Overseas Development Institute

THE PERFORMANCE OF THE SEED SECTOR IN ZIMBABWE:

AN ANALYSIS OF THE INFLUENCE OF ORGANISATIONAL STRUCTURE

Esbern Friis-Hansen

Working Paper 66
Results of ODI research presented in preliminary form
for discussion and critical comment

ODI Working Papers available at May 1992

27: European Community Trade Barriers to Tropical Agricultural Products
Michael Davenport, 1988, £4.00, ISBN 0 85003 117 6
28: Trade and Financing Strategies for the New NICS: the Peru Case Study
Jurgen Schuldt L., 1988, £3.00, ISBN 0 85003 118 4
29: The Control of Money Supply in Developing Countries: China, 1949-1988
Anita Santorum, 1989, £3.00, ISBN 0 85003 122 2
30: Monetary Policy Effectiveness in Côte d'Ivoire
Christopher E. Lane, 1990, £3.00, ISBN 0 85003 125 7
31: Economic Development and the Adaptive Economy
Tony Killick, 1990, £3.50, ISBN 0 85003 126 5
32: Principles of policy for the Adaptive Economy
Tony Killick, 1990, £3.50, ISBN 0 85003 127 3
33: Exchange Rates and Structural Adjustment
Tony Killick, 1990, £3.50, ISBN 0 85003 128 1
34: Markets and Governments in Agricultural and Industrial Adjustment
Tony Killick, 1990, £3.50, ISBN 0 85003 129 X
35: Financial Sector Policies in the Adaptive Economy
Tony Killick, 1990, £3.50, ISBN 0 85003 131 1
37: Judging Success: Evaluating NGO Income-Generating Projects
Roger Riddell, 1990, £3.50, ISBN 0 85003 133 8
38: ACP Export Diversification: Non-Traditional Exports from Zimbabwe
Roger Riddell, 1990, £3.50, ISBN 0 85003 134 6
39: Monetary Policy in Kenya, 1967-88
Tony Killick and F.M. Mwega, 1990, £3.50, ISBN 0 85003 135 4
40: ACP Export Diversification: Jamaica, Kenya and Ethiopia
Christopher Stevens, 1990, £3.50, ISBN 0 85003 136 2
41: ACP Export Diversification: The Case of Mauritius
Matthew McQueen, 1990, £3.50, ISBN 0 85003 137 0
42: An Econometric Study of Selected Monetary Policy Issues in Kenya
F. M. Mwega, 1990, £3.50, ISBN 0 85003 142 7
43: Differences in Econometric Performance between Franc Zone and other sub-Saharan African Countries
Christopher E. Lane and Sheila Page, 1991, £3.50, ISBN 085003 148 6
44: Monetary Policy Effectiveness in Indonesia, 1974-1900
Christopher E. Lane, David C. Cole and Betty F. Slade, 1991, £3.50, ISBN 0 85003 150 8
45: Monetary Control in Ghana: 1957-1988
Nii Kwaku Sowa, 1991, £3.50, ISBN 0 85003 152 4
46: The IMF in the 1990s: Forward to the Past or Back to the Future
Graham Bird, 1991, £3.50, ISBN 0 85003 153 2
47: What Can We Know About the Effects of IMF Programmes?
Tony Killick, Moazzam Malik and Marcus Manuel, 1991, £3.50, ISBN 0 85003 154 0
48: Country Experiences with IMF Programmes in the 1980s
Tony Killick with Moazzam Malik, 1991, £3.50, ISBN 0 85003 155 9
49: Evaluating the Impact of NGOs in Rural Poverty Alleviation: India Country Study
Mark Robinson, 1991, £5.00, ISBN 0 85003 157 5

WORKING PAPER 66

THE PERFORMANCE OF THE SEED SECTOR IN ZIMBABWE: AN ANALYSIS OF THE INFLUENCE OF ORGANISATIONAL STRUCTURE

Esbern Friis-Hansen

May 1992

ISBN 0 85003 184 2

Overseas Development Institute
Regent's College,
Inner Circle, Regent's Park
LONDON NW1 4NS

CONTENTS Page

LIST OF TABLES

ACRONYMS

AFC	Agricultural Finance Corporation
AGRITEX	Department of Agricultural Technical Services and Extension
ARDA	Agricultural and Rural Development Authority
CA	Communal Areas
COPA	Commercial Oilseeds Producers Association
CS	Communal Sector
CSO	Central Statistical Office
DERUDE	Department of Rural Development
DR&SS	Department of Research and Specialist Services
ENDA	Environmental Development Activities
GMB	Grain Marketing Board
GOZ	Government of Zimbabwe
IBPGR	International Board for Plant Genetic Resources
ICRISAT	International Centre for Research in the Semi-Arid Tropics
LSCF	Large Scale Commercial Farmers
LSCS	Large Scale Commercial Sector
MLARR	Ministry of Lands, Agriculture and Rural Resettlement
MT&C	Ministry of Trade and Commerce
NFAZ	National Farmers Association of Zimbabwe
NGO	Non Governmental Organizations
NR	Natural Region
ORAP	Organization of Rural Associations for Progress
RS	Resettlement Sector
SSCF	Small Scale Commercial Farmers
SSCS	Small Scale Commercial Sector
UDI	Unilateral declaration of Independence
ZNFU	Zimbabwe National Farmers Union

****

£1.00 = Z$4.9749 as at December 1990

PREFACE AND ACKNOWLEDGEMENTS

This report presents the results of a study of the performance of the seed sector in Zimbabwe undertaken under the auspices of the Overseas Development Institute, as part of a wider study of seed sector re-structuring in developing countries, conducted as an Extra-Mural Contract for the UK Natural Resources Institute. Other reports from this wider study describe the analytical framework used in the work and the results of country studies in Malawi and Zambia.

Field work for the study was conducted by the author in Zimbabwe during 1989 and 1990, with the permission of the Ministry of Lands, Agriculture and Rural Resettlement. The author is a Research Fellow at the Centre for Development Research in Copenhagen.

Thanks are due to The Rockefeller Foundation for an Agricultural Sciences Grant under the Strengthening Food Production Systems in Africa programme, which funded the cost of the Zimbabwe and Malawi studies. The Zimbabwe study built on field work conducted as part of a Centre for Development Research, Copenhagen, research project - funded by DANIDA Research Council - which investigated the role of seeds in food security and sustainable development in the communal areas of Zimbabwe.

The views expressed in the report are those of the author and do not necessarily reflect the views of the MLARR, The Rockefeller Foundation, the UK Natural Resources Institute or the Overseas Development Institute. Comments are welcome and should be addressed to Elizabeth Cromwell, Project Leader for this study, at ODI.

Esbern Friis-Hansen is a Research Fellow at the Centre for Development Research, Copenhagen, and he contributed to the study as part of his Ph.D. research on the contribution of seeds to food security and sustainable development in the Communal Areas of Zimbabwe.

1. INTRODUCTION

This study of the seed sector in Zimbabwe is one of three being undertaken as part of an ODI research project to improve understanding of the extent to which changing the organisational structure of the seed sector in developing countries can improve its performance, both in terms of firm-level economic efficiency and in terms of the accessibility of improved seed to small farmers, using evidence from Eastern and Southern Africa in particular.

The specific objectives of the project are to:

- identify the desirable functions of seed sector organisations and appropriate criteria for assessing their performance with respect to these functions;
- establish the most important factors influencing the performance of seed organisations, whether in public, private or co-operative ownership;
- assess the relative influence of these factors on performance, and the nature of any linkages between them, using detailed evidence from case study countries in Eastern and Southern Africa;
- assess, on the basis of this evidence, the nature of the relationship between performance and the organisational structure of the seed sector and, therefore, the scope, if any, for promoting improved performance in the seed sector through organisational change;
- identify the organisational structures, and the relative roles of different types of seed organisation, that are likely to be most successful in meeting the seed needs of small farmers efficiently;
- assess the relevance of project results to the organisational structure of diffusion systems for other improved agricultural technologies, outside the seed sector.

The research is targeted at policy makers in developing countries, donor agencies and researchers working to design seed sector policies, programmes and projects tailored to the needs of the different actors in it (government, seed organisations, small farmers, etc.).

Results are being presented, in the first instance, as a series of ODI Working Papers, covering each phase of the project, to make them quickly available, particularly to people currently actively working on seed sector development in developing countries. Subsequently, at the end of the study, it is intended to synthesise the results as a book to make them more widely available to people interested broadly in the diffusion of improved agricultural technology. It is hoped that results are applicable both at the national level in the case study countries and more generally in developing countries currently considering restructuring seed sector activities.

The scope of the study has been defined in this way for two reasons. First, improved seeds are one of the most important technologies for intensifying agricultural production and thus

contributing to growth in the agricultural sector. But difficulties in organising seed delivery, particularly for small-scale, semi-commercial farmers, have been underestimated in comparison to the amount of attention devoted to the delivery of other agricultural services and, within the seed sector itself, to issues to do with variety development and seed production.

Second, as a result many countries have persisted, in the apparent absence of alternative forms of organisation, with loss-making national seed parastatals - despite their failure to meet the seed needs of small-scale, semi-commercial farmers effectively. And, for similar reasons, are now embracing privatisation and/or seed market liberalisation as a potential solution to these problems. But it is not clear that this will produce a practical improvement in seed sector performance.

The study is divided into three parts. In the first part, documentary evidence from a wide range of seed sector projects and programmes in Asia, Africa and Latin America was used to create a conceptual framework for analysing the influence of organisational structure on seed sector performance, to establish the desirable economic functions of the sector and to develop criteria for measuring the performance of seed organisations with respect to these functions.

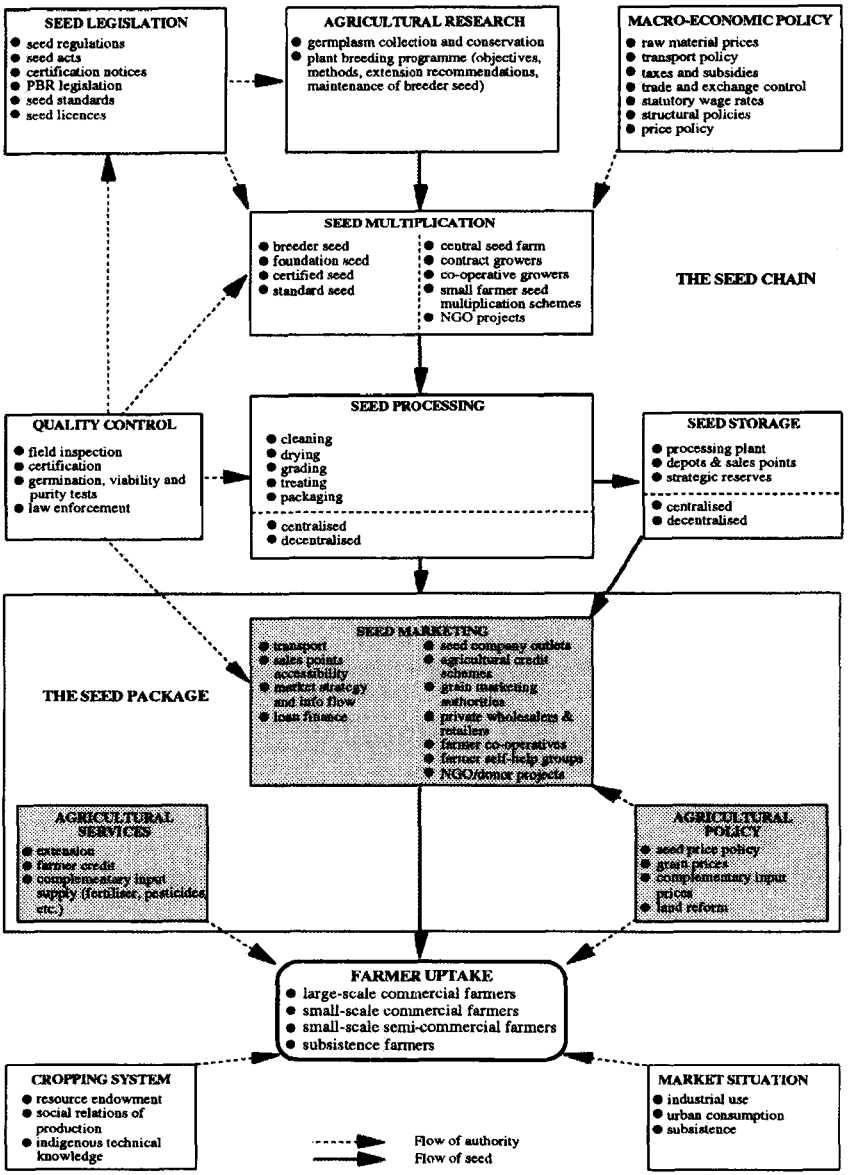
The conceptual framework defined the seed sector as those institutions linked together by their involvement in the multiplication, processing, distribution and quality control of seed, or by their influence on these activities - these linkages being a significant distinguishing feature of the seed sector. Within the sector as a whole, the framework defined 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. This is illustrated in Diagram 1.

The seed sector was found to be expected to fulfil two main functions: a **national development** function, which was defined as the delivery of the types and quantities of seed required by small-scale, semi-commercial 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.

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

In the second part of the study, field work investigation in Zimbabwe, Malawi and Zambia used this conceptual framework to reach country-specific conclusions concerning the project objectives. The third phase will examine the applicability of these country-specific results to the overall research objectives, as well as synthesising the results of the project as a whole.

Diagram 1: **The seed sector - a framework approach**



Source: Cromwell, Friis-Hansen and Turner, 1992.

The research hypotheses being tested in the second phase are:

- that structural and organisational factors (the fourth set of factors in the conceptual framework of analysis), and in particular the level of internal efficiency within seed organisations, are the most influential determinants of seed sector performance;

- that increasing the role of the private sector in the seed sector will produce a substantial improvement in performance.

The specific objectives of the country case studies are to:

- establish how well the seed sector is performing with respect to each part of the equity and efficiency functions. Are the types and quality of seed being supplied appropriate to the needs of small-scale, semi-commercial farmers? Are the correct quantities being supplied? At the right time and to the necessary locations? At prices these farmers can afford? Are the seed organisations fully recovering the fixed and variable cost of multiplication, processing and delivery in delivering seed to this group?

- using this information, to assess the comparative influence of the four sets of factors on performance. In particular, the extent it is determined by the organisational structure of the sector i.e. the relative balance between external and internal inefficiencies. And, with respect to the latter, their precise nature.

- identify whether the balance of these factors means changing the organisational structure of the seed sector is likely to minimise these inefficiencies i.e. the scope for improving performance through organisational change. If so, the type of organisational structure that can perform more effectively, particularly with respect to seed delivery to small-scale, semi-commercial farmers.

Some of the issues that are important at this stage are whether there a continuing role for direct public sector participation in seed multiplication, processing and delivery; whether policy changes create more effective incentives for and controls on the participation of other types of formal sector seed organisation in the small farmer seed market; whether, in particular, could greater encouragement of decentralised, small-scale seed activities could make a significant contribution to performance; whether is there a role for supporting informal sector seed activities; and to what extent a blend of these approaches is required, with different organisational structures promoted for different activities within the seed sector.

A three stage methodology is being used. First, an assessment is made of performance 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. In Zimbabwe, the source of primary information relating to performance was a survey of small farmers.

The survey was conducted in Silobela communal area in Kwekwe District in the Midlands and in Chiduku communal area in Makoni District in Manicaland. In each CA, 35 households

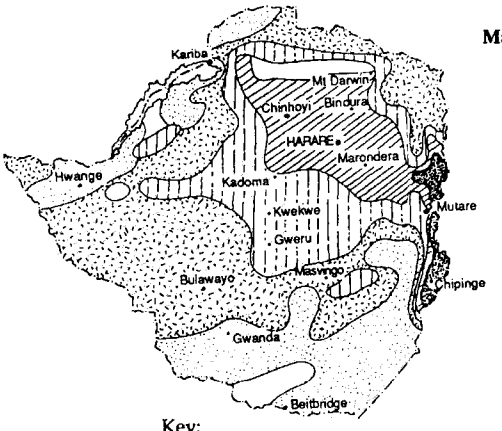
were interviewed, selected to represent the range of different soil types, farming practices and socio-economic conditions locally. Silobela is in Natural Region IV, classified as suitable for semi-extensive farming; average holding size is 3.5 ha. Chiduku is in Natural Region III, suitable for semi-intensive farming, and is more densely populated. Average holding size for long-established families is 4 ha, for recently resettled families it is 1 ha.

The evidence from the farmer survey was compared with and amplified by existing secondary data sources, such as MLARR Farm Management Surveys, other published survey results and research work related to crop use and small farmer seed preferences, etc., and also by interviews with staff at the key seed sector institutions. These represented:

- Ministry of Lands, Agriculture and Rural Resettlement, Department of Research and Specialist Services, Department of Agricultural Technical Services and Extension;
- Agricultural Finance Corporation;
- Village and Ward Development Committees in Silobela and Chiduku communal areas;
- Seed Co-op, Savanna Seed, Pioneer International, National Tested Seed, Environment and Development Association;
- Farmers Co-op, Commercial Farmers Union, National Farmers Association of Zimbabwe;
- Grain Marketing Board.

This information was then analysed to establish the extent to which performance is influenced by the four sets of factors, outlined above, and this analysis was discussed with the key informants, to allow the interpretation made from typically scanty quantitative data to be strengthened by the use of more subjective information where relevant. Finally, this analysis was used to test the research hypotheses and to generate conclusions specific to Zimbabwe concerning the scope for promoting improved performance in the seed sector through organisational change, and the organisational structures likely to be most successful in meeting the seed needs of small farmers efficiently.

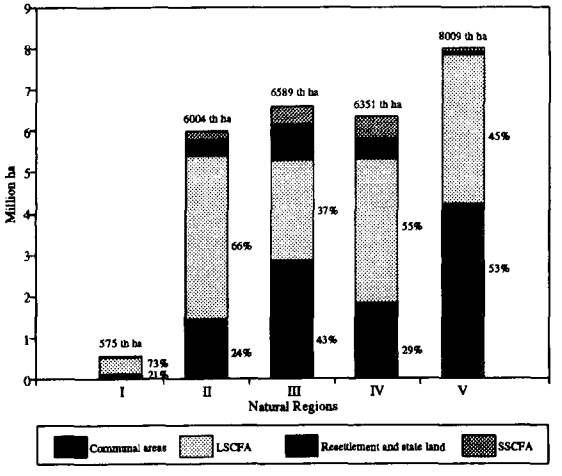
Map 1: Zimbabwe's Natural Regions



Key:

I	1.5% of the country's area. Very high rainfall (over 1000mm). Low temperatures.	Specialized and diversified farming incl. forestry, tea, coffee, deciduous fruit, potatoes. Intensive beef and dairying.
II	19% of the country's area. High rainfall (700-1000mm). Warm summer, cool winter.	Intensive farming of maize, tobacco, cotton, winter wheat, horticulture. Intensive beef and dairying.
III	17.5% of the country's area. Moderate rainfall (550-700mm). Higher temperatures, dry spells.	Semi-intensive farming. Drought-resistant cotton, soya, sorghum. Beef rearing and breeding.
IV	33% of the country's area. Low rainfall (450-600mm), seasonal droughts.	Semi-intensive farming. Drought-resistant crops under irrigation. Semi-intensive livestock.
V	29% of the country's area. Very low rainfall (less than 500mm).	Extensive farming. Irrigation of lowveld sugar, citrus, cotton, wheat.

Diagram 2: Land Use Categories by Natural Regions



Source: Hifab International and Zimconsult, 1989

2. SEEDS AND SMALL FARMERS IN ZIMBABWE

2.1 The role of small farmers in agricultural production

2.1.1 The land issue

Zimbabwe is subdivided into five Natural Regions (see Map 1, Table 1). NR I is in the Eastern Highlands and receives more than 1,000 mm rainfall and is suited for specialised and diversified farming. NR II is the prime agricultural land, situated on the central plateau around Harare. NR III and IV receive less and more unstable rainfall and are less suited for crop production. NR V is inappropriate for crop production. Table 1 gives total land by natural regions.

Table 1: Total land by Natural Region

Natural Region	*Rainfall (mm)*	*Suitability*	*% of land*
I	1000 +	Specialised & diversified crops	1.8
II	750-1000	Intensive farming	15.0
III	650-750	Semi-intensive farming	18.7
IV	450-650	Semi-extensive farming (marginal)	37.8
V	under 450	Extensive	26.7

Source: Central Statistical Office

Agriculture in Zimbabwe is divided into four sub-sectors: large-scale commercial farming; small-scale commercial farming; the communal sector and the resettlement sector. To simplify the analysis of production trends, we group farmers into two sectors only, the large-scale commercial sector and a small-scale agricultural sector, including the three sectors of small-scale farmers.

The distribution of land between the sectors was extremely unequal after Independence in 1980, with some 6,200 large-scale commercial farmers controlling about 47 per cent of the arable land, while approximately 850,000 households in communal areas were settled on about half of the land. The share of land owned by large-scale commercial farmers has today been reduced to 34 per cent of total arable land, cultivated by some 4,200 farmers. The pressure on land in the communal areas has increased as the population there has increased to an estimated 1 million families, settled on the same land area. A new sector of 52,000 resettlement farmers, occupying 10 per cent of the arable land, has been created by the land reform (see Map 1, Table 2).

Table 2: Land distribution by sector and natural region, 1990

Sector/NR	*I*	*II*	*III*	*IV*	*V*	*TOTAL 1990*	*TOTAL 1980*
LSCS	200	3,690	2,410	2,410	2,490	11,220	15,500
CS	140	1,270	2,820	7,340	4,780	16,350	16,400
SSCF	10	240	530	500	100	1,380	1,400
RS	30	590	1,240	810	620	3,260	NA
State farms	10	10	160	60	260	500	NA
Other	310	60	130	3,640	2,190	6,360	4,370
TOTAL	700	5,860	7,290	14,780	10,440	39,070	39,070

Source: Central Statistical Office, Agricultural and Rural Develpoment Authority and Department of Rural Development.

Notes: LSCS = Large-scale commercial farmers; CS = Commercial sector; SSCF = Small-scale commercial farmers; RS = Resettlement sector.

The contrast becomes even more striking if the quality of land is considered. The proportion of high potential land (NR I & II) controlled by large-scale commercial farmers has reduced little, from some two-thirds to 60 per cent over the last decade. Meanwhile, some 90 per cent of the communal areas and 80 per cent of the resettlement areas are located in the areas of insecure rainfall (NR III, IV and V).

Altogether, only about one fifth of the small-scale farmers live in the higher rainfall areas (NR I and II). A further fifth live in the medium potential areas (NR III), with sufficient rainfall for crop production but subject to occasional mid-season dry spells. Some 42 per cent of the small-scale farmers live in NR IV, receiving 450-650 mm of annual rainfall and subject to frequent dry spells and drought. The remainder, almost a fifth of the small-scale farmers, live in areas categorised as inappropriate for crop production (NR V), but attempt to grow crops for subsistence regardless.

Land use in the communal areas is continuously intensified. Between 1975 and 1984, the arable land in the communal area increased by one third, at the expense of grazing and fallow areas. This intensification process was primarily caused by increased population pressure on land resources. The commercialisation process added to the pressure of production on resources.

All land in communal areas is under customary land tenure. Individual households have the right to cultivate their specific fields and this right may be inherited from one generation to the next. All households have unlimited right to graze their livestock on communal grazing areas. Land in the communal areas may not be bought or sold. Before Independence, land in the communal areas was allocated to rural families by the traditional leadership, consisting of chiefs, headmen and kraal heads. These powers are today officially transferred to District Councils, although the traditional leaders have in practice retained many of their powers with respect to land allocation at the local level.

2.1.2 Small farm farming systems

The farming system in the communal areas is based on using limited resources of land, labour and capital: in general terms it can be characterised as a low input/low production system. The production potential is generally low because of very finite resource limitations: the amount of arable land is small; the quality of land is poor; and rainfall is low and unreliable.

There are very wide variations in small-scale farmers' access to resources, both between the 170 different communal areas and between small-scale farmers within a specific communal area. In the marginal areas, rainfall is the major limiting factor for production, while land is the limiting factor in the communal areas situated in areas with sufficient rainfall.

In addition, access to tools and equipment greatly influences farm practices in the communal areas. Absence of tools and equipment may constrain farmers in the communal areas from adopting improved practices, including seeds, and thereby from increasing productivity. Access to ploughs, cultivators and harrows is important for timely land preparation and weeding. Access to scotch carts is important for timely spreading of manure, harvesting, marketing and purchasing inputs. Table 3 show the access of farmers in the communal areas to tools and equipment.

Table 3: Communal farmers' access to tools and equipment

Type of equipment	*Percentage of communcial farmers*
Hoe	92 %
Plough	84 %
Cultivator	32 %
Harrow	18 %
Scotch cart	13 %

Source: MLARR, 1990.

The farming system is based on an interdependence and interaction between crop and livestock production. Crop production depends on oxen for draft power and manure, while livestock production depends on crop residues as supplementary feeding during the dry season.

Cattle dominate in the livestock sector, which also includes donkeys, goats, sheep, poultry and occasionally pigs and rabbits. Sale of livestock and crops provides cash income to purchase additional domestic consumption needs; to provide external inputs such as improved seeds, mineral fertilisers and pesticides; and to buy livestock, both as a means of saving and to provide additional draft power and manure.

Off-farm employment and income is generally very important for the economy of the communal areas. A recent farm management survey [MLARR, 1990] indicates that approximately one third of the average income in the communal areas comes from off-farm sources. The importance of off-farm income varies greatly between areas. Its significance in relation to total household income is highest in marginal areas and lower in the better-off communal areas. The proportion of income which derives from off-farm income is lower for livestock owners than other farmers.

Off-farm income may come from the part- or full-time employment of one or more members of a household in town or in the large-scale commercial sector, or from remittances from relatives permanently living and working in town. Only limited off-farm income comes from working for others within the communal areas, for example as causal farm labourers. The rate of proletarisation in the communal areas is very low.

There is no doubt that there is a real need for capital in the communal areas and this has grown over the last decade, most probably due to the increased use of inputs in agriculture and a strong emphasis on education. Credit plays an important but small role in financing farmers' input requirements. The MLARR farm management survey found that only 13 per cent of commercial farmers received credit in 1989, a reduction from 18 per cent in 1988. Approximately 85 per cent of the loan portfolio was in arrears in 1989.

Very little precise data exists on actual incomes and financing methods in agriculture in the communal areas. There are extreme variations in the source and level of income between various parts of the country. While most communal farmers are in some way or another involved in the cash economy, ensuring basic subsistence food supply remains the first priority. The lack of cash to purchase inputs leads many communal farmers to remain dependent on subsistence agriculture, outside the cash economy. This can be a vicious downward spiral which may eventually lead them to become dependent on government food relief.

Farming in most of the communal areas is highly risky. Communal farmers make use of a number of risk-avoiding agricultural strategies, both agronomic and socio-economic, to avoid the worst effects of erratic rainfall and drought. Common farm management reactions to drought include staggered planting, intercropping and relay cropping, use of both early and medium term maturing varieties and changes in the cropping pattern, for example to more drought-tolerant crops if rains are delayed or reduced - such as sunflower or small grains. Socio-economic reactions to drought include increased migrant labour, buying food from surplus areas and reliance on food relief.

2.1.3 Cropping pattern and production trends

The MLARR farm management survey [MLARR, 1990], indicates that the average cultivated area per household in the communal areas is 3 ha, with variations from 1.5 ha to 3.5 ha.

Table 4: **Communal area cropping patterns by Natural Region, 1986-89**

	Maize	*Finger millet*	*Sorghum*	*Pearl millet*	*Ground-nut*	*Cotton*	*Sun-flower*	*Vege-tables*	*Beans*	*Fruit*	*Other*	*Fallow*	*All Crops*
							(*Hectares*)						
NR I	14.5	0.9	0.0	1.4	0.1	0.7	0.0	0.0	0.1	0.2	3.7	3.6	25.3
NR IIA	211.2	4.1	3.4	2.6	10.6	29.0	7.4	3.5	1.8	2.9	19.7	129.5	425.5
NR IIB	109.8	5.9	2.8	11.2	11.3	2.6	10.0	4.4	1.7	0.9	13.7	74.6	248.9
NRIIB, III	54.6	1.2	3.7	0.5	4.1	39.4	6.6	0.0	0.1	0.0	7.0	24.1	141.3
NRIII	226.4	11.3	16.2	32.0	17.6	49.1	17.3	2.1	1.0	2.1	37.3	138.4	550.5
NRIII, IV	35.4	0.0	6.2	9.1	2.9	4.4	2.3	-	0.0	-	6.8	18.6	93.4
NR IV	674.4	55.8	142.2	318.6	90.5	87.4	60.7	12.0	4.2	8.8	177.7	499.0	2,131.6
NR IV, V	9.3	3.0	15.7	27.1	2.0	2.1	1.1	-	0.1	-	6.7	16.5	83.5
NR V	94.8	7.3	135.7	72.2	9.4	12.5	11.2	0.4	0.2	0.8	20.1	147.1	511.8
National	**1,430.4**	**89.5**	**326.0**	**474.7**	**148.5**	**227.1**	**116.6**	**-**	**9.3**	**-**	**292.7**	**1,051.4**	**4,211.8**
							(*Percentages*)						
NR I	67.1	4.2	0.0	6.5	0.5	3.2	0.0	0.0	0.5	0.9	17.1	-	100
NR IIA	71.3	1.4	1.2	0.9	3.6	9.8	2.5	1.2	0.6	1.0	6.7	-	100
NR IIB	63.0	3.4	1.6	6.4	6.4	1.5	5.7	2.5	1.0	0.5	7.9	-	100
NR IIB, III	46.6	1.0	3.2	0.4	3.5	33.6	5.6	0.0	0.1	0.0	6.0	-	100
NR III	54.9	2.7	3.9	7.8	4.3	11.9	4.2	0.5	0.2	0.5	9.1	-	100
NR III, IV	47.3	0.0	8.3	12.2	3.9	5.9	3.1	-	0.0	-	9.1	-	100
NR IV	41.3	3.4	8.7	19.5	5.5	5.4	3.7	0.7	0.3	0.5	10.9	-	100
NR IV, V	13.9	4.5	23.4	40.4	3.0	3.1	1.6	-	0.2	-	10.0	-	100
NR V	26.0	2.0	37.2	19.8	2.6	3.4	3.1	0.1	0.1	0.2	5.5	-	100
National	**45.3**	**2.8**	**10.3**	**15.0**	**4.7**	**7.2**	**3.7**	**-**	**0.3**	**-**	**9.3**	**-**	**100**

Source: Calculated from district-level data AGRITEX Crop Production Section.

Note: Crop percentages are calculated on the basis of crop area, excluding fallow, allowing for rounding errors.

As shown in Table 4, a wide range of crops are grown in the communal areas, with considerable differences in cropping patterns between the different natural regions. With the exception of NR V, maize in the dominant crop, although it is proportionately more important in the agro-ecologically better-off areas. Nearly all farmers in the communal areas cultivate some maize. The second and third most important crops in area terms are the drought-tolerant crops pearl millet and sorghum. These crops are particularly important in the more marginal areas. The fourth most important crop is cotton, which is grown by less than 10 per cent of communal farmers. Groundnuts occupy a rather small proportion of the area, but are grown by more than two-thirds of communal farmers. Sunflower is a cash crop primarily grown in the drier areas as an substitute for maize if the rainfall is late. Finger millet is used primarily for brewing traditional beer and is of declining importance.

Table 5 shows trends in crop production in the communal areas. Two crops within the small farm sector have shown remarkable progress in terms of increased production and marketed output, namely maize and cotton. The area cultivated with maize has increased from about one third of the total area prior to Independence, to approximately half of the cultivated area during the 1980s. Cotton cultivated as a cash crop has expanded rapidly; the area has more than tripled over the eight year period. As a result of this trend, the marketed share of the small-scale agricultural sector increased from 15 per cent in 1978 to 35 per cent in 1988.

The area occupied by finger and pearl millet has declined over the whole period; part of this area is likely to have been allocated to maize. Most of the millet was replaced by the equally drought-tolerant sorghum. These changes in the cropping pattern during the 1980s can be partly explained by the increasing commercialisation of the small farm sector; for example, external markets exist for maize and sorghum, and improved varieties are available, while this is not the case for millet. An additional explanation is changing food preferences.

□ *Maize*

Production of maize in the small-scale sector was stagnant (excluding drought years) during most of the 1970s. The area cultivated with maize also varied little and yield was stable at the low level of 600-900 kg/ha.

Only two years after Independence, small farmers' maize production had more than doubled. This spectacular increase had been accomplished largely through improved facilities and a 100 per cent expansion of the area cultivated with maize over the same period (1979-81), and is thus not significantly associated with yield improvements. The expansion of maize cultivation did not replace other crops but was instead related to a total expansion of the cultivated area by 25 per cent.

The major part of the area expansion between 1979-81 was closely linked with the transition from war to peace and better access to the Grain Marketing Board marketing facilities. Many new families settled and others returned to their previous land, as the restrictions on settlement were in practice limited. Also, many of the areas formally

Table 5: **Area and production of principal crops in communal areas, 1970-89**

Harvest Year	*Maize*		*Finger millet*		*Sorghum*		*Pearl millet*		*Groundnuts*		*Beans*		*Cotton*	
	Area (000)	*Prod (000)*	*Area (000)*	*Prod (000)*	*Area (000)*	*Prod (000)*	*Area (000)*	*Prod (000)*	*Area (000)*	*Prod (000)*	*Area (000)*	*Prod (000)*	*Area (000)*	*Prod (000)*
1970	611	246	53	59	199	65	176	55	245	30	33	13	14	17
1971	672	455	35	51	240	137	191	73	216	16	32	12	18	16
1972	665	555	30	47	240	120	202	110	221	17	27	8	30	27
1973	475	145	69	56	122	23	225	109	200	24	30	11	26	13
1974	724	470	-	-	275	150	-	-	290	187	42	12	62	55
1975	725	435	76	38	210	105	441	146	310	110	40	18	54	40
1976	760	550	120	81	235	120	456	165	325	173	-	-	35	28
1977	600	400	141	87	90	36	497	191	275	130	35	11	35	22
1978	700	450	35	11	120	57	254	83	200	101	43	8	41	31
1979	600	420	150	58	76	30	233	88	240	100	11	4	20	15
1980	900	600	147	61	120	66	293	100	175	67	-	-	15	12
1981	1,000	1,000	-	-	200	100	-	-	300	100	-	-	59	45
1982	1,100	595	-	-	200	50	-	-	240	95	-	-	51	27
1983	1,050	285	-	-	280	44	-	-	180	23	-	-	65	33
1984	1,136	454	-	-	156	37	-	-	144	19	-	-	100	70
1985	1,018	1,558	-	-	211	76	-	-	118	61	-	-	130	110
1986	1,074	1,348	-	-	150	66	-	-	160	64	-	-	114	99
1987	943	518	109	40	164	38	187	56	177	55	-	-	138	83
1988	1,036	1,450	120	84	206	160	237	184	197	106	-	-	161	137
1989	920	1,062	116	44	151	62	164	90	160	72	-	-	153	123

Source: Data for maize, sorghum, groundnuts, beans and cotton for 1970-84 are from the 1987 Statistical Yearbook, and from the CSO Crop Forecasting Committee for 1984-89.

designated for grazing were put under plough. The maize area has since stabilised at the 1981 level.

Maize production declined to its pre-Independence level during the 1982-84 droughts, but the 1985 harvest surprised many observers by reaching two thirds higher than the 1981 record production level. This increase may be explained as an overall improvement of yields. The average yield in the small-scale sector had almost doubled in 1985, compared with the pre-Independence level, reaching an average of 1,400 kg/ha.

The small-scale sector accounted for only a few per cent of the marketed maize during the pre-Independence period. The opening up of the market for small farmers resulted in a ten-fold increase in their maize sales in 1981. The marketed volume further doubled from 1981 to 1985, when small farmers contributed more than half Zimbabwe's maize supply and over one third of the official purchased maize.

However, the increase in marketed production within the communal areas is very unequally distributed geographically. Certain areas, namely Mashonaland, have a much higher rate of commercialisation. 18 communal areas (some 10 per cent of total the communal areas) account for well over half the total maize deliveries to the Grain Marketing Board. During the period of drought, the marketed share from these communal areas were even higher and reached 84 per cent in the driest year (1983/84). Even though some areas in Mashonaland were selling surplus production during the drought years, the majority of the rural areas were reliant on food relief or purchase of food using non-agricultural income (remittances from migrant labour, etc.). Furthermore, recent studies [see, for example, Masst, 1991] indicate that a significant social differentiation of production exists between households. The most commercialised farmers tend to be those who have more land and more cattle, and are situated in better-off areas in terms of rainfall.

The post-Independence growth in small-scale maize production has now ended and evidence suggest that the easy gains from expanding technology and market support through the extension service are over. Hybrid seed and fertiliser technologies were primarily developed for improving yields in the high rainfall areas, but they have spread with some success to the more marginal areas. There are several reasons for the transition of the semi-arid areas into maize growing: maize is less demanding in terms of labour than small grains; maize is easier to process and less susceptible to bird damage; and, most importantly, maize has proven to yield better than sorghum and millet in most years. The extension service faces a tremendous challenge in the semi-arid areas but unfortunately has few other technological options to offer.

□ *Groundnuts*

The area cultivated with groundnuts in the communal areas has expanded significantly and production reached a peak in 1981/82, but has declined since then. Most groundnuts grown by communal farmers are not sold to GMB. Groundnuts are grown primarily as a subsistence food crop, with harvested surplus sold on the local market. Parallel market prices are at least twice as high as official GMB prices, which is the

reason why communal farmers prefer to sell their groundnuts to the local market. The nuts are either sold unshelled by the bucket (20 litre tin) or processed into peanut butter. Sales of industrially-manufactured peanut butter have risen ten-fold and it is clear that communal farmers are not growing enough groundnuts to satisfy local demand.

Even though the price of groundnuts is much higher on the parallel market, communal farmers cannot be sure of selling their produce right away. At vendor type markets, it may take some time to sell the product, even if this is not more than a few bags. Prices may be high, but the volume sold is limited.

The main factors limiting production and deliveries in the communal sector are the poor availability and distribution of seed, the fact that groundnut is a labour-intensive crop and that the producer price offered by GMB is not high enough to ensure an adequate return. The size of future production of groundnut in the communal areas thus depends on the availability of labour and the provision of seed.

The area of groundnut planted by small-scale commercial farmers decreased from 1980/81 to 1984/85 and increased thereafter. The latter increase in deliveries is attributable to producer price increases from Z$500/tonne shelled to Z$1,000/tonne shelled between 1984/85 and 1988/89.

Factors that may limit future groundnut production by small-scale commercial farmers are shortage of draft power; shortage of labour during critical cultivation periods; and low yields, possibly due to poor seed and/or inappropriate varieties, which makes groundnuts unattractive as a cash crop compared to maize, cotton and sunflowers. The difference between parallel market prices and official prices is a factor which may limit deliveries to the GMB.

Most of the groundnuts currently grown by the small-scale sector are of unknown varieties and this makes them unsuitable for the export market. Hence, it is vital that the multiplication of suitable short-season varieties be increased so that they are easily available to the small-scale sector.

Groundnut production and deliveries to the GMB by large-scale commercial farmers are directly related to the producer price. Production peaked in 1981/82 and decreased steadily until 1985/86, when only 2,970 tonnes were delivered. During this period, the producer price increased by only Z$80/tonne. When the producer price was increased by 50 per cent from Z$500/tonne to Z$750/tonne, large-scale commercial producers responded by more than doubling their production and deliveries to the GMB. In the 1988/89 marketing year, 18,200 tonnes of unshelled groundnuts were delivered by large-scale commercial farmers, representing a 15 per cent increase.

There are various factors likely to limit production and deliveries from the large-scale commercial sector in the future. First, the producer price will have to increase to a more satisfactory rate if new growers are to be attracted and existing growers are to continue in production. Second, harvesting equipment is not readily available. Of the 40 harvesters in Zimbabwe, 15 are in poor condition and were imported in the early

1970s. The remaining 25 were imported in 1981. Thus, the availability of new harvesting equipment is limiting expansion by both established and new growers. If farmers expand to more than 20 hectares of groundnuts, hand harvesting becomes uneconomical; hence, there is a real need for harvesting equipment. Availability of spares becomes essential to maintain existing harvesters and new ones that may be imported. Third, the methods of sampling and grading presently used at the GMB depots need to be improved if the present number of producers are to continue. The present grading system is complicated, time-consuming and not representative.

Problems of excessive aflatoxin development have been experienced during shipment of the long season variety **Flamingo**, recommended for large-scale commercial farmers. Hence, the groundnut breeding programme now has to screen more carefully before arriving at a potential release. It is envisaged that a long season variety of comparable or better yield than **Flamingo,** with satisfactory seed quality, shelving characteristics and a minimum problem with aflatoxin, will be released within the next two seasons.

Export expansion is restricted by the damage caused by the incidence of aflatoxin in the crop. Brazil, which sold small quantities to many buyers, was virtually wiped out as an exporter because of continuing high levels of aflatoxin in deliveries. Although there have been, and are, major problems with aflatoxin in both **Flamingo** and **Swallow**, buyers have so far been willing to give Zimbabwe a little breathing space in which to overcome them.

Besides exports of confectionery nuts, the most important end uses of groundnuts in Zimbabwe are oil processing and livestock feed. The national demand for groundnuts for these two purposes depends on the relative prices of the competing crops, soyabeans and sunflower.

□ *Food legumes*

Soyabeans are the only legumes for which improved seed is available and moreover the only legume of commercial importance. Other legumes grown in Zimbabwe are cowpeas, field beans and bambara nuts, which are primarily grown by communal farmers for subsistence.

Little information exists about soyabean cultivation in communal areas. In the mid-1980s, the MOA Department of Research & Specialist Services mounted a campaign for increased soyabean cultivation by small farmers in Hurungwe communal area, with considerable success. Unfortunately, the effort was discontinued because of a change in personnel at DR&SS and the reasons for the success story was never followed-up. But it at least showed that a potential for increased soyabean production by small farmers exists.

Soyabean deliveries to GMB from the commercial sector were more or less stable in the early 1980s, with an increase to around 100,000 tonnes in 1988. According to COPA, commercial soyabean production would increase another 50 per cent if producer prices were increased to around Z$480/tonne. Soyabeans are grown on

heavy soils only, and they are an excellent rotation crop for maize, cotton and winter wheat. The open-pollinated soyabean varieties offered by the seed industry can survive mid-season droughts and yield about two tonnes/ha.

□ *Small grains*

Small grains comprise red and white sorghum, pearl millet and finger millet. Small grains are almost entirely grown by communal farmers, although some 20 per cent of the marketed red sorghum is produced by commercial farmers.

Government policy towards small grains has been ambiguous. It has encouraged production of small grains by communal farmers as ecologically suitable crops for the drought-prone areas in NR III, IV and V. Pearl millet and white sorghum are drought-tolerant and may secure a crop in dry years where maize fails. To be weighed against this objective are considerations of economic efficiency, which discourage wide cultivation of small grains as GMB has experienced high costs of storage, and since 1984 supply has exceeded demand.

Only a small proportion of sorghum produced by communal farmers is sold to GMB and the crop is primarily a subsistence one. One exception was in 1985, when sales increased to a quarter of production, largely due to the establishment of 135 temporary collection points that year. Two-thirds of these collection points were withdrawn the following year. The pricing level has had little influence on the level of deliveries from communal farmers to GMB.

The sales pattern of millet changed drastically in 1984, with the government decision to include it as a controlled crop. Millet deliveries to GMB in 1985 were close to three times sorghum deliveries and more than one third of total pearl millet production was marketed. The deliveries were reduced by 40 per cent in 1986 as a consequence of the reduced number of collection points.

Commercial farmers responded to the increased prices for sorghum in 1985 and sales were more than twice the level of the sales from the communal sector. The 1986 sales were even higher, but after this sales declined. Even though sorghum is a relatively minor commercial crop, the market was flooded during these two years and GMB has had considerable volumes of small grains in stock since then.

The market for small grains has been limited by the high selling prices charged by GMB and by low quality grain. Moreover, little research has been done on industrial utilisation. To bring down the increased cost of storing small grains, the market for red sorghum was deregulated in 1989, with GMB securing a floor price of Z$180/tonne. A large part of red sorghum marketed production is consumed by Chibuku breweries and, given the free market, they are now in a strong market position. Over the last season, Chibuku has changed its sorghum buying policy. Instead of buying unspecified sorghum from GMB, it is now contracting commercial farmers to produce hybrid sorghum **DC75**, a red sorghum with good brewing characteristics, at higher prices than the GMB floor price. If the contract growers produce sufficient quantities, Chibuku is likely to buy all its red sorghum requirements

from this source, and GMB will find it difficult to sell the red sorghum varieties bought from communal farmers to the industry.

□ *Sunflower*

Communal farmers are the major producers of sunflower in Zimbabwe, with a market share of about 75 per cent. Sunflower is in all sectors primarily grown as a commercial crop and local consumption is very limited. The recommended seed rate is 5-7 kg/ha. Most improved seed is sold to commercial farmers, while sunflower production in communal areas is primarily from retained seed.

Sunflower production has increased steadily since 1983. The increase is almost entirely from the communal sector and stems from an expansion of the cultivated area rather than an increase in productivity.

If producer prices were higher, sunflower would be an excellent commercial alternative to maize for large-scale farmers. The current price of Z$505/tonne does not compete commercially with the other main season crops such as cotton. Sunflower can be a risky crop to grow commercially, as it is susceptible to too much rain. If planted early, it may flower before the end of the rainy season. If planted late, there may be a need for supplementary irrigation, which is not economic at current prices. Communal farmers have been responsive to increased producer prices.

2.2 The development of the formal seed sector

The division of labour between the state and the private seed industry in Zimbabwe leaves in broad terms seed multiplication, processing and distribution in private hands, while the state has taken charge of research, certification, quality and price control.

The Zimbabwe Seed Maize Association was the first association of its kind in Zimbabwe and was formed in 1940 with the task of multiplying open-pollinated maize seed. The Seed Co-op of Zimbabwe was born out of the merger of the two largest seed houses, ZSMA and the Zimbabwe Horticultural Crop Seed Association in 1983. Agricultural activity on large-scale commercial farms increased fairly rapidly after 1945. Farmers used open-pollinated varieties, and on-farm retention of seed was the most common seed supply. In 1940 a group of large-scale commercial farmers formed the Seed Maize Association with the purpose of securing a sufficient supply of quality maize seed. In 1957, the Crop Seeds Association was formed, covering soyabeans, wheat and groundnut seeds. More recently, the Crop Seeds Association has dealt with sunflower, sorghum and bean seed crops. A number of other crop-specific seed associations were formed in the following years, covering cotton, tobacco, Irish potatoes, pasture and horticultural seeds.

During the 1950s and 1960s, an informal but at the same time extensive co-operation between government plant breeding and the seed associations developed. The government developed and released new varieties and fed them to the seed associations which multiplied and distributed them. An important part of the philosophy behind this co-operation was the belief in building up the seed associations in order to make them capable of producing high quality

seed under certification schemes. Gradually, over the first decade of existence, the requirements for becoming a member of a seed association increased.

The Seed Associations and Seed Co-op are made up of large-scale commercial farmers who wish to produce certified seed as part of their enterprises, and are prepared to comply with the regulations and standards laid down in the Seed Certification Scheme Notice of 1971. The majority of the farmers who are members of the Seed Association or Seed Co-op own well-established farms and have higher than average management skills. The number of commercial farmers involved in formal seed production is limited to approximately 1 per cent of the total.

This organisation of seed production has by and large been allowed to continue intact since Independence. While Seed Co-op is still by far the dominant seed producer in Zimbabwe, other private and public seed organisations have emerged. Savanna Seed and other private companies have challenged Seed Co-op on the domestic and export markets, even though Seed Co-op has maintained its monopoly status. Meanwhile parastatals such as GMB and ARDA have been involved in seed production and NGOs such as ENDA has also initiated seed programmes. The scale and scope of parastatal and NGO activities is very limited compared with that of private seed companies. GMB has since independence been responsible for groundnut seed, but its practical involvement with seed production has been limited.

Before Independence, improved seed was almost entirely sold to large-scale commercial farmers. Seed associations were geared to satisfy the demand for seed from the large-scale commercial sector only, while retained seed was predominantly used in the communal sector (at that time known as Tribal Trust Lands). Seeds were distributed through private wholesalers located in provincial and district towns. The major channel of seed distribution was the Farmers Co-op, which all commercial farmers belong to. A price control system was set up, under which a maximum pan-territorial price for seed was determined by MLARR in negotiation with the seed associations, based on production costs rather than on demand and supply.

The international sanctions against Rhodesia after UDI in 1967 caused a drop in tobacco exports. This forced the adoption of an agricultural diversification policy. To establish an alternative for tobacco farmers, a short season three-way cross hybrid maize was developed and marketed. This was intended only for the large-scale commercial farmers, but there was also interest in the high yielding maize in the communal areas. To exploit this market segment, the Maize Seed Co-op started packing three way hybrids in small packs for small farmers in the early 1970s. Sales of hybrid maize in small packs to small farmers expanded rapidly until 1976, whereafter expansion of agricultural activities all but ceased due to the effects of the liberation struggle.

2.2.1 The Tripartite and Bipartite seed agreements

The co-operation between government agricultural research stations and the Seed Associations was formalised in 1967 by the establishment 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. These agreements include a number of clauses aimed at further strengthening the previous informal co-operation. The three central conditions laid out in the agreements are:

a. The government agrees to release to the seed associations all new varieties which are developed and released from government breeding programmes. The government retains plant breeders rights over the released varieties, but licenses them free of charge to the seed associations for production.

b. A production schedule is developed annually and agreed upon between the government, the Commercial Farmers Union and the seed associations. This is to ensure that the country's demand for seed is secured, including the right proportions of the different varieties.

c. The seed associations are required to produce sufficient seed to meet the demand. In addition, in order to ensure that the nation will have sufficient seed should a bad season occur, a 20 per cent buffer stock is kept.

These agreements are unique to Zimbabwe and originate from the state capitalist policy of the UDI government of the 1970s, the aim being to create a politically controlled monopoly to serve the large-scale commercial farmers whilst securing its efficiency by leaving production in private hands. As the seed industry did function efficiently, the agreements were renewed after Independence and the latest Bipartite agreement was signed in 1982.

2.2.2 Seed services

In Zimbabwe, the seed certifying authority is the Seed Services Unit in the Department of Research and Specialist Services. The Unit comprises a seed testing laboratory and a number of seed inspectors. The laboratory is divided into several sections to cater for the various aspects of testing: purity analysis, germination testing and seed pathology as well as a library and administrative offices. The laboratory is headed by a senior seed analyst, assisted by two seed analysts and 13 seed technicians. It has equipment and facilities to test up to 5,000 samples a year. Currently there are eight qualified and experienced inspectors at the Seed Services. The primary objectives of conducting field inspections are to:

a. Confirm that the produced seed is of the designated variety;

b. Confirm that the produced seed has not been contaminated genetically or physically beyond certain specific limits, as set out in the field standards for each crop in the Seed Certification Scheme Notice of 1971. The Seed Notice also outlines the number and timing of inspections for each crop.

In addition to the seed testing authority, there also exist seed testing agencies. This status is granted to seed associations which have adequate equipment and experience. The largest is the Seed Co-op, which tests seed quality for wheat, barley, sorghum, sunflower and soyabeans. The Seed Co-op has a laboratory staffed with one seed

analyst, assisted by two technicians and two assistants and can handle up to 5,500 samples per year (i.e. more than the Seed Services). Other seed testing agencies are the Cotton Marketing Board and the Forestry Commission.

The Seed Services Unit functions as a controlling body, but its effectiveness has been constrained by inadequate resources, particularly lack of transport. The eight seed inspectors from the Seed Services share three cars and private seed companies sometimes have to provide transport for the inspection of their seed crops. Three types of licence are issued by the Seed Services to the seed industry: an A-licence allows for operating a seed laboratory; a B-licence allows for packing seed; a C-licence allows for retailing seed.

The A- and B-licence system functions well but, due to transport constraints, the Seed Services Unit is not capable of ensuring that all rural retailers who sell seed hold a C-licence.

2.3 Links between small farmers and the seed industry

In the early 1980s, Seed Co-op was the sole producer of seed for seven crops (maize, sunflower, wheat, barley, soyabeans, groundnuts and sorghum) under the Tripartite and Bipartite agreements between the seed industry and government. Maize seed makes up 80-90 per cent of the Co-op's total seed sales. Savanna Seed established itself as a Zimbabwe seed company in the mid-1980s and has obtained a market share for maize of about 5 per cent. Most of its sales are of **PNR 473** to the marginal communal areas.

Table 6 shows the improved varieties of maize and other crops currently available in Zimbabwe. Table 7 shows certified seed use by crop. Before Independence, the majority of small-scale farmers did not have access to any improved seed. Some hybrid maize seed had been in the communal areas through the small pack programme, but this was not comparable in scope and scale with post-Independence developments. Zimbabwe experienced a rapid penetration of hybrid maize seed into the communal areas between 1980 and 1983. As shown in Table 8, the market appears to have been already saturated by 1984, with national maize seed sales of between 25,000 and 30,000 tonnes per year. The adoption rate (annual purchase of seed) for hybrid maize in the communal areas has in recent years been above 90 per cent, which is very high compared with other African countries.

There are number of different reasons for this success. First, after Independence the government supplied hybrid maize seed as aid to communal farmers, in a package together with mineral fertilisers and chemicals. Second, after Independence communal farmers had open access to markets for their products for the first time and this initiated a commercialisation process and subsequent demand for hybrid seed. Third, appropriate varieties existed (three-way cross hybrids) which were substantially higher yielding and more drought tolerant than the local open pollinated varieties previously used. Also, the diffusion of hybrid maize seed was part of a government campaign to commercialise agriculture supported by AGRITEX and AFC, combined with relatively favorable producer prices paid by GMB.

Table 6: List of varieties available in Zimbabwe for maize

Variety	*White or Yellow*	*Days to 50% Silk*	*Days to Maturity*	*Date at Maturity (assumes planting date 21 Dec)*
ZS233	W	73	161	31 May
SR52	W	73	158	28 May
ZS206	Y	70	156	26 May
ZS107	W	70	153	23 May
SC601	W	73	150	20 May
PNR6557	W	70	146	16 May
PNR6566	Y	71	145	15 May
ZS202	Y	66	143	13 May
SC501	W	68	143	13 May
R215	W	67	142	12 May
PNR609	W	71	141	11 May
ZS232	Y	67	140	10 May
R201	W	65	140	10 May
PNR6549	W	73	140	10 May
PNR695	W	72	140	10 May
PNR482	Y	72	140	10 May
R200	W	65	137	7 May
PNR617	W	73	137	7 May
ZS225	W	65	135	5 May
PNR473	W	69	135	5 May
PNR6334	Y	67	130	30 Apr

Source: Department of Research and Specialist Services

The expansion of the area cultivated with maize in the communal areas, combined with the high rate of hybrid maize seed adoption, resulted in an increase in seed production of several hundred per cent. Commercialisation in the communal areas moreover shifted the bulk of the maize seed market from the commercial to the communal sector.

Considerably less success has been achieved in selling improved seed to the communal sector for other crops, even though appropriate varieties for at least some crops exist and have been released from research. The explanation for this differs from crop to crop and is discussed in more detail in Section 3. Savanna Seed has produced and marketed South African varieties of sunflower, sorghum and soyabean seed.

Groundnut seed production was transferred from Seed Co-op to GMB in the early 1980s. Initially GMB produced groundnut seed using contract growers. Recently, GMB has given up growing groundnut seed altogether and simply sells the groundnut crop bought from farmers back to them as standard seed after processing.

Seed Co-op has recently agreed with DR&SS to multiply and market the improved pearl millet **PRV1**, although it is not included in the Tripartite agreement.

Table 7: List of varieties available in Zimbabwe for sunflower, sorghum, groundnuts, soyabeans and pearl millet

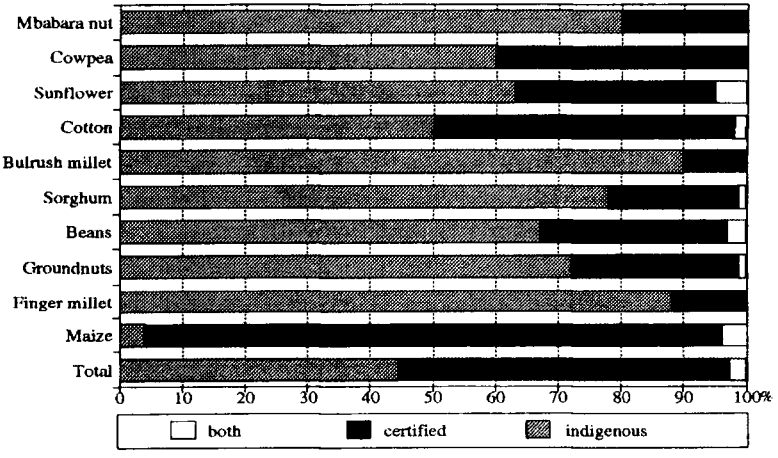
Crop	*Name of variety*	*attributes*
Sunflower	Peridovik	open pollinated. variable in maturity.
	So 209	hybrid. medium season.
	Masasa	hybrid. short season.
	Mupane	hybrid. medium season.
	PNR 7204	hybrid. short season
	PNR 40s	hybrid. medium season.
	PNR 7225	hybrid. medium season. An improvement on PNR 40s.
	PNR 7442	hybrid. long season.
Sorghum	Red Swazi A	open pollinated. red short season for brewing.
	Serena	open pollinated. red medium season for brewing.
	Segaolane	open pollinated. white medium season.
	SV-2	open pollinated. white short season.
	CD 75	hybrid. medium to long season.
	PNR 8544	hybrid. white short season.
	PNR 8369	hybrid. red short season.
	PNR 841	Only hybrid forage sorghum in Zimbabwe.
Soyabeans	Oribi	determinate
	sable	indeterminate
	Duiker	indeterminate
	Roan	determinate
	Buffalo	fodder variety.
Groundnuts	Natal common	short season
	Valencia R2	short season
	Plover	short season
	Swallow	medium season
	Makuln red	long season
	Egret	long season
	Flamingo	long season.
Pearl millet	PNV 1	short season.

Source: Department of Research and Specialist Services

Both National Tested Seed and ARDA have shown interest in multiplying beans, cowpeas and bambara nuts when improved varieties are released.

Seed distribution is, with the exception of groundnut seed, done by private wholesalers and retailers. The nature of the relationship between the seed companies and the retailers is one of equal business partners.

Table 8: **Household seed use by type and crop**



Source: Friis-Hansen, 1990.

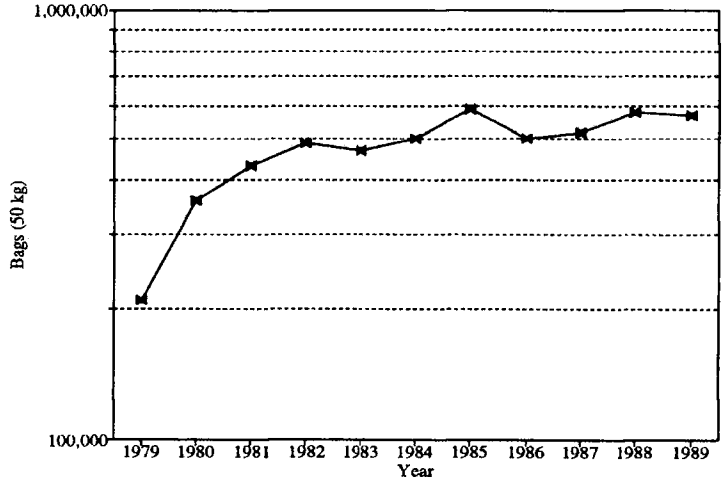
Table 9: **Maize seed sales in Zimbabwe**

Hybrid maize seed deliveries to smallholder farmers, 1974-81

Cropping season	*Seed deliveries (tonnes)*
1974/75	2,350
1975/76	3,950
1976/77	2,700
1977/78	3,700
1978/79	4,250
1979/80	4,300
1980/81	9,650

Source: Seed Co-op.

Total maize seed sales in Zimbabwe, 1979-89



Source: Seed Co-op.

3. NATIONAL DEVELOPMENT ISSUES

3.1 Maize seed - a success story

In Zimbabwe, plant breeding and agronomic research for maize has had a long and successful history. The combination of hybrid maize varieties and use of fertilisers dramatically changed the productivity of maize production. Average commercial maize yields were around 0.5 tonnes/ha until around 1950, they increased to 1.44 tonnes/ha in 1950-56, to 2.89 tonnes/ha in 1960-65 and further to 4.35 tonnes/ha in 1981-85.

Zimbabwe has over time developed a number of hybrid maize varieties suitable for a wide range of agro-ecological zones. The first single cross hybrid maize variety **SR52** was released in 1960. It is a long season (157 days to maturity) single cross hybrid suited for NR II and is today primarily grown by large-scale commercial farmers. The two most used varieties, **R201** and **R215**, are short-season (138 and 135 days respectively). These varieties (together with their predecessor **R200**) were released in the mid 1970s to enable large-scale commercial farmers situated in marginal areas to diversify production. **R201** and **R215** are examples of the successful transfer of technology, as they are well suited for growing conditions in communal areas; in 1989, they accounted for 46 per cent and 39 per cent respectively of total hybrid maize seed sales from Seed Co-op. It is remarkable that no replacement has been developed for **R201**, released 17 years ago. A new three-way cross hybrid short-season variety, **SC501**, was released by Seed Co-op in 1989, intended to replace **R215**. **R201**, **R215** and **SC501** all have good pollen to silk synchronisation, which reduces susceptibility to drought conditions at flowering. **R201** is heat stress tolerant and has satisfactory resistance to leaf blight and cob rot. **R215** has good resistance to leaf blight and to lodging. **SC501** has characteristics similar to **R215**, but is more responsive to good management and is likely to yield more in medium to high potential areas. The physiological quality of hybrid maize seed in Zimbabwe is very high and comparable with European standards.

The share of seed bought by communal and small-scale commercial farmers has gone up since Independence from 60 to 90 per cent of total sales. The market share of small packs has remained stable at around one third of total sales, suggesting that packing seeds in small packs is useful for reaching the poorest small farmers.

Table 10 shows the trend in maize seed sales by variety. The dominant market share, around three quarters of all seed sales, of the two short season varieties **R201** and **R215** is consistent throughout the period. In future, the newly released **SC501** may slowly increase its market share at the expense of **R215**. The market share of the 30-year-old **SR52** has declined by two-thirds over the last decade.

The vast majority of communal farmers buy hybrid seed annually and more than 90 per cent of the maize planted is hybrid seed. Seed sales have approximately been at their present level since the early 1980s and the market for hybrid maize seed is saturated and at a level close to potential demand.

Communal farmers may buy seed from local retail stores, from town through a local co-operative or self-help group, or they may buy individually direct from urban-based retailers or wholesalers and transport the seed back to their holding by bus. In all cases, the logistical

Table 10: Seed Co-op maize seed sales in Zimbabwe by variety (tonnes).

	1983	*1984*	*1985*	*1986*	*1987*	*1988*	*1989*
R201	12,792	9,201	13,108	11,950	12,820	13,111	12,731
R215	4,333	10,062	11,143	9,237	9,512	11,201	9,681
SC501	-	-	-	-	51	570	2,350
SR52	2,489	1,575	1,994	1,369	1,000	1,112	1,091
ZS206	23	197	440	598	744	1,026	1,007
R200	2,190	1,968	997	896	718	371	392
ZS107	530	394	616	324	256	200	196
ZS233	-	74	352	224	179	200	196
ZS225	461	49	498	249	179	171	168
Other	69	271	59	25	718	542	168
Total	23,049	24,603	29,323	24,896	25,640	28,502	27,980

Source: Seed Co-op

Note: Columns may not add up to column totals due to rounding up.

problems of transporting the seed causes difficulties. In particular, many transport operators are not willing to rent out trucks for transport off the tarred roads and into rural areas.

While large-scale commercial farmers commonly buy their seed requirements in good time before planting, communal farmers have a strong tendency not to buy seeds before the first rains. This buying behaviour creates additional difficulties in delivering seeds to communal farmers before the optimal time of planting. When the first rains have fallen in a given area, all farmers demand hybrid maize seed. But rural retailers operate with low stocks and will not buy large quantities of seed before they are sure demand is there.

Despite the logistical problems of distributing maize seed to marginal areas, hybrid maize seed is generally satisfactorily available to communal farmers in sufficient quantities within a week or two after the onset of the rains. But they may not always be able to choose between different varieties if they buy seed from the local retail store.

A large proportion of hybrid maize seed is sold to communal farmers by rural retailers. For example, in Silobela CA, located 80 km from the nearest district town, it is rural retailers who sell about half of the total seed; the proportion is less in Chiduku CA, where the farmers are situated closer to town.

Rural retailers are often located in groups at growth points or other rural business centres. The shops are owned by local businessmen and sell a range of products from cigarettes and beer to blankets and kitchenware. The average distance for small farmers to rural retailers is within reach by foot or donkey-drawn trailer.

Wholesalers of seed are all urban-based and located in the provincial capitals, with branches in the district towns. These towns are situated along the main roads, which all run on the ridges through the large-scale commercial farming areas, so the distances from communal areas to towns are therefore commonly relatively large. There are presently no rural-based wholesalers in Zimbabwe.

Not all maize planted today is hybrid seed. Local composite maize varieties do exist and are maintained through farmers' mass selection, but they are cultivated on a very small scale only. These so-called local varieties derive primarily from earlier releases by DR&SS. In addition, farmers do not always buy sufficient hybrid seed and they may add retained second generation hybrid seed to their bought seed. This is typically done for maize cultivated in gardens near the house, but can also be the case for parts of the fields. The potential yield of the F2 generation is estimated to be reduced by around 60 per cent in the case of **R201** [Ashworth, 1990].

One exceptional feature in the Zimbabwe seed industry is the deliberate ban on the sale of open-pollinated maize. Open-pollinated maize varieties have been discouraged since 1960 and no breeding effort has gone into developing high yielding composites. The only composite available is a South African variety, **Kalahari Early Pearl**, which for a number of years has been produced by seed companies for export only. One seed company began to market KEP in marginal areas during the 1988/89 season. This was strongly condemned by DR&SS and in 1990 the seed distributors received direct instructions from DR&SS that they must not sell KEP in Zimbabwe. The arguments against KEP are that trial results show hybrid maize significantly out-yields KEP and, from a national food security point of view, the highest yielding variety should be preferred; and that it is very difficult to determine whether the seed sold is KEP or not, as it is a composite with a broad genetic frequency.

Directly to forbid composite maize seed sales is a very authoritarian approach, as it is not unlikely that an improved composite maize could be the best choice for some poor farmers. First, they could retain seed, which saves them the trouble of getting hold of seed every year and allows timely planting using retained seed, where late access to purchased maize seed in some marginal areas results in late planting. Second, although hybrid maize seed is cheap, the difference in price between hybrid seed and retained seed is between Z$20 and Z$30 for the 25 kg required to plant one hectare. The money saved by using retained seed buys 100-200 kg maize, depending on the local price. In marginal areas and under low-input conditions, the yield for hybrid maize is lower than one tonne/ha. The hybrid thus has to out-yield the retained seed by 10-20 per cent before it becomes economically viable for the farmer to buy hybrid seed annually.

The price sensitivity of hybrid maize seed is low for most communal farmers, as competitive open-pollinated varieties are not available and the opportunity cost of using the F2 generation is very high, as mentioned earlier.

Seed prices from the producers are highly competitive and low compared with seed producer prices from neighbouring countries (see analysis of price build-up in Section 4).

NFAZ carried out an agricultural input survey in 1987/88 covering 251 households in nine districts. This survey found that seed prices at farm gate level are in general considerably

higher than the official maximum retail price. The cheapest source of maize seed is the Farmers Co-op (Z$0.95/kg); the most expensive prices were found at local traders (Z$1.30/kg). The prices at local traders were on average 73 per cent higher than the official price.

While improved seeds are a relatively cheap input, the cost of complementary inputs, notably fertilisers, is high and increasing. The farm economy of the package technology recommended by AGRITEX - consisting of hybrid maize seed, fertilisers and pesticides - is questionable. The crop packs have been formulated based on agronomic requirements and less attention seems to have been given to their relevance to the small farm economy. The crop packs are formulated by Agritex on the basis of information from DR&SS.

There is quite some difference in the economic viability of different crop packs. The highest benefit/cost ratio is achieved with cotton and tobacco, the net benefit for maize is less attractive and sunflower, sorghum and millet are not attractive. Loans for vegetable production are a viable option only if the farmers have a clear market opportunity. Ashworth [1990] suggests that a minimum return of 60 per cent on the marginal investment (ie a benefit/cost ratio of 1.6) is needed in NR II for farmers to accept the technology and secure a minimum income of approximately Z$4 per day. He also argues that the minimum return needs to be as high as 100 per cent in NR III and IV, since the risk involved here is higher. This is in sharp contrast to the 10 per cent margin used by AFC when calculating the break-even point for the various crop packs.

3.2 Groundnut seed - experience from failure

The majority of communal farmers use retained seed only. The most used variety is **Natal Common**, an out-dated open pollinated variety originally released by DR&SS in the early 1960s and retained since then by communal farmers. **Natal Common** has short season maturity (110-130 days) and is well suited to low rainfall and sandy soils. The Seed Services Unit conducted a major cleaning exercise and re-released it in 1986, however seed is not multiplied and distributed to communal farmers at present because, as there is no differentiation in the producer price, growing short-season varieties suitable for small farmers is less profitable for seed growers than producing long-season varieties, which are used only by large-scale commercial farmers.

Valencia R2 is another common retained variety in the communal areas. It was released by DR&SS in the 1970s and has short season maturity (100-110 days). Like **Natal Common** it is no longer available from the seed industry. **Valencia R2** has red-skinned kernels.

The most common non-retained groundnut seed in the communal areas is named **Spanish** and is purchased from GMB. **Spanish** is not strictly speaking a variety but the common name of the type of groundnuts used by communal farmers. The **Spanish** seed sold by GMB is not improved seed but a mixture of all groundnuts bought from the communal areas, cleaned and processed and resold to the same farming sector.

Plover, a short season maturity (110-130 days) replacement for **Natal Common**, was released in 1982 by DR&SS. It has a higher yield potential than **Natal Common** and is less prone

to leaf spot. Also, it has better quality kernels. However, **Plover** has never been multiplied and distributed to communal farmers.

Retained seed is generally tolerant to insect attack, although problems with pests (aphids, leaf spot and rosette) occur in some seasons. No pesticides or sprayers are available or used.

The local varieties of groundnut have medium-season maturity and have to be planted early to achieve a reasonable yield. If farmers plant late because of labour or draught-power bottlenecks, groundnut production becomes a high risk venture because of mid-season dry spells. DR&SS trials have shown that planting two weeks after the first rains can reduce the yield by 150-200 per cent. The incremental yield obtained from using improved seed with timely weeding and with two weeks delay in weeding is 84 per cent and 55 per cent respectively. In addition, harvesting takes place in February/March, which is during the peak labour period, but delaying harvesting because of this may cause rot.

Mineral fertiliser is not usually applied to groundnut, nor is it required to obtain reasonable yields. Groundnuts are frequently cultivated in rotation with maize. The seed rate is commonly not more than 50 kg seed/ha, half the rate recommended by DR&SS and Agritex.

Groundnuts have a remarkable ability to adapt to all types of soil, but a pH level of between 5.0 and 5.5 is required. The pH level of many soils in the communal areas is depleted and AGRITEX recommends application of 200-400 kg of gypsum/ha at early flowering. Due to transport constraints, lime is not available in the communal areas and very few communal farmers apply gypsum. Low soil pH leads to calcium deficiency and results in the development of pods without kernels, known as 'pops'.

While the availability of seed of the long season groundnut varieties demanded by the large scale commercial farmers presents no problems, the availability of good quality short season groundnut seed has been a serious problem for the last decade. Various schemes for groundnut seed multiplication and distribution have been tried with little success.

Approximately 90 per cent of groundnut growers are communal farmers and reports [see, for example, COPA, 1988] have documented a shortage of short season groundnut seed in all parts of the country, resulting in reduced plantings and consequent reductions in deliveries to the GMB. This shortage is caused both by the non-availability of improved seed over the last decade and by the recurrent drought which has wiped out the groundnut crops in several areas, including the Midlands.

Groundnut seed supply was from 1982 to 1989 handled by the GMB. Only standard grade seed of, for example, **Natal Common** and **Valencia R2**, was handled and made available to communal farmers during this period. GMB has not been involved directly in the production of improved seed and has instead relied on selling groundnuts bought from the communal areas back to the communal areas as standard seed, after processing and cleaning the crop. In addition, through COPA GMB has contracted large-scale commercial farmers to produce certified seed. The certified seed has all been the long season **Flamingo** variety demanded by large-scale commercial farmers and no certified **Plover**, needed by the communal areas has been produced.

Table 11: Volumes of groundnut sold by GMB ('000 tonnes)

	83/84	*84/85*	*85/86*	*86/87*	*87/88*	*88/89*
Confectionery	866	1,158	1,026	1,470	2,241	2,040
Edible	1,287	863	586	22	289	1,723
Crushers	1,268	200	432	6,834	8,096	5,638
Certified seed	139	41	194	455	606	281
Standard seed	591	464	499	403	558	828
Screenings	97	98	92	155	7	403

Source: GMB Annual Reports 1984-90.

The volume of standard groundnut seed handled by GMB is shown in Table 11. The potential demand for improved short-season groundnut seed is 1,800 tonnes per year for the communal sector alone (calculated with optimal planting rates). The potential demand is considerably higher than the real demand, as the seed rate used by communal farmers is commonly only between one quarter and half of the recommended. Moreover, improved groundnut seed is expensive and many farmers are reluctant to buy improved seed before they have been convinced of its advantage.

No information concerning the timeliness of delivery of standard groundnut seed to the communal areas exists, nor are there any statistics on sales per depot. Certainly, no marketing efforts have been undertaken by GMB to promote the sale of groundnut seed.

The GMB buying price for groundnuts for the 1990/91 season is Z$1,250 per tonne for the best grade (A1) and Z$1,000 for the lowest grade (B3). The official selling price for standard short maturing seed, sold under the heading **Spanish**, is Z$1,906 per tonne. The selling price for high quality certified **Flamingo** seed is Z$1,524 per tonne. The GMB selling price is more than Z$2,000/tonne and is thus the most expensive source.

The price sensitivity for groundnut seed is high. Almost certainly, certified **Plover** seed is too expensive for most communal farmers to afford. Groundnuts are a high value crop compared with the food staples, and the recommended seed rate is four times that of maize. The cost per ha of using certified groundnut seed is comparable to the fertiliser cost for maize and it is likely many communal farmers are reluctant to risk spending so much money on seed which can be substituted for by seed retained on-farm. This is likely to be the case despite the fact that the use of certified **Plover** seed would, from an economic point of view, be profitable for communal farmers.

3.3 Food legume seed - an untapped potential

A number of legumes are grown in communal areas, including cowpea, bambara nut, field beans and soyabeans. There is a comprehensive long standing research programme for the development of improved soyabean varieties, fully supported by the seed industry. DR&SS

is engaged in new legume plant breeding programmes for cowpea, field beans and bambara nuts and, in the not too distant future, improved varieties will be released.

3.3.1 Soyabeans

Improved soyabean seed is available at the urban wholesaler level only and this, in addition to production constraints, is limiting the expansion of certified soyabean seed into the communal areas.

Three varieties have been released by DR&SS and are available from Seed Co-op: **Sable, Duiker** and **Gazelle**. While **Duiker** and **Gazelle** are suited for the high and mid veld only, **Sable** is suited for the low veld and tolerant to mid-season droughts, as found in NR II.

Sales of soyabean seed are given in Table 12. Most seed is sold to commercial farmers and the level of seed sales is directly dependent on the price differential between maize and soyabeans. Approximately half of the area planted by commercial farmers is retained seed; seed is purchased for the other half.

A major effort was made in 1986, by DR&SS in co-operation with Seed Co-op, to promote cultivation of soyabeans in the communal areas. The area chosen was Hurungwe communal area, and the campaign was relatively successful in encouraging soyabean cultivation amongst small farmers. However, the then head of the DR&SS Agronomy Institute was the driving force behind the campaign and since his departure from DR&SS, the campaign has come to an end. Nonetheless, the Hurungwe experience showed that it is possible to grow soyabeans in the communal areas, but it requires serious support and extension advice to expand the cultivation of soyabeans to small farmers. Soyabeans are not an easy crop to grow and they are more suited to large-scale production, which can be combine harvested, because the harvesting period is very limited. In addition, a lot of the communal area soils are unsuitable because they are too sandy.

A precondition for achieving full potential of soyabeans is to apply rhizobium (rhizobium bacteria act as an inoculant in the soil and significantly increase the fixation of nitrogen by the crop). Rhizobium inoculant is available in Farmers Co-op sales outlets and is produced in sufficient quantities at Marondera research station, but at present it is seldom used in the communal areas. Rhizobium can be applied to the soyabean seed by mixing a bottle of the bacteria and adding sugar to the liquid, to make it stick to the seed. The seed then has to stay in the shade and needs to be planted the same day. Little research has been done into the use of rhizobium in communal areas and it is questionable whether the rhizobium bacteria can work in communal area soils, which are predominantly sandy and at times very hot. Preliminary results from DR&SS indicate that it might be possible if simple precautions are taken, for example application while the weather is overcast. The principle reasons why rhizobium inoculant is not used in the communal areas are the absence of distributors and the lack of knowledge about it in these areas, as there is little extension advice available about it.

Table 12: Seed Co-op soyabean seed sales (tonnes)

Variety/year	*1983*	*1984*	*1985*	*1986*	*1987*	*1988 (projected)*
Kudu	16.85	-	-	-	-	-
Impala	54.25	17.00	9.85	-	-	-
Oribi	669.45	153.95	88.15	107.40	61.40	-
Sable	2,886.45	1,103.05	660.40	1,742.30	1,152.15	690.00
Duiker	-	602.25	1,260.95	482.50	1,820.95	1,250.00
Buffalo	-	-	-	1.10	5.25	10.00
Roan	-	-	-	-	162.15	1,050.00
Other	-	-	-	1,416.45	2.30	-
Total	**3,627.00**	**1,876.25**	**2,019.35**	**3,749.75**	**3,204.20**	**3,000.00**
% change per year	n/a	48.3	7.4	86.2	14.8	6.1
Small packs						
Sable	-	2.50	-	1.75	-	-
Duiker	-	-	-	16.30	-	1.00
Other	-	-	-	3.75	1.35	-
Total small packs	**-**	**2.50**		**21.80**	**1.35**	**1.00**
Total all seed	**3,627.00**	**1,878.75**	**2,019.35**	**3,771.55**	**3,205.55**	**3,001.00**

Source: Seed Co-op

Promiscuous varieties of soyabean exist, which fix nitrogen without application of rhizobium, but they are not presently promoted as they have slightly lower commercial yield potential than non-promiscuous varieties. Commercial farmers obtain yields of 2-2.5 tonnes/ha on average for soyabeans, while communal farmers obtain only around one tonne/ha.

3.3.2 Cowpeas

Poor availability of cowpea seed at village level is limiting the area of cultivation of that crop in the small-scale farming areas. Recurrent droughts in the 1980s have in some parts of the communal areas caused local varieties of cowpeas to disappear. Improved varieties are available only in district and provisional town centres, and only very small quantities are sold to small farmers. The primary use of cowpeas in the communal areas is domestic subsistence consumption.

A comprehensive study of the role of cowpeas in communal areas was done by Naik [1989]. Communal farmers cultivate a creeping variety of cowpeas, grown as much for its leaves as for grain. Leaves are eaten from late January to early March. Part are eaten fresh as spinach, while the rest are harvested, cooked, dried and stored for the dry season. Although cultivation of cowpeas is often limited to a few lines

intercropped with maize, it is an important crop for the household diet and may be eaten three times a week during the rainy season.

3.3.3 Bambara nuts

Bambara nut is a common legume throughout the communal areas of Zimbabwe and is eaten as a supplement to maize in the diet. Bambara nuts are planted with the first rains in October and harvested in March/April. Mostly, it is retained seed that is planted, and seed sold between neighbours. The recurrent droughts in the early 1980s caused considerable genetic erosion and many farmers are today planting seed obtained from different sources, including markets in town. Farmers interviewed in Silobela communal area complained that because they have mixed seed, some of the crop is now early maturing while the remaining part is late maturing. The result is that some plants mature long before the others and, as the crop is harvested at the same time, part of the crop may not be ripe when harvested.

3.4 Small grain seeds - neglect of food security crops

A number of local varieties of small grains are used and maintained by communal farmers through mass selection. Not a great deal is known about these varieties, although some information has been collected recently by ENDA [see, for example, ENDA, 1990]. ENDA found many local land races of small grains are disappearing because of recurrent drought in the communal areas and the expansion of commercial agriculture, producing maize and cotton. To halt this genetic erosion, ENDA has collected more than 160 different local varieties of small grains and tested them in communal area trials. As explained later, ENDA has chosen the best of these local strains for further multiplication and distribution.

Although ENDA maintains these local land races can be high yielding, in practice they almost certainly yield less than improved varieties. In fact, part of their popularity must also stem from the limited availabilty of improved varieties in the communal areas, which might provide competition to them. However, they are locally adapted to climatic conditions and to small farmers' end uses for them - and they are certainly popular. It is only small grain crops which have this long history of farmer breeding, however, and are therefore well adapted to small farmer conditions.

The potential yield of improved pearl millet varieties is significantly higher than the yields currently obtained in the communal areas, which are in the range of 400 kg/ha. An improved open pollinated pearl millet variety, **PMV1**, was released by DR&SS in 1987, with a yield potential of 2-3 tonnes/ha in dry years. The **PMV1** variety is earlier maturing and more drought tolerant than traditional varieties, and it is shorter in height as well as having a higher potential yield.

Very little plant breeding has been done for finger millet and the DR&SS crop breeding programme is several years from a release.

An open-pollinated red sorghum variety, **Red Swazi**, has been on the market for a long time and is commonly used by small farmers. Two medium maturity white sorghum varieties,

SV1 and **SV2**, were released in 1985 by the DR&SS breeding programme. These varieties were developed from exotic material provided by ICRISAT and from germplasm collected within Zimbabwe by DR&SS in co-operation with IBPGR. They have a yield potential of some 25 per cent above existing varieties. **SV1** and **SV2** are resistant to leaf blight, but are susceptible to bird damage.

The improved white sorghum varieties **SV1** and **SV2** were released by breeders at DR&SS in 1985. Due to production problems, the **SV2** was not been available in substantial quantities until the 1989 season, while **SV1** is still not available. Two years passed before Seed Co-op received breeder seed of **SV1** and **SV2** from DR&SS and could start initial bulking of 50 kg of each variety [see Table 13]. Then **SV1** was not planted in 1987, partly because sorghum is a low priority crop compared to maize, and germination was below standard when it was planted in 1988. A new release of **SV1** breeder seed was given to Seed Co-op in 1989 which, because of too much rain, was never planted. **SV2** has been bulked up and was commercially available during the 1988/89 season. Very little was offered for sale at village level, however, and the seed remained at distributor level - resulting in a carry-over stock in 1989/90 of about 250 tonnes. One reason for the low uptake by retailers from distributors may be small farmers' lack of awareness of the existence of improved small grain seed. The majority of Seed Co-op's sales of **SV2** went for the export market, which is ironic given that there would most certainly be a huge demand for the seed, were it to be made available at community level.

Table 13: Delay from release by DR&SS to commercial availability, for open-pollinated sorghum and millet seed.

Variety	*Year of Release from DR&SS*	*Commercially available*
SV2	1985	From 1988/89 season
SV1	1985	Initial bulking planned 1990/91
PMV1	1987	Initial bulking planned 1990/91

Source: Interviews with Director DR&SS and Production Manager Seed Co-op 1990.

Seed Co-op sorghum and millet seed sales have declined after a peak in 1984 [see Table 14]. Hybrid seed sales show a clear correlation with the areas cultivated by commercial farmers, indicating that the amount of seed used by communal farmers is very limited. The majority of sorghum sales from Savanna Seed, which are very limited in any case, are also sold to commercial farmers. Part of the explanation for the low adoption of improved sorghum seed is that no high yielding open-pollinated variety has been produced by the seed industry so far.

There are various problems facing the production and distribution of improved open pollinated varieties of small grain seed. There are no clear procedures for the release of breeder seed by DR&SS for multiplication and distribution by the seed industry. There is little interest in open pollinated crops in general within the seed industry, and little interest in seed of crops with no clear commercial demand in particular. There is no great interest within public

Table 14: Seed Co-op sorghum seed sales (tonnes)

Variety/year	*1983*	*1984*	*1985*	*1986*	*1987*	*1988*	*1989 (projected)*
Hybrid							
DC75	174.50	251.05	163.70	76.55	32.45	59.25	97.50
DC99	97.60	-	105.05	11.05	1.15	0.05	-
Sub-total	272.10	251.05	268.75	87.60	33.60	59.30	97.50
Open-pollinated							
Red Swazi	249.10	231.75	35.30	57.65	0.50	0.50	-
Dwarf Wonder	0.50	27.45	2.50	-	-	-	-
Serena	-	104.60	95.25	1.15	12.85	73.05	75.00
Segaolane	-	0.45	1.65	105.25	111.60	1.25	15.00
SV-2	-	-	-	2.00	-	12.30	15.00
Sub-total	249.60	364.25	134.70	166.05	124.95	87.10	105.00
Small packs							
Hybrid	-	-	-	9.80	4.10	2.30	2.50
Open-pollinated	-	468.80	10.15	56.45	477.80	59.05	245.00
Sub-total	-	468.80	10.15	66.25	481.90	61.35	247.50
Total local sales	**521.70**	**1,084.10**	**413.60**	**319.90**	**640.45**	**207.75**	**450.00**

Source: Seed Co-op

institutions in promoting improved varieties of small grains, as no industrial market has been identified and storage costs at GMB have been high. These crops are moreover regarded by Agritex extension workers as traditional crops of little extension interest. There is little interest in open pollinated crops amongst seed distributors. And there is no knowledge about the new varieties of sorghum and millet among communal farmers.

Potential demand for small grain seed is considerable higher than the present seed sales to the communal areas. Using 1988 data for cultivated area in the communal areas and a planting rate of 12 kg/ha, the potential demand for improved sorghum seed is 2,550 tonnes, compared with Seed Co-op sales of 200 tonnes. Potential demand for pearl millet seed is 2,800 tonnes and for finger millet 1,430 tonnes. But in the case of both types of millet, no organised seed production has taken place so far.

The 1987 NFAZ survey shows very high mark-ups on sorghum seed (see Table 15). The market is fragmented and risky from the point of view of the trader and this is reflected in these higher prices.

Table 15: Sorghum seed prices 1987 (Z$/kg)

	Local farmer	*Local trader*	*Local store*	*Coop Union*	*Farmers' Co-op*	*GMB*
etail	0.48	0.78	1.83	1.5	1.33	1.39
Wholesale	0.44	0.44	0.44	0.44	0.44	0.44
Mark-up (%)	9	77	315	240	202	216

Source: NFAZ 1987

3.5 Sunflower seed - shortcomings in marketing

Sunflower can adapt to a wide range of soils and climatic conditions as it is insensitive to variations in day length. Sunflower is drought tolerant, but yields are significantly reduced if there is moisture stress immediately before or during flowering. As it is resistant to the parasitic Witch weed, it is a good crop to rotate with maize.

Two local varieties are dominant in the communal areas. The most common variety used is an open-pollinated black land race, originating from the improved variety **Peridovic** which was first introduced in the communal area in the early 1960s. It is a medium maturity variety (85-105 days). The **Peridovic** variety originally had 40 per cent oil content which, in the present day land race, has been reduced to below 20 per cent. The second popular variety is a white striped land race, **Russian White**, of the type used for bird feed in Europe and North America. Its volume yields are higher, but its density is lower and the oil content below 10 per cent.

Most farmers retain seed from previous harvests through mass selection. However, farmers have no way of isolating the crop to ensure the purity of the seed, as pollination can occur over distances of up to two kilometres. Selection of seed takes place after harvest but before threshing. Selection criteria are: the heaviest seeds with large shells chosen from mature plants.

DR&SS has released two improved hybrid sunflower varieties since Independence, **Msasa** in 1986 and **Mupane** in 1990. Increased oil content has been a major objective behind the development of hybrid sunflower varieties and these new varieties yield 45 per cent and 44 per cent oil.

Hybrid varieties are easier to handle for farmers than the locally retained seed which is most commonly used. The hybrids mature at the same time, are uniform in height and have a single large flower. The locally retained, open-pollinated varieties are of mixed origin and therefore can vary in maturity by up to several weeks. In addition, they have two or more smaller flowers at different locations on the stem and they differ in height. This makes harvesting more laborious.

Msasa is demanding in terms of water and management inputs if high yields are to be achieved. Under the prevailing conditions of cultivation in the communal areas, viz. low spacing and no fertiliser application, communal farmers interviewed in Silobela and Chiduku communal areas unanimously claim that no significant yield improvements are achieved from using the hybrid sunflower. No scientific proof for this exists, as no evaluation trials have been carried out under realistic small farm farming conditions.

In 1988, sunflower seed sales from Seed Co-op had about 65 per cent of the market in the commercial areas and about 70 per cent of the market in the communal sector [see Table 16].

Using a planting rate of 7 kg/ha, the potential demand for sunflower seed for the communal areas is about 620 tonnes, using 1988 crop data; current sales of 125 tonnes therefore account for only about 20 per cent of this.

The marketing of sunflower seed is unsatisfactory to the extent that sunflower seed sales to the communal areas are more or less neglected by wholesalers and retailers. Improved sunflower seed is seldom found in rural retail shops, and communal farmers who want to buy it have to go to town to get it. Seed Co-op distributors do not take sunflower seed seriously and advertising and marketing activity is limited. Wholesalers and retailers claim that demand is low and it is therefore not worth their effort to sell sunflower seed.

Table 16: Seed Co-op sunflower seed (50 kg bags)

Variety/year	*1983*	*1984*	*1985*	*1986*	*1987*	*1988 (projected)*
So209	769	63	187	114	334	124
So209	-	-	-	284	55	25
Msasa	-	-	-	52	165	350
Peredovic	-	-	-	-	-	2,000
Other	13	-	-	-	-	-
Total	782	63	187	450	554	2,499

Source: Seed Co-op

Hybrid sunflower seed is more than four times more expensive than retained seed (valued at producer prices). In 1989, the retail price for **Msasa** seed was Z$95/50 kg, while 50 kg local seed cost Z$22.50. The reason for the high seed cost is the expense of producing the male sterile inbreed lines needed for the hybrid.

There is no grading of sunflowers for oil content at GMB depots, so communal farmers have no incentive to adopt improved varieties to benefit from their higher oil content. Communal farmers harvest sunflower when it has the highest moisture content. It is stored on the husk and threshed when dry, in order to keep the moisture content as high as possible when it is sold.

4. FIRM-LEVEL EFFICIENCY ISSUES

4.1 Seed Co-op

As we saw in Section 2.2, Seed Co-op was established in its present form in 1983 out of the amalgamation of the Seed Maize Association and the Crop Seeds Association. Seed Co-op is a full producers' co-operative with approximately 150 large-scale commercial farmers as members. It consists of a mixture of seed maize producers and other crop seed producers.

Maize seed is by far the most important crop for Seed Co-op, but it is also the sole producer of government varieties of soyabeans, wheat, barley, sunflower, sorghum and, recently, also groundnuts and pearl millet. As maize seed makes up the bulk of seed produced, we concentrate on that crop in our analysis of the Co-op's internal efficiency.

Every member is given an equal production quota based on expected sales. A member may gamble and produce more: if members produce excess seed and sales do not meet expectations, they carry the expenses; if the Co-op is short, the farmer gains. If a member for one reason or another does not produce his[1] quota, he may lose his membership of Seed Co-op. If a member produces more than his quota, he will have to retain the seed unless the Co-op specifically asks him to hand it in, for example if the Co-op has stronger than expected demand for domestic sales or exports. The growers make 5 or 6 reports during the growing season and the Co-op closely monitors production levels. Members are obliged to sell seed to the Co-op, which in turn ensures that it is distributed throughout the country as far as possible. After delivery, it is the duty of the Co-op to market the seed as efficiently and effectively as possible. Farmers deliver seed in bulk packs of either 50 kg or 25 kg. The Co-op then re-packs these at a central plant, when small packs are needed. Small packs (ranging from 500g packets to 10 kg packs) accounted for about 25 per cent of total sales in 1989/90. For 1988/89, the proportion was slightly lower. The reason for the high percentage in 1989/90 was the extended drought, which necessitated a lot of replanting and corresponding repacking.

All the hybrid maize seed is processed on the farms of Seed Co-op members, all of whom have the equipment to grade it, clean it and treat it - seed processing is thus decentralised. For crops such as wheat and soyabeans, the majority of processing is done in town on a more advanced centralised Seed Co-op processing plant which has gravity tables, cleaners and dippers which are not available on members' farms.

Members are paid only for what they deliver. The Co-op stipulates in its constitution that members have to deliver their summer crop seeds by 15th October to qualify for the first payment. This enables the Co-op to start distributing to the market on time. Late deliveries result in the grower being penalised, so it benefits members to deliver seed early, as they will then qualify for early payment, clear the stock from their warehouses and improve their cash flow. The Co-op does not pay tax, but members do. The growers may choose to hold back some seed. For the first payment, members are paid the official grain marketing price. On a formula which is laid down in the Tripartite agreement, they are then paid an additional premium in stages as the seed is sold by the Co-op. The size of the premium over the grain

---

[1] All Seed Co-op members are men.

price varies. The retail price for three-way cross hybrid maize seed is about 100 per cent above the grain price and Seed Co-op aims to pay the seed growers about 85 per cent of this, taking the rest to cover the overhead costs of running the Co-op, including running the Co-op's own Rattray Arnold research farm.

The fact that there is a long queue of farmers waiting to become seed growers implies that growing seed for the Co-op gives good returns. The Co-op limits the number of members to ensure economic viability for individual members. Seed Co-op has a waiting list and assesses annually whether its planned production schedule requires an expansion of the number of growers. In 1989, six new growers were admitted from the waiting list. All new growers are on probation for the first five years. The amount of seed that they are allowed to produce is limited during this probation period whilst their ability as seed growers is assessed by Seed Co-op. If growers fail to produce the required volume of quality seed, they may be removed from the list. When the probation period is over, the seed grower is allocated a production quota equal to that of other full members of Seed Co-op. As a true co-operative, all members of Seed Co-op are allocated an equal production quota of seed. In practice, there are some variations in yields and performance, but growers are paid a standard price per bag of seed delivered. New members are chosen from the top of the waiting list, irrespective of their geographical location in the country. This is possible because the seed processing and packing facilities are decentralised. The exact number of members admitted is based on a subjective assessment by the Seed Co-op Board. The number of members is balanced with production, in such a way that the production quota for each single member is large enough to justify investments in on-farm seed processing equipment.

The technical and management performance of Seed Co-op has generally been excellent. One accident occurred in 1984 when a seed grower mixed up labels on bags of male and female parent lines of **R201**. The parent lines were thereafter planted wrongly on three seed farms. Although the seed production on the three farms were rejected, the situation did not result in any shortage of seed in Zimbabwe and Seed Co-op covered all losses internally. It is to cope with mistakes like this that Seed Co-op is required to maintain a reserve of 20 per cent of annual seed production. There have from time to time been discussions on how to interprete this requirement. Is it a requirement to store a minimum of 20 per cent of each variety or simply 20 per cent of all seed? It is presently interpreted by Seed Co-op as 20 per cent of each group of hybrids, i.e. three-way cross, single-cross, etc.

The Tripartite and Bipartite agreements have created an intimate relationship between Seed Co-op and DR&SS. Seed Co-op is the sole user of the new releases from DR&SS of varieties of the crops in the agreements. To develop its own breeding and variety testing programme, and thereby depend less on the government, Seed Co-op acquired the Rattray Arnold Research Station in 1973. This is a 400 ha research station located outside Harare. It is funded and staffed entirely by Seed Co-op and provides facilities for testing hybrids and other varieties developed by DR&SS under the Tripartite and Bipartite agreements. More than 4,000 trials are conducted annually at the Station, including approximately half of all DR&SS trails.

The relationship between Seed Co-op and Seed Services is likewise close. Seed Co-op is in fact a certifying agency for a number of crops and employs its own seed inspectors, under the formal supervision of Seed Services, which is the certifying authority. The cuts in the budget

of DR&SS in recent years have had a negative impact on the Department's performance. To an increasing extent, Seed Co-op has therefore had to provide assistance to DR&SS in order to allow it to operate smoothly. This has included, for example, managing research trails, helping out with transport, etc.

Cert Seed International was formed in 1989 as a subsidiary of Seed Co-op, to cater for the export market as a separate company. The benefit has shown as a 400 per cent increase in the volume of seed exports from 1989 to 1990. These increased seed exports do not give rise to production capacity problems, as Seed Co-op has large carry-over stocks of seed which serve as a buffer. In addition, members' production quotas are the minimum volume which Seed Co-op will buy and several members have been producing more than their quota, in the hope that seed exports will increase and they will be able to sell their surplus. A sustained increase in seed exports would allow an increase in the number of Seed Co-op members. The exports are either direct purchases by governments or private companies or donor-financed purchases.

As business has expanded, Seed Co-op has met its increased storage requirements by renting storage space located in several different places in the outskirts of Harare. To overcome the problems deriving from this, Seed Co-op started building a large new headquarters in 1990/91, with sufficient storage space and more modern facilities. This investment will cost approximately Z$ 24 million. The Co-op estimates that, if it was a registered company, the return to the shareholders on this investment would be up to Z$ 1 million annually. Because Seed Co-op is a co-operative, where its members are producers, the investment is made to improve the performance of Seed Co-op, rather than for short-term profitability.

Seed Co-op has 23 appointed distributors, who handle all seed sales for the Co-op outside its own retail sales outlets in Harare and Chinhoyi. These fall into four groups: national co-operatives; community co-operatives; national wholesalers; and wholesalers with a limited geographical territory. As appointed distributors, they have the sole right to sell seed produced by Seed Co-op. However, to achieve this status, a number of conditions are imposed on them: they are prohibited from selling other companies' seed; they have to ensure given quality standards; and they are obliged to report all instances of seed re-packing by wholesalers and retailers that they come across.

Seed Co-op's appointed distributors sell seed under a discount system dictated by the Co-op. As it has a virtual monopoly on seed sales, Seed Co-op is in a very strong position to impose conditions on the distributors. The discount differs between distributors depending on their size and their relation to Seed Co-op.

The best discounts are achieved by the Farmers Co-op which, given its large market share and status as interest group, is in a strong position to negotiate: the Farmers Co-op is the largest marketing co-operative in Zimbabwe and includes almost all 4,000 large-scale commercial farmers as members. With sales outlets in all major towns throughout the country, it is the largest wholesaler of agricultural inputs and implements. It is allowed discounts of 9 per cent on the large packs (50 kg and 25 kg) and 20-25 per cent for small packs (10 kg, 5 kg and 2 kg).

The smallest discounts are granted to the smaller individual wholesalers, who have to buy from Seed Co-op at a price equivalent to the retail price in Harare. These wholesalers have to negotiate individually with the area-specific distributors for what they want to sell from their other branches. The discounts are highest for small packs. The logic behind this is that the 25 kg and 50 kg bags are often sold in bulk and they involve less work than selling small packs. The high discounts for small packs also reflect a deliberate policy of tSeed Co-op of encouraging seed to be sold as widely as possible.

According to interviews with seed distributors and examination of purchase invoices, the appointed seed distributors charge high mark-ups, of 17-22 per cent, on their retail sales direct to farmers in the provincial and district towns [Friis-Hansen, 1990]. For seed sold through other wholesalers and retailers operating in the same areas, much of this profit margin is passed on, leaving the distributor with a more modest mark-up of 2-5 per cent. The high mark-up for seed sold from the appointed distributors retail outlets is only possible because the distributors have monopolies on seed distribution in their area. The price is deliberately held high by the distributors through the establishment of cartels. Wholesalers and retailers who buy seed from the distributors give informal verbal promises not to sell seed on at less than the retail price set by the distributors. If they do, they are often unable to obtain further supplies of seed from the distributors.

Some national wholesalers are opposed to this system and claim that they could cut the retail seed price in district towns by 5-10 per cent and still make their required 10 per cent margin. if they were allowed to operate in a free market, where they could buy seed from Seed Co-op in Harare and arrange their own transport to their branches. The argument against such a liberalisation of seed distribution is that the wholesalers would then sell only from the district towns and would not make any effort to get seed out to communal farmers located in marginal areas. From the available data, it is difficult to judge whether the existing appointed distributors in fact use their high mark-up on retail sales in towns to subsidise the cost of getting seed out to the more marginal farmers.

There are great differences in the development impact of the way different distributors operate. One distributor does an excellent job of getting cheap seed out to every corner of Mashonaland and thus performs a good service for the 10 per cent mark-up charged. Another is not active in getting the seed out to communal farmers in the Midlands and merely sells seed to retailers from a rented warehouse, without even passing on part of the discount to the retailers or to the self-help farmers groups who perform the difficult task of transporting the seed from the provincial capital to the consumer.

Seed Co-op would appear to be one of the most efficient seed organisations in Africa and the fact that it has very low seed production costs is reflected in its seed prices being among the cheapest in Africa. The fact that Seed Co-op is a true co-operative, and does not have any share-holders wanting an immediate return on investments, contributes to holding down its production costs and thus the price of its seed.

Seed Co-op's major activity is the production of hybrid maize seed: all other seed crops are of minor importance to the Co-op compared to maize. An elaborate price setting mechanism is in force for maize, as described in detail in the following Section, while the producer price

for seed of other crops is fixed as the grain price plus a premium calculated as a percentage of the grain price.

Seed Co-op members are paid the grain price for their hybrid maize seed on delivery to the Co-op and the remaining premium is paid in stages during the selling season. The actual payment for hybrid maize the members receive varies from year to year and depends on the size of the Co-op's overhead costs and on the discounts given to wholesalers. Seed Co-op pays its members approximately twice the market grain price for hybrid maize seed.

Table 17: Maize seed cost calculations 1982-89 (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.

MLARR and the seed companies hold talks annually to decide on maximum wholesale and retail seed prices. These talks take seed production costs as their point of departure, so seed prices are thus directly linked to production costs - which is not a common practice in other countries.

Table 17 shows the differing approach to calculating seed production costs taken by MLARR and the major seed company in Zimbabwe, Seed Co-op, using single cross hybrid maize seed as an example. Seed Co-op's calculations show that the seed selling prices proposed by MLARR provide an inadequate profit for itself and its seed growers.

Table 18 shows the cost build-up for Seed Co-op single cross hybrid maize seed calculated by an independent source. Comparing 1990 with 1984 figures, retailer and wholesaler margins have remained constant at 15 per cent and 10 per cent whilst Seed Co-op's overheads have increased slightly from 13 per cent to 15 per cent. Seed grower margins, on the other hand, have increased substantially. This is the result of the much lower allowances for overhead costs and for finance costs made in the 1990 calculations.

Of course neither of these options is likely to increase seed availability and use in a sustainable way if it is implemented in isolation of other policy changes. A limited period of price subsidy may be a feasible way of increasing the use of improved seed of self-pollinated crops such as groundnuts and sun flower, because seed of these crops once bought, can be maintained on-farm satisfactorily over a number of seasons. However, it is critical that it is backed up with support from the agricultural research and extension institutions, to ensure that sufficient improved material can be made available to farmers and that its use on-farm is monitored, to feed back into future breeding work and into sustainable seed distribution system development.

The producers' margins for maize seed given in Tables 17 and 18 are considerably lower than for tobacco; they are roughly comparable with irrigated cotton, irrigated green maize, irrigated groundnuts, winter wheat and barley and significantly higher than for commercial maize, soyabeans, sorghum and sunflower [Coopers and Lybrand, 1990]. Maize seed provides a net return of 66 per cent on expenditure on inputs compared to returns for the other crops ranging from 11 per cent to 138 per cent. According to Seed Co-op, the fact that producers' margins in practice are higher than the 10 per cent envisaged in the production cost model should not be taken as an argument for lower grower prices. Rather, it should be accepted that the 10 per cent margin is unrealistically low as it is because the profitability of seed crops compares favourably with irrigated crops that the Zimbabwe seed industry does not experience the problems with insufficient production capacity that are common in neighbouring countries [see, for example, Cromwell and Zambezi, 1992].

4.2 Other private seed companies

4.2.1 Savanna Seed

Savanna Seed retail prices are relatively high compared to Seed Co-op's. It is not possible to compare maize seed prices directly, as Savanna Seed produces top cross and double cross hybrids, while Seed Co-op produces single cross and three way cross hybrids. Seed Co-op stopped producing double cross hybrids in 1980; at that time double cross hybrids were priced at 35 per cent of the price calculated from the production cost model for single cross hybrid maize. Now, Savanna Seed has been granted a price which is twice as high by the Ministry of Trade and Commerce.

Table 18: Cost build-up for single cross hybrid maize seed production (nominal prices)

	1984	*1990*
Per hectare		
Labour	275.00	1,058.85
Foundation seed	41.60	73.00
Fertiliser	187.40	488.42
Herbicides	53.85	297.33
Chemicals	147.87	
Aerial sprays	27.30	44.00
Tractor fuel	128.56	54.00
Irrigation	-	52.00
Packing and storage	18.90	130.00
Insurance	8.16	14.00
Transport	18.69	75.00
Total variable costs	907.33	2,286.60
Overheads	315.99	158.14
Cost of finance	82.29	-
Total costs	1,305.61	2,444.74
Per bag (30 x 50 kg bags/ha. seed yield)		
Total producer costs	43.52	48.88
Producer price	47.87	80.00
Total costs (including factory)	54.83	92.00
Wholesale price	60.31	101.20
Retail price	69.36	116.38

Source: MLARR; Coopers & Lybrand.

Notes:
1. Foundation seed rate = 25 kg/ha.
2. Labour costs include both manual labour and supervisory management for crop husbandry. Labour costs for processing and storage are also included.
3. Tractor operating = 110 litres fuel.
4. Depreciation of capital costs is included in repair and maintenance when calculating seed production cost in Zimbabwe. As seed production in only a small part of the total production on the large scale commercial farms which are members of Seed Co-op, the major part of machinery such as tractors is depreciated over normal crop production.
5. Because of the history of land appropriation in Zimbabwe and the absence of land based taxation, land rent is negligible.
6. Practically all processing of hybrid maize seed is done on-farm by the Seed Co-op members. The processing equipment is locally developed and produced and adapted to small scale operation.
7. Labour cost of processing is very small and for practical purposes included in the crop husbandry labour cost as shown above.
8. Because of the decentralized method of processing, variable inputs such as fuel treatment chemicals are estimated to be very low and for practical purposes neglectable. The only cost included in the estimate of variable costs for processing is packing.
9. The total price of the processing equipment is less than z$ 30.000 and using an estimated time of depreciation of 20 years, the depreciation cost of processing per ha becomes very low and for practical purposes neglectable.
10. Part of the storage of hybrid seed is done on-farm and the hybrid seed may be sold and transported directly from the Seed Co-op member to the wholesaler/farmer (although the paper work is done and permission given by Seed Co-op head office). The storage cost per ha is calculated from the Seed Co-op charge per square meter of storage (15 Z$/m2).

Savanna Seed started as a South African owned company, set up by Pioneer (SA). Savanna Seed in Zimbabwe is 40 per cent owned by Zimbabweans and 60 per cent by Pannar (UK). Its management is supervised by Pioneer (SA) and a royalty agreement exists between Pannar (Zimbabwe) and Pioneer (SA) covering the use of parent line material from South Africa.

Savanna Seed (Zimbabwe) has its headquarters in Ruwa, 30 km outside Harare. This includes modern central grading and processing equipment, packing facilities and offices. Seed multiplication is done on contract by large-scale commercial farmers located in the vicinity of the processing plant.

In the late 1980s, Savanna Seed experienced a number of problems in trying to enter the Zimbabwe seed market. For example, Agritex and wholesalers such as the Farmers Co-op discouraged the use of their seed varieties. This has to changed a little today and all Savanna Seed varieties are now available from the Farmers Co-op. However, Savanna Seed's opportunities for expansion are still limited as their varieties are not on the recommended list of DR&SS. Agritex workers are therefore not permitted to recommend them, even if they judge Savanna Seed's varieties are well suited for their area.

Savanna Seed's relations with public sector seed organisations are problematic. DR&SS does not contribute anything to variety development for the company, in terms of research, as all the Department's inbred lines are made available exclusively to Seed Co-op. Similarly, although Seed Services provide testing facilities for Savanna Seed varieties, the company has not allowed its varieties to be tested and certified by government as it does not trust Seed Services to certify its varieties properly. The varieties that Savanna Seed sells therefore have to be sold as standard seed. Savanna Seed maintains its in-house standards are at least the same or even better than the formal seed certification requirements and that it has high standards which achieve more than 95 per cent germination. This implies that the main constraint to greater participation by Savanna Seed in the market is not the quality of the company's seed but its fear of losing control over its own varieties and not being able to maintain a secure market position.

Savanna Seed gives discounts to both wholesalers and retailers. The retailers' discount is 9 per cent for 25 kg packs and 15 per cent for small packs. A larger discount goes to the wholesalers who get 12 per cent and 21 per cent on large and small packs respectively. Thus Savanna Seed's discount is much higher than Seed Co-op's, but its seed prices are likewise higher. The result is that the respective selling prices for tSeed Co-op and Savanna Seed do not differ much.

4.2.2 National Tested Seed

National Tested Seed is a private, family-owned company which has been operating in Zimbabwe for the last decade or more. It owns two commercial farms and also uses out-growers. The seed is processed at a centrally located plant. The company keeps down the cost of transport by using out-growers that are within a distance of

40 km from the plant. The owner is personally in charge of seed multiplication, while an employed director manages the company.

National Tested Seed produces maize, sorghum and sunflower varieties for export only, as this market is considered to be more profitable - partly because it is largely donor-financed - and the foreign exchange earnings from it are useful for funding necessary imports. In addition, at least until 1988, there was little competition for exports as Seed Co-op dealt with the domestic market only.

National Tested Seed has also recently started producing **Makulu red** groundnuts after production of that variety was terminated by GMB. It has also finally taken up multiplication of **PNV1**. It imports and exports horticultural seeds and produces seed of open-pollinated crops, such as pearl millet, for export. National Tested Seed would like to co-operate with DR&SS in producing cowpea seed; but considers it would need the security of a Bipartite agreement protecting its production of seed of the new variety for this to be worthwhile. It fears that if it expands its co-operation with the cowpea breeders without this, Seed Co-op will take the results of its efforts and simply include cowpeas in the Co-op's own agreement.

Three other Zimbabwean companies are involved in seed production on a smaller scale. These are Seed Export Associates, Farm Tech and the Farmers Co-op. The first two are similar to National Tested Seed, i.e. family owned companies, while the third is a co-operative, as described earlier. The aim for all three is production for export; an export incentive scheme that allows seed houses to retain 25 per cent of incremental export earnings as foreign exchange is, in Zimbabwe, a major incentive to becoming involved in seed exports.

4.2.3 Pioneer International

Pioneer International is a multinational company based in USA. It is the largest seed company in the world and has access to an extremely large germplasm bank. However, compared to Savanna Seed, it has played a much more cautious strategy in becoming involved in the Zimbabwe seed market. Although it has many varieties, it has not yet released any onto the market: instead of screening its own varieties and marketing the best of these, the company has actively engaged in adapting its most promising varieties to the specific needs of the Zimbabwean environment.

According to COPA, one of Pioneer's hybrid sunflower varieties out-yields everything available locally and in addition, has a higher oil content. When this variety is released it may take over a considerable market share. However, trials have run for two years only and as such are not yet conclusive.

4.3 Non-governmental organisations

ENDA is a Southern NGO engaged in a range of development activities. Its headquarters are in Senegal and it has regional offices in Harare, Bombay and Latin America. ENDA's programmes are financed by European and North American donor organisations. In

Zimbabwe, ENDA is active in afforestation, informal sector activities, women's issues and the conservation and distribution of indigenous seeds.

In 1985, ENDA initiated an Indigenous Seeds Programme in Zimbabwe financed by NOVIB, a Dutch NGO. It is aimed at conserving, testing and multiplying local strains of maize, sorghum and millet. In recent years, it has collected more than 100 different varieties and conducted an on-farm trials programme in six communal areas.

During the first stage of the ENDA project, the best varieties were selected and registered and tested. In 1988, a seed multiplication scheme began to operate on a small scale. The idea is to multiply the best of the local composite varieties and distribute them among communal farmers. According to ENDA, there is strong demand among communal farmers for high quality local composite varieties of sorghum and pearl millet and for finger millet varieties. This demand should be seen in the context of the great variation in quality of local varieties between local areas and the absence of any support for these crops from the formal seed sector.

The ENDA seed multiplication programme operates in four communal areas: Mutoko, Chipinge, Plumtree and Chivu. Table 19 shows the results of the first year. 48 communal farmers participated in the multiplication programme, producing nearly 58 tonnes of seed - of which 21 tonnes was sorghum, 16 tonnes maize and nearly 2 tonnes pearl millet. The yields obtained were relatively low: around one tonne per ha.

Table 19 **ENDA seed multiplication programme 1988**

Location	*Mutoko*	*Plumtree*	*Chipinge*	*Chivhu*	*Total*
Number of participants	15	7	6	20	48
Maize					
area	2.0	1.3	2.2	7.5	13.0
harvest	2.0	1.7	2.5	10.0	15.6
av. yield	1.0	1.3	1.1	1.3	1.2
Sorghum					
area	2.8	1.2	0.8	15.0	19.8
harvest	2.2	2.0	0.5	16.5	19.8
av.yield	0.8	1.7	0.7	1.1	1.0
Pearl millet					
area	1.2	0.4	0.0	0.0	1.6
harvest	1.3	0.4	0.0	0.0	1.7
av. yield	1.1	0.9	0.0	0.0	1.1

Source: Elaborated from ENDA, 1990. Area cultivated is given in ha, harvest in tonnes and yield in tonnes/ha.

External inputs such as seed, fertiliser and pesticides are supplied by ENDA free of charge to growers, along with management supervision. A total of 14 local composite varieties of

maize, sorghum and pearl millet are being produced. The participating farmers contribute land and labour. Beside the 48 small farmers who participate directly in the programme by providing land and labour, a much larger number of farmers living near the growers participate by providing labour on the plots. The seed crop is divided equally between the farmers and ENDA.

ENDA processes and bulk stores the seed. In 1988, ENDA had 32 tonnes of seed in store for distribution to farmers for use in the 1989/90 season. The seed is distributed free of charge to communal farmers through ENDA and other NGOs such as ORAP, Silvira House and Manicaland Development Association.

From the available data, it is not possible to establish objectively ENDA's efficiency as a seed producer. From the input costs per bag given in Table 20, and given that half the harvest is paid to the farmer growers for their efforts, the production cost for ENDA can be estimated at a modest Z$ 17.8 per bag for maize and Z$ 13.4 per bag for sorghum. What makes the picture unclear is the difficulty with calculating ENDA's overhead costs. However, it is obvious that, with the relatively small scale of the whole operation, seed production costs would be exorbitantly high if overhead costs such as depreciation and the running costs of the transport fleet and the salaries of the head office staff in Harare were included.

Table 20: **ENDA seed production costs in Chivu communal area (Z$)**

Crop	*Input cost/ha*	*Yield (tonnes/ha)*	*Cost per tonne (Z$)*
Maize	983.60	9.9	0.8
Sorghum	1169.56	15.53	0.6

Source: Elaborated from ENDA, 1990.

4.4 Grain Marketing Board

Groundnut seed is included in the Bipartite agreement. At Independence, Seed Co-op had formal responsibility for producing sufficient seed to meet demand. To keep down groundnut seed production costs, Seed Co-op formed an agreement with GMB that the processing of groundnut seed would be done by GMB, as the Board had bought an advanced groundnut processing plant in the early 1970s.

For some reason, responsibility for groundnut seed production was transferred from Seed Co-op to GMB in 1983, by decree from the Minister of Agriculture. As groundnut seed production is not an economically viable activity at existing price levels, Seed Co-op was not unhappy with this decision.

GMB organised groundnut seed production through a system of out-growers set up with the help of COPA. On behalf of GMB, COPA selected and assisted in contracting growers. Growers were paid a 15 per cent premium for cultivating seed quality groundnuts, irrespective of the variety. All growers were located within a radius of 50 km from Harare. COPA assisted in solving production problems during the season, but otherwise seed production was handled by GMB.

For reasons to do with farm economics, the out-growers only wanted to grow **Flamingo** (a long-season variety) and none were interested in multiplying short-season **Plover** seed. The cause of the present shortage of short-season groundnut seed is thus that it is not economically viable for the seed growers to produce it. The potential yield of short-season groundnut varieties is 50 per cent less than that of the long-season varieties and currently the producer price is the same for both types. This means it is unattractive for seed growers, who all have irrigation facilities, to grow short-season varieties.

Instead of trying to solve this problem, GMB gave up its attempts to produce the early maturing **Plover** variety needed by communal farmers. In recent years, it has simply processed and cleaned the groundnut purchased from the communal areas and offered it back to communal farmers after processing as standard seed.

When GMB took over the task of producing groundnut seed, it was overlooked that GMB is not, according to the Seed Act, a legal seed certifying agency and as such cannot produce certified seed. GMB, moreover, does not have the staff to ensure the proper handling of breeder seed and foundation seed. Despite this, GMB sold seed as certified for a number of years in the mid-1980s. The certification of seed by GMB was stopped in 1988. Since then, Seed Services has had to spend six months hand-sorting the breeder seed for **Plover**, which GMB had mixed up with other varieties.

The responsibility for multiplying groundnut seed was returned to Seed Co-op in 1989, when the Co-op was given 90 kg cleaned breeder seed for **Plover** by Seed Services. The expected production of **Plover** in 1989/90 is 20 tonnes. If all 20 tonnes pass the gemination test and are all planted for further seed multiplication, up to 300 tonnes should be available for sale for the 1991/92 season.

The basic problem of no differential in seed grower prices for short- and long-season groundnut varieties has not yet been addressed. Seed Co-op intends to solve the problem by linking seed production of **Flamingo** with seed production of **Plover**. Seed Co-op is in a better position to 'force' a less profitable venture (**Plover** seed production) on its seed grower by combining it with a more profitable venture (**Flamingo** seed production). GMB still handles groundnut shelling for Seed Co-op.

It is impossible from the available data to determine the efficiency of GMB's groundnut seed production. The only account available is the general trading account covering all GMB groundnut activities, given in Table 21. This reveals that GMB has a small deficit on overall groundnut operations. The main cost is payment to farmers for purchased groundnuts, while 12 per cent is GMB overhead costs - of which approximately half are for transport and handling. About one third of income comes from exports of groundnuts, the remaining two

thirds are from internal sales. Only about 10 per cent of internal sales revenue comes from the sale of seed: the majority comes from sale of commercial nuts.

Table 21: GMB groundnut trading account for 1987/88-88/89

	Tonnes	*Amount $000's*	*1988/89 Rate per tonne $ c*	*1987/88 Rate per tonne $ c*
Stock at 31 March 1988	1,774	1,837	1,035.42	765.86
Local purchases - grain	12,412	12,239	986.03	931.02
- sacks		1,040	83.71	90.18
	14,186	15,116	1,065.45	928.30
Less: stock at 31/03-89	485	503	1,037.02	1,035.42
	13,701	14,613	1,066.45	914.74
Provision for future losses			1.18	
	13,701	14,613	1,066.45	915.92
Board costs		2,039	148.84	179.70
Collection points		11	0.79	0.05
Handling		772	56.34	61.39
Internal transport		342	24.94	22.35
Storage and capital loan interest		58	4.25	3.53
Administration		153	11.19	12.30
Short term loan interest & bank charges		703	51.34	80.08
Cost of groundnuts sold	13,701	16,652	1,215.29	1,095.62
Sales - Export realisations				
Kernels	4,612	6,080	1,318.39	1,119.72
Less: transport & other export costs		777	168.52	75.66
	4,612	5,303	1,149.87	1,044.06
Local realisations				
Kernels	9,089	9,730	1,070.49	949.90
Sacks		168	18.51	18.11
Empty sack recoveries		638		
Realisation of groundnuts sold	13,701	15,839	1,156.07	1,039.67
Deficit on trading transferred to Trading Reserve Fund		813	59.22	55.95

Source: GMB, 1989.

GMB has thus not taken up the development challenge of producing and distributing short-maturing groundnut seed because, with present prices, this would clearly result in losses.

GMB has thus avoided adding to the deficit on its groundnut operations but only by declining to take on the responsibility of producing groundnut seed transferred to it in 1983.

4.5 Small farmer seed multiplication schemes

As far as we know, only one attempt has been made to multiply seed using communal farmers as seed producers. The scheme was administered by Agritex and conducted in Mangwende. No formal evaluation was ever carried out and apart from correspondence there is nothing on file about the scheme.[2]

In the early 1980s, farmers in Magwende were offered seed of the short-season and at that time newly released groundnut variety, **Plover**. Agritex identified good farmers in certain areas, who were given seed. A precondition was that these farmers had the required inputs and resources. Agritex established an exchange system whereby the farmers were initially given 2 bags of **Plover** which they multiplied. The agreement was that each farmer should return the two bags to Agritex after harvest but could retain the remaining part of the harvest for sale as seed. The scheme included the provision of seed dressing. The idea was that Agritex could then give these two bags of **Plover** seed to other farmers and thus initiate a continuous development process. This system was chosen, rather than trying to distribute the seed to the farmers through the formal marketing system, as it was envisaged that the improved seed would spread to neighbouring farmers more efficiently through informal contacts.

In the first year, the scheme worked well: farmers received good returns and returned seed to Agritex. Unfortunately there was a drought during the second year and this completely disrupted operations. Only a few farmers returned seed to Agritex. In addition, at this time Agritex was in a period of rapid internal change, with many staff changes taking place. Because of the drought, the new staff were not enthusiastic about the project and it was never followed-up. The scheme was declared a failure and terminated.

However, the evidence available from Zimbabwe and elsewhere suggest that small-scale seed bulking offers real potential for supplying cheap non-hybrid seed to the communal areas and there may well be potential for re-establishing a similar programme.

---

[2] The information about the small farmer seed multiplication scheme presented here has been gathered through interviews with staff at the DR&SS Agronomy Institute, COPA, and Seed Co-op.

5. FACTORS INFLUENCING SEED SECTOR PERFORMANCE

5.1 Seed sector performance

As we saw in Section 2.2, the basis for the operation of the seed industry in Zimbabwe is laid down in the 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 production capacity, this agreement has been a success: Zimbabwe has never been short of seed.

As part of the agreement, the government determines seed prices based on a production cost model which allows for a 10 per cent margin over production costs. This part of the agreement must also be judged a success: seed prices offered to wholesalers are highly competitive compared with similar prices in other African countries. At the same time, producer prices have been high enough to make seed production attractive for large-scale commercial farmers compared to other possible enterprises.

What has been less successful is the marketing of seed of crops other than maize. On the one hand, purchasing seed of commercially insignificant crops such as sorghum, sunflower and legumes, has not been economically attractive to wholesalers and retailers. On the other hand, the demand for such seed of these varieties has in some instances 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.

It can therefore be concluded that the Bipartite and Tripartite agreements have been relatively successful in ensuring sufficient quantities of quality 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.

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 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 marketing its seed to communal farmers.

5.2 The influence of location-specific factors

5.2.1 Agro-ecological factors

Communal areas are primarily located in marginal areas of low agricultural potential. A major limiting factor for agricultural production is unreliable and insufficient rainfall. There is thus a strong need for drought tolerant crop varieties among communal farmers. As most large-scale commercial farmers are situated in the better-off natural regions, most agricultural research in the past focused on the problems faced in these areas and neglected the requirements of small farmers. This situation

has partly been rectified in the first decade after Independence, but few concrete results, in terms of new varieties, have been released by DR&SS and even less have actually reached and benefited communal farmers.

The benefit of using improved varieties in these marginal areas is sometimes linked to the use of complementary inputs, especially mineral fertiliser. The use of fertiliser under resource-poor conditions and in areas of insecure rainfall is highly risky, and the net economic benefit of doing so is also doubtful in many cases. In case of an early-, mid- or late-season dry spell, communal farmers may loose part of or the entire harvest and may become indebted as a result. Partly because of this insecurity, 85 per cent of the AFC's loan portfolio to communal farmers is currently in arrears.

In addition, breeding for high response to fertiliser limits the relevance, and therefore the adoption, of improved varieties among small-scale farmers operating under low-input conditions. An example is hybrid sunflower seed, which according to small farmers' evaluations, does not yield higher than local retained open-pollinated varieties when grown without applications of mineral fertiliser. When improved seed costs four to seven times the price of local retained sunflower seed, there is little reason for resource constrained farmers to buy it.

Marginal agro-ecological conditions do not effect the production of seed in Zimbabwe, as virtually all production of improved seed takes place on large-scale commercial farms, which are either situated in favourable agro-ecological areas or use supplementary irrigation.

5.2.2 Socio-economic factors

Transport and marketing infrastructure in the communal areas is generally of a low standard, although better than in many other parts of sub-Saharan Africa. Many private contractors and business people with lorries prefer not to hire them to transport anything off the tarmac roads. High transport costs clearly lead to increased seed prices for small farmers. This further reduces the economic viability of selling seed in the marginal areas. This is especially so when the official maximum retail seed price, which is pan-territorial, is strictly enforced, as the allowed mark-up is often not enough to cover transport costs.

In some parts of the communal areas, effective demand for a given variety may be too low for production and distribution of seed to be attractive to the formal seed industry. In addition to the small numbers of farmers requiring seed, they may be very dispersed geographically. This low density of demand is linked to the degree of social differentiation in the small-scale farming sector. The rate of commercialisation varies greatly among farmers and, with it, the ability of small farmers to meet the management demands required by improved seed in order to get a good yield - such as use of complementary inputs, ability to plant early and weed satisfactorily, etc.

The qualitative characteristics of the seed varieties required vary between different groups of farmers. An example of this is the differing importance of early maturity amongst farmers with and without oxen and ploughs. The delay in planting facing

farmers without oxen and ploughs, who often have to wait to rent an ox-team to prepare their fields, causes them to prefer shorter maturing varieties compared to farmers with their own oxen. Similar differences in demand derive from variations in household access to labour and land.

5.3 The influence of national economic policy

5.3.1 Macro-economic policy

The macro-economic environment influences the performance of the agricultural sector in general, and the seed industry in particular, in a number of ways.

The pressure that GOZ is under to reduce spending because of large budget deficits greatly affects the agricultural sector. Subsidies to agricultural parastatals account for more than one third of the total GOZ budget deficit. The government has therefore ordered all parastatals to become independently economically viable. This is likely to result in organisations such as AFC and GMB becoming more restricted in the service they provide to small farmers and less development-oriented in their operations.

The macro-economic environment also affects seed prices directly through tax policy and price regulations. Co-operatives are exempt from tax in Zimbabwe, which clearly favours Seed Co-op compared to private companies. Other things being equal, this tax exemption allows the retail price at which seed is sold to be reduced, as the seed prices paid to growers to provide acceptable returns can be lower than if tax were paid.

The existing seed price structure, based on the production cost model described in Section 4.1, has also been instrumental in keeping down the cost of seed. Seed prices are based on pure production costs on efficiently run farms with a reasonable margin for the grower and a very low 12 per cent overhead for Seed Co-op - Seed Co-op's overhead costs are extremely low compared to those of other seed organisations in the region. Provided that the price-setting mechanism functions correctly, controlled monopoly systems such as this may in fact produce cheaper seed than more openly competitive systems which tend to need considerable resources for advertising. However, the policy of the Ministry of Trade and Commerce in recent years, of limiting retail seed price increases as much as possible, may have a knock-on effect on growers' margins and create production capacity problems in the future.

The overall shortage of foreign exchange in Zimbabwe has had a significant impact on the seed sector as it has created a severe shortage of transport in rural areas, which has indirectly forced retailers to increase retail seed prices.

5.3.2 Agricultural policy

Despite the agricultural sector's relatively small contribution to GNP (11 per cent in 1989), the sector contributes significantly to the economy in other ways. Agricultural

products account for 40 per cent of total merchandise exports, 50 per cent of the manufacturing sector is agriculturally related and approximately 70 per cent of the population live and work in rural areas, primarily engaged in agricultural activities [Christiansen, 1990].

As discussed in Section 2.1, the land issue is at the centre of agricultural policy in Zimbabwe. There is immense pressure on GOZ to redistribute land because of the political expectations created by the liberation struggle, the low potential of the land currently allocated to the communal areas and the natural resource degradation in these areas caused by overcrowding. In 1990, GOZ decided on plans for a second phase of land reform involving the redistribution of more than half of the land in the large-scale commercial sector and the settling of 100,000 families [Friis-Hansen, Bendsen and Culver, 1991]. But even if these plans were carried out over a 10 year period, they would not eliminate the pressure on resources in the communal areas, but merely absorb the population increase over the same period. Meanwhile, the solutions to the two most pressing problems, high unemployment and shortage of foreign exchange, depend crucially on the continued satisfactory performance of the large-scale commercial sector. This implies that any future land reform will have to put emphasis on productivity rather than development goals alone.

The provision of credit and extension services has been a central element in GOZ agricultural policy over the last decade. Credit facilities for communal farmers with government guarantees were rapidly expanded in the early 1980s. The number of loans peaked in 1987, after which numbers declined rapidly. The major reason for this decline has been the poor repayment rate on loans. Today less than 10 per cent of communal farmers receive seasonal loans to finance their seasonal input requirements.

Agricultural extension services have been expanded at a moderate pace and have had some success in reaching farmers through using a group approach. There is approximately one extension worker per 800 households. However, it is feared there will be a decline in the efficiency of the service due to continuing budget constraints [Friis-Hansen, Bendsen, Sass and Dickens, 1991].

Produce marketing in Zimbabwe is conducted by single channel networks operated by parastatals, and a system of government administered pan-territorial prices. This policy has contributed to the success of maize and cotton production, but has also contributed to the deficits of the parastatals and distorted the market. The government is presently considering partially liberalising the marketing system.

5.3.3 Seed sector development policy

The control over the seed sector provided by the Tripartite and Bipartite agreements is a central part of GOZ seed development policy. The agreements state that all organisations involved in the seed sector must meet together annually to review the performance of the agreements. Studying the records of these meetings since Independence, it seems the main recurring issue in them has been price setting. In the second half of the 1980s, Seed Co-op tried several times in the meetings to use the

conditions of the agreements to block Savanna Seed's entry into the Zimbabwe seed market. Seed Co-op has been almost entirely unsuccessful in achieving this, however, because in practice there is nothing in the agreements which directly prohibits competition; in addition, recently the Ministry of Agriculture has itself started to favour increased competition in the seed sector.

Seed Co-op's operations are limited by a number of other clauses in the agreements. One of the most important for the Co-op is the requirement that the Co-op's production schedule is agreed annually by the government and the Commercial Farmers Union. This stems from the government's wish to ensure the adequacy of seed supply domestically - and that an appropriate mix of varieties is supplied. MLARR is the Ministry with official responsibility for this but in recent years the Ministry of Trade and Commerce has also become involved.

Another part of the agreements that affects the Co-op's operations is the requirement that the Co-op holds reserves of seed sufficient to cope with poor years. For maize, this is set at a minimum of 20 per cent of normal annual requirements.

Also because the government does not want seed stocks to run low, the agreements contain a requirement that Seed Co-op obtains official permission before exporting seed.

In practice, neither of these requirements causes significant problems for the Co-op as it usually keeps stocks equivalent to substantially more than 20 per cent of annual domestic requirement, to cope with the large number of requests for seed that are made regularly by other countries in the region. Thus, it is worthwhile for the Co-op to have more seed in stock than the required minimum, although the exact amount that is appropriate is something the Co-op management has to take a risk in estimating every year.

The impression obtained from interviewing MLARR staff is that the Ministry does not have any clear policy towards either the development of the seed industry or monitoring its performance, in terms of how well in practice it meets the seed needs of all farmers, including supplying those in the communal sector, with the varieties they require. This latter has been regarded as a technical matter and left to DR&SS.

Two institutions within DR&SS are involved with the agreements, the Crop Breeding Institute and Seed Services. Because of the agreements, the breeding programmes of Seed Co-op and of the Crop Breeding Institute are strongly inter-linked, to the extent that it is difficult to view them separately: more that half DR&SS's trials are actually run on the Seed Co-op's Rattray Arnold research farm.

Seed Services is the other co-operating institution, in charge of testing and controlling seed quality. Seed Services also co-operates closely technically with the Seed Co-op which, as mentioned earlier, acts as the seed certifying agency for maize. After a recent change in leadership, Seed Services has become more aware of its other role too, as the authority responsible for ensuring the Seed Co-op produces sufficient seed to meet demand.

The price control department at the Ministry of Trade and Commerce appears to be opposed to the present system of seed distribution, using registered private distributors, and, from the 1990/91 season, a new system which standardises the discounts available at different stages in the seed distribution chain has been introduced. This allows all wholesalers a maximum mark-up of 10 per cent and all retailers a maximum mark-up of 15 per cent.

The consequence of this new system is that wholesalers' earnings will most probably be increased on seed sales in large packs and correspondingly reduced on sales in small packs, as the previous discount structure which differentiates by pack size will not be continued. This is likely to have a strong negative impact on the rate of adoption of improved seed amongst smaller farmers and will thus directly reduce the development impact of the formal seed distribution system.

The system of panterritorial seed prices is intended to favour access to seed in the more marginal agricultural areas by ensuring prices are not affected by the distance seed has to be transported. In reality, however, the system is unlikely to work as it means that, for private distributors, trying to market seed at the official price in the more remote communal areas is not economically viable. Thus, the effect of price control is in fact almost certainly to reduce access to seed for communal farmers in marginal areas.

While the intention of the Ministry of Trade and Commerce is to promote national development, the policy appears to be out of touch with the way the private sector economy works in practice and therefore actually serves to reduce access to seed in some areas. When the marketing of seed is left to private traders to handle, national development objectives cannot be achieved simply by lowering the maximum seed price; instead, it needs the creation of carefully targeted and selective incentives for private traders to encourage them to become involved in supplying seed to communal farmers in remote areas as well as to better resourced farmers.

5.4 The influence of linkages with allied institutions

Good co-operation between agricultural extension, research, credit and marketing institutions has clearly been very important in contributing to the successful growth of maize production in Zimbabwe, including to the exceptionally high rates of adoption of hybrid maize seed. There are various reasons for this. First, these institutions were already operating relatively efficiently at the time of Independence, so the re-orientation of their focus to include the needs of small-scale farmers has been implemented successfully. Other contributing elements are that the agricultural marketing system was already well set up to handle maize; well-adapted hybrid varieties were available; and appropriate crop husbandry advice and suitable credit packages existed. But a similar level of successful co-operation has not been achieved for other less important crops.

In agricultural research in general, and in plant breeding in particular, there have traditionally been very strong links between DR&SS, Seed Co-op and the CFU and this close relationship continued after Independence. With the decline in government funding of research in relative

terms, private research bodies financed by the large-scale commercial sector, such as the Agricultural Research Trust, have in recent years increased in importance.

However, the links between communal farmers and formal agricultural research have remained weak or non-existent, even though the post-Independence government is strongly committed to serving small farmers. The practical influence of small farmers on issues such as plant breeding objectives and the direction of formal agricultural research programmes has been minimal and only indirect. And compared with the CFU, NFAZ remains a weak organisation which has severe problems communicating with its grass-roots members.

Seed production has remained entirely in the hands of large-scale commercial farmers and attempts to involve communal farmers and government institutions have failed (see Sections 4.3-4.5).

There is only limited information available on the use of fertiliser in the communal areas of Zimbabwe. The most recent and comprehensive source is a national survey conducted by ZIDS in the 1984 cropping season, covering 769 households [ZIDS, 1990]. This survey shows that only 19 per cent of the survey households' fields were fertilised, and there was proportionately higher use in the better-off agro-ecological zones. The typical pattern of application is to concentrate all fertiliser on cash crops such as cotton and maize. Other crops are fertilised only via the residual effects of these applications, through crop rotation.

The rate of fertiliser application by small-scale farmers is generally lower than recommended by the extension service; again, it varies considerably by Natural Region and more is applied in areas with higher and more stable rainfall. In the ZIDS survey, a high proportion of farmers said they modified extension advice for the following reasons: financial constraints; shortage of fertiliser at the optimal time of planting; and unsuitability of the types of fertiliser available. Recent calculations demonstrate the logic of farmers' low rates of fertiliser application: they show that rates of application between 25 and 50 per cent of the recommended level are the most viable from a household economic point of view [Ashworth, 1990].

There is no clear link between fertiliser application and use of improved varieties among small-scale farmers in Zimbabwe. Hybrid maize varieties are used by more than 90 per cent of small farmers and they are used on both fertilised and non-fertilised fields.

5.5 The internal efficiency of seed organisations

The fourth key factor influencing the performance of the seed sector is the ability of the seed organisations to operate efficiently, both technically and economically, other things being equal. There are three major different causes of internal inefficiency: insufficient allocations of resources; lack of technical competence; and managerial malfunctions.

With regard to resource allocations, budget cuts for government agricultural research services and Seed Services are, in particular, threatening the long term efficiency of the industry. There is a tendency for an increasing share of the central seed sector agricultural research and

quality control functions to be taken over by private seed companies as, increasingly, these services fall short of what is required.

The technical competence of both DR&SS and the private seed companies is commendable. In large part, this is because during the years of isolation, due to international sanctions after UDI, Zimbabwe built up its own technical standards and expertise in seed activities to high levels compared to those in the rest of sub-Saharan Africa. Since Independence, there has been only one seed organisation that has functioned inefficiently because of technical incompetence: this is GMB, which tried to handle groundnut seed multiplication and distribution in the mid-1980s with almost no technical knowledge about seed production and handling.

Poor internal organisation and management has not been a major cause of inefficiency in seed organisations in Zimbabwe during the post-Independence era.

5.6 Conclusions

A number of location-specific factors influence seed sector performance. One important on-going process is the re-orientation of formal agricultural research from serving only large-scale commercial farmers, who are mainly located in the more favourable agro-ecological zones, to including the needs of small farmers in communal areas, which are mainly 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.

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.

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 transport costs.

The macro-economic environment also affects the performance of the agricultural sector in general and the seed industry in particular. 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.

Retail seed prices have been kept relatively low 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.

A number of changes in agricultural policy are likely to affect the performance of the agricultural sector and the seed industry within it. The proposed land reform, which has been discussed for a number of years, is likely to be implemented soon; this will involve a major redistribution of land, although the emphasis is likely to be on trying to retain current

productivity levels. Government budget constraints are also likely to limit any major expansion in agricultural credit and extension services. The marketing of grain is also likely to be partially liberalised.

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 MT&C; the latter has recently fundamentally changed the price control structure for seed distribution in a way which is unlikely to encourage private sector seed distributors to serve the small farmer market (see Section 5.3.1).

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, although government budget cuts are undermining the capacity of public sector research institutions to contribute actively to research.

With the exception of GMB's handling of groundnut seeds, the internal efficiency of both public and private seed organisations has been good.

6. THE SCOPE FOR ORGANISATIONAL CHANGE TO CONTRIBUTE TO IMPROVED PERFORMANCE IN THE SEED SECTOR IN ZIMBABWE

6.1 The present organisational structure

The existing system, that allows Seed Co-op a monopoly in seed production of varieties released by the Department of Agricultural Research, has proved to be relatively cost efficient and capable of ensuring the supply of sufficient seed for the market. If this policy is continued, the system will without doubt be able to continue efficiently supplying high quality seed. In contrast to other countries, the main seed problem in Zimbabwe is not one of seed production capacity. Part of the explanation for this can be found in the agrarian structure of Zimbabwe which, with its large-scale commercial agricultural sector, provides a basis for the existence of cost efficient 'modern' seed producers. But this is not the full explanation. In addition, the post-Independence government has continued a seed price structure under which it has been profitable to produce seed, compared with alternative enterprises. In other African countries, low prices offered to contract farmers have been a major reason for seed production capacity problems. However, in common with other African countries, Zimbabwe experiences problems with efficient input distribution and with agricultural support and pricing systems.

Assessing the organisational structure of the seed industry from a national development perspective, it seems it has functioned well for hybrid maize seed (and for other seeds demanded by large-scale commercial farmers, such as wheat, barley and soyabeans); less well for sorghum, sunflower and groundnuts; and badly for pearl and finger millet and for other legumes - for these crops, it has very substantially failed to meet the demand for seed.

Maize seed is by far the most important in the seed industry in Zimbabwe, accounting for more than three quarters of total seed sales. The adoption rate in communal areas is very high and production and distribution of maize seed has been very successful - although the present system could be further improved through various policy initiatives targeted at particular problems. Examples of these are given later in this Chapter.

Groundnut seed production was transferred from the Seed Co-op to GMB. However, GMB has completely failed to meet its obligation to produce and distribute seed to communal farmers: only standard seed, selected from groundnut purchases by GMB from the communal areas, has been sold.

An assessment of the adequacy of seed supply for soyabeans, sunflower and sorghum, depends on how demand is defined. The Seed Co-op argues that it can supply all that is required but that seed of these crops is not demanded by communal farmers. There is no doubt that the Seed Co-op is right in the sense that it is not deliberately limiting seed production or sales, but it is also clear that potential demand does exist for these crops, if they were actually made available at village level and Agritex provided the necessary information and advice about their availability and how to use them.

The major disadvantage of the present seed sector structure is the very weak link between the small farm sector and the formal seed industry. There are various consequences of this weak link.

Plant breeding and other agricultural research work institutions have been slow and not very accurate in re-orientating their objectives to the needs of small farmers. As yet, there are no efficient mechanisms which measure the demand for improved seed of those self-pollinated food crops which are not yet commercialised.

Using the efficiency function as a basis for assessing the organisational structure of the seed industry, it can be concluded that high quality seed is being produced cost effectively by the private sector. Government spending on the seed industry is very modest and is only indirectly related to seed activities - for example, it is allocated primarily to basic agricultural research and to seed services.

Assessing the advantages and disadvantages of current seed sector organisation inevitably involves political judgements, stemming from the fact that the private seed sector is dominated by a group of long-established large-scale commercial farmers. Even though these large-scale commercial farmers, the majority of whom are members of the Seed Co-op, have been co-operative in transforming the aims and operation of the industry to include the communal areas as a target group, there are parts of the government administration which are pressing for the more rapid opening up of seed multiplication, and the seed industry in general, to all social groups. This could be achieved in any of three ways: by admitting new entrants to the large-scale commercial sector as members of Seed Co-op; by involving communal farmers as seed producers, through the organisation of small-scale seed multiplication schemes; or by the direct involvement of the government in seed production through the state farms.

6.2 The scope for organisational change

6.2.1 Public and private sector participation in seed production

Zimbabwe is an example of a country with a well-functioning private seed industry, capable of producing quality seed at cost effective prices without government subsidies. However, Seed Co-op's success is not directly transferable to most other African countries because it has been based on low-cost production on private large-scale commercial farms, which are a phenomenon unique to Zimbabwe. Some elements behind the success are without doubt transferable, though, including the following:

- close links between plant breeding and seed multiplication;
- decentralised on-farm seed processing;
- a price structure which allows seed multiplication to be profitable enough to compete with other farm enterprises;
- the co-operative organisation of production, which allows the seed growers themselves to obtain a greater share of the retail seed price than is possible under a normal private company structure.

The only recent state involvement in the seed industry is the GMB handling of groundnut seed. This resulted in substantial groundnut seed deficits. In the present situation of cuts in the civil service and financial strains on the government budget, it would seem to be ill-advised for GOZ to start engaging in seed multiplication directly now, in competition with the private sector. Direct involvement in seed production through either state farms or parastatals would require considerable investment and, judging from past experience, would also probably require subsidies to cover losses.

Seed marketing is also undertaken by the private sector. The system of wholesalers and retailers of seed has functioned well in the case of hybrid maize, although it has not been so successful in selling other types of seed. There are clear economic reasons for these short-comings. As long as the demand for a particular new seed variety is low, it is not economically viable for individual retailers to become involved in marketing it. There is thus an important role to play for the state in facilitating the marketing of seed other than maize to communal farmers, and in ensuring that seed reaches all parts of the country. Instead of building up a separate parastatal organisation for marketing seed, a cheaper policy - which would also probably be more efficient - would be to give selective policy support to existing private traders already involved in supplying communal farmers. Examples of selective support that might be appropriate are as follows:

- subsidising the price of high value seed, such as groundnuts and sunflower, in order to make it economically viable to produce and sell;

- subsidising delivery of seed to marginal areas by providing foreign exchange allocations to those wholesalers who provide services to the rural areas.

Of course neither of these options is likely to increase seed availability and use in a sustainable way if it is implemented in isolation of other policy changes. A limited period of price subsidy may be a feasible way of increasing the use of improved seed of self-pollinated crops, such as groundnuts and sunflower, because seed of these crops, once bought, can be maintained on-farm satisfactorily over a number of seasons. However, it is critical that price subsidies are backed up with support from the agricultural research and extension institutions, to ensure that sufficient improved material can be made available to farmers and that its use on-farm is monitored, to feed back into future breeding work and into sustainable seed distribution system development.

6.2.2 Options for GOZ policy towards the seed sector

☐ *An active seed industry policy oriented to national development goals*

There is a strong need for GOZ, through MLARR, to play a more active role influencing the private seed industry, in order to meet the development needs of the country. This can be done either within the Tripartite and Bipartite agreements or by liberalising the production and distribution of seed.

According to the Tripartite and Bipartite agreements, the Seed Co-op is obliged to meet all domestic demand for seed. As shown earlier, estimates of seed demand can vary considerably depending on the method used. The method used by the Seed Co-op at present is based on information from the distributor network and occasional reports from the Co-op's staff. It is likely that the demand for improved seeds at village level for crops such as sunflower, sorghum and pearl millet would be shown to be considerably higher if MLARR conducted its own survey. MLARR would then have a strong case, within the Tripartite and Bipartite agreements, for demanding that the Seed Co-op makes greater efforts to distribute seed in the communal areas.

A more radical solution to the problem of low adoption rates of improved seed, for some of the crops included in the Tripartite and Bipartite agreements, would be to liberalise the production of varieties of these crops released from DR&SS - although maintaining the monopoly agreements for the remaining crops. The crops that could be liberalised are sunflower, sorghum and groundnut. It would be logical, if this scenario is chosen, also to liberalise the production of new crop varieties released by DR&SS in the future. There are a number of seed houses that have the capacity to produce seed from government released material for these crops including Savanna Seed, National Tested Seed, Farmers Co-op, Farm Tech and others.

If, in addition, seed prices were de-controlled and left to market forces, it is questionable whether seed would actually become any cheaper to buy for small farmers, as the profit margins under the present system are already low. Other problems may also arise were seed production to be liberalised, such as disrupting DR&SS's plant breeding program, which is presently highly integrated with Seed Co-op's work.

- *Co-ordinating seed sector work between Government departments*

Part of the reason for the low adoption rate of improved seed other than maize is a simple lack of knowledge about its existence among farmers in the communal areas. When farmers do not request the new varieties from retailers, the retailers do not request them from the wholesalers, who in turn do not order seed from the seed companies. AGRITEX could play a valuable role in improving this situation by conducting a campaign to increase awareness of the new varieties of sorghum, pearl millet, sunflower, groundnuts and soyabeans.

Communal farmers do not have any tradition of purchasing improved open pollinated sorghum and millet seed, and an awareness of their existence and benefits has to be built up in the communal areas. Communal area trials conducted by DR&SS show there is a 70 per cent yield advantage for the sorghun varieties **SV1** and **SV2** over local varieties and a 25 per cent advantage for the Panaas variety **PNR1**. If these results are applicable under on-farm conditions, the seed industry should have no problem in selling these seeds, were they made available to farmers in rural retail shops and information about their existence was provided by Agritex.

To succeed, such an awareness campaign should be linked to and co-ordinated with the activities of other parastatals such as GMB, AFC and ARDA. Examples of how

such co-ordination might be organised are outlined in the following, in relation to sunflower and small grains:

- Influence of GMB policies on increased adoption of improved sunflower seed

Expanded cultivation of sunflower, coupled with more efficient marketing and processing, could alleviate the present national deficit of edible oil production. At present, GMB mixes all the sunflower it buys, whether it is **Russian White** (oil content around 9 per cent), local retained **Peridovic** (oil content around 15 per cent), improved **Peridovic** (oil content around 40 per cent) or **Msasa** (oil content around 45 per cent). The oil extracted from sunflower is used in the food processing industry by companies such as Olivine, Lever Brothers and Blue Ribbon. Because GMB mixes up all purchases, when the oil extractors buy sunflower, they do not know what quality they are getting. Therefore, they have to set their machinery to handle sunflower with an oil content of 20 -25 per cent, because some of the sunflower produced by communal farmers has very low oil content. From a macro-economic point of view this is clearly a waste as, in a situation where Zimbabwe has a deficit production of vegetable oils, only half of the potential oil is extracted from the hybrid sunflower varieties with high oil content.

A solution to this problem would be grading for oil content at GMB depots and paying a premium price for sunflower with high oil content. The equipment required to grade sunflower for oil content is expensive and needs qualified technicians to operate it. At present such equipment cannot be installed at GMB's depots, but it could well be used by the private oil extracting companies. Or simpler ways of grading could be developed. A simple grading by variety could easily be undertaken. GMB rejects this idea as impossible in practice, as the Board would then also have to store and handle the different varieties separately.

Another solution would be to deregulate sunflower marketing. COPA is arguing for this option. Deregulating sunflower marketing would probably result in the private oil extractors contracting large-scale commercial farmers to produce hybrid sunflower. It is likely that this would boost commercial sunflower production considerably and solve the problem of under-utilisation for the oil extractors - and it might perhaps even alleviate the national shortage of vegetable oils. But GMB would then have a huge problem selling the sunflower varieties bought from the communal areas. And this solution would not increase adoption of improved varieties in the communal areas. GMB has therefore rejected this proposal and maintains that all sunflower has to be sold through its markets.

- AFC loans for non-maize enterprises

In recent years, Agritex has encouraged communal farmers in Natural Region III, IV and V to grow sunflower as a cash crop. However, AFC has not been pushing sunflower and very few seasonal loans have been given for crops other than maize and cotton. If the hybrid sunflower seed available today is to be adopted by communal farmers, a deliberate promotion campaign has to be undertaken by the government,

which should include granting seasonal loans for hybrid sunflower seed and fertiliser packages.

- Distribution of small grains as food relief

Presently only maize seed is given to farmers as part of the food relief programme, but there is no reason why the programme could not be expanded to include improved white sorghum and pearl millet seed: the major recipients of food relief are situated in traditional small grain growing areas in any case. Distributing improved small grain seed free of charge as part of a food relief program is not intended to expand the area cultivated but rather to replace inferior varieties with improved seed and thereby to increase productivity.

☐ *Support for seed marketing*

The pan-territorial pricing policy introduced by the Ministry of Finance from the 1990/91 season is making meeting national development objectives more difficult, by making it unprofitable to market seed in marginal areas with low density of demand for seed and high transport costs. The effect of setting minimum prices for seed, valid nation-wide, is not to lower seed prices in the marginal areas, but rather (to the extent that price control is enforced) to reduce access to seed. Retail seed prices have to be higher in the more remote areas in order to attract private traders and, if GOZ policy is to keep input prices low in these areas, the logical policy would be to subsidise transport prices. This could be done by offering transport at reasonable rates to private traders serving the rural communities.

In addition, credit facilities could be extended to rural seed retailers to ease the cash flow problems faced at this level of trading. Systems could be designed to facilitate rural retailers returning unsold seed in January; this is presently possible for regional seed distributors only. This might make seeds other than maize available in rural shops and it might make hybrid maize seed available during a longer period each season. The system of appointed stockists used by the fertiliser industry could possibly serve as a model.

☐ *Consolidation of Seed Services*

To maintain the current high quality of seed, there is a strong case for providing more funding to Seed Services. Seed Services is particularly short of transport: 8 seed inspectors have to share 2 vehicles. At present, the private seed companies have to provide transport for Seed Services staff if they want their seed crop certified. In the present situation, where new seed companies are entering the market, there is strong justification for supporting an independent institution for testing new varieties before they enter the market place, to guarantee that they are superior to existing ones. Seed Services is well suited to carry out this function.

6.2.3 Options for informal sector seed activities

A final issue which needs to be addressed is the possible contribution of decentralised small-scale informal seed activities. Seed activities in the small-scale informal sector are currently limited to mass selection of open-pollinated and self-pollinated seed from harvest. A number of land races have been developed over time through the process of mass selection, particularly for crops such as finger millet, pearl millet and sorghum, which have been grown in the region for centuries. In addition, a number of land races exist for crops such as groundnuts and sunflower and even for maize. And seed of these crops has been retained from earlier formal seed sector releases from up to 30 years ago. All seed produced in the informal sector is produced primarily for on-farm use and only very limited marketing of land races takes place: diffusion of land races is linked more closely to social relations than to organised marketing activities.

Apart from the success with hybrid maize, the formal seed industry has not succeeded in producing and delivering improved seed to the small-scale farming sector to any significant extent. As discussed elsewhere, there are two major reasons for this. First, the re-orientation of the industry from concentrating all its efforts on the large-scale commercial sector to serving all farmers has taken time. Second, the production and distribution of certain types of seed, for example self-pollinated non-commercial food crops, is simply not economically profitable for private companies within the industry.

One strategy for satisfying the small farm sector's seed requirements would be to combine formal sector seed activities with informal sector activities. There are obvious potential benefits to be gained from involving small-scale farmers in seed production for sale within the local community. These include:

- farmers have direct access to seed produced in their own community, minimising the cost and risk of using seed transported from elsewhere;

- because of the lower production costs, it is possible to produce improved seed of crops which would not be commercially attractive to the formal seed sector.

At present, there is no production of improved seed in the small farm sector. As discussed in Section 4.5, past experience with this in Zimbabwe has not been promising. Nonetheless, the involvement of the small farm sector in production of improved seed has for some years been a political demand put forward by NFAZ. In response to this demand, Seed Co-op entered discussions with NFAZ about how small farmers could become involved in the production of groundnut seed for the 1990/91 season. From the point of view of Seed Co-op, one of the difficulties with involving small farmers as contract growers is controlling the large number of small contracts - in this case, each farmer had only 0.5-1 ha of seed crop. To overcome this problem, a contract was drawn up between Seed Co-op and NFAZ under which NFAZ agreed to take responsibility for organising the small farmers to grow seed, while Seed Co-op agreed to buy the seed and provide the technical support required, including weekly

inspections. For 1990/91, NFAZ organised small farmers in Masvingo to produce a total of 35 ha of groundnut seed.

At the time of writing there is no indication of how this initiative is performing, but one major obstacle to success is already apparent: the price paid for the seed. The farmers are offered the official producer price plus an additional 10 per cent premium. Meanwhile, the open market price may be as much as double this, which will clearly tempt some farmers to sell their seed for consumption rather than as seed to NFAZ/Seed Co-op.

Another drawback is that ultimately, the scope of the initiative is limited to exploring ways of involving small farmers as contract growers for the formal seed industry and does not provide a model for a real alternative/supplementary system of informal seed supply to generate local competition in seed production and distribution.

6.3 Final remarks

GOZ needs to adopt a blend of approaches to solve existing efficiency and national development problems within the seed industry in Zimbabwe. This report argues that a well functioning seed sector is essential for ensuring that the productivity of the small farm sector increases. When formulating its strategies in practice, it is crucial that GOZ develops policies for each of the different elements of the industry, including agricultural research, seed multiplication, seed pricing and distribution, on the basis of a comprehensive analysis of the firm-level efficiency and national development issues involved.

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

There is sufficient seed production capacity within the private sector and its 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. It is politically desirable, in the medium to long term perspective, to broaden the base of ownership of the means of production in Zimbabwe - but it may not be helpful to achieve this through nationalisation or by initiating seed production on state farms. Instead, it is suggested that the public sector's role should be in developing policies to encourage the successful involvement of small farmers in seed production.

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. 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 discussed earlier, there are for both crops clear economic benefits for Zimbabwe

from high levels of adoption of improved seed by small farmers. In addition, small farmers themselves suffer from using low quality out-dated varieties. 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. It would be critical, however, that such subsidies be implemented with appropriate institutional support (see Section 6.2.1).

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. These might include, for example, priority allocation of foreign exchange for the purchase of lorries and spare parts to private companies which in the past have shown a keen interest in providing seed services in the rural areas.

BIBLIOGRAPHY

ASHWORTH, V.A. (1990); *Agricultural technology and the communal farm sector.* Zimbabwe Agricultural Sector Memorandum. Washington: World Bank.

BILLING. (1985); Zimbabwe and the CGIAR Centres. A study of their collaboration in Agricultural Research. CGIAR Study Paper Number 6. World Bank.

CHRISTIANSEN, R. (1990); Agricultural Sector Memorandum of Zimbabwe. Washington: World Bank.

CIMMYT (1987); *1986 world maize facts and trends: the economics of commercial maize seed production in developing countries.* CIMMYT, Mexico.

COOPERS & LYBRAND (1990); *Gross margin analysis.* Harare: St Barbara House Agricultural Services (PVT) Ltd.

COPA (1988); 'Groundnut review committee report'. Joint Groundnut review by NFAZ, ZNFU and COPA. Harare: COPA.

CROMWELL, E.A. and ZAMBEZI, B.T. (1992); 'The performance of the seed sector in Malawi: an analysis of the influence of organisational structure', *ODI Working Paper.* London: Overseas Development Institute.

CROMWELL, E.A., FRIIS-HANSEN, E. and TURNER, M. (1992); 'The Seed Sector in Developing Countries: a framework for performance analysis', *ODI Working Paper.* London: Overseas Development Institute.

DOUGLAS, J.E. (ed.) (1980); *Successful seed programs: a planning and management guide.* Boulder CO: Westview Press.

DUFFUS, C.M. and SLAUGHTER, J.C. (1980); *Seeds and their uses.* UK: John Wiley and Sons.

ENDA (1990); Zimbabwe Seed Action Network Annual Report, 1988-89: Harare: ENDA.

FAO (1978); *Improved seed production.* Manual produced by FAO Seed Improvement and Development Programme.

FAO (1987a); *Evaluation of the Seed Improvement and Development Programme.* Paper presented to twenty-fourth conference session, Rome, November 1987.

FRIIS-HANSEN, E. (1988); 'Seeds of Wealth - seeds of risk? The vulnerability of hybrid maize production in the South Highlands of Tanzania'. *CDR Project Paper 88.2.* CDR, Copenhagen.

FRIIS-HANSEN, E. (1990); *The Zimbabwe Seed Industry.* Background study for the World Bank Agricultural Sector Review of Zimbabwe. Washington: World Bank.

FRIIS-HANSEN, E., BENDSEN, E., SASS, H. and DICKENS, J. (1991); Four Agricultural Training Institutes. Zimbabwe. Evaluation Report, No. 1991/3. Copenhagen: Danida.

FRIIS-HANSEN, E., BENDSEN, E. and CULVER, J. (1991); Resettlement Credit Scheme. Zimbabwe. Evaluation Report, No. 1991/4. Copenhagen: Danida.

GRAIN MARKETING BOARD (various years); Annual Reports; Harare: Grain Marketing Board.

GREGG, B.R. (1983); 'Seed marketing in the tropics'. *Seed Science and Technology.* 11 (1).

HIFAB INTERNATIONAL and ZIMCONSULT (1989); 'Zimbabwe: Country Study and Norwegian Aid Review'. Harare: Hifab International and Zimconsult.

LELE, U. (1988); 'Comparative advantage and structural transformation: a review of Africa's economic development experience', in Ranis, G. and Schultz, T.P. *The state of development economics.* UK: Blackwell.

MASST, M. (1991); *State sponsered development and economic differentiation among the peasants in Zimbabwe.* Oslo: University of Oslo.

MLARR (1990); *Farm management survey of Zimbabwe.* Harare: Ministry of Lands, Agriculture and Rural Resettlement.

MUGABE, Ntombana (1985); Agricultural Research Resources Assessment in the SADCC countries. Vol. II, Zimbabwe USAIS.

NAIK, D.M. (1989); *Production and uses of cowpea (Vigna unguiculata) in Zimbabwe.* Mimeo. Agronomy Institute, DR&S.

NFAZ (1987); *Survey of agricultural inputs in the communal sector.* Harare: National Farmers Association of Zimbabwe.

PRAY, C. and ECHEVERRIA, R. (1988); 'Transfer of hybrid maize technology'. *Food Policy.* 14 (3).

THOMSON, J.R. (1979); *An introduction to seed technology.* UK: Hill.

USAID (1987); *Improved seed production and utilization (seed program/Industry Development 1959-87) evaluation report.* Science and Technology Bureau, USAID.

ZIDS (1990); *National Extension Survey.* Harare: Zimbabwe Institute for Development Studies.

50: Evaluating the Impact of NGOs in Rural Poverty Alleviation: Bangladesh Country Study
Sarah White, 1991, £5.00, ISBN 0 85003 158 3
51: Evaluating the Impact of NGOs in Rural Poverty Alleviation: Uganda Country Study
John De Coninck, 1991, £5.00, ISBN 0 85003 159 1
52: Evaluating the Impact of NGOs in Rural Poverty Alleviation: Zimbabwe Country Study
Ann Muir, 1991, £5.00, ISBN 0 85003 160 5
53: Environmental Change and Dryland Management in Machakos District, Kenya: Environmental Profile
edited by Michael Mortimore, 1991, £4.00, ISBN 0 85003 163 X
54: Environmental Change and Dryland Management in Machakos District, Kenya: Population Profile
Mary Tiffen, 1991, £4.00, ISBN 0 85003 164 8
55: Environmental Change and Dryland Management in Machakos District, Kenya: Production Profile
edited by Mary Tiffen, 1991, £4.00, ISBN 0 85003 166 4
56: Environmental Change and Dryland Management in Machakos District, Kenya: Conservation Profile
F.N. Gichuki, 1991, £4.00, ISBN 0 85003 167 2
57: Environmental Change and Dryland Management in Machakos District, Kenya: Technological Change
edited by Michael Mortimore, 1992, £4.00, ISBN 0 85003 174 5
58: Environmental Change and Dryland Management in Machakos District, Kenya: Land Use Profile
R.S. Rostom and Michael Mortimore, 1992, £4.00. ISBN 0 85003 175 3
59: Environmental Change and Dryland Management in Machakos District, Kenya: Farming and Income Systems
edited by Mary Tiffen, 1992, £4.00, ISBN 0 85003 176 1
60: Explaining Africa's Post-Independence Development Experiences
Tony Killick, 1992, £4.00, ISBN 0 85003 177 X
61: The Informal Financial Sector: How Does It Operate and Who Are the Customers?
J.J. Thomas, 1992, £4.00, ISBN 0 85003 178 8
62: Environmental Change and Dryland Management in Machakos District, Kenya: Institutional Profile
edited by Mary Tiffen, 1992, £4.00, ISBN 0 85003 179 6
63: Environmental Change and Dryland Management in Machakos District, Kenya: Tree Management
Michael Mortimore, 1992, £4.00, ISBN 0 85003 180 X
64: IMF Lending: The Analytical Issues
Graham Bird, 1992, £4.00, ISBN 0 85003 182 6
66: The Performance of the Seed Sector in Zimbabwe: An Analysis of the Influence of Organisational Structure
Esbern Friis-Hansen, 1992, £4.00, ISBN 0 85003 184 2

Overseas Development Institute
Regent's College
Inner Circle
Regent's Park
London NW1 4NS
England

Telephone: 071-487 7413
Fax: 071-487 7590
Telex: 94082191 ODIUK
odi @ gn.uucp (GreenNet)
10074: SKK1133 (Telecom Gold)