological zones. However, because of the time lag in plant breeding from deciding on breeding objectives to being able to release new varieties, the results of this re-orientation are only just beginning to emerge a decade after Independence. And if budget constraints continue to limit public sector research work, the absolute benefits to small farmers of this reorientation may be limited.

Hybrid maize has been adopted universally throughout Zimbabwe, regardless of whether complementary inputs are also used. For other crops, such as sunflower, there is a closer relationship between the adoption of improved seed and use of complementary inputs so another linkage with a critical influence on seed uptake is the level and focus of complementary agricultural support services.

Policy factors have also been important. The macroeconomic environment affects the performance of the agricultural sector in general and the seed industry in particular. Retail seed prices have been kept relatively low, at least for three way cross maize seed by the exemption from tax of co-operatives such as Seed Co-op. The general difficulty in obtaining foreign exchange for imports of inputs and spare parts is increasing and this has affected, in particular, the cost of transport in rural areas: seed distributors are passing on this increase in the form of higher seed prices.

The density of demand for improved seed varieties is in some areas too low for seed distribution to be undertaken commercially, given the current maximum mark-ups on retail seed prices and current transport costs. Support policies for rural distribution infrastructure, particularly in the communal areas, are thus essential.

A number of changes in agricultural policy are likely to affect the performance of the agricultural sector and the seed industry within it. For example, the new policy aimed at making parastatals more commercially oriented is likely to result in less emphasis being given to national development concerns in organisations such as GMB and AFC. And the proposed land reform will involve a major redistribution of land. Government budget constraints are also likely to limit any major expansion in agricultural credit and extension services. Also, the marketing of grain is likely to be partially liberalised.

Seed sector policy

GOZ seed sector development policy in the post-Independence era has not been very clear or articulate. The basic structures embodied in the tripartite and bipartite agreements have been continued. At the same time, competing private companies have been allowed to enter the Zimbabwe seed market. Seed price setting has been transferred from MLARR to the Ministry of Trade and Commerce; the latter has recently fundamentally changed the price control structure for seed distribution in a way which, by enforcing standard and relatively small mark-ups for wholesalers and retailers in the seed chain, is unlikely to encourage private sector seed distributors to serve the small farmer market.

GOZ needs to become more actively involved in directing the seed sector towards providing for the needs of small farmers. In doing this, it needs to adopt a blend of approaches to solve existing efficiency and national development problems within the seed industry, for each of the different elements of the industry, on the basis of a comprehensive analysis of the firm-level efficiency and national development issues involved. That this is a very difficult task is illustrated by MT&C's experience, referred to above. Because it appeared that, in recent years, some of Seed Co-op's appointed distributors have been making excess profits through selling seed to communal farmers at higher than the recommended retail prices (see Table 7) (through the enforcement of cartel arrangements based on geographical monopoly power), MT&C has now set allowable mark-ups on seed prices at 10 per cent of procurement price for wholesalers and 15 per cent for retailers (compared to mark-ups of up to 60 per cent previously). Unfortunately, the immediate result of this has been to reduce the availability of seed in the communal areas as distributors concentrate on supplying the more profitable markets in the rural centres.

It is strategically important that agricultural research remains within the public sector. If the decline in the real value of GOZ funded agricultural research continues, it is likely that an increasing proportion of adaptive research will be taken over by private research trusts leaving an absolute decline in basic research capacity. One possible consequence of such a development is that agricultural research becomes much less oriented to the specific needs of small farmers.

There is sufficient seed production capacity within the private sector and the past track record has shown that it is able to produce seed in an efficient and cost-effective manner. There is thus no immediate need for direct state involvement in seed multiplication. Instead, the public sector's role should be in developing policies to encourage the successful involvement of small farmers in seed production. However, MLARR should conduct its own survey of demand for seed in communal areas, instead of relying on private seed companies' reports, and the agricultural extension service should provide more information about new varieties to small farmers, to stimulate demand.

Pricing policy for both producers and consumers of seed has in the past been successful. Seed prices have been kept high enough to attract commercial seed producers, which has ensured that there is sufficient seed production capacity. At the same time, retail seed prices have in most cases been kept reasonably low. On the available evidence, prices should not be de-controlled as this would adversely affect small farmers in more remote areas (see above). For a few specific crops, for example groundnuts and sunflower, there are arguments for subsidising the consumer price of improved seed, as retail seed prices that cover production costs are high and an obstacle to adoption as there are clear economic benefits for Zimbabwe from high levels of adoption of improved seed for these crops by small farmers. As the improved varieties are self-pollinated, subsidies would need to be only temporary and could be reduced when farmers had replaced their retained seed with the improved self-pollinated varieties.

Distribution to small farmers of improved seed other than maize has not been successful in the past. GOZ needs to develop initiatives to improve distribution in the communal areas, either directly or indirectly.

5.4 Comparative experiences

Comparing the experience of the Malaŵi, Zambia and Zimbabwe, it seems that real retail prices for three way cross maize seed — the largest segment of the seed market in all three countries — have been very similar (see Table 6), despite the different seed pricing policies pursued: direct subsidisation in Malaŵi, periodic subventions in Zambia and cost-plus pricing in Zimbabwe. This has not been the case, however, for single cross maize seed (which is more expensive to produce due to lower seed yields per unit area). This reflects the different attitude in each country towards the extent seed companies should be encouraged to continue production of this type of seed via price support. The experience with secondary seed distribution in Zimbabwe provides an example of the counter-intuitive effect on the seed service provided to small farmers of attempting to reduce high distributors' margins: in this

case it appears that seed is either priced high and consequently available in the communal areas or priced low and consequently not available to the majority of small farmers.

As regards the impact of reform on quantitative performance, Zimbabwe and Zambia are satisfying current demand for maize seed whereas Malawi is not. However, in the first two there is considerable potential for expanding cultivation and the seed companies will need to be able to provide for the increased demand for seed that this results in, if reforms encourage this expansion. None of the three countries currently perform well in supplying seed for non-maize crops, although Malawi in the past has been able to supply significant quantities of groundnut seed.

The available data is too patchy to do more than hypothesise on the key factors determining seed sales and the impact of reform on this. Bearing this in mind, three factors emerge. First, the availability of acceptable seed varieties from the agricultural research institutions appears to be an important influence, evidenced by the rapid growth of seed sales in the communal areas in Zimbabwe once the existing well-adapted maize hybrids were made available in these areas after Independence; by the similar rapid growth in maize seed sales following the release of new small-farmer friendly three way cross hybrids in Zambia in the mid-1980s; and by Malawi's problems in the past with stimulating improved maize seed sales in the absence, until recently, of varieties appropriate for small farmers.

Second, the cross-price elasticity of demand for seed, with respect to agricultural producer and input prices, is relatively high and a more significant influence on seed sales than the price of seed per se. Thus, there appears to be a gradual decline in the use of improved seed when producer prices are declining in real terms.

And third, the effectiveness of the secondary distribution system for seed appears to have a critical influence on seed sales: for example, seed sales have increased rapidly in the communal areas of Zimbabwe, where there has been a good network of private trader seed distributors whilst, in comparison, there has been a marked decline in sales in Zambia following the retrenchment of the PCUs in 1990 (although, as the evidence from Malawi show, the retail seed distribution network does not have to be particularly dense geographically).

Thus, it appears that the availability of appropriate seed varieties is a necessary condition for an effective seed service for small farmers but it is not by itself sufficient and the existence of a functioning seed diffusion mechanism is equally as important.

In this context, where they have been implemented, economic reforms in Malawi, Zambia and Zimbabwe appear to have made seed companies' factor and product prices more market-determined but the effect of this has been to increase seed company costs. The partial liberalization of agricultural markets has allowed the companies to pass on these costs as increased seed prices — but staple grain prices have not been de-controlled in any of the countries so farmers' returns to improved seed use have fallen.

Reform does not appear to have improved the service provided to small farmers by the allied agricultural research and marketing institutions in the seed sector; and it is debatable whether it has produced a real improvement in the internal efficiency of these institutions. From the available evidence, none has been operating at excessive margins and furthermore some, such as ADMARC in Malaŵi, have been absorbing seed subsidy costs within these margins. The main group in the seed sector that has been achieving what appear to be excessive margins are the contract seed growers. In all three countries these are large-scale commercial farmers — who appear to have been able to protect their margins both before and during reform.

Finally, reform does not appear necessarily to increase the incentives for small farmers to use improved seed and their ability to do so.

Our analysis has brought out the problems with respect to increasing small farm production and productivity in Eastern and Southern Africa caused by failing to take the specific needs of the seed sector in to account when planning policy changes (whether these changes are part of specific reform programmes or part of general policy development) that affect seed:grain price differentials, the structural determinants of production levels and the extent of cultivation, etc. As in so many developing countries[10], the potential contribution of the seed sector to national development has been severely constrained as a result.

The analysis has also caused us to question some of the common assumptions about seed sector needs[11]: appropriate varieties are necessary but not sufficient for effective seed sector performance; and the diffusion system is as important as the technology generation system in the seed sector. Seed price levels themselves are much less influential than relevant product and input prices: thus, the considerable amount of attention devoted to schemes for subsidising seed prices and providing credit services for small farmer seed users [see, for example, Gregg, 1983; FAO, 1987; Menon, 1983] may therefore be misplaced as long as grain prices are not kept at below market levels. This is beginning to be recognised in some countries such as Nepal [Rhoades, 1989], but the pace of change needs to increase.

Finally, from the available evidence, the analysis has shown conclusively that, contrary to popular perception [Fenwick Kelly, 1988; ICD, 1987], reform has had a primarily negative impact on seed sector performance in terms of its contribution to national development and its incremental effect on firm-level efficiency — at least from the short — to medium-term perspective provided by this study. The dimensions of this are explored in more detail in Chapter 6.

6. LESSONS OF REFORM

The evidence from Malaŵi, Zambia and Zimbabwe shows that small farmers have a range of very particular requirements of the services providing seed, in order to be able to benefit from them. These requirements, as they relate to the varieties of seed that need to be provided and its quality, the quantities made available and the timeliness of delivery, all affect the cost to the seed organisations providing the service. In addition, the survey results have shown that there are distinct groups of small farmers each with different seed needs: those that always save seed on-farm; those that obtain seed off-farm only at times of domestic crisis; those that obtain seed off-farm regularly by choice, to replace seed or to obtain different varieties; and those that are chronically seed insecure and have to piece together supplies of seed from off-farm sources every year in a haphazard way. Each of these thus has different requirements from the formal seed sector. This further adds to the cost of serving semi-commercial small-scale farmers compared to providing seed for more commercialised small farmers and the large-scale commercial farming sector.

Three general tiers of problems with the equity and efficiency of current seed sector performance as it relates to small farmers can be distinguished. Most obviously, the absolute quantities of quality improved seed made available are often small, particularly for non-maize crops; the blend of maize seed varieties provided do not always match small farmers' expressed preferences; and the quantities and varieties available are frequently delivered late. Of the 3 countries, Zimbabwe appears to be least affected by these problems — although performance with non-maize seed continues to lag behind.

But underlying this, there is a second tier of problems concerning the relationship between the prices of seed and other agricultural products and inputs. For a majority of small farmers who wish to obtain seed from off-farm sources periodically for replacement or to source different varieties, the absolute level of retail seed prices is not the major constraint in itself; however, for the significant minority who are chronically seed insecure, because the resources available to them are insufficient to generate surplus domestic production, finding cash to pay for seed is a major problem and special help is needed to enable them to do this. Of the 3 countries, Malaŵi has gone furthest in attempting to do this by the provision of credit; however, the disadvantages appear to outweigh the advantages (see Section 6.3) and Malaŵi's experience suggests that policies which directly increase farmers' incomes may be a better enabling mechanism.

Ultimately, however, the third and underlying tier of problems remains, particularly in Malaŵi, that the benefits from using the currently released varieties of seed of non-maize crops are minimal at current official producer prices, compared to consumer grain prices and seed retail prices, and at current levels of small farmer agronomic management. And for certain crops, allocating scarce cash to other purchases, for example of inoculant for soyabeans, generates better real returns.

In this context, the different experiences of Malawi, Zambia and Zimbabwe with seed sector reform are useful in allowing us to make both cross-country and time-series comparisons of the success of different policy approaches to the seed sector: Malawi and Zambia provide us, first, with contrasting experiences of using parastatal seed organisations and then, after the respective market re-structurings in 1987 and 1990, two different experiences of moving from the public to the private sector; Malawi and Zambia compared to Zimbabwe demonstrate the differences between parastatal and private sector outcomes; and all three countries, with their current policies, show three different outcomes of increasing private sector involvement.

6.1 Operational efficiency and institutional issues

Malawi's macroeconomic distortions have been relatively mild in comparison to those in similar economies in sub-Saharan Africa and much progress has been made in restoring macroeconomic equilibrium over the last decade. For much of the period that ADMARC and NSCM were operating prior to that, however, the operating costs of both organisations were affected by the policy towards controlling general macroeconomic variables in Malawi.

Movements in interest rates and statutory wage rates did not impose additional costs on the organisations as they were negative in real terms. Similarly, investment in transport has been given a high priority in the Malawi government budget so transport infrastructure has been good; however, the national transport fleet has remained small and this has given rise to difficulties in hiring private vehicles, which has made serving the small farmer seed market difficult and expensive.

NSCM has had in addition to deal with cumbersome procedures for exporting seed and for importing essential inputs. Although foreign exchange distortions reduced the kwacha cost of imports, annual inflation rates of up to 30 per cent increased the cost of domestic inputs.

ADMARC at first benefitted from the macroeconomic distortions, through its ability to cross-subsidise less profitable operations with surpluses from buying smallholder produce cheap and selling it dear for export. Subsequently, however, it too was badly affected by declining international commodity prices and the devaluations that formed part of the macroeconomic reform programme. It also suffered from the imposition of non-commercial operational functions.

The situation has now changed for both organisations due to the macroeconomic reform programme. For NSCM, increasing real interest rates have increased the cost of seasonal borrowing and increased statutory minimum wage rates have increased labour costs and the same for contract growers, who require compensating in the form of increased grower seed prices. Continuing exchange rate devaluation also increases the kwacha cost of imported production and processing chemicals, but at the same time makes NSCM's seed exports more competitive internationally. The reduction in domestic inflation will have reduced the rate of increase in domestic costs, and the simplification of foreign exchange allocation procedures will have reduced the real cost of using foreign exchange to purchase imported inputs. On balance, however, the net impact of the reform programme is

likely to have been an increase in NSCM's operating costs as the downward distortions have been removed on many macroeconomic variables.

For ADMARC, the devaluations will have made international exports of small farm produce more competitive and, as for NSCM, changes in statutory wage rates will have affected the wage bill. However, for ADMARC, the public sector institutional reforms have had an even greater impact than the changes in macroeconomic variables. This type of change will have increased the Corporation's operating costs but, overall, the reforms are intended to allow more efficient and lower cost operation. However, this process is not yet complete and, in particular, ADMARC has a continued obligation to fulfil certain high cost national development functions, including seed distribution to small farmers.

In Zambia the experience has been similar but worse, as some reforms that have been implemented, such as the foreign exchange auctions and subsequent continued devaluations, have substantially increased Zamseed's costs, whilst other reforms that might have had an off-setting impact, such as controlling domestic inflation, have not been successful (and the indirect positive impact on the real cost of seed to small farmers has been at least partly off-set by the negative impact on producer prices). SCCI has been particularly badly affected by the combination of continued devaluations and foreign exchange shortages. This has also affected Zamseed's contract growers as it has limited their ability to invest in the necessary plant and equipment, resulting in zero growth in the grower hectarage in recent years. Government budget cuts have impeded public sector plant breeding work, which has in turn required Zamseed to allocate financial resources to multiplying breeder seed and other research-type work.

The liberalisation of agricultural produce marketing has had a severe knock-on effect on Zamseed's seed distribution costs and the level of service it can provide via the PCUs: Zamseed can no longer rely on using the PCU network to distribute seed relatively cheaply, because as a result of liberalisation the PCUs no longer have sufficient cash to purchase seed to distribute (see Section 5.2). There is little prospect at present of Zamseed being able to transfer the seed distribution function to private traders given the low level of retail activity in rural Zambia. At the same time, most of the private traders entering the produce market are millers wishing to buy maize direct; as the controlled prices at which they can buy maize grain and sell maize meal provide them with very low margins, only very small numbers have so far become involved. Therefore there is no real effective competition in agricultural marketing yet so there is no incentive for the PCUs to improve the efficiency of the produce buying and input distribution services that they provide. It would seem that Zambia is currently experiencing all the disadvantages of removing downward distortions in the economy and none of the potential advantages of reform.

In Zimbabwe, Seed Co-op has derived substantial benefits from its tripartite and bipartite agreements with GOZ, its tax exempt status as a co-operative, and an incentive scheme operated by GOZ for seed exports; there is no indication that any of these will be changed as part of the reform programme. However, the Co-op's grower members' operations are becoming increasingly expensive due to the growing shortage of foreign exchange for imports of essential inputs. In seed distribution,

private sector seed wholesalers and retailers should benefit from the government's commitment to developing the communal areas, via the reduction in transport costs and increase in market size this should bring about. There have been few other changes directly attributable to economic reform.

Overall, although quantitative data are not available, it seems that the main impacts of economic reform on the operational efficiency of the seed organisations in Malaŵi, Zambia and Zimbabwe are likely to have been to increase their operating costs as we saw in Chapter 5, but with no change in the policy of controlling retail seed prices and no prospect of any significant off-setting market growth as long as the majority of small farmers are penalised rather than supported by reform (see Section 6.4).

6.2 Public/private sector mix

NSCM financial records are not in the public domain but circumstantial evidence suggests Cargill's involvement has increased NSCM's operational efficiency by returning the Company's primary focus to its most profitable crop, hybrid maize, getting retail seed prices back on an upward trend in real terms and undertaking more active marketing of NSCM seed.

Malaŵi government policy discouraged private retail trade in agricultural commodities directly and indirectly until the mid-1980s. ADMARC had a *de facto* monopsony on trade in small farmer agricultural products. But this attitude changed as part of SAL III: the produce market liberalisation in 1987 much reduced ADMARC's presence in rural agricultural marketing; and Cargill replaced ADMARC as the major shareholder in NSCM in 1988. ADMARC's efficiency appears to have improved too. But there are only limited prospects for further improvement due to the cost of transport within Malaŵi, and the distances that have to be travelled on poor roads in order to reach all the Corporation's depots. There is no real prospect of widespread competitive private trader involvement due to the historical underdevelopment of petty trading in Malaŵi: the sector's small size and its lack of working capital, storage capacity and transport. In any case, the `liberalisation' that reform has brought about is limited in scope as it removes statutory controls on private trader participation only and not price controls.

As we saw in Section 5.3, Zambia has also reversed its previous policy of heavy reliance on parastatals and co-operatives in agricultural marketing and it removed controls on private sector participation in 1990. However, at present there are no plans to change the public/private sector mix in the Zamseed itself.

The ARPT seed survey found that there is already a sharp increase over the last year in the number of farmers relying on retained seed. The data with which to prove lines of causality are not available but we can assume, given that the varieties currently available in Zambia are known to be popular with small farmers and seed prices have not changed significantly, that this is primarily a result of the 1990 market liberalisation. Although it has caused severe short-run imbalances, however, it may prove to be beneficial in the long run as, unless GRZ intervenes with transitional support measures, it is likely to force the less efficient PCUs to close and the

remaining ones to become more genuinely responsive to farmers' needs. For seeds, it may result in the more remote areas being cut off from Zamseed supplies and an increased reliance on local-level small farmer seed production. At the same time, it may encourage Zamseed to widen its distribution network to include alternative channels besides the PCUs.

Thus, as in Malawi, increased efficiency in produce marketing has increased the seed organisation's costs and reduced the effectiveness of the seed service to small farmers. The evidence suggests that more fundamental market re-structuring is needed to produce a real improvement in seed marketing; this is unlikely as long as GRZ retains a commitment to protecting small farmers through the co-operative network and until the market and transport infrastructure in Zambia is significantly improved.

There are definite plans to reduce the role of the parastatal GMB in agricultural marketing in Zimbabwe as part of the economic reform process. But there is already heavy private sector involvement in both seed production and wholesale and retail seed distribution and there are no plans to change this. Zimbabwe's experience provides an insight into the effect on small farmers of a more mature private sector seed production and distribution system; this is by no means entirely positive.

First the relationship between public sector plant breeders and private sector seed organisations, becomes a problem. Zimbabwe's tripartite and bipartite agreement have hampered the entry into the seed market of the considerable number of private companies wishing to sell seed, by granting Seed Co-op an effective monopoly on multiplying new GRZ-released varieties. Seed Co-op's market power has almost certainly allowed it to neglect semi-commercial small-scale farmers' special seed needs.

Added to this, communal farmers in the more remote areas are not well served by private sector seed retailers. Retailers do not sell improved seed for less profitable crops that are important to communal farmers, such as open-pollinated maize and short season groundnut varieties. The 'farm gate' cost of the seed they do sell is considerably increased by the need to cover their own margins and they are able to sell seed at higher than the recommended price; this is happening in a number of areas at present in response to the increased difficulty of getting spare parts for vehicle maintenance.

Ultimately, it is the government which fills the gaps in the private sector's market coverage by, for example, using the extension service to promote improved varieties to create an effective demand for them from below. Thus, while Zimbabwe's experience suggests private sector seed organisations can be very efficient in the seed production and processing stage of the seed chain, they are often much less efficient in seed distribution and much less effective in serving small farmers' needs.

6.3 Agricultural prices and services

In Malaŵi, agricultural producer prices have been increased recently for food crops, but initially the increases were for export crops, such as tobacco and cotton, only. In addition, prices have declined in real terms due to the increase in the cost of agricultural inputs such as fertiliser. So, overall, the changes in producer prices resulting from the reform programme have served as a disincentive to small farmers using improved seed.

In Zambia, the reform programme has not included producer prices, which are supposed to be set by GRZ at least to cover 100 per cent of typical small farm production costs. However, the failure to control the very high inflation rates has meant that the real value of the prices is eroded substantially between the time they are announced, in May, and harvest time, the following June, thirteen months later.

Neither have producer prices yet been the subject of reform in Zimbabwe. Their impact is felt slightly differently (although the same situation prevails for hybrid maize in Malaŵi): the lack of price **differentials** for different varieties of the same crop is the main disincentive to improved seed use. Thus communal farmers have no incentive to buy improved higher oil content sunflower seed as GMB buys all sunflower at the same price; and for the same reason, contract seed growers have no incentive to produce short-season groundnut varieties, which are preferred by communal farmers but more expensive to produce.

Chemical fertiliser is widely used in Zimbabwe and typical per hectare application rates are three times the average for sub-Saharan Africa [Eurostat, 1990]; reforms to date have not touched on agricultural input prices. This is also the case in Zambia. However, here, the ARPT seed survey found the high cost and limited availability of fertiliser was a major disincentive to farmers to use improved seed. In Malaŵi, removing the subsidy on fertiliser was a central component of SAL III. There are widely differing views on the effect of this on small farmers. The subsidy removal programme is now suspended, at the Malaŵi government's insistence, and a subsidy of 42 per cent of total fertiliser costs operated in 1990 [Williams and Allgood, 1990]. However, earlier moves towards removing it are considered by many to have had a direct negative effect on fertiliser uptake and on maize production using hybrid maize seed, and the on-farm cost is still increasing in real terms because of the increased landed fertiliser costs caused by the disruption to Malaŵi's lower cost external transport routes through Mozambique.

The recurrent budgets of Malaŵi's Agricultural Development Divisions have been cut as part of efforts to reduce the overall government budget deficit. But this has had little direct impact on seed use as the service works with blanket recommendations, deals very largely with hybrid maize (grown on less than 10 per cent of the small farm area) and has no messages of specific relevance to variety choice or on-farm seed saving.

Reform has had a similar indirect impact on the extension service in Zambia. Here, however, the impact is potentially more serious as the extension service does deal with seed issues in some detail, including specific advice on variety choice (see

Section 5.2), and is considered to have contributed positively to the uptake of improved seed by small farmers.

In Zimbabwe, the experience is similar to Malaŵi's. AGRITEX's work in the communal areas is less well developed as the extension service has had to start from scratch in these areas after Independence. In particular, it provides very little information on improved varieties of crops other than hybrid maize and this contributes to the lack of demand for such seed. Thus the indirect impact of GOZ budget cuts is likely to have only limited effect on the uptake of improved seed in the communal areas.

In contrast to its extension service, Malaŵi's agricultural credit system, which also operates through the ADDs, is well funded — it had MK49 million or MK156 per loanee available in 1989/90 [SACA, 1990] — and it has been protected during reform as it is largely donor funded. However, repayment rates declined dramatically after ADMARC's retrenchment in 1987, when it was no longer possible for ADD Credit Officers to collect all loans as farmers were paid for their produce by ADMARC market staff. Zambia and Zimbabwe both have less well functioning credit systems for small farmers; neither have been the subject of reform so far. However, the Malaŵi seed survey found a majority of credit defaulters are able to obtain funds from alternative sources to buy improved seed — and 65 per cent of the Zambian farmers surveyed said they preferred to buy seed on cash [ARPT, 1991] — and the detrimental effect of cumbersome credit administration systems on the timely distribution and/or purchase of seed in both countries appears therefore to outweigh its potential advantages.

6.4 Income distribution and food security

Structural rigidities in Malaŵi's agricultural sector impose severe limitations on the smallest, poorest farmers' opportunities for growth and development and have been a long-standing problem. Small farmers' access to land has been limited; smaller farmers find it harder to get extension advice, credit and therefore fertiliser; and this, and the Special Crops Legislation, has prevented them from growing some of the more profitable crops. Current agricultural technologies exacerbate rather than relieve seasonal labour shortages, which are a critical constraint in small farm agriculture in Malaŵi [Carr, 1989]. And, until 1987, all small farmers were effectively required to sell produce through ADMARC, at considerably lower prices than those prevailing internationally. Female-headed households have found it relatively more difficult to cope with these constraints and so have been particularly badly affected.

Because the early reform programmes concentrated on restoring growth through the price mechanism, concentrating on export crops which the smallest farmers tend not to grow, the incomes and food security status of this group benefitted little from reform. Neither did they benefit when attention subsequently turned to market structure because their previous close access to ADMARC markets and pan-seasonal and pan-territorial prices had provided them with an implicit subsidy, which was now removed. It is only most recently of all, now that the ASAC programme is dealing with land tenure and the Special Crops Legislation and includes interventions targeted specifically at the smallest, poorest farmers that reform is likely to have a real positive impact on the incomes and food security status of the majority of small

farmers. None of these impacts work via improved seed uptake, however, which remains dependent on increased production of non-maize seed and, for maize seed, changes in producer price policy.

It can be hypothesised that more commercialised small farmers have not been as badly affected as they, at least, should have benefitted from increased producer prices and been able to capitalise on their better access to extension, fertiliser and credit, and on their stronger bargaining position with the private traders that became involved in crop buying after 1987. Even so, the real prices for their main crops, including maize — the only edible crop for which improved seed is readily available, decreased in real terms until the late 1980s and with the increase in fertiliser prices, this will have been a disincentive to move to higher-input production regimes.

The only group of seed users likely to have derived real positive benefit from Malawi's reforms are the agricultural estates planting tobacco and maize. Real seed prices were in decline for much of the 1980s and the macroeconomic reform initiatives to devalue the kwacha, to liberalise external trade and to reduce domestic inflation will have made estates' exports more competitive, improved their access to foreign exchange for essential inputs and reduced domestic input costs. Although the reforms will have increased the interest bills of the high proportion of estates that are indebted, and increased the landed costs of imported spare parts and equipment, the general consensus is that the reform programme has provided a much needed boost to those estates that were already operating relatively efficiently.

In Zambia, the incomes of the smallest farmers have been declining in real terms due to the high levels of domestic inflation, which has been little affected by reform initiatives. Access to fertiliser, credit and extension has not improved and, via the 1990 market liberalisation, access to improved seed has deteriorated. This will not have affected traditional food security crops as there are no improved varieties of seed available but it has had a very damaging effect on maize, as an increasing proportion of farmers will save seed leading to reductions in output and therefore in incomes and maize availability at household level. Reform has also, at least in the short run, made marketing arrangements more haphazard so many of the smallest farmers have ended up selling to the PCUs as before, but only after lengthy delays whilst trying unsuccessfully to find private trader purchasers. As in Malawi, the underlying structural problems in the small farm agricultural sector have not been addressed.

The more commercialised small farmers will also have seen their real incomes deteriorate as a result of inflation, and they have the same problem of poor access to inputs and services. For this group, however, this latter problem is exacerbated as there is much greater use of capital equipment [Kydd, 1988], most of which is imported and has become much less readily available after the 1985-87 foreign exchange auctions created inertia in import-export trading concerns. And for this group, too, the agricultural market liberalisation will not have brought any benefits as few of the millers, who form the majority of the private traders entering the market, find it profitable to buy at the margins currently provided by controlled maize grain purchase and maize meal selling prices. To the extent that this more commercialised

group buys in domestic food needs, the albeit small reductions in consumer food subsidies will have increased households' food bills.

Large-scale commercial farmers in Zambia use relatively capital-intensive production methods, compared to other similar farmers in the region, in response to the incentives provided by past government policy. As most of the equipment is imported, these farmers are badly affected by the current devaluations and current shortages of foreign exchange. Unlike in Malawi, commercial farmers in Zambia sell at the same controlled prices offered to small-scale farmers so their income has been declining in real terms. To the extent the equipment shortages and poor incentives provided by current price levels limit total production, national food security, which is very dependent on the output of the large farm sector, is likely to deteriorate even further.

Small farmer producer prices have been maintained at reasonable levels in Zimbabwe and this has contributed to the very substantial increase in the quantities of maize produced in the communal areas since Independence — and the rapid spread of improved maize seed in these areas. However, drought and the lack of extension work on non-maize crops has limited yields of the more traditional food security crops in the communal areas, and contributed to the loss of many of the local varieties of these crops, damaging the food security status of households in these areas. The reforms have not dealt with agricultural issues directly and the only indirect impact has been via increased maize consumer prices. However, further land reform in the future may ease the pressure on land in the communal areas and the continuing re-orientation of the agricultural support services towards the needs of the smaller, poorer farmers may also improve their position.

In contrast, the seed system in Zimbabwe, and indeed all the agricultural support services, were originally set up to serve large-scale commercial farmers primarily. This emphasis has continued today although it is continually declining. Agricultural production techniques on the large farms remained independent of imports, largely as a result of the international sanctions imposed after UDI, so Zimbabwe's recent shortages of foreign exchange have had some impact on the large farms but less than elsewhere in the region. And, in any case, the new export incentive schemes allow a proportion of foreign exchange earnings, including those from agricultural exports, to be retained. As the large-scale farming sector makes a major contribution to national food security, the policy dilemma now is whether or not to speed up the pace of land reform and risk comprising food security, at least in the short run.

Taking the experiences of all three countries together, it would seem that the smaller, semi-commercial farmers have largely been unable to benefit from the reform programmes put in place to date either because the reforms have not been tailored to small farm households' production environment (in particular the emphasis on low-input food crop production) or because they have failed to take account of the market failures which affect the macro-micro linkages between small farm households and the wider economy. This has had a worse impact in Malawi where there are fewer off-farm employment opportunities, so farm households are heavily dependent on maximising returns to on-farm production. However, the seed services provided to

small farmers have not been made worse by reform, except in Zambia. The incomes of commercialised small farmers have generally benefitted from reform. The effect on the large-scale commercial farmers depends on the import dependence of the sector: it has been positive in Malawi and Zimbabwe but negative in import-dependent Zambia.

6.5 Constraints to reform and additional policy needs

After more than a decade of reform experience in each of the three countries studied, it is clear that the original focus of reform — on restoring balance in the key macroeconomic variables — is necessary but not sufficient for encouraging a return to growth. Similar conclusions can be drawn about the particular needs in the seed sector.

Improved seed must provide a clear economic benefit to farmers at current price levels in order to be adopted on a wide scale and permanently. One of the problems with recent reform-type initiatives in all three countries is that changes in agricultural producer and fertiliser prices have been made without reference to their impact on returns to using improved seed (or, conversely, seed prices have not been adjusted to take account of these new prices). As a result, real returns to using improved seed, in situations of declining producer prices and less rapidly rising consumer grain prices,[12] have been declining substantially, providing a strong disincentive to increased uptake. As in the long run wider use of improved seed represents an important means of raising productivity, a wider perspective needs to be taken in agricultural price policy to include the effect of changes on seed use as well as on cropping patterns, marketed production, consumer welfare, etc.

In fact, there needs to be more special consideration of seed issues in policy planning in general as, because of the seed sector's strong longitudinal and latitudinal links, many policy areas have an indirect impact on the sector. There are particular issues that need to be taken account of, for example: the effect of seed biology on the need for seed price subsidies (self-pollinated crops, for example, are more easily maintained on-farm and may therefore need to be priced more competitively if it is considered necessary to increase the use of improved seed from outside sources); and how to deal with plant breeders rights, or at least with the relationship between breeders, who are often public sector employees, as seed organisations are increasingly encouraged to move into the private sector as part of overall reform programmes. This greater attention to seed issues, and the corresponding need for an overall seed sector development policy to work from in this process, creates a need for more and more accurate data on small farmers' seed needs. This has rarely been collected systematically in the past: the surveys on which this study is based were the first nationwide seed surveys in each of the three countries.

Another missing link which has been as important in the seed sector as elsewhere in the economy is the lack of institutional support accompanying legislative changes. This has two dimensions. First, in Malawi, Zambia and Zimbabwe and many other countries in sub-Saharan Africa, there is no vibrant private sector waiting `in the wings' to take over the responsibilities of the state enterprises departing as a result of reform. Individuals and existing enterprises need encouraging to become

involved in the seed sector, with business and technical advice, loans for capital investments and working capital, and the provision of transport and storage infrastructure.

Second, existing seed organisations need to be provided with institutional support to allow them to capitalise on the new opportunities provided by market liberalisation. Organisations like ADMARC, NSCM and Zamseed have all operated in the past without complete records or strategic plans, because the functions they were originally set up to perform did not require these. However well the new principles are embraced, as in ADMARC in Malaŵi for example, expertise from outside the organisation has to help in this transformation process, at least initially.

More fundamentally, as we saw in Section 6.4, the general macroeconomic reform process has, however well-designed and conscientiously implemented, failed to improve the economic security of the majority of small-scale semi-commercial farmers and has, indirectly via government budget cuts, not improved — and in some cases damaged — the quality of services provided to small farmers. In this context there is no incentive to increase production; the market liberalisations in Malaŵi and Zambia, with their negative impact on market access in most small farm areas, have further reduced any remaining incentives. So the value of using improved seed will, in most small farmers' minds, be very marginal at best.

All these additional policy needs are predicated on the assumption that the available varieties of improved seed have the agronomic potential to increase yields for small farmer users. However, the two major constraints to policy change being able to contribute to improved seed uptake are the low incremental yield of non-maize crops under small farm management conditions in much of Eastern and Southern Africa, and the limited relevance of increased yield in many small farm situations. As long as most semi-commercial small-scale farmers are unable to carry out all husbandry tasks on time and technically optimally, due to shortage of labour, competing demand from other crops in their typically complex farming systems, and shortage of capital resources, then the on-farm yields of most of the currently available improved varieties will be much below potential. At the same time, many small farmers require attributes other than high yield potential, such as storability, taste, etc, in order to fit the crop into their complex cropping patterns and end uses. Both these factors can severely limit the attractiveness to small farmers of the currently available varieties of improved non-maize seed.

6.6 Sequencing, implementation and focus of reform

According to the evidence from Malawi, Zambia and Zimbabwe, the way economic reform is planned and implemented has a significant impact on its eventual outcome. Three areas stand out as critical.

First, the sequencing of reform. For example, the critically-needed support for the development of private sector trading capacity in Malawi was not dealt with until the 1990 ASAC, more than three years after agricultural produce markets were liberalised. This created a marketing `gap' which at one time threatened national food security, by effectively removing control over the national harvests of certain basic food crops, and it opened up many small farm households to exploitation by the very limited number of traders that did enter the market. Zambia appears to be following the same route now, with the same results: small farmers are having to sell to the now much less financially robust PCUs in the absence of private sector participation in marketing in many parts of the country.

Second, complementary support for reform. For example, as we saw in Section 6.5, support for the kind of institutional reform Malawi's ADMARC has been subject to is necessary in many countries as there is no `institutional memory' of how market-oriented organisations should operate.

Third, the comprehensiveness of reform. The evidence suggests that real change will only come about in the context of fundamental reform: in the case of agricultural market functioning, this would require de-control of prices as well as market participation (this begs the question, of course, of whether such reform is in the best interests of small farmers). This includes regaining control over the key macroeconomic variables, such as domestic inflation, to avoid reforming organisations being in a situation of `running to keep still' in the process of change.

As the increased use of improved seed is in most situations dependent on a well-functioning agricultural produce and input marketing system, to allow households to benefit in the form of cash income from its potential for increasing productivity, minimising these kinds of dislocations through careful sequencing and planning of reform is essential.

6.7 Overall reform impact

The economic reform programmes implemented in Malawi, Zambia and Zimbabwe so far seem to have had four impacts on the seed sector in common, none of which, unfortunately are positive in terms of encouraging increased use of improved seed by small-scale, semi-commercial farmers.

The overall macroeconomic reform initiatives, if implemented, tend to increase the operating costs of the organisations producing seed for small farmers, as the downward distortions in the domestic economy are removed. Assuming the organisations were not making excess profits before (this seems to be the case in all three countries), this has to be passed on in the form of higher prices to seed users or increased subsidies from government. Where small farm produce prices are

controlled, as in all three counties, higher seed prices are bound to affect returns to improved seed use adversely. This clearly illustrates the difficulty with achieving efficient, unsubsidised seed production and distribution without also liberalising producer prices.

None of the macroeconomic or sector-specific reforms have actually increased effective competition in the seed sector, according to the available evidence. On the production side, where public sector monopolies have been disbanded, they have been replaced by private ones. In Zimbabwe, competition between different private seed producing companies is developing but both the limited access to GOZ varieties and the finite size of the domestic market are likely to limit the number wishing to become involved. On the distribution side, private sector traders do not appear to offer any better service than public sector outlets, at least in part because in most rural areas they enjoy an element of monopoly power because of the poor level of rural infrastructural development (see Section 5.3).

Thus it seems that neither the efficiency nor the effectiveness of the seed services provided to farmers are improved by reform. Small farmers are likely to be worse affected as this group has often been particularly dependent on the near-by low-cost marketing services provided by the albeit relatively high-cost and inefficient agricultural parastatals. At the same time, it is the household economy of this group which is worst affected by the general economic reforms, so they are often in need of special seed services tailored to the particularly opportunities and constraints of their complex, low-input farming systems.

According to the experience of Malawi and Zambia, there is only one thing worse for seed supply than economic reform and that is selective economic reform. For example, removing statutory controls on market participation without ending price de-control often provides no real incentive to private traders and resulted, in Malawi and Zambia, in significant reductions in the overall coverage and equity of the national agricultural marketing system, with knock-on effects on seed supply. There appear to be a number of strong arguments against transferring all responsibility for small farmers seed services to the private sector but, should this be the preferred course of action, Malawi's and Zambia's experience suggests it is essential to implement a comprehensive reform that deals with all the key market variable uniformly.

6.8 Public or private seed sector development in the future?

The different nature and pace of the economic reform programmes in Malawi, Zambia and Zimbabwe allow valuable cross-country and time-series conclusions to be drawn concerning the appropriate public/private sector mix for sustained seed sector development in the sub-Saharan African context.

First, the experiences of the countries studied highlight the importance of tailoring seed sector development policy to individual crop- and location-specific circumstances.

There can be considerable differences between the most appropriate policy actions for encouraging seed uptake between different crops. For example, we have seen how multiplication of improved seed for self-pollinated crops can and is being managed successfully by small farmers whereas multiplication of hybrid crops, because of the isolation distances and management skills required, usually has to organised more formally. We have also seen how seed that provides benefits the individual grower can take advantage of, such as the increased yield derived from hybrid maize seed, often requires relatively little promotion or price incentives — in contrast to seed, such as for groundnuts, for which the benefit is mainly felt at national level, in this case in the form of a more uniform quality national export crop.

There is also the contrast between crops, and locations, where the main requirement is for seed of improved genetic quality, such as hybrid maize, which may require a formal sector seed organisation, and those where the main requirement is more simply seed of higher physiological quality (germination capacity, etc), such as beans in Malaŵi, where periodic screening of the small farm crop or simple seed treatment applications at local level may be sufficient.

And in a few cases, for example soyabeans, it may need to be accepted that expenditure on encouraging the uptake of improved seed may not be as cost-effective as some other innovation — in this case, rhizobium inoculant to increase yields by stimulating nitrogen fixation.

Seed requirements also vary between locations. Different economic situations is one cause. For example, Malaŵi is a very poor country in which ADMARC had a near monopoly on small farmer crop marketing. Zambia is a very big country and it too has, historically, depended heavily on agricultural parastatals. In these contexts, there is little prospect of conventional small-scale retail traders playing a significant role in seed distribution. This therefore may require a different approach, such as the one currently being pursued in The Gambia, where the government has handed over nearly all responsibility for multiplication and distribution of improved seed to NGOs and other community organisations.

In Zimbabwe, on the other hand, there is a much longer experience of rural retail trade so the requirement may be simply for suitable incentives to encourage existing retailers to stock improved seed suitable for communal farmers. This could be based on the approach used successfully by the Kenya Seed Company, for example, which aims at having `every stockist an extension agent' by providing a range of flexible incentives including attractive margins, the acceptance of returned stock and a line of stockist credit.

Then there are general lessons, applicable to all countries and seed situations. The most important of these is that, as long as small-scale, semi-commercial farmers form a significant group in the agricultural sector, the scope for reliance solely on private sector seed organisations will be limited. In all three countries, whether moving towards greater private sector involvement, as in Malaŵi and Zambia, or with long standing private sector involvement, as in Zimbabwe, small farmers — because of their limited resources and special seed needs in terms of varieties and quantities, are not well served by the private sector. In order to increase the effectiveness of the

service provided to small farmers in addition to improving the efficiency of the seed producing and distributing organisations, government policy must provide incentives for and controls on seed organisations' small farmer seed services, or government must take responsibility for providing these services itself.

There are two major areas of conflict. Firstly, the relatively high retail seed prices that seed organisations need to charge to cover production and processing costs once macroeconomic distortions are reduced (in Malawi and Zambia, costs have increased considerably after reform, as we saw in Chapter 5; in Zimbabwe, this is avoided only because of Seed Co-op's preferential access to new varieties and tax exempt trading status). Secondly, private trader involvement in distribution increases, or at least does not reduce, seed marketing costs (see Section 5.3). It also tends to create marketing `gaps' in areas where transport costs are high and/or the overall size of the market is unprofitably low. This latter problem is unlikely to decline in the foreseeable future in any of the countries studied.

Both these conflicts could largely be avoided by greater reliance on decentralised, farm-based seed production and distribution. So a second general lesson from the three countries' reform experience is that policy could usefully be redirected towards providing the incentives and the support services required for this to take off (contrary to the current situation, where policy directs that national companies are the sole providers of improved seed). Immediate changes that would facilitate this are:

- transferring a proportion of seed sector funding to separate **local budgets**, within Ministries of Agriculture or other suitable organisations, for local-level support for farmer seed production, especially of self-pollinated crops;

- **partial privatisation** of the seed sector, to allow private sector organisation and management only where it is likely to be beneficial in overall terms. In particular, it would appear that the quality control authorities, such as Seed Services in Malawi and Zimbabwe and SCCI in Zambia, would benefit from this approach;

- **appropriate legislation** to permit seed produced under this system to be sold as seed (most countries insist on seed being formally certified using International Seed Testing Association standards; Malawi's experience with `approved' seed shows that this is not always necessary). This would allow a staged approach to seed sector development;

- and greater extension focus on **farmer training** in seed selection and maintenance techniques.

Thus, there is scope for increasing private sector involvement — but only if it is organised and controlled at local level. The public sector will need to continue to provide key support services, especially complementary input supply and extension advice (the need for credit is less clear).

Lastly, for those private sector seed companies that do develop, to produce hybrid maize seed and seed for the more commercial farming sectors, regional co-operation and trade needs to be facilitated, in both plant breeding and exports and imports of certified seed, in order to allow each company to serve a large enough market to be profitable and to operate genuinely competitively: a major barrier to more effective domestic competition at present is the small size of most domestic markets for seed in sub-Saharan Africa, which effectively prevents the establishment of more than one seed company.

NOTES AND REFERENCES

1. There are two sources of improvement in seeds: the genetic information constrained within the seed itself and its physical and physiological attributes — purity, germination capacity, etc. The seed produced and distributed by the formal seed sector should contain some blend of the two, the exact combination depending on the location-specific requirements of the farmer seed users; seed produced by farmers themselves is also often improved to some extent compared to local land races. Not infrequently, poor management of multiplication and processing reduces the extent formal sector seed is an improvement on farmers' seed, but 'improved' seed is usually taken to mean the product of the formal agricultural research system and the formal seed sector.

2. This is explained more fully in Cromwell, Friis-Hansen and Turner, 1992.

3. For simplicity we refer to this groups as small farmers (communal farmers in Zimbabwe).

4. This section is based on information in Cromwell [1992] and various issues of *Africa Economic Digest.*

5. This section is based on information in Gulhati, 1991; Young and Loxley, 1990; Mwanaumo, 1989; Ristanovic, 1989; Kydd, 1988; Norrby, 1986; and various *Africa Economic Digest* reports.

6. Information in this section is taken from Eurostat, 1990 and Lehman, 1990.

7. The full report on the seed survey in Malawi, on which this section is based, is given in Cromwell and Zambezi, 1992.

8. This section is based on information in SIDA, 1991; ARPT, 1991; Erikson *et al.*, 1989; JSSA, 1989; Kanungwe, 1989; Ristanovic, 1989; DANAGRO, 1987; Norrby, 1986; Chibasa, 1985 and interviews with Zamseed and SIDA staff in Lusaka.

9. This section is based on the full Zimbabwe seed survey report, Friis-Hansen, 1992.

10. See, for example, the case studies cited in Cromwell, Friis-Hansen and Turner, 1992.

11. See, for example, Duffus and Slaughter, 1980; USAID, 1987; Asian Productivity Organisation, 1987.

12. The opportunity cost of saving grain to use as seed in most semi-commercial small farm households.

ACRONYMS AND EXCHANGE RATES

ADD	Agricultural Development Division
ADMARC	Agricultural Development and Marketing Corporation
ARDA	Agricultural and Rural Development Authority
ARPT	Adaptive Research Planning Team
ASAC	Agricultural Sector Adjustment Credit
CDC	Commonwealth Development Corporation
EC	European Community
ENDA	Environmental Development Activities
FFYNDP	First Five Year National Development Programme
GDP	Gross Domestic Product
GMB	Grain Marketing Board
GNP	Gross National Product
GOZ	Government of Zimbabwe
GRZ	Government of Zambia
IDA	International Development Association
IMF	International Monetary Fund
MLARR	Ministry of Livestock, Agriculture and Rural Resettlement
MMD	Movement for Multi-Party Democracy
MOA	Ministry of Agriculture
NAMBOARD	National Agricultural Marketing Board
NGO	Non-governmental Organisation
NSCM	National Seed Company of Malawi
ODA	Overseas Development Administration
PCU	Provincial Co-operative Union
SAL	Structural Adjustment Loan
SCCI	Seed Control and Certification Institute
SIDA	Swedish International Development Aid
SSMS	Smallholder Seed Multiplication Scheme
STU	Seed Technology Unit
UDI	Unilateral Declaration of Independence
USAID	United States Agency for International Development
ZAMSEED	Zambia Seed Company
ZCF	Zambia Co-operative Federation
ZIMCO	Zambia Investment and Marketing Company
ZSPA	Zambia Seed Producers Association

MK1 = US$0.37

ZK1 = US$0.02

Z$1 = US$0.20
as at December 1990

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