The Performance of the Seed Sector in Malawi

An Analysis of the Influence of Organisational Structure

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Acronyms

ADD	Agricultural Development Division
ADMARC	Agricultural Development and Marketing Corporation
AES	Agro-Economic Survey
ARC	Agricultural Research Council
ART	Adaptive Research Team
ASA	Annual Survey of Agriculture
ASAP	Agricultural Sector Adjustment Programme
ASSP	Agricultural Sector Support Programme
BLADD	Blantyre ADD
CAN	Calcium Ammonium Nitrate
CDC	Commonwealth Development Corporation
CIAT	International Centre for Tropical Agriculture
CRSP	Malawi/Michigan State University Bean/Cowpea Collaborative Research Support Programme
DAP	Di-Ammonium Phosphate
DAR	Department of Agricultural Research
EPA	Extension Planning Area
FAO	UN Food and Agriculture Organisation
FMB	Farmers' Marketing Board (pre-ADMARC)
GOM	Government of Malawi
ICRISAT	International Centre for Research in Semi-Arid Tropics
ISTA	International Seed Testing Authority
KADD	Kasungu ADD
KRADD	Karonga ADD
LADD	Lilongwe ADD
LPO	Local Purchase Order
LWADD	Liwonde ADD
MANR	Ministry of Agriculture and Natural Resources (pre-MOA)
MCT	Maize Commodity Team
MOA	Ministry of Agriculture
MZADD	Mzuzu ADD
NADD	Ngabu ADD
NBP	National Bean Programme
NGO	Non-Governmental Organisation
NRDP	National Rural Development Programme
NSCM	National Seed Company of Malawi
NSSA	National Sample Survey of Agriculture
ODA	Overseas Development Administration
OPC	Office of the President and Cabinet
PTC	People's Trading Company
RDP	Rural Development Project
SACA	Smallholder Agricultural Credit Administration

SADC	Southern African Development Community
SFFRF	Smallholder Farmers Fertiliser Revolving Fund
SLADD	Salima ADD
SSMS	Smallholder Seed Multiplication Scheme
STU	Seed Technology Unit (pre-Seed Services)
TVC	Total Variable Costs
VRC	Variety Release Committee
UNDP	United Nations Development Programme
USAID	United States Agency for International Development

Preface and Acknowledgements

This report presents the results of a study of the performance of the seed sector in Malawi undertaken under the auspices of the Overseas Development Institute, as part of a wider study of seed sector restructuring in developing countries, conducted as an Extra-Mural Contract for the UK Natural Resources Institute.

Field work for the study was conducted by the authors in Malawi in November and December 1990, with the permission of the Department of Agricultural Research of the Ministry of Agriculture. The Development Officers and Field Assistants in Bembeke and Kabwazi EPAs in Lilongwe Agricultural Development Division and in Eswazini EPA in Mzuzu ADD helped to select and interview farmers. The Rockefeller Foundation's Malawi office provided logistical support.

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Elizabeth Cromwell is an Agricultural Economist and a Research Fellow at the Overseas Development Institute. She was research leader for this study. Dr Batson Zambezi is now Head of Chitedze Agricultural Research Station and was Senior Maize Breeder at the time of the study. He collaborated in the field work and provided technical interpretation of the results.

The support provided by the staff of the Rockefeller Foundation Malawi office and the field staff in Lilongwe and Mzuzu ADDs was invaluable: great thanks are due for this. The authors also wish to thank the staff of all the other seed sector institutions, and the farmers in Bembeke, Eswazini and Kabwazi, who gave up time to be interviewed during the busiest period of the agricultural year. At ODI, thanks are due to Geraldine Healy and Virginia Ball, who spent many patient hours preparing this report for publication.

The views expressed in the report are those of the authors and do not necessarily reflect the views of the Department of Agricultural Research, The Rockefeller Foundation, the UK Natural Resources Institute or the Overseas Development Institute.

1
Introduction

This study is one of a series 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. The project uses evidence from Eastern and Southern Africa in particular.

The research project 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 first part was reported in ODI *Working Paper* 65.

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

The research hypotheses tested in the second phase were:

- that structural and organisational factors, 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 were to:

- establish how well the seed sector is performing in terms of equity and efficiency. Are the varieties 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 costs of multiplication, processing and delivering seed to this group?
- using this information, to assess the comparative influence of four sets of factors on performance: 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.

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

Some of the important issues are whether there is 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 formal sector seed organisations in the small farmer seed market; whether, in particular, greater encouragement of decentralised, small-scale seed activities could make a significant contribution to performance; whether there is 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 was used. First, an assessment was 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 Malawi, the source of primary information relating to performance was a survey of small farmers. The questionnaire used is given at Appendix 1.

The evidence from the farmer survey was compared with and amplified by existing secondary data sources, such as Annual Survey of Agriculture (ASA) data, 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.

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 Malawi, 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.

The Malawi study focused on four small farm crops: maize, groundnuts, beans and soyabeans – maize and groundnuts because of their dominance in the small farm farming system; beans because of their importance to smaller farmers as a dual purpose food and cash crop; and soyabeans to investigate

their potential in the Malawi small farm farming system as a nitrogen-fixing crop. Maize questions were further sub-divided into local and hybrid (meaning both hybrid and composite) varieties. A distinction was made between improved seed and other grain used as planting material: 'improved seed' was used to refer to both certified seed produced by National Seed Company of Malawi (NSCM) and approved seed produced under the Smallholder Seed Multiplication Scheme (SSMS).

This report is divided into six parts. After this Introduction, Part II provides an overview of the seed sector in Malawi and its role in the small farm farming system. Part III then examines the performance of the seed sector with respect to various functions that are important for national development. In Part IV, performance is assessed with respect to the efficiency of the individual organisations that make up the formal seed sector. Part V investigates the extent to which various factors influence both these aspects of performance. And Part Vl provides an overall assessment of seed sector performance, of the extent that the organisational structure of the sector influences performance and of both the short- and long-term changes necessary in order to improve performance.

The report is intended to be of interest both to those readers interested in Malawi's detailed experience with organising seed supply and to those who are more concerned with the general lessons of Malawi's experience for seed supply in the wider Eastern and Southern Africa region. For the former, all the various Chapters in each part of the report may be of interest; for the latter group, the detailed results presented in the Chapters comprising Parts II–V may be of less interest and so a concluding Chapter, which summarises these results, has been provided at the end of each Part.

Part II

Seeds and Small Farmers in Malawi

2
The Small Farm Farming System

About 50 per cent of the total land area in Malawi is cultivable (Government of Malawi (GOM), 1987) and about 80 per cent of this is available to small farmers as customary land.[1] The climate is sub-humid, with a single rainy season between November and April; annual rainfall averages 1,220mm. Inter-annual fluctuations are generally small, but there is some evidence of a long-term decline both in total rainfall and in the length of the wet season. Soils are predominantly friable, permeable latosols with high natural fertility, although cultivation has accelerated degradation in many areas through insolation and leaching. Topography varies from the Lower Shire valley at 50m above sea level, through the Central plains to mountains of 3,000m in the Southern Highlands and on the Northern Plateau.

There are a number of features of the small farm sector in Malawi which make it unusual in the context of sub-Saharan Africa as a whole. Most importantly 50 per cent of all farms are less than 0.5 ha (World Bank, 1989).

This small farm size dictates the production strategies small farmers can pursue. First, the bulk of farmland is allocated to producing staple foods: 70 per cent of the small farm area is down to maize; 27 per cent is down to other food crops; and only 3 per cent is down to non-food cash crops. Maize is less widely grown on parts of the Lakeshore where cassava and rice are important. Groundnuts are important in many areas, covering up to 20 per cent of cultivated land, and beans are important everywhere except on the Lakeshore; they cover around 10 per cent of the area. Millet and sorghum are locally important, especially in the Lower Shire valley, where they cover nearly 10 per cent of cultivated land. Much maize is intercropped with groundnuts and pulses and also with root crops and small grains: up to 30 per cent of total area is down to interplanted maize. For those households with less than 0.5 ha, improved maize is less important and more maize is interplanted, groundnuts and tobacco are relatively less important and cassava and beans are relatively more important.

These figures are taken from the 1987 ASA conducted by the Ministry of Agriculture (MOA), to provide a sketch of the general cropping pattern in Malawi. However, there is considerable inter-annual variation in the proportion of land planted to each crop, primarily in response to changing producer and input prices. Malawian farmers are highly price-responsive (Dean, 1966) and this dynamic aspect to the small farm sector is another important feature.

Because of the need to allocate nearly all the land to maize to satisfy

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1. Land to which user rights, but no title, are allocated by Traditional Authorities. The only class of land small farmers can use (Pachai, 1978).

domestic food needs, a large proportion of small farms are continuously monocropped[2] with maize. Most cultivation is done by hand because there is little economic benefit to ox-ploughing on such small holdings. There is considerable intercropping and relay cropping, despite discouragement of this in the past by the agricultural extension service.

Given the dominant role of maize, the basic good agronomic practices for maize (early planting, appropriate plant populations, early weeding) are well-known and observed by the majority of small farmers. So management standards are considerably above average for the Eastern and Southern African region, except with respect to early weeding: although the benefits are known, small farmers find it difficult to carry this out in practice because the most widely grown groundnut variety (*Chalimbana*) has a long growing season, and so needs early planting and weeding, so this creates labour requirements which clash with those for maize.

The dominance of a single crop leads to a common set of constraints facing the majority of small farmers:

- **availability of plant nutrients** : available soil nitrogen under continuous cropping supports grain yields of 400–800 kg/ha, so increasing yields above these low levels requires additional sources of nitrogen. Small farmers are aware of the value of additional plant nutrients, however access is problematic for them: there is little intercropping of legumes; the livestock populations on the small farms are too low to provide sufficient organic manure; and about 70 per cent of small farmers do not have sufficient cash resources to pay for chemical fertiliser. Consequently, only 13 per cent of small farmers with less than one hectare of land use any fertiliser at all (World Bank, 1989:4);
- **shortage of labour** : during the first few weeks of the growing season, the dominance of maize and groundnuts in the cropping pattern bunches the tasks of planting and weeding together, but most small farmers do not have sufficient resources to employ extra seasonal labour. Therefore, they concentrate on planting maize and this delays maize weeding and fertiliser applications and groundnut planting, and reduces yields as a result. For the very smallest households, and female-headed households, there is the additional difficulty of needing to sell their own labour at this time in order to earn maize for food and seed, because production from their own holdings is insufficient to provide all their domestic consumption needs.

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2. This study uses the following definitions: pure stand = a single variety of a crop grown alone; intercropped = two different crops grown together in the same plot; mixed stand = more than one variety of one crop grown together in the same plot; monocropped = a plot planted continuously to the same crop year after year.

In this situation, between 75 per cent and 95 per cent of all small farmers cannot meet their staple food needs from their own holdings and a majority do not sell any significant quantities of agricultural production (or they sell at harvest to obtain cash for school fees and other essentials and have to take emergency measures later in the season to obtain food needs); and they are net sellers of labour, to provide supplementary food. However, the vast majority of the population in Malawi still lives and works on small farms. Small farm production accounts for about 20 per cent of total agricultural output and, after a period of stagnant growth in the early and mid-1980s, output is now growing at nearly eight per cent a year, primarily due to the better producer prices now available for small farm crops.

However, in the prevailing situation of substantial population pressure on holding sizes, the prospect for continued long-run growth in small farm incomes is constrained by the wider policy context. Specifically, the continued emphasis on maize in agricultural technology development, extension and marketing policies has limited the opportunities for farmers to grow other higher value crops. The main option for farmers to sustain and expand income is therefore to increase yields of crops that are already grown, such as maize. The use of improved seed has a potential role to play in increasing yields, but the contribution that it can make is limited for most farm households by having inadequate family labour to meet the peak labour demand at certain seasons that is needed to optimise crop management. Without optimal crop management, the potential benefits of using improved seed are suppressed.

3
The History of Organised Seed Production[3]

Organised seed production has been carried out in Malawi for many years. The first locally bred maize hybrid (*LH7*) started distribution in 1959 and other programmes for groundnuts, rice, cotton and tobacco followed. The distribution of improved seed tended to follow a cyclical pattern: the need for a new variety would be identified, breeders would work to develop one and a concerted campaign would follow to encourage adoption, usually with free distribution or exchange for farmers' own seed. And the breeders would play a major role in the multiplication programme itself. Then the campaign would end, farmers would maintain the variety on-farm and varietal purity would decline over time. Often, the new material was not properly maintained on the research stations and this added to the difficulties of promoting regular replacement of seed.

In 1968, a formal programme for maize and groundnut seed multiplication started, with storage and processing facilities at Lilongwe and a seed testing laboratory at Bvumbwe Agricultural Research Station in Southern Region. The majority of multiplication work was carried out by the plant breeders but two Agricultural Development and Marketing Corporation (ADMARC) seed farms, and private contract growers, were also used. Co-ordination was the responsibility of a Seeds Officer from the Department of Extension and Training in the MOA. Seed was first distributed on an exchange basis then, from 1971, it was sold for cash, after the Government decided seed production in Malawi should be organised on a commercial basis.

At this time, total distribution of maize seed was sufficient for less than 3 per cent of national maize area. Many small farmers remained unaware that seed was available and indeed in many areas it was not. Little progress was made with groundnut seed, as the yield advantage over using farm-saved seed for the main variety, *Chalimbana*, was small and the cash outlay required was high. In the early 1970s, most of the groundnut seed made available by ADMARC went to the Lilongwe Land Development Project (precursor to Lilongwe Agricultural Development Division (LADD)) for distribution on credit. In 1972/73, the quantities being made available were in the order of 300–400 tonnes.

In 1973, the first set of proposals were drawn up for a national seed programme that would integrate all the activities previously carried out on a crop-by-crop basis by the respective plant breeders. From the start, it was recognised that individual crop programmes differ in their objectives as well

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3. This Section draws heavily on information contained in Overseas Development Administration (ODA) (1973) and Commonwealth Development Corporation (CDC) (1978).

as in the technical approach required. Also, it was considered unlikely that the volume of internal seed sales would interest a private commercial company in the medium-term future. Three main categories of seed production were distinguished:

- those crops for which there is an immediate economic advantage to the small farmer from using improved seed (thought to be maize, beans, and pasture seed), allowing a conventional commercial approach to seed production to be pursued;
- those crops for which the benefit to individual farmers is only indirect but it is in the national interest to produce a uniform crop: for example, groundnuts, rice, cotton and tobacco. For these crops, it was planned that seed production could still be commercial but retail seed prices should be subsidised by the MOA.
- those seed crops grown specifically for export at commercial prices: for example vegetables, flowers and some pasture seed. These, it was proposed, should be recognised as a useful means of strengthening the economic base of the national operation but they should not be allowed to divert the programme from its main objective of producing improved seed for Malawi's small farmers.

It was therefore proposed that maize seed would be produced primarily by ADMARC, through its new Farm Supplies Section (FSS), but also by some tobacco estates; and certified groundnut seed would be produced by ADMARC and private growers, whilst small farmers would multiply groundnut seed to 'approved' status. It was proposed beans would continue to be grown on contract primarily for export. Production of bean seed for the domestic market by the FSS was to wait until the varieties being produced by the National Bean Programme (NBP) at Bunda College of Agriculture had been evaluated and released. Production of soyabean seed was not considered by the seed programme planners.

By 1978 certified seed was being produced for maize, groundnuts, beans, sunflower, grasses, pasture legumes and tobacco. Given the progress that had been made, it was decided to consider establishing a national seed company, which would operate on commercial lines. Accordingly, the UK CDC was asked to appraise and prepare the project with a view to investing in it and providing staff. At the time seed multiplication, certification, distribution and sale involved several different organisations and demand for hybrid maize seed was being met largely by imports. But with the start of the National Rural Development Programme (NRDP)[4] in 1978, demand for seed was due to

4. As its name implies, this replaced four area-based agricultural development projects with a national programme of rural development implemented by dividing Malawi into eight Agricultural Development Divisions (ADDs) with teams of Subject

increase and continuing to import the majority of requirements would be too expensive. However, the existing seed processing equipment was old, simple and low capacity. Therefore, it was proposed that a self-contained autonomous subsidiary company of ADMARC, the NSCM, would be set up to deal solely with seed production, and responsibilities for the different stages in the seed chain were to be allocated as follows:

- plant breeding, production of new varieties: Department of Agricultural Research (DAR);
- variety evaluation and release: DAR and Variety Release Committee (VRC);
- basic seed production: NSCM supervised by Seed Technology Unit (STU);
- certified seed production: NSCM using contract growers;
- quality control: STU;
- processing, storage: NSCM;
- distribution: ADMARC, factory gate sales by NSCM to large purchasers;
- storage of seed reserve: NSCM;

The STU (now known as Seed Services) was to be financially self-supporting and was to levy MK5/tonne on all seed brought into the new company's processing plant, to cover its costs. The only major constraint which it was considered could affect the new seed company achieving its objectives was the NRDP failing to achieve its planned seed uptake targets.

The only major change to this division of responsibilities in the intervening period has been the introduction of the SSMS. The SSMS started operating in the mid-1980s, with the aim of reducing seed production costs and encouraging crop diversification by involving small farmers themselves in the production of improved seed for self-pollinated crops. It is organised and managed at ADD level. In addition, in response to the 1991/92 drought, a British NGO – ActionAid – initiated a project to procure and sell local maize and other crops to seed-short households. The project sold some 14,000 tonnes of seed in 1992/93. The potential for continuing this initiative is currently being evaluated.

There is no overall seed sector development policy in Malawi and different parts of the MOA work on different aspects. The Permanent Secretary is the Chair of the NSCM Board, although this position is not used to exert a great deal of control over the Board's activities in practice. The MOA Inputs Section co-ordinates seed estimates and the quantitative aspects of seed distribution and the MOA Pricing Section deals with retail seed pricing. The Seed Technology Working Party, with the DAR Seed Services as secretariat, is the main vehicle for strategic planning. Its members represent the MOA Planning

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Matter Specialists. The ADDs are further divided into Rural Development Projects (RDPs), Extension Planning Areas (EPA) and EPA Sections.

Division, Seed Services and DAR breeders; the Office of the President and Cabinet (OPC) Department of Economic Planning and Development; Bunda College of Agriculture; ADMARC; and NSCM and it is chaired by the MOA Controller of Agricultural Services, representing the Permanent Secretary. It meets every three months and its brief is to discuss seed availability, seed price policy, budget problems and variety issues. It does not have executive functions but it can recommend formal policy debate of important issues as a way of progressing policy development.

As we will see in later Sections, the organised seed sector remains low key in the agricultural sector as a whole. Seed Services and other parts of the seed chain that are within government often have difficulties securing budget allocations; some important seed sector responsibilities have been allocated to organisations, such as ADMARC, which have a major focus on other activities; and total production of improved seed by NSCM and the SSMS remains modest compared to small farm cultivated area: NSCM's hybrid maize seed sales, for example, were sufficient for less than five per cent of the small farm maize area throughout the 1980s (World Bank, 1989:37).

4
Seed Survey Households

Three areas were chosen for the seed survey on which this report is based, to represent the major small farm farming systems prevailing in Malawi: Kabwazi EPA in Thiwi-Lifidzi RDP, LADD; Eswazini EPA in Central Mzimba RDP, Mzuzu ADD (MZADD); and Bembeke EPA in Dedza Hills RDP, LADD.

In Kabwazi, 50km South East of Lilongwe in Central Region, holding sizes are relatively small, social organisation follows a matrilocal pattern and maize, groundnuts, beans and soyabeans are dominant food and cash crops, cultivated by hand on the sandy clay, degraded soils of the mid-altitude Dedza plain (1,100–1,200m). Tobacco is also grown by a minority of households. Most of the land is continuously cropped.

In Eswazini, 65km North of Mzimba in Northern Region, holding sizes are relatively large by Malawi standards and land shortage is not as yet a major production constraint, social organisation is patrilineal and maize, groundnuts, beans and millet are the dominant crops. A high proportion of farmers grow hybrid maize. A minority cultivate tobacco. Soils on the mid-altitude Mzimba plain (1,100m) are sandy loams, prone to acidity, but not yet degraded by continuous cultivation. A number of farmers cultivate with oxen.

In Bembeke, 25km East of Dedza in Central Region, holding sizes are relatively small, social organisation is matrilocal and hoe cultivation predominates. The area is in the Dedza Hills, above 1,700m, and this affects crop maturity. Gully erosion is beginning to be a problem as cultivation extends up the steep slopes in response to growing land pressure. Soils are ferruginous and highly permeable. Maize, beans and millet are the dominant crops (the soils are too acid for groundnuts) but a range of other high value fruit and vegetable crops, such as tomatoes, Irish potatoes, peaches and apples, are also grown and sold along the nearby Lilongwe–Blantyre main road and to traders supplying the Lilongwe and Blantyre markets. These are an important source of cash income for many families.

The survey was conducted during November and December 1990. In each area farmers, and officials at the ADMARC selling points serving the farmers, were interviewed. Farmers were selected by EPA staff to be representative of typical farm households in each area (compared to recent ASA survey data), in terms of holding size and socio-economic status. The following specific selection criteria were used: the majority of farmers to have holdings of less than 1.5 ha; the proportion of credit recipients interviewed to reflect the overall proportion of farmers receiving credit in the area; and an equal number of male and female farmers to be interviewed. In practice, in most male-headed households it was possible to interview the husband and (senior where

relevant) wife together; a number of *de jure* and *de facto*[5] female-headed households were also interviewed.

Further details about the 25 survey households are given in Table 1.

Table 1: Seed survey households – a profile

Household no	*EPA*	*Sex of household head*	*No. of adults*	*No. of children*	*Holding size (ha)*	*Credit recipient now*	*Credit recipient in past*
1	Kabwazi	m	2	2	2.43	yes	yes
2	Kabwazi	m	3	5	1.42	no	yes
3	Kabwazi	f	2	3	0.40	no	no
4	Kabwazi	m	4	3	0.81	yes	yes
5	Kabwazi	m	2	2	0.40	no	no
6	Kabwazi	m	2	1	0.40	no	no
7	Kabwazi	m	2	6	0.81	no	no
8	Kabwazi	m	3	4	1.21	yes	yes
9	Kabwazi	f	2	1	0.81	yes	yes
10	Kabwazi	m	2	2	1.62	no	no
11	Eswazini	m	5	5	12.14	yes	yes
12	Eswazini	m	5	2	1.62	yes	yes
13	Eswazini	m	7	2	0.81	no	yes
14	Eswazini	m	2	3	0.61	yes	yes
15	Eswazini	m	3	7	0.81	no	yes
16	Eswazini	m	2	10	0.40	no	yes
17	Eswazini	m	2	0	0.40	no	yes
18	Eswazini	m	2	2	0.60	no	yes
19	Eswazini	m	2	3	1.62	no	yes
20	Eswazini	m	2	4	1.01	yes	yes
21	Bembeke	m	4	3	3.24	no	yes
22	Bembeke	m	4	5	3.24	no	yes
23	Bembeke	f	4	3	1.21	yes	yes
24	Bembeke	f	1	3	1.01	yes	yes
25	Bembeke	f	1	3	1.21	yes	yes

Note: No of adults and children resident defined using the standard ASA criterion, viz those individuals regularly eating from the household pot during the last three months.

Source: Seed survey

5. Using Peters' (1988) classification of female-headed households: *de jure* being unmarried women, *de facto* being wives of absent husbands.

5
Traditional Seed Systems and Links to the Formal Sector

Seed Care

The MOA *Guide to Agricultural Production*, the annually updated handbook for all agricultural staff in Malawi, contains little reference to seed care other than instructions to tell farmers to replace seed of composite and hybrid maizes regularly and to use certified seed of improved maize varieties, which the *Guide* says are available from ADMARC. Use of off-farm seed sources for other crops is proposed only for those farmers not self-sufficient in seed. Advice on on-farm seed selection is limited to local maize and groundnuts. For the former, the advice is to select in the field and store separately from food grain, and for groundnuts it is to select sufficient quantities of nuts for seed, grade them properly and store in shell until planting. The official extension message for selecting maize seed is to take maize from the middle of the field (for isolation) before harvest.

Similarly, ADD annual work plans contain no specific emphasis on activities to promote awareness of the differences between seed and food grain, or good seed selection practices on-farm. The benefit of using improved seed is described in extension messages, and demonstration plots of improved varieties are mounted at some EPA offices and Training Centres, but these must have little relevance to the majority of small farmers who are in areas where there is no improved seed available. Smallholder seed multiplication for self-pollinated crops is organised in a number of ADDs but the quantities produced remain small and are mainly reserved as seed supplies for SSMS growers for following seasons.

Farmers' seed care practices were assessed in interviews with survey households. None of the survey households applied any kind of treatment to seed of any crop before planting. Table 2 gives summary results.

Local Maize

Most farmers plant food maize from the granary when the rains start. They do not see the value of trying to maintain purity as there are so many local maize varieties and sources of cross-pollination. The most common practice is to select likely looking cobs from the grain remaining in the granary, tip and butt it, de-hull it and select from the kernels produced. Seed is selected to remove rotten, shrivelled, weevilled and diseased kernels and to keep big, white coloured kernels and those with live endosperms. However, nearly 50 per cent of local maize farmers did not describe any particular seed selection attributes. The selected seed is then placed in a sack either back in the granary or in the

Table 2: Households' seed care practices (per cent of households)

Practice/Crop	*Local Maize n=25*	*Groundnuts n=18*	*Beans n=21*	*Soyabeans n=12*
Selection				
• At harvest	20	11	27	50
• Prior to planting	32	78	73	0
• At planting	20	11	0	50
Selection attributes specified	52	61	57	58
Treatment applied in store	70	0	67	0

Source: Seed survey

house, until planting day.

Of those that select seed early, roughly equal proportions store seed in sacks in the granary and in the house. 40 per cent of the farmers who select seed early treat the selected seed, adding the pesticide Actellic (*pirimiphosmethyl*) to the sack containing the seed before storage. However, 30 per cent of the others also apply Actellic to food grain (the recommended practice) thus including seed maize.

Groundnuts

The specified attributes by which seed is selected were removal of shrivelled, broken, rotten and diseased kernels and inclusion of big kernels. Colour is not judged important except in the case of the variety *Mawanga*, for which red/white-coloured kernels are preferred. Except for the minority selecting seed at harvest, all farmers follow the same storage and selection practice, namely initial storage in the granary in shell, followed by de-shelling and selection and, for those farmers not selecting for immediate planting, subsequent storage in a pot, bag or gourd in the granary or in the house. Storing groundnuts in shell is seen as sufficient protection from pests and diseases by all farmers and no seed treatment is applied.

Beans

No household selected at planting; this may be because beans tend to be planted after other crops and households have one seed selection session for all crops in time for the earlier maize planting, in mid–late November.

Those that specified particular seed selection attributes named the removal

of weevilled, diseased, rotten and shrivelled seed and the inclusion of big beans and the separation of beans by type (beans are often stored mixed by type).

As regards seed storage practices for beans, insect pests such as bruchids are a major problem in Malawi. Accordingly, most households attempt to control pests. One third of households add ashes, 15 per cent add only Actellic, and 15 per cent add a mixture including Actellic, ashes, sand, finger millet chaff and blue gum leaves. A further one third add nothing (largely the families that double crop beans in Bembeke). The NBP confirms that ashes are just as effective a treatment against storage pests for bean seed as Actellic.

Soyabeans

Those that specified particular attributes by which seed is selected specified removing rotten, shrivelled and diseased seeds and including big seeds and white or creamy coloured ones. A quarter of households did not specify particular seed selection practices. One third select seed into a separate sack or gourd, the remainder select at planting time so do not need to store. No households treat soyabeans as it is universally believed no treatment is needed.

Sources of Seed

This Section summarises the results detailed in Table 3.

Local Maize

Over 90 per cent of the households growing local maize rely on stocks saved on-farm as the primary source of seed; only 10 per cent are chronically seed insecure, doing seasonal agricultural labour every year to obtain seed.

Of the 40 per cent of households that also make use of off-farm sources of planting material periodically, 90 per cent use only one other source and 70 per cent use other sources only at times of crisis, mainly obtaining local maize as gifts, from relations and other local people. The other 30 per cent use other sources by choice, to obtain different varieties of local maize: as gifts from relations and via exchanges of material with local people. Thus cash changes hands for very few of these transactions.

Hybrid Maize

As hybrid maize seed should be bought every year for genetic reasons, and as currently the only source of hybrid maize seed for small farmers is the ADMARC market network, farmers can exercise little choice in hybrid maize seed sourcing decisions. Access to institutional credit to finance the purchase of hybrid maize seed and fertiliser is considered to be an important determinant of uptake.

Only 7 per cent of the households growing hybrid maize recycle seed. Of the remainder, over 90 per cent had, up until 1990, obtained hybrid maize seed

Table 3: Sources of seed used by survey households

Seed Status	*Secure*	*Crisis*	*Choice*	*Insecure*
Source				
Local maize				
Saved	**1 2 4 6 7 8 9 10**	**12 16 18 20 21 24**	**11 13 17**	
ADMARC	**14 15 19 22 25**	**23**		
Local people		12C 20C 24GA	13X	3GA 5GA
Local markets		23C		
Relatives		12G 16G 21G	11G 17G	
Groundnuts				
Saved	**2 6 9 19 25**	**4 7 12 14 15**	**1 11 13**	**20**
ADMARC		4CR 12CR 14CR 15C	11C 18CR	16C 20CR
Local people		15C	13C 18C	16G 17C 20C
Local markets				
Relatives		12C 14G		16G 17G
Beans				
Saved	**1 6 18 25**	**4 10 13 14 15 20 22 23 24**	**2 9 11 12 17 21**	
ADMARC		14C 15C 13CR 20C 22C 24C	11C 12C	7C
Local people		4G 15C 20G 22GA 23GA	9C 12C 21C	16C
Local markets		4C 10C	2C 9C 21C	7C 16C
Relatives		14C 20G	12C 9G 17G	16G
Soyabeans				
Saved	**1 2 7 9 10 21 22 23 24**	**11**	**8**	
ADMARC		11C	8C	4CR
Local people				
Local markets				4C
Relatives				

Seed Status	*Regular grower*	*Recent grower +*
Source		
Hybrid maize		
ADMARC (credit)	**4 8 11 12 13D 14 15D** 17D 21D	**16D 18D 19D 20**
ADMARC (cash)	**2** 11 12	
Other	**2 22**	

Notes: 1–25 = survey household number; **bold script** = primary source
C = purchased using cash; CR = purchased on credit
G = gift; GA = paid for with seasonal agricultural labour
X = exchanged seed; D = member of defaulting credit club
\+ = within last 5 years

Example interpretation: survey household no 12 sources seed off farm only at times of crisis. For maize seed, saved stocks are the primary source for this household, but maize seed is also obtained from local people (for cash) and from relatives (as a gift).

Source: Seed survey

on credit from ADMARC.[6] By 1990, however, the credit clubs of 40 per cent of the regular growers and 75 per cent of the recent growers were in default so these growers were having to look for alternative means of financing hybrid maize seed purchases.

Groundnuts

Nearly 80 per cent of the households growing groundnuts rely primarily on their own saved seed as planting material. Of the 65 per cent of these households that sometimes use other sources, most use more than one source.

55 per cent of the households that sometimes use off-farm sources do so only at times of crisis. For them, ADMARC is the most frequently used source, with purchases mainly on credit. 44 per cent sometimes use off-farm sources by choice only, to obtain different varieties of groundnuts. These households use ADMARC and local people equally, financing purchases mainly on cash.

15 per cent of the groundnut growing households are chronically seed insecure and use a mixture of sources of planting material and exchange mechanisms.

Other sources of information used by Pervis and Nyondo (1985:151) indicate 87 per cent of small farmers plant groundnuts saved from previous years, 5 per cent use ADMARC and 8 per cent use 'other sources'. Comparing the two sets of results shows an increase in the proportion of families that obtain planting material for groundnuts off-farm; circumstantial evidence would suggest that this is because of the growing importance of groundnuts as a cash crop.

Beans

90 per cent of the households growing beans rely primarily on seed saved on-farm but 80 per cent sometimes use off-farm sources as well; they all use more than one such source.

60 per cent of the households that sometimes use off-farm sources of planting material for beans do so mainly at times of crisis. ADMARC purchases on credit are the most popular source for these households, followed by local people, paid in cash or with seasonal agricultural labour. Only 20 per cent use local markets and 20 per cent use relations.[7]

40 per cent of the households sometimes obtain planting material off-farm entirely by choice, to get different varieties of beans. Only one third of these use ADMARC, all paying cash. Local people, local markets and relations are all equally used and all are paid in cash, except by the one third of the

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6. One Kabwazi farmer also tried some of the *SR52* maize seed available in the area from Mozambique but did not repeat this experiment due to the poor germination of the seed.

7. One also obtained some stocks from the local Seventh Day Adventist mission, for which the household head is a lay preacher.

households who get planting material as a gift from relations.

Only 10 per cent of households are chronically seed insecure, using a mixture of sources and means of payment to obtain planting material.

Soyabeans

75 per cent of the households growing soyabeans rely entirely on seed saved on-farm. 8 per cent obtain planting material off-farm only at times of crisis, purchasing stocks on cash from ADMARC and, in Kabwazi, obtaining some material also from the local Seventh Day Adventist mission. 8 per cent obtain stocks off-farm by choice, to replace seed, and also uses cash purchases from ADMARC. Less than 10 per cent are chronically seed insecure, using ADMARC and local market purchases to piece together stocks of planting material.

Nearly 90 per cent of the households that are now seed secure started growing soyabeans within the last decade. Three quarters of these obtained their initial seed stocks from ADMARC and the remainder obtained them from local people. All paid cash.

Seed Sharing

Half the households growing local maize say they never share planting material for local maize; the half that do share, do so as a gift or on a cash sale basis or as payment for seasonal agricultural labour. 80 per cent of the households growing hybrid maize do not share their seed purchases with others. Of those that do, the majority have a long-standing reason for doing so. For example, one is a female-headed household with a long-standing arrangement to share credit packages with a friend; and another is a Traditional Authority who may be expected to share seed because of his traditional social obligations. 70 per cent of the households obtaining planting material for groundnuts from off-farm sources do not share it; the seed secure households that gave information all do share planting material. 65 per cent of the households regularly obtaining planting material for beans from off-farm maintain they never share it. The chronically seed insecure households always do, as do the seed secure households.

For all crops, the majority of households obtaining planting material from off-farm sources do not share it with others, this being most marked for hybrid maize seed. As we shall see in later Sections, hoarding seed and distributing outside the immediate family only to selected people, appears to be fairly widespread, creating concern amongst households over securing access to off-farm sources of planting material. However, both the seed secure and chronically seed insecure sub-categories of households do share seed for groundnuts, beans and soyabeans, about one third of households sharing groundnuts as a gift and nearly half of households doing this for beans. None did so for soyabeans.

6
Conclusions

Local maize, groundnuts and soyabeans growers are mainly seed secure, obtaining seed off-farm only at times of crisis, if at all. Only a tiny minority of growers recycle hybrid maize seed. The majority of bean growers, however, use off-farm sources, mainly to change variety. A very small proportion of households are chronically seed insecure for all crops. Growers of groundnuts and beans sourcing off-farm tend to use more than one source; local maize, hybrid maize and soyabean growers tend to use only one source.

The sources and means used to obtain seed tend to be similar across all crops for individual households and households can be categorised into different groups on this basis (see Table 4). There are *seed secure* households who rely primarily on seed saved on-farm for seed needs for all crops; there are those who are basically seed secure but have to obtain seed off-farm at times of domestic *crisis*, such as death, illness, harvest failure, etc.; there are those who obtain a proportion of seed needs off-farm regularly, by *choice*, either to replace seed or to obtain different varieties; and there are a small proportion of households who are chronically *seed insecure*, who rely on scraping together planting material from whatever off-farm sources, often season agricultural labour, that they can get access to. Female-headed households are significantly less seed secure than other households: taking all crops together, 20 per cent of female-headed households are seed insecure and only 40 per cent are seed secure or obtain seed off-farm only by choice.

Table 4: Seed security status of survey households

Crop	*Percentage of households growing crop*			
	Secure	*Crisis*	*Choice*	*Insecure*
Local maize	52	28	12	8
Groundnuts	28	28	22	17
Beans	19	42	29	10
Soyabeans	75	8	8	8

Source: Seed survey.

There seems to be some connection between the nature of seed need and the seed source usually used. Purchases from ADMARC on credit are important for 'crisis' households growing groundnuts and beans and an important source generally for hybrid maize. Cash purchases from ADMARC have been important as an initial source of seed for soyabeans. ADMARC is not, however, an important source for groundnuts and beans growers sourcing off-farm by

choice, nor for local maize growers or for growers of soyabeans after initial sourcing.

There does not seem to be any significant geographical variation in the seed status of households growing groundnuts, beans and soyabeans. For local maize, the majority of the households that obtain planting material off-farm by choice in order to change variety are located in Eswazini. The households in Kabwazi seem polarised between the seed secure majority and a chronically seed insecure minority. For hybrid maize, all the recent growers are in Eswazini.

Part III

National Development Issues

7
Seed Varieties

The attributes required of seed varieties by small farmers depend most importantly on the economic functions of the crop to be planted within the small farm system and on current cultivation practices.

Economic Functions of Small Farm Crops

There are no detailed studies of the economic functions of the major crops grown by small farmers, although some work is starting to be done by the DAR Adaptive Research Teams (ARTs). The general consensus of opinion, however, is that hybrid maize is grown almost entirely as a cash crop; groundnuts, beans and rice are grown primarily for sale, although small quantities may be traded domestically; and local maize is the main food staple (sales of which are made only of surpluses or to meet immediate cash needs for school fees, clothes, etc.).

Results from the seed survey support this analysis. Two thirds of the households growing hybrid maize rank earning cash income from crop sales first, although one third also consume small quantities domestically. The function of groundnut production varies more: nearly 40 per cent of the households growing this crop cite income from cash sales as the most important function (and very few make no cash sales at all), but 50 per cent also cite domestic food consumption. Bean production is primarily for domestic food consumption in all households growing this crop – except for the households in Bembeke, where cash cropping is a longer-established and more widespread practice, due to the proximity of the main road linking Blantyre and Lilongwe. Here, beans are double cropped in seasonal gardens for sale. 70 per cent of the other households also make small sales of beans. Less than 5 per cent of the households growing local maize grow it primarily for sale, although over half sell small quantities in emergencies or when they have surpluses (a number of the female-headed households making these sales in the form of beer). In Kabwazi, alternative biomass uses for local maize, e.g. fuel, animal fodder, green manure, appear to have become more important over time, perhaps due to the increasing land pressure and economic insecurity amongst many households in the area.

Soyabeans have had a chequered history in Malawi. They were introduced in the early Twentieth century, primarily as a cover crop for moisture conservation in tung plantations, and there were exports of grain to Europe in the 1930s and 1940s. After a period of decline, the crop spread more widely to small farmers through religious missions, where it was encouraged for production of *Likuni phala*, an infant weaning food developed by Likuni Mission as a protein supplement made out of maize/beans or soyabeans mix. *Likuni phala* is usually made out of beans but, as there are better uses for beans,

soyabeans can be used as a substitute; this is also advantageous because soyabeans have a higher protein content. However, although it is now recommended by most hospitals in Malawi, *Likuni phala* is not always available from them and rarely from shops, so it has not been taken up on a wide scale.

A study of soyabean use in Kabwazi EPA found that women are making their own weaning food out of soyabeans and also *chikondamoyo* cakes for sale (*chikondamoyo* are usually made out of maize bran and yeast). Demand must be strong, because if they have no soyabeans the women buy them in; however, this may only be because soyabeans are familiar locally in this area.

More recently, soyabean seed has been produced under the Smallholder Seed Multiplication Scheme. However, uptake has remained patchy and restricted to households in contact with religious missions, and those in areas with an SSMS and extension activity on soyabeans (primarily LADD).

Staff of the Minor Legumes breeding programme at Chitedze Agricultural Research Station have spoken to processors, who find there is strong demand for soyabeans but insufficient supplies coming onto the market. ADDs, on the other hand, say they are willing to encourage farmers to grow the crop but are worried that there is no market for them. Part of the problem has been the very low and stagnant producer price for soyabeans; an attempt was made to overcome this in 1990/91 by increasing the price by one third, to 60t per kg.

Only one seed survey farmer, a Traditional Authority and Seventh Day Adventist lay preacher, grows soyabeans in Eswazini although they are common in Kabwazi, because of the SSMS and the nearness of Likuni Mission. That the missions have encouraged soyabeans for nutrition while the extension service has promoted them as an alternative cash crop is reflected in the reasons given by the seed survey households for growing the crop: earning income from cash sales was the main reason for two thirds of the households, with a quarter of the households producing soyabeans solely for sale. Households recently taking up the crop through extension contact primarily mention cash sales; whilst many of the households that have been growing the crop for longer give the initial reason for growing it as nutritional advice from a mission but they have now changed to growing soyabeans primarily for cash income.

Cultivation Practices for Small Farm Crops

Considerable information is available about cultivation practices, in particular through the MOA's *Annual Survey of Agriculture* but also from recent work by the Maize Commodity Team (MCT) (1990a, 1990b), Smale (1990) and various diagnostic surveys carried out by the DAR's ADD-based ARTs. To this, we can add the results of our own seed survey, although it should be remembered that the survey households represent only two out of the three broad agro-climatic zones in Malawi: importantly, they do not represent the Lakeshore zone.

Overall in Malawi, according to the Annual Survey of Agriculture, only

3 per cent of local maize and 15 per cent of hybrid maize plots benefit from the full set of agricultural practices recommended by the Department of Extension, viz. plant early (taken to mean before 15 December), space seed correctly, weed twice and rotate crops. MZADD's 1990 *Extension Operation Review and Crop Development Planning* workshop discussed the reasons for this; the ADD's conclusions are summarised in Box 1. The rest of this Section discusses the overall findings of the other sources mentioned above.

Interplanting

The ASA assumes that all hybrid maize plots are pure stand; it indicates that about 15 per cent of the local maize area is interplanted (up to 30 per cent on holdings under 0.5 ha). Smale (1990) surveyed over 400 growers of local and hybrid maizes in Blantyre, Kasungu and Mzuzu ADDs (BLADD, KADD and MZADD) in 1989/90 and found that interplanting occurred in all areas, with the highest percentage of interplanted maize plots in BLADD.

No ASA data is available for groundnuts but the MCT surveys (1990a, 1990b) found that nearly all farmers interplant groundnuts. A 1984 ART survey in Thiwi–Lifidzi RDP found that groundnuts are often planted with soyabeans. 15 per cent of the seed survey households interplant groundnuts, of which two thirds plant a mixture of varieties in the same plot. Respondents report that groundnuts are often planted in pure stand when they are for sale as a cash crop and interplanted when for domestic consumption.

According to the ASA, about 10 per cent of the bean area is interplanted, with little variation between different holding sizes. For beans, nearly half the seed survey households interplant, 80 per cent of these planting a mixture of varieties together in the interplanted plots and 20 per cent planting different varieties separately. Bean planting practices are very complex: some varieties are planted separately, some mixed; some varieties are always interplanted with another crop (especially climbing varieties), others are always planted pure stand.

For soyabeans, 40 per cent of the seed survey households were recorded as interplanting with another crop. The soyabean breeding team at Chitedze Agricultural Research Station have found that soyabeans are normally grown pure stand only in non-maize areas and when they are interplanted, this is usually with maize and replaces beans.

Recommended Practices

The MCT farmer surveys (1990a, 1990b) indicate that the vast majority of farmers ridge their fields to limit soil compaction and plant on the ridge, although the ART survey found that ridge spacing for local maize is often wider than recommended in order to accommodate interplanted crops planted later. There is no ASA data currently available on plant spacing.

ASA data indicate that around 80 per cent of local maize plots are planted early but more than half all hybrid maize plots are planted later than 15

Box 1: MZADD extension operation review and crop development planning workshop September 1990: major agronomic issues

Problem	*Reason*
Maize	
• late garden preparation	• restricted access to ox-drawn implements • households cultivating with hoes wait for rains for easier cultivation • wish to minimise weed germination
• late planting	• knock-on from late garden preparation • fear of hybrid maize rotting before harvest
• late & incorrect fertiliser application	• low knowledge of high-analysis fertiliser technology • households with limited labour prefer to allocate labour to weeding
• late weeding	• allocation of scarce labour to activities on other crops first
Groundnuts	
• late garden preparation, weeding	• scarce labour allocated first planting & to activities on other crops (esp. maize)
• insufficient seed to plant planned area	• over-selling of groundnut crop
Beans	
• late planting, incorrect plant populations	• no extension message
• poor control of bean beetle	• no known method of control
Soyabeans	
• no seed inoculation, poor disease control	• low knowledge of soyabean incorrect fertiliser application, late planting, technology as new crop
• incorrect plant population	• as above + high labour requirement due to closeness of recommended spacing

Source: MZADD, 1990

December, as the priority is on establishing local maize for food security. Smale (1990) confirms that planting shifts to later dates for hybrid maize in all zones in Malawi. The MCT surveys (1990a, 1990b) found local maize is always planted first both for food security but also because farmers believe hybrid maize rots at harvest if planted early, and because of late input distribution. The ART survey also found that priority is given to local maize at planting time, with other crops planted according to their economic function (especially whether or not they are used as a cash crop) and according to perceived risk of loss from disease. Pure stand groundnuts are always planted after hybrid maize, whilst interplanted groundnuts are planted after local maize emergence to encourage upright growth.

ASA data show that nearly 75 per cent of hybrid maize plots are weeded twice whereas only 60 per cent of local maize plots are weeded twice. For all crops taken together, however, the ART survey found that the modal number of weedings is only one. Smale (1990) found that farmers in areas of greater land pressure weeded more frequently.

The 1984 ART diagnostic survey in Thiwi–Lifidzi RDP found that crop rotation is practised but local maize is in effect monocropped in a number of areas, as it covers such a large proportion of the total area. In addition, some households do not use groundnuts in the rotation due to problems with 'pops'. All farmers surveyed by the MCT (1990a, 1990b) claimed to rotate tobacco with maize and groundnuts as recommended, but the surveys found some evidence that groundnuts are not rotated, with the reason being given as shortage of groundnut seed. Smale (1990) found that farmers in KADD and MZADD were more likely to bring fallow land into maize cultivation, especially for hybrids.

Fertiliser Use

According to ASA data, 15–40 per cent of the total small farm area is fertilised, with significant variations between regions, holdings of different sizes, and different crops and varieties. For maize, the only crop for which detailed information is available, some 65 per cent of the hybrid and composite maize area is fertilised, but only 30 per cent of the local maize area and 25 per cent of interplanted maize (and coverage is similarly skewed by holding size: only 10 per cent of local maize area and 35 per cent of hybrid maize area is fertilised on holdings of less than 0.5 ha). ASA data also indicate that only just over 40 per cent of hybrid maize plots are fertilised twice, despite the proven yield advantage of doing this, and only 20 per cent of local maize and maize mixtures plots are fertilised even once (and only 5 per cent twice). The MCT surveys (1990a, 1990b) found that there is little awareness of high analysis fertiliser (the high nitrogen DAP and Urea that was introduced in Malawi in 1986). 5 per cent of seed survey households do not grow hybrid maize because of its higher fertiliser requirement. There is no ASA data currently available on the use of organic manure. The MCT surveys (1990a, 1990b) indicate that crop residues, also potentially valuable as organic matter, are usually burnt.

Pests and Diseases

Only the MCT survey (1990a, 1990b) reported specifically on pests and diseases. It found that the most common pests and diseases in the areas surveyed (KADD and LADD) are *striga* spp., termites and stalk borer.

Variety Attributes Required for Small Farm Crops

A full list of the varieties of maize, groundnuts, beans and soyabeans in use in Malawi is given in Table 5.

Variety Development Work in Malawi

Until the late 1980s, formal plant breeding work, which in Malawi is primarily the responsibility of the DAR,[8] was conducted exclusively on the Department's research station sites and was geared primarily towards producing high potential yield cultivars for each of Malawi's three 'zones of adaptation'.[9] Other sub-objectives varied between breeding programmes, including seed longevity for soyabeans, 'pops' resistance for groundnut and disease resistance in beans, but all were oriented to production maximisation under optimum conditions. Formal channels for feedback from extension to research were limited and the DAR relied on the Department of Extension to speak on behalf of farmers, the main forum for this being the annual meeting where research results were presented by the DAR.

But there has been a growing realisation on the part of government and donors of the poor uptake of agricultural research results, most particularly hybrid maize varieties, and this led to the formulation of the World Bank and USAID-funded *National Agricultural Research Programme* and *Malawi Agricultural Research and Extension Project* as part of the fifth phase of the NRDP (1986–91). These include reorganisation of the DAR's work into Commodity Teams, more action-oriented research plans, proposals for a Technology Clearing House and the establishment of a national Adaptive Research Team with staff in all ADDs, to improve extension–research feedback on all new agricultural technologies.

Thus work is now being done by the DAR on assessing variety attributes

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8. Since 1988, when Cargill became involved in the NSCM, NSCM has also had its own maize breeding programme. This uses South African and Zimbabwean material to select from for Malawi. The Company co-operates with the DAR on germination testing of in-bred lines, etc. but the programme is still in the early stages of development and the DAR remains the focal point for formal sector breeding in Malawi.

9. Less than 50m (Shire valley); 500–600m (Lakeshore); more than 600m (mid-altitude zone) (50–500m is the escarpment which is not suitable for agriculture). This classification is considered to encapsulate all the important agro-climatic differences in Malawi, i.e. temperature and rainfall as well as altitude.

Table 5: Seed varieties available to small farmers in Malawi

Status / *Crop*	*Released by VRC*	*Produced/imported by NSCM*	*Produced by SSMS*	*Other varieties grown by survey households*
Maize				
Top cross	MH17, MH18	nil		
Single cross	MH17, MH18			
Three-way cross	MH12, (MH17), MH15, (MH18), MH16	NSCM41, R201, R215	nil	Bingo (LH11) (double cross)
Synthetic/Open -pollinated	Tuxpeno 1	Kalahari Early Pearl	nil	Asilikali/Askari (SV17), SV37
Composite	UCA (CCC), CCA, (CCD)	UCA, CCC, CCA	nil	Bantam, Kagolo, Thikinya
Groundnut	Chalimbana, Manipintar, Malimba, RG1, Chitembana, Mawanga	*Chitembana, Mawanga*	Manipintar/Mawanga	Kalisere, Kasawaya, Mwitunde, Charles
Beans	Nasaka (253/1), Bwenzilawana (373), Kamtsilo (4991/1), Sapelekedwa (600/1), Kanzama (97/1), Namajengo (336)	*Red Canadian Wonder, Longbow, Bonus, Harvester*	*Nasaka, Sapelekedwa, RCW*	RCW, Thyolo, White Haricot, Sugar Beans, Maliya, Phalombe, Khaki, Mkharatsonga, Nanyati, Nagogoda, Chimbamba, Nyauzembe, Kalongalonga, Chizgama, Nyalubwe, Chaholi, also 'red', 'green', 'yellow', 'white' and 'black'
Soyabeans	Davis, Impala, Hardee, Bossier, Kudu, Geduld	*Bossier, Geduld, Duiker, Hardee*	Local varieties	No special names

Note: *italic script* = not for sale to small farmers

Source: VRC, 1986; Seed survey; NSCM, 1990

(MCT, 1990a and b) and by the ARTs in their Diagnostic Surveys and ADD-level variety trials (ART, 1990). The work has tended to focus on maize but is now including other crops: for example, the ARTs' variety trials include beans, sunflower, pigeon pea and rice as well as hybrid and composite maizes; and the CRSP[10] is working on beans.

Further information, described in the Sections below, is provided by the households taking part in the seed survey. In general, farmers displayed a poor knowledge of varieties of improved seed: for example, 40 per cent of the households growing hybrid maize were confused about or did not know the name of the varieties they have been growing; there was also some confusion in relation to groundnut varieties.

Maize

According to ASA and NSSA data,[11] there has been a dramatic increase in the area planted to hybrid maize over the last three seasons, from 7 per cent of the total in 1987 to 16 per cent in 1991/92. However, the proportion of holdings of less than 0.5 ha planted to hybrid maize remains much lower.

Smale (1990:2) finds 'The most striking finding is the complexity of farmer adoption patterns (for maize technology) in Malawi'. The percentage of households adopting hybrid maize was found to vary by agro-ecological zone, from 14 per cent in BLADD to 40 per cent in MZADD, but the proportion of adopters' total maize area planted to hybrid varied much less, at around 40 per cent in all three zones, due – the study concluded – to households' desire to retain some local maize for domestic consumption, which is a particularly pronounced feature in Malawi. Intensity of adoption was measured by the fertiliser application rate. The survey found nitrogen application rates are near the recommended levels for local maize in all three zones and for hybrid maize in KADD and MZADD (farmers in BLADD apply higher levels to local maize and lower levels to hybrid maize). Patterns of adoption diverge between the zones, from 6 per cent of total maize area in BLADD to 20 per cent in MZADD, probably due to differing objectives and constraints faced by those farmers who are full-time large-scale commercial maize growers (in KADD and MZADD) and those who are not (in BLADD).

In its 1990 survey, the MCT found that the main reason given for growing hybrid maize rather than local maize was its higher yield. Most farmers sold a part of the crop but also retained a part for domestic consumption or payment of seasonal agricultural labourers. The main reason given for selling hybrid maize grain was its susceptibility to weevil damage in store. Some

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10. Malawi/Michigan State University Bean/Cowpea Collaborative Research Support Programme.

11. The ASA was discontinued in the late 1980s and has been replaced with a periodic National Sample Survey of Agriculture.

farmers also mentioned its inferior poundability (with its softer outer coating than local maize, more of this coating crumbles into the maize flour when hybrid maize is pounded). When farmers were asked whether they would stop growing local maize if they had access to a flinty hybrid, the majority said they would try it and they would change to hybrid if it performed well. A few insisted they would never abandon local maize. Shortage of labour and capital to buy fertiliser were the two issues most frequently mentioned as being constraints to hybrid maize production.

Smale's work clearly demonstrates both farmers' consumption preference for local maize and their desire to control risk by varietal diversification; both these factors limit the potential uptake of hybrid maize. Smale found local maize was preferred for domestic consumption due to its superior resistance to weevils (for storage) and its flintiness (for processing). However, there was some substitution of consumption of own-produced hybrid maize for local maize: some farmers apply Actellic hybrid and consume it intermittently throughout the season, some consume it immediately following harvest to avoid storage losses. In 1989/90, Smale found about 50 per cent of own-produced hybrid maize was saved for domestic consumption in BLADD and KADD and about 20 per cent in MZADD – this lower proportion is thought to be because firstly, the non-maize alternatives in this area are less valuable than in the others, so hybrid maize is needed to repay credit, and secondly, there is more local maize available to carry-over for domestic consumption. The greatest advantage of hybrid maize perceived by the surveyed farmers was its higher yield and therefore profitability: 87 per cent of farmers cited this, although 10 per cent said there was no clear advantage to hybrid maize (Smale, 1990:24). Early maturity is an important trait for farmers in certain agro-ecological zones and was considered more important in BLADD than in KADD and MZADD.

Overall, however, farmers were found rarely to be aware of the differences in traits among different hybrid varieties. The MCT surveys conducted in 1990 found that the variety grown is almost always dependent on the supply available from ADMARC; composites and synthetic maize varieties are virtually unknown. In KADD and LADD, variety assessments made by farmers included: *MH12* has longer maturity and lower susceptibility to cob-rotting compared to *R201* as well as large cobs and a high shelling percentage; but *R201* is easier to pound than *MH12* and *NSCM41* and *R201* has heavier kernels than *MH12*. In Ngabu ADD (NADD), *R201* was liked for its earlier maturity and higher yields but its susceptibility to bird damage and weevils were considered to be significant disadvantages.

The DAR ARTs are also beginning to deal with farmers' variety preferences. The Teams have found the new hybrid maize varieties *MH17* and *MH18* are now much closer to small farmers' needs, as the MCT's breeding work now responds to farmers' expressed preferences, viz. storability, poundability, resistance to lodging (falling over in the field) in composites and yield

susceptibility to temporary drought stress and low rainfall seasons. It is the greater relevance of these two varieties that explains the significant expansion in the hybrid maize area in recent seasons. The need now, the ARTs are finding, is for more work on performance under low input and low management conditions.

Amongst the seed survey households, of the hybrid maizes, *NSCM41* was given a wider range of positive attributes, including poundability, but *R201* and *MH12* were strongly favoured on yield criteria. *MH12* was disliked for its late maturity and poor poundability. Overall, it emerged as the most popular variety. The main determinant of the actual variety grown, however, was the availability of seed at ADMARC and the most common complaint in relation to seed availability is that there is usually no choice of varieties. Thus it is very likely that variety preferences are not fully revealed in terms of effective demand at present, as small farmers rarely have the full range of maize varieties to choose from.

Groundnuts

Amongst the seed survey households, the *Chalimbana* groundnut variety was strongly favoured for its high yield, big kernels, palatability and strong market demand. In some areas, its late maturity was considered an advantage (to minimise 'pops' (a condition in which kernels fail to develop, probably due to nutrient deficiency)); in others it was considered a disadvantage. Fewer households had experience of *Chitembana*. This variety was also favoured for its high yield, big kernels, palatability and cash-earning potential. It was disliked for its early maturity and therefore susceptibility to 'pops'. The main constraint to using these varieties has been lack of cash to buy seed and the non-availability of seed at ADMARC.

The ARTs have found that the currently available groundnut varieties serve farmers growing groundnuts solely for cash sales relatively well, as groundnut breeding in Malawi to date has been very market led, for groundnuts primarily for export and as a domestic cash crop. This is reflected in, for example, the high oil content of *Manipintar*. However, there have been problems too. The varieties released to capitalise on strong international demand for large-seeded confectionery nuts are no longer attractive as international demand now favours small-seeded nuts and, in addition, large-seeded nuts are more susceptible to 'pops'. Furthermore, many small farmers have not been able to get seed of the released varieties and the genetic status of *Chitembana* is now very uncertain because, it is thought, it was released too early before it was fully stabilised in the rush to take advantage of the strong international market in the early 1970s. And households growing groundnuts primarily for domestic consumption have been badly served as the available varieties generally have high oil content, so do not store well domestically and turn the typical relish of vegetables seasoned with groundnut flour rancid.

The DAR groundnut breeding programme uses material from Southern

African Development Community (SADC) and International Centre for Research in Semi-Arid Tropics (ICRISAT) as well as local material, released varieties and unreleased lines, although there have not been any collections of local traditional groundnut varieties. The programme seems the least sensitised to small farmer needs and is still breeding essentially for high potential yield. There have not been any surveys of the desirable variety attributes for home consumption and trade as food: the programme views groundnuts as a cash crop and thus focuses on market issues. The programme believes that all small farmers now grow recommended varieties of groundnuts and that any problems with uptake are not the responsibility or concern of breeders; however, the seed survey found households growing varieties clearly visually different from the recommended varieties and with different names (for example, *Kalisere, Kasawaya, Mwitunde* and *Charles*).

Beans

The role of beans in the small farm farming system is very complex and the genetic diversity of bean landraces in Malawi is extremely important. Each variety is valued for different reasons: although farmers grow a mixture of many different bean types, this is not undifferentiated and farmers deliberately add and remove bean types from their stocks in response to various needs and pressures (Ferguson, 1987:16). However the names given to different types of beans are not consistent nor a reliable guide to their physiological characteristics.

All farmers growing beans plant a large number of different types (average 12 (Ferguson, 1987:10)). They plant some in pure stand and some interplanted with local and hybrid maize or in mixed plots (70 per cent of bean types in Malawi are climbing, rather than bush, due to the prevalence of intercropping beans with maize (Edje *et al.*, 1981:59)); they plant some for the main growing season and some for the off-season in seasonal gardens. There is no clear evidence yet why certain bean types are grown in pure stand and others in mixed stands, although there are sound agronomic reasons for planting beans in mixed stands, to reduce losses from disease – a major cause of yield loss in beans in Malawi.

The CRSP Programme has collected important information on bean variety preferences based on farmer surveys in Northern and Central Regions (Ferguson, 1987; Barnes–McConnell, 1989). These found that preferred attributes fall into two distinct categories: around one quarter of all households cited yield, taste and cooking quality; whilst some 10 per cent also cited marketability, early maturity and health-related issues. Bean plant growth habit (climbing or bush) is important for types interplanted with maize and grown in seasonal gardens. Fast cooking is an important variety attribute for home consumption (*Kayera, Khaki* and *Butter* are considered best for this) but some slow-cooking varieties are planted because their other features, for example early maturity, outweigh this disadvantage. The production of green pods and

leaves is also important for domestic consumption (and is considered to be another advantage of *Kayera*). Some varieties are grown in larger quantities than others. For example *Kayera* is perceived to have numerous advantages including high yield, strong market demand, good taste and fast cooking time. *Nanyati, Khaki* and *Phalombe* are also valued for their taste and fast cooking time. The surveys found that a small number of varieties are very commonly grown (*Mkharatsonga woyera, Phalombe, Kayera* and *Nanyati*) but there is a wide diversity of other types also grown.

The attributes favoured by our own seed survey households for beans were high yield, palatability and visual appearance, strong market demand, early maturity and fast cooking, corresponding closely to the CRSP Project findings.

The ARTs have found that, at present, small farmer bean types tend to perform better than the NBP's – partly because the Programme is only selecting from local landraces and material imported from the International Centre for Tropical Agriculture (CIAT) and South Africa, not breeding, so there is little improvement in disease resistance, seed size or colour. In addition, the work is being carried out under optimum management conditions. However, the Programme is trying to adapt better to small farmer needs and in 1989 it added taste requirements to its formal list of breeding objectives, reflecting the importance attached by farmers to non-yield factors in bean variety choice. Also, it has reoriented its breeding work towards 'component breeding', designed to improve the overall performance of small farmer bean mixtures rather than breeding varieties that will improve performance only in pure stand. But the overriding problem remains one of poor availability of seed of the improved types and varieties for small farmers.

Soyabeans

The ARTs have found that due to the influence of the current extension messages, most farmers now want to grow soyabeans in pure stand for sale. Few seed survey respondents detailed preferred attributes for soyabeans. Those mentioned were big grains, palatability and good visual appearance. The Minor Legumes breeding programme has also collected some information although, as soyabeans are a new crop, there has been little work on varieties so far and there is low knowledge of them amongst farmers. Soyabean research in DAR started in the 1960s with agronomy and inoculation work. But momentum died as soyabeans ranked third and last in importance in the grain legumes programme. Work started again in 1988 – but on promotion, not research – in response to the World Food Programme's need for *Likuni phala* weaning food for the Mozambican refugees in Southern Malawi. Soyabean research work at Chitedze was relaunched in 1989/90 with the assistance of The Rockefeller Foundation. The objectives of the soyabean breeding programme are: for zones of adaptation; for high grain yield; for seed longevity; for nodulation without inoculation; for less shattering; for seed size; and for yellow/creamy colour. The breeding work is mainly advancing

varieties brought from elsewhere from F2 generation onwards, testing and selecting them. Chitedze is planning to have its own breeding programme but this will take at least 10 years to produce releasable varieties, due to the lack of greenhouses and short day lengths in Malawi.

There is no evidence that small farmers have done any variety development work; usually, growers simply save the best seed – which they consider to be the large and yellow-coloured grains, not the green and black or physically damaged grains. There are no 'local' varieties (soyabean only mixes, it does not cross) but it should be possible to make selections from local seed to improve seed quality.

The main issue in soyabean seed production is ensuring the different varieties are kept separate for sale. So far, there are no major pest or disease problems with soyabeans in Malawi, although this may be because the crop is still grown on a small scale. The main problem is with storage, as soyabeans lose viability fast (in hot conditions, 50 per cent of the crop can be lost in nine months (average length of storage) unless kept in an airy place). There are no major variety issues: any of the available varieties can be grown in most regions in Malawi, although a longer season variety is needed in the Lower Shire. The major research issues are breeding and agronomy: the programme has some varieties and some recommendations but needs to increase understanding of the potential role for the crop in Malawian farming systems, especially its need for inoculants (*rhizobia*).

Yield Increases From Using Improved Seed

It is difficult to disaggregate accurately information on yield increases attributable to using improved seed alone, as most work in Malawi has pursued a package approach and measured yield increases from using improved seed, fertiliser and optimal management practices together. In any case, this kind of work has dealt only with maize. In this Section three official sources of information are used: Bolton and Bennett (1974); the MOA/UN Food and Agriculture Organisation (FAO) fertiliser programme adaptive research trials in LADD; and ASA data from 1987. This is supplemented with anecdotal evidence from ADD staff.

Maize

Bolton and Bennett (1974) describe the Overseas Development Administration (ODA)–funded maize breeding and agronomy project then operating in Malawi, which focused on producing improved composite varieties of maize. It is possible to extract indicators of the influence of genotype on composite maize yields from the 35 fertiliser x variety comparisons conducted at 15 sites in Malawi over a three-year period, although in common with many similar programmes, Bolton and Bennett's work did not measure genotype and fertiliser responsiveness at different levels of husbandry practice. In 22 of the comparisons, the difference in yields between the worst and best varieties was greater than the response of the worst variety to 84 kg/ha of fertiliser. At 21

of the sites, the response to variety was not influenced by fertiliser. From their observation that yields without fertiliser in many trials were higher than quoted national averages, Bolton and Bennett concluded this demonstrated the importance of improved husbandry in increasing yields and the need to concentrate extension effort on improving maize husbandry before placing emphasis on the use of improved seed and fertiliser.

Over twenty-five years later, agronomists on the MCT now consider that husbandry practices on small farms in Malawi are generally of a high standard and match Department of Extension recommendations (MCT, 1990a and 1990b). This suggests that the time may now have come for extension to encourage the uptake of improved seed as the next major yield-increasing strategy small farmers can adopt.

MOA/FAO yield measurements have been conducted in LADD during 1989/90 on 30 demonstration sites with four combinations, for hybrid maize only. These show the yield increase stemming from the use of improved seed and better management practices together as being over 200 per cent with fertiliser (3,800 kg/ha) and 50 per cent without (1,750 kg/ha). By comparison, 1987 ASA yield data show the average yield increment from using improved seed alone (without improved management) compared to local maize seed to be 35 per cent, that from using fertiliser on local maize to be 45 per cent and that from using improved seed and fertiliser to be 110 per cent (2,460 kg/ha).

Smale's survey results (Smale, 1990) suggest that small farmers basing their decision to grow on yield criteria alone should grow fertilised hybrid maize and unfertilised hybrid maize, fertilised local maize and unfertilized local maize, in that order. But the results also show that most farmers do not make variety choices based on yield criteria alone and economic considerations are the main reasons for rejecting hybrid maize; specifically, there is a strong processing and storage preference for local maize, and hybrid maize is preferred mainly as a cash crop. Smale calculates the appropriate market value of hybrid maize is severely reduced by the implicit value households place on local maize, even allowing for the relative difference between hybrid and local maize in the probability of production losses. The survey also found that no single maize production technology dominates with respect to riskiness of net returns, suggesting varietal diversification may enable some households to improve their overall net returns.

Groundnuts

Groundnut yields under small farmer management conditions without fertiliser average 600 kg/ha (World Bank, 1989:96). There is generally considered to be no significant yield advantage from using groundnut seed produced under the SSMS, which is the only source of improved seed for small farmers at present. Pervis and Nyondo (1985:148) actually record declining average *Chalimbana* groundnut yields during the early 1980s: from 515 kg/ha in 1979/80 to 189 kg/ha in 1981/82.

Beans

The NBP estimates yields of 300 kg/ha from retained seed grown under small farm conditions and yields of 1,000 kg/ha from their improved seed grown under optimal conditions. However, the yield increment is, they consider, due mainly to the impact of optimum plant population and disease control rather than the genotype effect from the improved seed, as this seed is only selections from farmers' local varieties. This is not attractive to small farmers: they want to plant mixed stands of beans, so one improved variety will not have much impact.

Edje and Mughogho (1974) similarly found that weed control, optimum plant populations and spacing and timely planting all had greater impacts on yield than use of improved varieties and/or fertiliser. They considered disease the most important single factor limiting bean yields in Malawi, particularly anthracnose, blight, leaf spot and rust. Average yields between 1972 and 1976, they recorded, were static at 530 kg/ha.

Soyabeans

The Minor Legumes programme at Chitedze consider increased use of *rhizobia* inoculant (which they estimate can increase yields threefold) is more important than increasing the use of improved seed as, except for storage problems, soyabean seed can be recycled for a number of seasons without harm. Yields under good management, according to the MOA *Guide to Agricultural Production*, can reach 2,000 kg/ha.

8
Quantities of Seed

Seed Estimates Procedure

In 1990, responsibility for the co-ordination of the annual input estimates was transferred from the Crops Officer in the DOA to the Inputs Section in the MOA Planning Division. This Section has been newly created to implement the liberalisation of domestic trade in agricultural inputs, which forms part of Malawi's continuing agricultural reform programme. Each ADD and Smallholder Crop Authority makes a preliminary estimate of quantities required (from EPA Section level upwards) which it provides to the MOA in December of the year preceding the start of the selling season. A tentative consolidation of these is made by the Inputs Section and circulated. The feasibility of fulfilling the requirements is discussed at a series of three meetings, starting in January/February, convened by MOA and attended by the Inputs Section, the ADDs, the Smallholder Crop Authorities, NSCM, Seed Services and ADMARC. Feasible supply (domestic production and imports) is set against demand from each ADD and allocated between the ADDs, to produce final estimates by the March preceding the start of the seed selling season. It is then ADMARC's responsibility to procure from NSCM and distribute the right quantities to the necessary markets, to meet these estimates.

NSCM has to make its own estimates of demand in advance of the MOA meetings, in time for planting of seed crops starting in the November of the year preceding the start of the selling season. This is done in the February/March of the preceding year, based on current sales figures. Thus, in February 1990 area requirements were calculated for production during 1990/91 to be sold during 1991/92 – whereas the Ministry system calculates estimated sales only six months ahead. However, following an acute shortage of hybrid maize seed in 1987, the MOA has asked ADDs to include five-year projections of demand with their annual seed estimates.

The parameters the ADDs try to use in estimating seed needs are:

- number of farm families
- cropping pattern
- recommended seed rates and replacement rates
- volume of credit
- trends in input and producer prices
- the likely impact of releases of new varieties
- historical trends in seed demand.

But, in practice, greater emphasis tends to be placed on historical trends in credit sales, so the influence of other factors, most importantly changes in

agricultural prices and the weather, is often not accounted for. (This latter is increasingly important due to the apparent long-term decline in the length of the rainy season, which is creating increased demand for short-season maize varieties.) In some years, this has resulted in disparities of up to 60 per cent between estimates and actual demand. For example, ADD and ADMARC staff report that in 1988 there was a large increase in demand for maize seed which remained unsatisfied, when a shortage of groundnut seed (the only cash crops for many small farmers are groundnuts and maize) coincided with good gross margins for maize, encouraging many farmers to switch a proportion of their land from groundnut to maize production.

Adjustments to deliveries of agreed allocations are supposed to be made during the course of the selling season, based on information provided to ADMARC by the ADDs. In theory, this is an important means of trying better to match supply to actual demand and a necessary complement to the seed estimates exercise. But in practice, it is difficult to achieve successfully. Part of the reason for the late supply of revised demand details to ADMARC is that the ADDs are keen to provide input packages to as many farmers as possible and so hold back final estimates, in the hope of supplying late credit repayers. The way credit is administered has other important influences on the seed distribution exercise and is discussed in more detail later.

NSCM also liaises directly with ADMARC's Divisional Supervisors and makes three visits each selling season to all ADMARC Area Market Supervisors, to encourage them to move seed out rapidly from the parent/area markets to the unit/scheme markets in the field. Since 1985, NSCM has also monitored this movement of seed by asking all ADMARC Market Supervisors to send in weekly prepaid cards that report how much seed of each variety has been received, any transfers to markets outside the area market, total seed sold and balances. If any problems are revealed by the cards, NSCM's Sales Department alerts the Regional Manager at the relevant ADMARC Divisional Office directly. The response rate is good and NSCM considers this system has enabled the Company to monitor seed distribution in the field much more effectively.

Seed Allocations Compared to Requests and Sales

Table 6 gives the actual sales of seed through ADMARC for the last five years compared to allocations, and compares allocations of seed for the last five years with the quantities originally requested each year at the start of the seed estimates process. Requests for hybrid maize seed increased steadily to three times 1986/87 levels by 1990/91. Allocations seem to have improved, from 81 per cent of request in 1987/88 to 100 per cent of request in 1990/91. Sales have fluctuated substantially however, from 56 per cent to 109 per cent of allocation. Composite maize requests seem to fluctuate between around 200–250 tonnes one year and around 400–500 tonnes the next. Allocations have been more uniformly around 250 tonnes, with the exception of 1989/90 when nearly

Table 6: Comparison of requests for seed, allocations and sales 1986/87–1990/91 (tonnes)

	Requests	*Allocations*	*Allocation as proportion of request (%)*	*Sales*	*Sales as proportion of request (%)*
1986/87					
Hybrid maize	1,494.70	**	n/a	839.00	56
Composite maize	255.61	**	n/a	114.90	45
Groundnuts (certified)	3,276.20	**	n/a	3,175.63	97
Groundnuts (basic)	161.00	**	n/a	0.00	0
Beans (certified)	129.06	**	n/a	17.30	13
Beans (basic)	7.00	**	n/a	0.00	0
Soyabeans	0.00	**	n/a	10.00	n/a
Other seed	4,385.87	**	n/a	3,395.70	77
1987/88					
Hybrid maize	1,588.43	1,278.80	81	1,398.22	109
Composite maize	4,13.52	231.50	56	173.20	75
Groundnuts (certified)	2,165.21	4,411.00	204	**	n/a
Groundnuts (basic)	20.00	0.00	n/a	**	n/a
Beans (certified)	725.04	141.00	19	**	n/a
Beans (basic)	0.00	0.00	n/a	**	n/a
Soyabeans	10.00	7.00	70	**	n/a
Other seed	4,519.14	4,892.30	108	**	n/a
1988/89					
Hybrid maize	2,334.11	2,180.15	93	1,717.00	79
Composite maize	225.40	225.40	100	234.00	104
Groundnuts (certified)	**	**	n/a	2,692.52	n/a
Groundnuts (basic)	**	**	n/a	5.00	n/a
Beans (certified)	**	**	n/a	21.64	n/a
Beans (basic)	**	**	n/a	0.00	n/a
Soyabeans	**	**	n/a	0.80	n/a
Other seed	**	**	n/a	1,483.45	n/a

550 tonnes were made available. Importantly, sales records for composite maize show a steady growth; allocations appear to fit sales relatively closely, with the exception of 1989/90.

Groundnuts, beans and soyabeans data is much less complete. Requests for certified groundnut seed do not appear to have increased over the period and remained at around 3,000 tonnes in 1990/91. Allocations appear to have been consistently higher than requests, at 4,400 tonnes. Sales were marginally less

Table 6: Comparison of requests for seed, allocations and sales 1986/87–1990/91 (tonnes) *continued*

	Requests	*Allocations*	*Allocation as proportion of request (%)*	*Sales*	*Sales as proportion of request (%)*
1989/90					
Hybrid maize	3,142.60	3,451.54	110	3,358.82	97
Composite maize	538.38	547.46	102	264.55	48
Groundnuts (certified)	**	4,477.84	n/a	**	n/a
Groundnuts (basic)	**	68.00	n/a	**	n/a
Beans (certified)	**	218.97	n/a	**	n/a
Beans (basic)	**	9.00	n/a	**	n/a
Soyabeans	**	42.60	n/a	**	n/a
Other seed	**	2,340.99	n/a	**	n/a
1990/91					
Hybrid maize	4,901.10	4,900.00	100	**	n/a
Composite maize	270.10	272.10	101	**	n/a
Groundnuts (certified)	3,087.30	**	n/a	**	n/a
Groundnuts (basic)	**	**	n/a	**	n/a
Beans (certified)	223.30	**	n/a	**	n/a
Beans (basic)	12.00	**	n/a	**	n/a
Soyabeans	303.48	**	n/a	**	n/a
Other seed	4,743.03	**	n/a	**	n/a

Notes: other seed = rice, wheat, sunflower, cotton, cowpeas, guarbeans (includes basic seed)
1986/87 hybrid maize sales exclude LWADD
** = no record
n/a = not applicable

Source: MOA Planning Division, Inputs Section records

than the levels estimated in the requests, so were less than 75 per cent of allocations. Requests for certified bean seed appear to fluctuate considerably, with 725 tonnes requested in 1987/88 but less than one third of this requested in other years. Allocations have been more consistent, between 150 tonnes and 200 tonnes each year according to the available data. The two years for which data are available show sales of only around 20 tonnes, 10 per cent of allocation. Requests for soyabean seed have increased thirtyfold over the period, to 300 tonnes in 1990/91, probably reflecting the new focus on the crop in Malawi. Allocation records cover only one year. Similarly, sales records

cover only two years, and show substantial fluctuation – 10 tonnes in 1986/87 but only 0.8 tonnes in 1988/89.

Overall, requests do not appear to be closely related to previous sales. Neither are all the allocations regularly sold, except for composite maize seed. In particular, the large allocations of hybrid maize seed do not appear to be warranted by the actual sales achieved. Allocations do not accurately reflect requests, but as requests do not appear to reflect real demand this may not be a problem in practice.

Table 7 gives a breakdown by ADD of the data for maize seed sales for the two years it is available. This shows, within this national picture, considerable variation between individual ADDs in their apparent ability to match requests to sales, and in their allocations received compared to requests. Karonga ADD (KRADD) sold all its 1988/89 composite maize allocation but its 1989/90 allocation was less than 20 per cent of request, which appeared to be based on actual sales the previous year. KADD 1988/89 allocations of hybrid maize seed were similarly only half the request put forward, but only 80 per cent of allocation was actually sold. On the other hand, LADD sold only 70 per cent of its 1988/89 hybrid maize seed allocation but it still increased its 1989/90 request by 180 per cent. At the same time, it made a request for composite maize seed apparently based on previous sales but this was only half fulfilled at allocation. Salima ADD (SLADD) was in the same position for both hybrid and composite maze seed. Alternatively, Liwonde ADD (LWADD) underestimated sales of both types of seed in its requests whereas BLADD overestimated. As with Liwonde, NADD recorded 1988/89 hybrid maize seed sales totalling 166 per cent of request but did not increase 1989/90 requests. Only MZADD appeared to base requests reasonably accurately on previous sales and to receive allocations in line with these requests.

Seed Availability Compared to Allocations

Table 8 gives the actual availability of seed in November/December 1990 at the ADMARC selling points serving survey households. At Lifidzi, initial deliveries of maize seed had closely matched allocations except for *R201*, of which more than double the allocation had been delivered. Sales, however, had significantly exceeded initial allocations for all varieties except *MH16*. Because of this, the selling point had had no maize seed in stock for six weeks at the time of the survey's visit and stocks of groundnuts were also likely to be exhausted in the very near future, although large stocks of beans and soyabeans were still available. At Thiwi, deliveries were in excess of allocations for all varieties of maize except UCA, of which nil was delivered. Sales were between 10–20 per cent in excess of initial allocations for all varieties except *MH16* and *MH12*. Significant stocks remained for *NSCM41* and *R201* only. Groundnut, bean and soyabean stocks were not made available. There were no records of allocations at Eswazini. Over half the delivery of *R201* maize seed and large amounts of the *R215* delivery had been sold but apparently

Table 7: Comparison of requests for seed, allocations and sales by ADD 1988/89–1989/90 (tonnes)

	1988/89					1989/90				
	Request	*Allocation*	*Allocation as proportion of request (%)*	*Sales*	*Sales as proportion of allocation (%)*	*Request*	*Allocation*	*Allocation as proportion of request (%)*	*Sales*	*Sales as proportion of allocation (%)*
Karonga ADD										
Hybrid	43.50	41.51	94	40.71	98	88.00	84.00	95	**	**
Composite	30.00	30.00	100	32.36	107	30.50	5.20	17	**	**
Mzuzu ADD										
Hybrid	499.30	429.00	85	347.00	80	595.00	595.00	–	**	**
Composite	33.00	33.00	100	32.61	98	19.00	14.00	73	**	**
Kasungu ADD										
Hybrid	1,045.00	572.00	54	457.00	79	1,041.00	1,046.00	100	**	**
Composite	8.00	8.00	100	163.00	2,037	200.00	93.00	46	**	**
Lilongwe ADD										
Hybrid	557.00	480.00	86	334.65	69	998.00	992.00	99	**	**
Composite	7.30	7.30	100	152.29	2,086	81.00	30.00	37	**	**
Salima ADD										
Hybrid	153.00	173.00	113	90.58	52	187.00	187.00	100	**	**
Composite	50.00	50.00	100	43.89	87	42.00	34.80	82	**	**
Liwonde ADD										
Hybrid	73.00	79.50	108	228.16	312	171.00	181.00	105	**	**
Composite	24.00	24.00	100	40.91	170	66.50	59.00	88	**	**
Blantyre ADD										
Hybrid	240.31	284.00	109	144.40	50	260.52	260.63	100	**	**
Composite	68.80	68.80	100	35.18	51	106.48	87.00	81	**	**
Ngabu ADD										
Hybrid	25.00	29.00	116	48.10	165	22.87	22.87	100	**	**
Composite	23.00	25.00	108	0.00	0	0.00	0.00	0	**	**
Northern Region										
Hybrid	542.80	470.15	86	388.00	82	638.00	778.00	121	77.30	99.36
Composite	63.00	63.00	100	64.97	103	49.50	19.20	38	22.99	119.74
Central Region										
Hybrid	1,755.00	1,225.00	69	882.00	72	2,226.00	2,226.00	100	1,921.00	86.30
Composite	65.30	65.30	100	359.17	550	323.00	158.00	42	113.56	71.87
Southern Region										
Hybrid	358.31	392.50	109	420.66	107	454.39	464.50	102	664.81	1,431.12
Composite	115.80	117.80	101	76.09	64	172.98	146.00	84	128.00	87.67

Note: ** = no record
Source: ADD records

Table 8: Availability of seed in survey areas Nov/Dec 1990 (tonnes)

Market	*Allocation*	*Delivery*	*Sales*	*Sales for Cash*	*Sales for Credit*	*Balance*
Thiwi						
MH12	8.0	8.0	7.2	4.0	3.2	nil
MH16	1.2	1.5	1.5	1.5	nil	nil
NSCM41	9.0	+	22.0	3.2	18.8	9.0
R215	100.0	+	111.0	2.9	108.1	0.5
R201	12.0	+	14.0	4.5	9.5	4.0
UCA	3.5	nil	nil	nil	nil	nil
Lifidzi*						
MH12	9.0	10.0	21.9	9.1	12.7	n/a
MH16	1.3	1.3	1.3	0.1	1.2	n/a
NSCM41	10.0	10.0	14.8	0.8	14.0	n/a
R215	2.0	2.0	11.5	2.8	8.2	n/a
R201	8.0	18.0	21.0	1.2	10.3	n/a
Eswazini						
R215	n/a	0.2	'a lot'	n/a	n/a	1.0
R201	n/a	0.8	0.5	n/a	n/a	0.3
NSCM41	n/a	0.2	n/a	n/a	n/a	1.5
Bembeke						
MH12	0.7	0.7	n/a	n/a	n/a	nil
NSCM41	1.7	3.4	n/a	n/a	n/a	'some'
R215	n/a	4.0	n/a	n/a	n/a	nil
R201	n/a	3.8	n/a	n/a	n/a	nil
Bembeke total	10.0	11.9	n/a	n/a	n/a	'some'

Notes: + = extra supplied after initial allocation
* = includes sales at other markets supplied by Lifidzi
n/a = not available

Source: Seed survey

substantial stocks remained of *R215* and *NSCM41*; this may be a recording error, or the result of seed having been carried over at Eswazini from the previous season. There was no seed for groundnuts, bean and soyabeans. There were no records at Njuyu either. 40 bags of maize seed, mainly of *NSCM41* and some of *R201* and *R215*, were physically available; there was no seed for other crops. At Bembeke, deliveries of hybrid and composite maize

seed had been marginally in excess of allocation and stocks remained only of *NSCM41*. There was no seed for other crops but all but 180 kg of a delivery of 3.3 tonnes of non-seed soyabeans had been sold. Thus ADMARC could not in 1990 offer improved seed of groundnuts, beans or soyabeans at any of the selling points in the survey areas.

An SSMS for groundnuts has been operating in LADD but SSMS groundnut seed was not reaching Kabwazi. There used to be an SSMS for beans in the Dedza Hills, which would have served Kabwazi and Bembeke, but this grew traditional varieties only and has in any case been discontinued. LADD operated an SSMS for soyabean seed in 1989/90 in the Kabwazi area but farmers were buying the commercial soyabean crop as seed due to problems with the SSMS. This was also the case in Bembeke, although a number of farmers were under the impression that SSMS soyabean seed would shortly be available through the Thiwi–Lifidzi RDP SSMS. MZADD, which covers Eswazini, had produced enough *Nasaka* bean seed under its SSMS to plan to make approved seed available at selling points during the 1990/91 season. The ADD's Credit Section had planned for distribution of 50 ha worth of groundnut seed in Eswazini on credit in 1990/91 but this was not available at the time of the survey visit. There were no plans for any distribution of bean and soyabean seed on credit in Eswazini.

ADMARC Seed Sales Over Time

The growth in ADMARC seed sales over time is shown in Table 9. The quantities of hybrid maize seed sold fluctuated considerably in the early 1980s and showed a marked drop in 1986/87, however they recovered rapidly and showed significant growth in the late 1980s. Sales of composite maize seed apparently declined markedly in the early 1980s, although they increased during the remainder of the decade. Sales of groundnuts showed a continuous and rapid rise over time. The study was not able to obtain time series national totals for beans and soyabean seed sales through ADMARC. By comparison, sales of seed for all other crops (dominated by rice and wheat) appeared to peak at 3,400 tonnes in 1986/87 but generally remained very low.

It has been possible to make an estimate of the proportion of small farm area down to each crop that is covered by the quantities sold only for selected crops for one year, 1986/87.[12] This shows the quantities sold would have covered about 32 per cent of the hybrid maize area, about 15 per cent of the composite maize area, about 5 per cent of the groundnut area and less than 1 per cent of the beans area. Thus, although there has been good growth in hybrid and composite maize seed sales over time, the area down to each crop

12. Calculated using small farm cropped area down to each crop from 1986/87 ASA data; seed sales from ADMARC records given in Table 9; and standard sowing rates of 25 kg/ha for maize, 90 kg/ha for groundnuts and 80 kg/ha for beans from the MOA *Guide to Agricultural Production*.

Table 9: ADMARC seed sales 1981/2–1989/90 (tonnes)

Crop/Year	*1981/82*	*1982/83*	*1983/84*	*1984/85*	*1985/86*	*1986/87*	*1987/88*	*1988/89*	*1989/90*
Hybrid maize	1,242.32	1,462.87	1,274.80	1,514.73	1,401.42	882.27	1,402.00	1,691.00	3,361.00
Composite	433.20	491.59	233.18	149.10	224.70	148.97	191.00	234.00	264.55
Total maize	1,675.52	1,954.46	1,507.18	1,663.83	1,626.12	1,031.24	1,593.00	1,925.00	3,625.55
Groundnuts	1,583.84	1,801.81	1,967.35	1,933.16	2,615.92	3,212.62	**	2,692.52	**
Beans	**	**	**	**	**	17.30	**	21.64	**
Soyabeans	**	**	**	**	**	10.00	**	0.80	**
Other	70.23	46.63	159.87	**	2,007.67	3,395.70	**	1,483.45	**

Notes: Only wheat recorded for other seed 1981/82–1983/84
** = not available

Source: ADMARC records; 1986/87 ASA data; NRDP, 1987; 1989/90 *Guide to Agricultural Production*

planted with improved seed remains low and these figures suggest there must be a considerable amount of recycling of both hybrid and composite maize seed (although this extent of recycling is not confirmed by the seed survey results). At the same time, ADMARC has had to carry over significant quantities of unsold seed each year, as shown in Table 10.

Table 10: ADMARC carry-over seed stocks 1983/84–1987/88 (tonnes)

Seed	*1983*	*1984*	*1985*	*1986*	*1987*	*1988*
UCA	114.96	32.69	241.37	120.83	127.90	47.73
CCA	8.29	37.12	53.18	26.18	34.87	27.48
MH12	397.33	475.37	538.72	415.31	759.23	165.15
NSCM41	nil	35.78	54.30	75.45	72.33	18.88
Maize Total	520.58	580.96	887.58	637.76	994.33	259.25
Beans	7.41	0.02	0.85	0.75	0.49	n/a
Groundnuts	31.92	0.52	27.75	47.46	165.84	115.08
Total	1,491.80	932.15	1,076.53	782.07	1,325.19	391.12

Note: n/a = not available

Source: Scherer, 1988b:4

Seed Production

National Seed Company of Malawi

NSCM is the sole producer in Malawi of certified hybrid and composite maize seed and it provides all the maize seed distributed to small farmers through the ADMARC network, as well as selling to estates and exporting small quantities, particularly of composite varieties.

Until 1984/85, NSCM was the sole producer of certified groundnut seed in Malawi and produced shelled, dressed seed. However, chronic shortages, the high proportion of breakages in processing and the high prices that had to be charged made this impractical and led to a new strategy being developed involving small farmers in the production of 'approved' groundnut seed under the SSMS. The high price of NSCM groundnut seed is created by the need to pay high prices to contract growers to compete with Lever Bros, the main commercial purchaser of groundnuts in Malawi. So now, although the Company produces both basic and certified groundnut seed and will supply this to the ADDs, it is only for use in the SSMS. However, this system has run into problems, centring on the unreliability of ADD demand for the seed; in 1989/90, for example, no ADD collected the groundnut seed it had ordered.

NSCM maintains it is for this reason that it ends up selling much of its groundnut seed for export, although it does also produce a proportion entirely for export as this is very profitable.

As at 1981, when NSCM started operations, bean seed production was still in its relative infancy in Malawi (Edje *et al.*, 1981:89) and was done by NSCM under the supervision of the then STU (now Seed Services). 1981 was the first year certified seed of improved varieties was offered to the commercial sector. It was also the first time that tested, treated seed was provided to small farmers on time. Around that time other varieties newly released by the NBP were also given to NSCM but seed was never produced from them, so there was little distribution of improved bean seed to small farmers in Malawi until 1987, when the SSMS took on beans. NSCM now refuses to produce bean seed for small farmers because it says the supply of parent material from Bunda is inadequate and there is no demand. Staff in the MOA and the ADDs consider demand is strong and NSCM's real reason for not producing is the low retail seed price that can be charged for this seed in comparison to its high production costs (NSCM produces bean seed under irrigation in the off-season to minimise disease problems).

At present, NSCM refuses to produce soyabean seed for sale through the ADMARC network in the absence of clearer evidence of strong market demand for the seed, because of the technical difficulty of storing carry-over soyabean seed.

There is a common perception, particularly in government, that one of the major limitations to effective seed supply in Malawi is inadequate production of seed by the NSCM. Is this justified?

NSCM itself states that its priority crops are tobacco, for profit; maize, for profit and because of its strategic importance to Malawi; grasses, for profit; and groundnuts and soyabeans, also because of their strategic importance (groundnut exports are also relatively profitable for the Company). Its stated policy is not to produce any crop on which the Company might actually lose money but at the same time to take seriously its obligation to consider national development objectives in its operational decisions, especially with regard to supporting national self-sufficiency in maize grain. Therefore, it maintains, it cannot easily produce only the most profitable lines and it has to base its production choices on technical arguments, such as shortage of parent material from the DAR, proven lack of demand for a variety, or uneconomic production costs. The Company maintains it produces seed for all varieties released for use in Malawi except for those affected by one of these factors. However, over the years a large number of lines have been dropped, including beans, soyabeans, sunflower, sorghum, cowpeas, pigeon peas, rice and cotton. In part, this reflects the policy of Cargill who, after taking over the Company in 1988, insisted it focused primarily on maize seed production.

NSCM production figures are available only for hybrid maize. Details are given in Table 22 (see page 111). This shows that production does fluctuate

considerably from year to year, although there is an overall upward trend; production has been less than requests (shown in Table 6) in all of the last five years.[13] Whether this suggests that it is a shortfall in production that has limited the quantities of seed available for small farmers to buy is difficult to establish categorically, given the availability of seed is also influenced significantly by the seeds estimates process. Indeed, a difficulty for the Company is its obligation to work to the MOA's official seed estimates, which in years when they prove to be inaccurate, creates costly carry-over stocks for NSCM.

This problem is well illustrated by the Company's experience in the mid-1980s. All through the early 1980s, NSCM had large carry-over stocks of hybrid maize seed each year as demand did not meet the levels anticipated at the start of the NRDP in 1978. By 1986/87, hybrid maize seed sales had been only 35 per cent of the previous year and ADMARC had 700 tonnes of carry-over seed. Demand estimates of the time for 1987/88 indicated sales would again be low. This was a significant drain on NSCM's resources. So, in 1987, the Company obtained government permission to export surplus hybrid maize seed to Mozambique and Tanzania and a significant proportion of contract growers were laid off. Unfortunately, shortly after this had been done, a nationwide campaign to increase the hectarage of hybrid maize was mounted by the MOA. This resulted in a substantial increase in demand for hybrid maize seed in the 1987/88 selling season which NSCM was unable to meet. The Company therefore had to import quantities of seed from Zimbabwe to meet demand, but this was not achieved until after farmers had experienced difficulties in obtaining hybrid maize seed and there had been a certain amount of furore surrounding the affair.

Thus, almost certainly, a significant part of the problem is the poor accuracy and co-ordination of the MOA seed estimates. Nonetheless, the available information on NSCM's seed production planning, as given in Table 11, suggests production shortfalls are also part of the problem. Table 11 shows that in 1989/90, seed yields achieved by contract growers were low compared to both national averages and potential yields: average yields are 2–3,000 kg/ha for hybrid maize and 1,400–2,400 kg/ha for composite, whereas potential yields in Malawi are considered to be 6,500 kg/ha and 4,500 kg/ha respectively (MOA, 1989:24). In addition, the Company achieved only 44 per cent of target maize area.

With increasing pressure on both NSCM and ADMARC to minimise carry-over seed stocks, this situation of production shortfall necessitates a tighter production schedule and increased reliance on imports, which totalled 875 tonnes in 1988/89 and 2,500 tonnes in 1990/91 (MOA Inputs Section records) – 37 per cent and 43 per cent of total available maize seed respectively.

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13. Note production is sold in the following year so requests should be compared with production in the previous year.

Table 11: NSCM maize seed production plan 1989/90

Variety	*Actual hectares*	*Target hectares*	*Actual hectares as % target*	*Yield/hectare (tonnes)*	*Estimated production (tonnes)*
MH12	333.80	1,000.00	33.00	1.53	509.71
MH16	178.40	450.00	40.00	1.45	258.32
NSCM41	800.00	1,500.00	53.00	2.23	1,780.00
UCA	65.00	200.00	33.00	2.06	133.64
CCA	20.00	40.00	50.00	2.75	54.90
KEP	44.40	100.00	44.00	3.05	135.38
Total	1,441.60	3,290.00	44.00	1.99	2,871.95

Source: NSCM records

At the same time, NSCM had laid off a large number of regular contract seed growers in 1986/87 which caused some bad feeling and has added to the Company's difficulties in recruiting sufficient domestic growers in recent years, although this has also been caused by the relative attractiveness of tobacco production.

As well as the matching of total production to total demand, there is the need to match the balance of different varieties produced to demand for them. This is an important aspect of performance as small farmers have clearly expressed variety preferences, as we saw earlier. In addition, it has a significant impact on total sales. For example, in 1989/90 there was no *MH12* maize seed available for BLADD so *R201* was provided instead and this resulted in demand being very low because farmers did not want *R201*.

NSCM focuses on the cheaper three-way crosses for domestic hybrid sales and now produces composite maize seed almost entirely for aid-financed export to countries such as Mozambique and Angola (it has not yet produced any certified seed from the breeder material for Malawi's new composite CCC, provided to it by the DAR in 1990). However, the criticism that NSCM produces only a narrow range of maize varieties does not appear to be wholly justified. The comparison between the number of varieties released for use by small farmers in Malawi and the number produced by NSCM in 1990/91 is given in Table 12. Nonetheless, there do appear to be some problems with the matching of varieties to requests. Table 11 shows that, at least in 1989/90, significantly lower proportions of target hectarage were achieved for the single cross hybrids and composites, which are preferred by farmers but less profitable to produce, than for other maize varieties. In other years, the picture has been similar. In 1988/89, for example, the total maize seed stock available for distribution matched estimated demand but this was achieved by providing

Table 12: Maize varieties produced by NSCM 1990/91

Varieties released by VRC	*Varieties produced by NSCM*
MH12, MH15, MH16, MH17, MH18	MH12, MH16
NSCM41	NSCM41
	KEP
UCA, CCA, CCC, CCD	UCA, CCA, CCC
Tuxpeno 1	

Source: VRC, 1986: 1–3; NSCM, 1990: 3–4.

975 tonnes of imported *R201, R215* and *CG4141*, which had not been requested, leaving a shortfall of over 1,000 tonnes, or 60 per cent of total request, on the single cross hybrids (MOA Inputs Section records). NSCM has reduced production of the first single cross hybrid it produced, *MH12*, maintaining the long-term decline in rainfall has caused a decline in demand and this variety is not as widely adapted or as poundable as some of those subsequently released. The Company's critics say, however, that demand for *MH12* is strong and NSCM does not produce it because it is more expensive to produce than other varieties.

Nonetheless, NSCM estimates Malawi will be self-sufficient in maize seed in 1991 due to the release of two new three-way crosses *MH17* and *MH18* by the MCT at Chitedze Agricultural Research Station, so the recent practice of importing *R201* and *R215* hybrids from Zimbabwe should stop.

Smallholder Seed Multiplication Scheme

There is only one SSMS operating for groundnuts currently, in SLADD. Previously, there were SSMSs for groundnuts in KADD and LADD but these collapsed due to problems with segregation of lines in *Chitembana* (although LADD apparently reconstituted the Scheme in the 1990/91 season). The groundnut SSMS in MZADD was suspended at the end of the 1988/89 season due to problems with contract growers selling production to private traders. In 1989/90, all production was saved as seed stock for the next season.

KADD, MZADD and LADD have had an SSMS for beans for some time but at first these produced only imported varieties such as *Red Canadian Wonder*. However, this main-season variety was of only limited relevance for areas, such as Bembeke, where off-season bean production is important. Due to problems with getting NSCM to produce seed of the improved bean varieties released by the NBP in 1979, there was no distribution of improved bean seed originating from Malawi until 1987, when the NBP gave MZADD one tonne of *Nasaka* for production under the SSMS. This has taken off rapidly and by 1989/90 ADMARC was purchasing 26 tonnes within MZADD for further multiplication. SSMS production of *Sapelekedwa* followed and in 1990/91,

Nasaka and *Sapelekedwa*, as well as some *Red Canadian Wonder*, were due to be produced by the SSMS in KADD, MZADD, LADD and BLADD. However, all bean seed production under the SSMS is at present sold to ADMARC for resale as seed for the next seasons' SSMS, due to the relatively small quantities being produced, so no improved bean seed is yet available on the open markets for small farmers to buy.

There are SSMSs for soyabeans in LADD and NADD. NADD has tried production under irrigation in the dry season to avoid storage problems in the hot conditions of the Shire valley. The Scheme in LADD is the largest and has been operating in Thiwi–Lifidzi RDP for the last two or three seasons and in 1989/90 expanded to Lilongwe West RDP. Both the Schemes are still producing only traditional varieties, in the absence of any released improved varieties from the DAR and are facing considerable problems with seed-borne diseases and deterioration of seed in storage.

All the SSMS operate relatively autonomously of the MOA and records are kept and decisions made at ADD level. SSMS production targets are set at ADD level to meet internal ADD demand for seed, except for a few items, such as basic seed for rice, which are produced in one ADD on behalf of all the others. The targets are set by the ADDs' Credit Sections and as such tend to underestimate the potential demand for seed from cash purchasers. The available figures for SSMS seed production of all crops given in Table 13 show that for all crops SSMS production remains very small and not yet significant in terms of overall seed supply.

Farmer Survey Results

The chief objective of this part of the survey was to find out farmers' assessment of the physical availability of seed in their local area compared to their own seed needs. The secondary objective was to establish their views on the size of packs in which seed is available. There was some confusion in some of the answers relating to hybrid maize, between households' total seed needs and the quantities in which seed is bought. Many of the answers for non-hybrid maize crops were given in traditional measures; these were converted to metric measures using conversion factors provided by Chitedze Agricultural Research Station.

The typical quantity of new planting material that farmers wish to obtain each year varies between crops. The survey results suggest this averages 15 kg for hybrid maize; 25 kg for groundnuts; 6 kg for beans; and 18 kg for soyabeans. This does not appear to vary with the seed security status of the household – except for beans, where the chronically seed insecure households appear to obtain significantly smaller quantities than the others.

The typical quantity of hybrid maize seed obtained by survey households suggests current pack sizes are appropriate. The relatively large average quantities of groundnuts required probably reflects the large size of groundnuts seed and the fact that, except at ADMARC, it is sold in shell. The

Table 13: SSMS seed production 1984/85–1988/89 (selected figures)

MZADD 1985/86–1990/91
Groundnuts

Year	*Farmers*		*Hectares*		*Tonnes sold*	
	Target	*Actual*	*Target*	*Actual*	*Target*	*Actual*
1985/86	150.0	158.0	60.0	63.0	30.0	17.0
1986/87	250.0	247.0	100.0	103.0	60.0	47.0
1987/88	373.0	242.0	150.0	97.0	30.0	11.0
1988/89	500.0	373.0	200.0	144.0	55.0	4.6
1989/90						
Beans						
1985/86	25.0	25.0	10.0	10.0	12.0	3.0
1986/87	25.0	25.0	10.0	10.0	16.0	0.5
1987/88	50.0	24.0	20.0	10.0	2.0	1.5
1988/89	75.0	27.0	20.0	15.5	8.0	6.5
1989/90	75.0	166.0	30.0	85.0	25.0	25.0
1990/91	250.0	n/a	62.0	n/a	40.0	n/a

Source: MZADD Crops Officer Records

All ADDs 1984/85–1987/88
Groundnuts

	1984/85	*1985/86*	*1986/87*	*1987/88*
MZADD				
Farmers	nil	134	254	n/a
Ha	nil	54	103	88
Yield (kg/ha)	nil	17	36	n/a
KADD				
Farmers	110	1,299	630	n/a
Ha	44	520	252	100
Yield (kg/ha)	30	213	139	n/a
LADD				
Farmers	231	1,237	678	n/a
Ha	95	495	271	63
Yield (kg/ha)	65	302	149	n/a
SLADD				
Farmers	nil	1,044	340	n/a
Ha	nil	418	198	110
Yield (kg/ha)	nil	551	270	n/a

Source: Sibale and Mtambo 1989:6–7; Seed Services Annual Report 1988:9

All ADDs 1987/88
Other Crops

Hectares	*Wheat*	*Rice*
KRADD	—	221
LADD	18	—
SLADD	—	48
LWADD	—	27
BLADD	13	—
NADD	—	47

Source: Seed Services Annual Report 1988:9;

Note: n/a = not available; — = nil

average quantity of beans required is surprisingly large, considering the common complaint that the minimum 1 kg quantity of beans that can be bought from ADMARC is too big. But this may be explained by the fact this quantity is the total of all the different varieties farmers wish to buy and the individual quantities of each variety are small.

Only very rough estimates of replacement rates were made by the survey; these are given in Table 14. These estimates provide an interesting insight but need following up with more rigorous calculations. They show that although, for all crops except soyabeans, a clear majority of households obtain planting material off-farm at some time, only for hybrid maize do more than one third of households do so every year. It is also interesting that the proportions are roughly the same for the three non-maize crops. The slightly higher proportion of households replacing beans periodically may reflect the need to maintain bean portfolios with regular off-farm sourcing of planting material.

The MOA does not publish recommended replacement rates for the non-maize crops. Breeders in the DAR suggest replacing every two years for groundnuts and every five/six years for beans. The actual rates provided by the survey are broadly as might be expected, with the differences in the proportions replacing each crop in line with the different recommended replacement rates, but the overall levels much below recommended rates.

Respondents' assessments of the physical availability of planting material did not vary significantly between crops, except for groundnuts: for hybrid maize, beans and soyabeans between 40 and 55 per cent of households stated planting material is always readily available. For groundnuts, this figure was only 20 per cent. However, there was widespread complaint that although hybrid maize seed of some description is usually available from ADMARC, preferred varieties are not. Only for beans was availability considered to be worse at ADMARC than for other sources: three quarters of households said that from ADMARC, as opposed to from local sources, beans for planting are not readily available. ADMARC is considered the most reliable source of planting material for soyabeans.

Table 14: Survey households' seed replacement habits (per cent of households)

Crop	*Replace periodically*[+]	*Replace every year*
Hybrid maize	100	92
Groundnuts	66	22
Beans	86	10
Soyabeans	24	8

Note: [+] = within last 5 years.

Source: Seed survey.

9
Seed Quality

Seed Quality Control in Malawi

Seed Services is responsible for inspection, certification and quality control of seed produced in Malawi, as well as raising awareness of seed quality issues amongst ADMARC's Input Officers (the ADMARC staff responsible for monitoring the distribution of seed through the Corporation's markets). Although training is up to standard in the Services, lack of funds, and therefore of staff and transport, and of authority to act independently to respond to field problems as they occur, is a continuing problem. For example, the Services are staffed to conduct up to 700 laboratory samples of seed per year but in practice, throughout the 1980s up to 2,000 samples per year have been carried out (Mloza Banda *et al.*, 1988:30).

Malawi's Seed Act was not passed until 1990 and the Regulations to go with it are still being drafted. Until the passing of the Seed Act, seed quality was regulated by a set of Seed Rules drawn up in 1976, based on those operating in Zambia. Until 1990, the most important gap in seed quality control was the lack of any legal right of inspection of seed sellers. The need for this has increased significantly in recent years with the encouragement of private seed traders by NSCM, in line with the general move towards agricultural market liberalisation in Malawi. In the 1990/91 seed selling season, NSCM had to mount an extensive media campaign against re-bagging of seed by unauthorised private traders. Unauthorised selling of carry-over seed by private seed retailers is not so much of a problem as few registered retailers accumulate much carry-over stock. However, both NSCM and ADMARC find discarded carry-over seed that has failed re-certification tests finds its way back into the ADMARC seed distribution system or is made available unofficially.

There is a real conflict between ensuring the timely availability of seed for planting and ensuring seed quality. Seed produced by contract growers for NSCM is harvested in June or July and often does not reach the Company's processing plant in Lilongwe until near the 30 September deadline for submission. It is therefore not ready for distribution, after processing, until even later than this so early deliveries of seed consist of carry-over stocks from the previous season (or imported seed). Added to this, ADMARC is loathe to sell new seed before the new season's seed selling prices are announced together with all other agricultural prices, in September/October.

NSCM Seed Quality

For maize seed, Seed Services visit NSCM's contract growers on average 16 times per season (involving more than 20,000 kms of travel (Seed Services, 1988)). This high frequency of visits is considered necessary in Malawi because

of the low level of training of most contract growers and the coincidence of maize de-tasselling time with tobacco reaping (most contract growers are tobacco estates growing maize seed as part of their tobacco rotation), which can lead to skimping of the former task. Rejection rates are falling and in 1989/90 there were no rejections at all due to poor de-tasselling – whereas in the past up to 2.5 per cent of the total contracted maize seed area has been rejected for this reason. Maize seed is first cleaned by the contract growers by hand to remove husk, cob particles and under-sized, diseased and weevilled seed. The bags of seed are fumigated on arrival from the contract growers' farms at NSCM's processing plant at Kanengo and then opened. The husk is removed by fans and the seed is sieved to remove small and deformed kernels to ensure a minimum size. As very little maize seed is planted mechanically in Malawi, no effort is made to ensure a standard sized kernel. Maize seed treatment consists of coating with Actellic, which gives protection against weevil damage for at least three months, and with a blue colouring to identify it as certified NSCM maize seed. Mistakes have sometimes been made at this stage in the process – including missing out the Actellic from the treatment mix and using too strong a mix or overcoating, leading to burning of the maize membrane – but the Company maintains that it takes weevilling very seriously and takes every precaution to avoid this. Other problems have occurred when unauthorised seed dealers have tried to pass off commercial grain as NSCM seed by dying it. The seed is then bagged.

NSCM does produce both basic and certified groundnut seed for use in the SSMS, as well as for export. But in recent years a large proportion of production has been of varieties other than those recommended for small farmers in Malawi and little has entered the small farm market. All groundnut seed produced by the Company is handled in shell to minimise aflatoxin contamination and damage from poor handling and storage. This adds considerably to transport costs and seems to reduce consumer confidence in the seed: small farmers express a clear preference for buying groundnut seed not in shell. NSCM is not currently providing bean and soyabean seed for small farmers.

The Company has its own seed testing laboratory at Kanengo, staffed by agricultural graduates trained by Seed Services, which follows International Seed Testing Authority (ISTA) rules for quality control. Mis-labelling of certified seed does occur from time to time but the Company takes this very seriously and takes as much care as possible to avoid it. There have also been incidents of labels being stolen but the most common labelling problem is the re-sowing of labelled bags by ADMARC staff and others once they have left NSCM. At the processing plant, seed is stored at constant temperature and humidity, designed to keep all kinds of seed for up to ten years without deterioration.

NSCM does not at present provide a warranty for the purity and performance of its seed and deliberately minimises the capital intensity of the

processing process. However, the quality control systems currently in place appear to perform adequately and the Company has a strong incentive to maintain standards to protect its own reputation. In addition, the quality of NSCM staff has been upgraded following the take-over by Cargill in 1988 and all staff are now of BSc level or above.

ADMARC Seed Quality

Most training for ADMARC Market Supervisors is geared to the handling and storage of grain crops: specialist advice on dealing with seed is not part of normal training. ADMARC outlets where seed is sold are not supposed to re-bag seed under any circumstances and should follow strict storage guidelines (e.g. keeping seed on pallets off the floor, etc.) but, for honest and less honest reasons, staff do refill and re-stitch split bags and are not always able to follow the storage guidelines due to, for example, lack of pallets, insufficient storage space resulting in seed being stored outside, heat levels in stores with tin roofs designed only for commercial grain, etc.

The survey visited all those ADMARC seed distribution points serving the survey farmers; five in total ranging from basic Input Sheds (Njuyu) to unit/scheme markets (Eswazini and Bembeke) to parent/area markets (Thiwi and Lifidzi). Only at Bembeke was all the seed properly stored in cool conditions. Although nearly all the staff could recite the correct seed storage techniques, all the other distribution points were experiencing at least some of the problems outlined above, with maize seed bags stored on the floor or outside (where the stores were already full with the commercial grain harvest) and evidence of rodent damage and split bags, some of which were being refilled and re-sown.

Quality control is made difficult by ADMARC's practice of selling 'damaged' seed to staff at reduced prices, which makes it difficult to control on-selling of such seed to farmers. However, relatively small quantities are damaged (in 1989/90, for example, 3.3 tonnes were damaged out of a total of 4,060 tonnes delivered (ADMARC records)).

Maintaining the quality of the large quantities of carry-over stocks that accumulate in the off-season at ADMARC's main depots has been a major problem. However, in 1988 ADMARC changed its agreement with NSCM concerning carry-over stocks. Now, ADMARC collects seed free from NSCM and pays NSCM only for seed actually sold to farmers. Carry-over stocks revert to NSCM without any money having been paid. This seed is moved from ADMARC's field distribution points to its permanent depots between January and March (the official end of the seed selling season) for testing by Seed Services. Now, only that seed which passes re-certification reverts to ADMARC. This is then sent out to the field in June, if Seed Services has completed testing (they are sometimes delayed by lack of transport).

As well as the renegotiation of the agreement, ADMARC's greater commercial freedom after Malawi's 1987 market liberalisation and associated

restructuring has enabled it to order seed more closely to fit expected demand. This has reduced the quantity of carry-over stock from 1,300 tonnes in 1987 to 400 tonnes in 1988 (see Table 9 (page 57)) and enabled ADMARC to control quality better. Nonetheless, field seed distribution points still do not always send all seed back to the parent depots at the end of the seed selling season. And ADMARC is loathe to give carry-over seed back to NSCM because it has to buy it back at higher prices the following season. In addition, sub-optimal co-ordination between ADD field staff and ADMARC, combined with shortage of transport at ADMARC's field markets, exacerbates the carry-over problem as the movement of seed from areas of surplus to shortage during the course of the selling season is not maximised. And the ADDs put pressure on the ADMARC distribution points to keep seed back for potential credit recipients; if these do not materialise, due to default on the previous season's loan, this adds to the carry-over problem.

SSMS Seed Quality

At present, the quantities of seed produced under SSMS are very small and most production is reserved to form the next season's SSMS seed stock, so very little SSMS seed reaches small farmers. Nonetheless, it could become a much more significant source of seed so quality issues remain important.

Seed Services cannot provide a full inspection and certification service for SSMS seed due to lack of funds. There is no evidence to date that SSMS seed quality is compromised because of this (although it means SSMS seed has to be classed as 'approved' rather than 'certified'), but it is an important strategic weakness in the policy argument for increased SSMS seed production. This is because for most SSMS crops, particularly groundnuts and beans, there is little yield advantage for small farmers from using SSMS seed, compared to using saved seed from the commercial crop, so the only advantage SSMS seed can offer is superior physiological quality.

At present, SSMS seed is not processed, although there are plans for selective processing using simple technologies such as hand-operated dressing bins. SSMS seed is not moved around and it is stored for sale at whichever ADMARC market it is bought from the small farmer grower. Loss of viability in these low-technology stores is a major constraint for some crops.

The survey had no opportunity to assess SSMS seed quality at first hand. The general consensus is, however, that it is definitely possible to produce good quality seed for many crops through the SSMS (see, for example, Sibale and Mtambo, 1989) but the Scheme's overall success requires attention to other issues too.

Seed Quality Observations in the Field

Practical observations of the quality of improved seed being used by small farmers in the field were possible only for hybrid maize as, reflecting the current non-availability to small farmers in Malawi of improved seed of other

crops, all other crops grown by survey households were produced from grain.

All respondents assessed hybrid maize seed purity as satisfactory or good, although 12 per cent reported experience of hybrid maize seed with poor germination. Only half the respondents expressly discussed seed vigour; all these gave favourable reports. Reports on seed health were less favourable and nearly half the respondents, some in each survey area, said they had received weevilled or rotten *NSCM41, R201* and *MH12* hybrid maize seed.[14] One respondent in Kabwazi had requested *R201* seed at Thiwi ADMARC depot but had been given *NSCM41* seed in a bag with *R201* overwritten on an *NSCM41* label. Another was given *R201* seed in a bag labelled *R201* but stamped *NSCM41*. Except for the high incidence of reports of weevilled and rotten seed, the overall quality of hybrid maize seed observed and described by survey households was good. 20 per cent of households stated specifically that they consider hybrid maize seed quality to be very good. Only 5 per cent of households considered seed quality has deteriorated in recent seasons.

A rather different picture emerged when the same investigation was made into the quality of groundnut, bean and soyabean material used for planting.

Nearly two thirds of the bought-in groundnut seed and about one third of the retained seed was classified as very good; none was found to be very bad. All the groundnut samples, of both retained seed and seed obtained off-farm, looked healthy and none had damaged kernels. Seed from the local varieties was smaller than that from the improved varieties. The relative quality of bought-in compared to retained bean seed appeared to be the reverse of groundnut: only 40 per cent of the bought-in seed was very good quality whilst 60 per cent of the retained seed was – perhaps because most farmers, especially those in Eswazini, treated retained bean seed with either Actellic or home-made preparations, as storage pests are a major problem in beans in Malawi. Only 10 per cent of the bought-in soyabean samples were found to be very good quality; very few samples of retained seed were provided and none were very good. No farmers treated soyabean seed, as it is supposed to be less susceptible to storage pests. Some of the retained samples from seed that had been recycled over a long period of time were very mixed in size.

Visual assessments of the quality of respondents' local maize seed were not possible in Bembeke as all households had already planted at the time of the survey. Of the samples assessed in Kabwazi and Eswazini, 85 per cent were good or very good (i.e. no weevilling; large, white kernels).

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14. One respondent reported receiving seed of *R201* in 1990 with many broken kernels, which he attributed to the mechanical shelling used by Seed Co-op in Zimbabwe, from where *R201* is imported into Malawi.

10
Locational Issues

The ADMARC Market Network in Malawi

Farmers can obtain improved seed from four types of outlet in Malawi: ADMARC's national network of input selling points, where seed produced both by NSCM and the SSMS is supposed to be available at subsidised prices; private general retail traders registered as stockists with NSCM, that sell hybrid maize and vegetable seed provided to them by the seed company; People's Trading Company (PTC), Kandodo and Malawi Book Service, three national retail chains that also stock NSCM seed; and independent private retail traders who obtain seed from Chipiku, a chain of general goods wholesalers that stocks NSCM seed.

Since Cargill became involved in NSCM in 1988, NSCM has expanded the number of private trader outlets. Coupled with the closure of 15–20 per cent of ADMARC's seasonal markets and the withdrawal of seed from the rest, after the reorganisation of ADMARC in 1987, this means there are now a significant number of private seed retailers compared to ADMARC outlets for seed: in 1990, 266 or one per 140 sq.km, compared to 105 ADMARC parent/area markets and their 207 associated unit/scheme markets (and a small number of input sheds) (NSCM files; Scherer, 1988a:6). However, the number of small farmers using these sources is relatively small because they supply only small (1 kg) packs of hybrid maize seed and they sell them at non-subsidised prices (approximately double ADMARC's price). The small pack size and non-subsidised price reflects the historical concentration of private outlets in urban areas, catering for urban families growing maize on a small-scale in back gardens. Even now, nearly one quarter of these outlets are in urban and peri-urban locations.

The quantities of improved seed produced for crops other than hybrid maize are relatively small and many ADMARC input selling points have not been able to provide groundnut, bean and soyabean seed. Farmers commonly obtain planting material for these crops in the form of grain, from relations, local people and local markets as well as from ADMARC.

ADMARC has played a dominant role in Malawi's agricultural development since its inception in 1971 and its national network of produce buying and input selling points has become established in most farmers' minds as providing a fair, guaranteed and accessible marketing service. By 1987 it was operating 12 depots, 52 permanent parent/area markets and 1,050 seasonal markets. Market density remained higher in Central region but was generally good all over the country. By 1987, it was estimated that 60 per cent of the rural population were within 8 kms of an ADMARC seasonal market, judged as 'adequate access' and the target distance of the government (GOM, 1987).

Other evidence suggests, however, that the rapid increase in the number of ADMARC markets during the 1970s and 1980s in fact had little effect on the average distance to markets. Despite a 50 per cent increase in seasonal markets between 1981/82 and 1986/87, Christian and Southworth (1988:26) found the average distance to a market decreased by less than 20 per cent – partly because many were sited according to donor requirements or other considerations.

As part of the institutional reform programme implemented in 1987, all buying points dealing in less than 60 tonnes of produce a year (about 20 per cent of all seasonal markets) were slated to be closed down and inputs were withdrawn from the rest of the seasonal markets. Private traders were allowed to buy produce under licence at 1,139 designated buying points but no similar arrangements were made for private trade in inputs. The common perception has been that these changes resulted in a substantial deterioration in small farmers' market access, as private traders did not move into all the areas vacated by ADMARC (although no system was established for monitoring the real impact of these changes, so there is no comprehensive empirical data).

The effect on access to seed should be easier to judge as there was never any intention that private traders would become involved in the supply of subsidised inputs. However, it is, in practice, almost as difficult. The net result should have been a significant decline in the number of ADMARC outlets where seed is available, from 1,114 in 1987 to, in 1990, no more than the 312 parent/area markets, and their associated scheme/unit markets and inputs sheds. However, Christiansen and Southworth (1988:13) state that not all the planned 190 markets were closed and several new markets were added in the north, bringing the total reduction in markets to about 125 and still leaving ADMARC with a rural market network larger than two years earlier. They conclude (1988:25) that, even after the liberalisation, 75–80 per cent of the rural population is within 8 kms of a seasonal market. An alternative source, Scarborough (1990:25), cites a study which found the average distance to the nearest ADMARC buying point post-liberalisation was 3.63 kms in MZADD, 7.35 kms in LADD and 10.2 kms in BLADD.

However, none of these sources show separately the markets at which inputs are available, which is not all of the remaining markets, and this study has been unable to find out the exact proportion of scheme and unit markets continuing to stock seed, in addition to the 105 depots and parent/area markets. If it is true that no seasonal markets stock seed any more, the maximum density of ADMARC seed outlets is one per 119 sq. km of cultivable customary land – nearly a fourfold reduction in the density of ADMARC seed outlets since liberalisation.

Market Situation: Survey Results

Two parent markets, at Thiwi and at Lifidzi, serve farmers in Kabwazi and in three surrounding Extension Planning Areas (EPAs). Lifidzi parent market has reduced the number of seasonal markets it operates from 14 to 12; the one unit market[15] it operates is still functioning. Thiwi market is currently operating 22 seasonal markets and two scheme markets. All the seasonal markets attached to both parent markets stopped selling inputs in 1987; fertiliser deliveries are made to credit clubs by arrangement but this is not done for seed as the quantities involved are too small to be feasible. Opinion is divided concerning the impact of this retrenchment: some ADD staff think small farmers have stopped buying seed as a result; some ADMARC staff think demand for seed has continued to increase, and they point out there always used to be unsold seed left at the seasonal markets when they did sell seed.

Eswazini had four seasonal produce buying and input selling points and 11 seasonal buying points prior to the 1987 retrenchment, in addition to two permanent input sheds. All the seasonal operations have now closed. There are three permanent depots or markets just outside the EPA, between 5 kms and 8 kms from Eswazini itself, to the North, West and South, and two much further afield to the East. MZADD Credit Section considers this has had a significant detrimental influence on the uptake of inputs and, in particular, caused a dramatic increase in the use of credit to finance input purchases. MZADD does seem to have been badly affected, with 112 out of 148 input selling points closed after the 1988/89 season and distances of up to 55 kms common between the remaining selling points. There were 14 registered private traders operating in MZADD in 1990/91 (compared to 35 in 1989/90) (MZADD Credit Section records) but few of these were operating in Central Mzimba RDP, where Eswazini is located, and none are selling inputs openly. A number of survey households in Eswazini complained that, at the time of the survey, there were no private traders dealing in seed in the area. Records of private trader activity were not obtained for Kabwazi and Bembeke.

At present, there are four outlets where seed is supposed to be available in Bembeke: Thiwi parent market, Bembeke unit market, Dedza PTC and (for wholesale purchases only) Dedza Chipiku store. Prior to 1987, there were other ADMARC markets selling inputs in Dedza and elsewhere in the area.

Farmer Survey Results

Households were asked to describe all the types of place they obtain planting material from. Locations were then traced on large-scale maps and distances estimated. Previous sources were also named, where these have changed recently. The objectives were to assess how ADMARC selling points, the only source of improved seed for small farmers, compare in terms of physical

15. Known as scheme markets in other ADDs and comprising a seasonal market plus input shed.

access, distance, etc., to other sources of planting material; and how important a factor distance is in small farmers' decisions about seed source.

75 per cent of the survey households are self-sufficient in local maize seed or obtain it from off-farm sources only by choice. When local maize seed is obtained off-farm, it is virtually always from relatives or other local people; only 10 per cent of farmers described ever obtaining local maize for planting from ADMARC. Given this situation, and the fact that obtaining mixed maize grain from ADMARC for planting is highly undesirable agronomically, locational issues were not considered by the survey in relation to local maize.

All the households growing hybrid maize obtained seed from ADMARC selling points, at distances from the household ranging from zero to 12 kms. The modal distance was between 1.5 kms and 5 kms. One third of these households have had to travel further since the 1987 retrenchment, but by 2 kms or less; the households in Eswazini have had less to travel, by about 4 kms, since the opening of the new input shed at Njuyu. Distance to ADMARC markets selling hybrid maize seed does not appear to be an issue for most households: it was last, and mentioned by only 15 per cent of households, in the ranking of disadvantages of ADMARC as a source of hybrid maize seed.

There are three crops – groundnuts, beans and soyabeans – for which survey households can exercise choice in sourcing material off-farm. For groundnuts, according to the survey results, local people and local markets are the nearest seed source (not more than 2 kms away), the next nearest are ADMARC markets (the furthest away is 12 kms but most are much nearer) and the furthest of all sources are relatives, who are between 5 kms and 10 kms away. Distance was not mentioned at all as a factor determining choice of groundnut seed source by the households.

Households travelled greater distances to all sources of beans for planting compared to those for other crops, with distances of between 12 kms and 30 kms common. The relative nearness of local sources of beans was mentioned as one of a number of advantages of this source, that made it the most popular after seed saved on-farm. Only one household cited distance as a factor influencing choice of seed source. This may be due to the need to source beans for planting more widely to obtain the wider range of varieties typically planted by small farmers for this crop.

Initial sources of soyabeans for planting included a range of local markets and villages in the Kabwazi area, between 5 kms and 10 kms distant, plus the local ADMARC market then functioning at Kabwazi and those at Thiwi and Lifidzi – the furthest being Lifidzi at 12 kms. ADMARC was the initial source for all seed in Bembeke, the market being not more than 5 kms from any household. Altogether, about two thirds of survey households used ADMARC for initial supplies of soyabeans. The majority of households now use seed saved on-farm so no travelling is involved. Of the remainder, half used Lifidzi ADMARC market (12 kms away), a quarter used Eswazini ADMARC (no distance involved) and a quarter used unnamed local market sources. Distance is only one of a number of factors influencing choice of soyabean seed source.

11
Timeliness of Seed Delivery

The Seed Selling Season

The seed marketing season in Malawi begins in June, when NSCM starts to release seed carried over from the previous season to ADMARC and ADMARC's own carry-over stocks are moved back out to all seed distribution points in the field from the parent markets, where it has been stored during the off-season.

ADMARC is responsible for movement of all the seed it sells, which is around 80 per cent of what NSCM produces. It has decentralised responsibility for moving seed to a significant degree and ADMARC's central administration, through its regional Farm Inputs Officers, takes responsibility only for moving seed from NSCM's processing plant on the outskirts of Lilongwe to the Corporation's seed stores at regional depots in Lilongwe, Mzuzu and Blantyre. It contracts private transporters to do this as, by the terms of its constitution, ADMARC can maintain only a limited transport fleet of its own. The more complex and difficult task of moving seed from the regional depots to ADMARC's 105 parent/area markets and their unit/scheme markets and Input Sheds in the field, and between selling points to match surpluses to deficits as the selling season progresses, is the responsibility of the Corporation's Divisional Supervisors (responsible for a group of parent markets) working with the Regional Managers and their Inputs Officers. The regional depots have a limited pool of in-house transport (for example, four vehicles for Central Region) and they and the Area Market Supervisors have authority to hire local transport to supplement this.

Seed produced by small farmers under SSMS is sold by farmers at their nearest ADMARC market as soon as it has been harvested and is stored there until the seed selling season starts. SSMS seed is not moved from the market where it is bought from growers.

The MOA *Guide to Agricultural Production* stresses the importance of timely planting for all crops, and particularly for maize, for which a 1–2 week delay in planting can cause up to 25 per cent yield loss – much more than the yield loss due to rotting at the end of the season if rains are prolonged.

ADMARC headquarters records show that distribution from NSCM at Kanengo to the main ADMARC depots is often still continuing in early November, when seed needs to be available to farmers at the field selling points by mid-November at the latest and, according to farmers' preferences, by September/October. In recent years, however, ADMARC has succeeded in getting seed out from NSCM to its regional depots and parent markets in reasonable time. Delivery of seed to the regional depots in the last two years, for example, has been completed by 20 October and 11 November respectively.

But this is only half the story and the Corporation's performance in getting seed out to the final selling points has not been as good. The delay between seed arriving at ADMARC's main depots and moving out to field markets is supposed to be not more than one week. However, in 1990, up to 40 per cent of maize seed and more of groundnut seed had not been moved by mid-November. Table 15 shows the deliveries and sales ADMARC had achieved by mid November 1990 in Central and Northern Regions to unit/scheme markets: 6 per cent of maize seed and 80 per cent of groundnut seed was yet to reach farmers in Northern Region, although all soyabean and bean seed was out. In Central Region, 39 per cent of maize seed was left.

Besides the problems relating to the initial distribution of seed from the regional depots to the field, there is also the task of moving stocks from field markets with surplus to those with deficit during the course of the selling season. There is only anecdotal evidence available concerning this: it all suggests this is not carried out with maximum efficiency – in large part due to the communications and transport difficulties between field markets – resulting in larger than necessary shortages and carry-over stocks.

Seed Survey Results

The objectives of the farmer survey were to establish at what time of year farmers wish to have seed ready for planting (we distinguished this from the time of year farmers actually plant) and to obtain their assessment of whether ADMARC has stocks available at this time. Local maize was not included in this part of the survey as local maize seed is always sourced locally.

A wide range of answers were given concerning what time of year farmers wish to have hybrid maize seed ready, from at harvest (June/July) to December, and this did not appear to be related to their geographical location (i.e. Eswazini farmers being further North than those in Kabwazi and Bembeke). The modal answer was September/October. A number of respondents mentioned specifically that they would like to be able to buy seed when selling their produce (i.e. in June and July) to ease their cash flow problems.

All the respondents in Kabwazi considered ADMARC seed is only sometimes available at the desired time. ADMARC staff at Thiwi and Lifidzi (both serving Kabwazi) supported this assessment: for example, at Lifidzi parent market, at the time of the survey visit on 30 November 1990, there had been no hybrid maize seed available for six weeks. The market staff had notified the parent market of this but had been told there was no more seed at NSCM and they should make their own arrangements to obtain surplus stocks from other ADMARC markets. Thiwi market had had haphazard deliveries of seed – including in November, December and January after the main selling season – in the past, but deliveries had been satisfactory in the current year.

In Eswazini, there was more widespread evidence of the non-timeliness of

Table 15: ADMARC seed deliveries as at 30 November 1990 (tonnes)

	Allocation	*Distributed*	*Sales*	*Stock*
Central Region				
MH12	298.00	300.01	274.42	2.91
MH16	111.00	105.48	93.88	11.45
NSCM41	871.00	909.41	618.11	309.11
R201,215	1,257.00	1,219.64	1,021.34	158.44
UCA	32.70	57.74	2.99	55.05
CCA	36.00	24.33	3.01	5.05
KEP	—	2.37	2.22	0.27
Northern Region				
MH12	34.00	43.00		
MH16	11.00	10.00		
NSCM41	244.00	244.08		
R201,215	648.00	656.93		
UCA	15.00	14.65		
CCA	2.00	2.40		
KEP	10.00	4.98		
CCC	3.00	—		
Soyabeans	306.00	103.39		
Chalimbana	170.00	337.64		
Nasaka	—	23.83		

Source: ADMARC records

seed delivery: 75 per cent of respondents said hybrid maize seed was never or only sometimes available at the desired time. Again, 1990 evidence supported this assessment: Njuyu ADMARC shed (serving part of Eswazini) had opened only four days prior to the survey visit on 6 December and had 0.4 tonnes of hybrid maize seed available, whilst half of the 27 agricultural credit clubs in the EPA had not yet received seed and there had been no cash sales to date. At Eswazini ADMARC shed, stocks were higher (2.8 tonnes) but, again, the first delivery had not been until 23 November.

Half the respondents in Bembeke said seed was always available on time but often preferred varieties were not, and half said seed was never available on time. In 1990, seed had arrived at Bembeke ADMARC on time, at the end of October. When the Bembeke ADMARC depot was visited by the survey in mid-December, nearly all the distribution of seed on credit (47 tonnes in total) was complete but only 0.9 tonnes of seed was available for cash purchases.

ADMARC staff at all the markets visited maintained that sales of seed could start as early as June, as long as stocks are available, and often the bulk of

sales take place in August and September, as farmers combine purchase of inputs with one trip to market for the sale of produce – even though the official seed selling season is targeted to get under way only from late October. Both ADMARC staff and farmer respondents confirmed farmers who are members of agricultural credit clubs tend to have priority access to such deliveries of hybrid maize seed as are made.

In Kabwazi, the uniform desired time of availability of groundnuts for planting was late October/early November; in Eswazini, there was a greater range – from August/September through October to November/December, with no clear mode. Groundnuts are not grown in Bembeke. In Kabwazi, all farmers said groundnuts are always available at ADMARC in time for planting (although there were no groundnuts left at Lifidzi parent market at the time of our visit). In Eswazini, 90 per cent of respondents said groundnuts were never or only sometimes available at the desired time.

A wide range of desired times of availability of beans for planting were recorded, from August/September to December, the modal response being November/December. In Bembeke, seed is needed twice each year, in November/December and again in July/August, for double cropping. In Kabwazi, all farmers considered beans to be available at the desired time (and this was confirmed by Lifidzi ADMARC staff). In Eswazini, all respondents considered beans are never or only sometimes available at the desired time. In Bembeke, most farmers considered beans for planting are only sometimes available on time.

There was no clear distinction between the relative timeliness of bean seed availability from different sources: some respondents considered ADMARC always provides planting material on time and local sources do not; others considered the opposite to be the case. As with hybrid maize, there were numerous complaints that although some beans are usually available on time, preferred varieties are often not – and also that any improved seed that is available is reserved for credit recipients at the expense of cash purchasers.

The desired time of availability of soyabeans for planting was October in Kabwazi and December in Bembeke. The prevailing assessment, by 70 per cent of the respondents, was that soyabeans for planting were always available from ADMARC at the desired time. Plenty of soyabeans were available at Lifidzi ADMARC depot in Kabwazi at the time of the survey visit in November 1990 and some 0.98 tonnes of seed was delivered to Bembeke ADMARC by mid-December, however all this latter was reserved for credit recipients.

12
Seed Prices

Seed Price-Setting Process in Malawi

The Board of NSCM announces the retail prices for the Company's seed in the May preceding the start of the seed selling season. The prices at which ADMARC will sell seed are announced by the MOA, together with official agricultural producer prices for the forthcoming season, in September/October each year, after discussions involving the MOA Chief Agricultural Officer, the MOA Planning Unit, the ADDs, NSCM, Seed Services and ADMARC. Table 16 gives real retail seed prices from both sources for the last ten years.

The overall objective of NSCM in setting its retail seed prices is to recover production costs and provide a return on capital employed. However, as the sole large-scale producer of seed in Malawi, it also feels an obligation to be sensitive to national development objectives and arranges a differential allocation of overhead costs between product lines to allow retail seed prices of nationally important crops, such as maize, to be held down. It controls the prices at which seed may be sold from each of its outlets. As ADMARC provides NSCM's largest outlet in volume terms (about 80 per cent of the Company's domestic seed sales by volume), NSCM discounts the price the Corporation is asked to pay. In 1990/91, for example, the discount on maize seed was 17.5 per cent (MOA, 1990).

The prices at which NSCM and SSMS seed are sold through ADMARC are proposed by the MOA Planning Division Pricing Unit using a pricing model which takes into consideration producer prices, estimated production trends and the relative importance of different crops for national development objectives. Both NSCM and SSMS seed has been sold by ADMARC at subsidised prices, the amount of the subsidy varying between crops and over time, as shown in Table 16.

The arguments put forward to justify subsidising retail seed prices to small farmers are:

- to encourage uptake of improved varieties in order to increase yields and profitability, for example of maize and groundnuts;
- to encourage diversification by promoting special crops, for example soyabeans;
- to maintain seed quality by discouraging farmers from retaining their own seed, for example of groundnuts;
- to off-set the impact on small farmers of Malawi's particularly high seed production and seed import costs[16] (MOA, 1990).

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16. The former due to the need for contract seed growers to be paid prices that compete with high-value tobacco production; the latter because of Malawi's land-locked position.

Table 16: Real seed prices in Malawi 1980/81 – 1990/91 (MK/kg)

	1980/81	*1981/82*	*1982/83*	*1983/84*	*1984/85*	*1985/86*	*1986/87*	*1987/88*	*1988/89*	*1989/90*	*1990/91*
Single cross hybrid maize											
NSCM Retail Price	0.73	0.74	0.77	**	0.69	0.60	0.61	0.60	0.59	0.75	0.94
NSCM Price to ADMARC	**	0.74	0.73	0.73	0.71	0.67	0.61	0.49	0.48	0.55	0.70
ADMARC Retail Price	**	0.74	0.68	0.61	0.60	0.54	0.50	0.40	0.33	0.39	0.45
Seed Retail Price Subsidy (%)	**	0	7	17	15	19	19	19	33	30	35
Consumer Grain Price	0.08	0.10	0.11	0.09	0.10	0.09	0.09	0.09	0.08	0.08	0.08
Producer Grain Price	0.07	0.06	0.09	0.08	0.07	0.06	0.06	0.06	0.07	0.07	0.07
Three-way cross hybrid maize											
NSCM Retail Price	**	**	0.73	0.65	0.69	0.60	0.45	0.48	0.54	0.64	0.80
NSCM Price to ADMARC	**	**	**	**	**	**	**	0.38	0.40	0.45	0.56
ADMARC Retail Price	**	**	**	**	**	**	**	0.34	0.28	0.35	0.41
Seed Retail Price Subsidy (%)								10	29	22	28
Consumer Grain Price	0.08	0.10	0.11	0.09	0.10	0.09	0.09	0.09	0.10	0.08	0.08
Producer Grain Price	0.07	0.06	0.09	0.08	0.07	0.06	0.06	0.06	0.07	0.07	0.07
Composite maize											
NSCM Retail Price	0.25	0.34	**	**	**	**	0.32	0.36	0.38	0.44	0.07
NSCM Price to ADMARC	0.30	0.34	0.37	0.37	0.36	0.41	0.30	0.28	0.28	0.29	0.34
ADMARC Retail Price	**	**	**	0.29	**	**	**	0.23	0.18	0.23	0.29
Seed Retail Price Subsidy (%)	**	**	**	23	**	**	**	19	34	22	13
Consumer Grain Price	0.08	0.10	0.11	0.09	0.10	0.09	0.09	0.09	0.08	0.08	0.08
Producer Grain Price	0.07	0.06	0.09	0.08	0.07	0.06	0.06	0.06	0.07	0.07	0.07

Table 16: Real seed prices in Malawi 1980/81 – 1990/91 (MK/kg) *Continued*

	1980/81	*1981/82*	*1982/83*	*1983/84*	*1984/85*	*1985/86*	*1986/87*	*1987/88*	*1988/89*	*1989/90*	*1990/91*
Groundnuts											
NSCM Retail Price	0.50	0.52	0.47	0.43	**	**	**	**	0.36	**	1.29
NSCM Price to ADMARC	**	**	**	**	**	**	**	0.30	0.24	**	**
ADMARC Retail Price	**	0.52	0.47	0.43	0.42	0.41	0.36	0.28	0.24	0.23	0.23
Seed Retail Price Subsidy (%)	**	**	**	**	**	**	**	6	0	**	***
Consumer Grain Price	0.33	0.30	0.46	0.42	0.35	0.32	0.36	0.28	0.24	2.50	0.25
Producer Grain Price	0.33	0.30	0.30	0.25	0.42	0.41	0.36	0.28	0.24	0.23	0.21
Beans											
NSCM Retail Price	0.73	0.72	0.65	0.57	0.48	**	**	0.57	0.48	**	0.56
NSCM Price to ADMARC	**	**	**	**	**	**	**	0.57	0.25	**	**
ADMARC Retail Price	**	**	0.65	0.57	0.51	0.46	0.43	0.34	0.25	0.25	0.25
Seed Retail Price Subsidy (%)	**	**	**	**	**	**	**	40	0	**	**
Consumer Grain Price	0.15	0.13	0.26	0.27	0.25	0.23	0.20	0.34	0.25	0.24	0.25
Producer Grain Price	0.14	0.13	0.16	0.22	0.24	0.23	0.21	0.17	0.14	0.14	0.14
Soyabeans											
NSCM Retail Price	0.50	0.45	0.41	0.39	0.36	0.39	0.35	0.28	**	**	0.47
NSCM Price to ADMARC	**	**	**	**	**	**	**	0.27	0.42	**	**
ADMARC Retail Price	**	**	**	0.44	0.39	0.36	0.31	0.27	0.20	0.19	0.18
Seed Retail Price Subsidy (%)								0	52		
Consumer Grain Price	**	**	0.22	0.19	0.18	0.17	0.31	0.27	0.20	**	0.18
Producer Grain Price	0.11	0.12	0.09	0.08	0.10	0.10	0.12	0.17	0.13	0.10	0.14

Notes: (1) Single Cross = *MH12*; Three-way cross = *NSCM41*; Composite = CCA; Groundnuts = *Chitembana*; Beans = all varieties; Soyabeans = all varieties. (2) + = average price for all maize varieties. (3) Seed retail price subsidy = % difference price paid to NSCM by ADMARC and price charged to small farmers by ADMARC. (4) ** = not available. (5) Nominal prices deflated by Blantyre low-income Consumer Price Index.

Sources: MOA Price Policy Documents 1990/91 and 1989/90; ADMARC records; NSCM Seeds Catalogues 1990/91 and 1989/90; World Bank, 1990a Appendix Table 3.05; CDC, 1983

Achieving these objectives via subsidising inputs rather than by increasing producer prices is felt to be more appropriate because increased producer prices may be spent only partly on yield-increasing agricultural inputs (a major concern in a land-short country like Malawi); and because increased producer prices may give rise to difficulties in selling the production on export markets or to local consumers (MOA, 1990).

Returns to Using Improved Seed

Although the retail seed prices announced by the MOA are influenced by national development concerns, it is estimates of returns to production, in the form of gross margins, that form the departure point for the price calculations. However, the basis of some of the calculations can be questioned, in a way which puts a different interpretation on the returns to the use of improved seed for small farmers. In particular, the yield estimates and fertiliser application rates used in the calculations for hybrid and local maize differ from those given in the MOA *Guide to Agricultural Production* and elsewhere. The gross margins for unfertilised local maize assume an average yield of 800 kg/ha, whereas both FAO trials and ASA survey results show average yields closer to 1,170 kg/ha – 46 per cent higher. Similarly, fertiliser applications for hybrid maize are taken to be 100 kg 20:20:0 and 150 kg Calcium Ammonium Nitrate (CAN) (for conventional fertiliser) and 50 kg Di-Ammonium Phosphate (DAP) and 115 kg urea (for high analysis fertiliser), whereas recommended applications in the *Guide* are 200 kg and 200 kg for conventional and 80 kg and 175 kg for high analysis. These differences mean that in the gross margin calculations, fertilised hybrid maize production appears considerably more profitable and local maize production appears considerably less profitable than they actually are.

Real Per Hectare Returns Using Improved Seed

Table 17 shows the real returns to maize, groundnuts, beans and soyabeans production taking into account these alterations. In 1982, there was a clear benefit in per hectare terms to growing hybrid maize with or without fertiliser. Real returns per hectare to growing groundnuts using improved seed were quite a lot lower and real returns per hectare to bean production using improved seed were lower still. Over time, the real returns per hectare to hybrid maize production have decreased significantly. Returns to fertilised hybrid maize production improved with the introduction of high analysis fertiliser in 1986/87 but to less than 1982/83 benefit levels.

In contrast, real returns per hectare to groundnut production using improved seed increased significantly at first, before falling to pre-1982 levels. Returns to bean production plunged dramatically, then improved in the mid-1980s, but by 1988/89 returns were two thirds of 1982 levels and beans were less than a third as profitable as groundnuts. In 1988/89, soyabean production with improved seed was slightly more profitable than groundnuts and local maize in per hectare terms, even without the use of inoculant.

Table 17: Small farmers' gross margins (real) (MK)

Crop/Year	*1981/82*	*1982/83*	*1983/84*	*1984/85*	*1985/86*	*1986/87*	*1987/88*	*1988/89*
Using Improved Seed								
Maize								
Hybrid no fertiliser	133.97	117.44	109.02	95.53	82.82	64.94	69.66	92.32
Hybrid conventional fertiliser	152.63	113.40	104.55	80.65	55.77	41.22	50.54	85.54
Hybrid high analysis fertiliser (low rate)	*	*	*	*	*	53.42	68.12	101.02
Groundnuts								
Chalimbana	73.93	122.89	121.11	127.74	118.70	95.16	67.45	67.40
Manipintar			90.64	110.18	104.71	98.57	72.54	71.44
Beans	27.61	(3.19)	18.04	32.56	31.41	25.75	18.94	19.42
Soyabeans								79.23
Using grain as seed								
Maize								
Local no fertiliser	103.59	91.26	83.63	75.67	66.40	53.00	53.77	68.80
Local conventional fertiliser	114.80	93.85	85.99	74.13	59.66	46.86	49.42	69.77
Local high analysis fertiliser	*	*	*	*	*	46.34	51.52	72.02
Groundnuts	91.89	123.62	122.19	133.59	125.11	95.16	67.45	67.40
Beans	27.61	24.35	38.60	51.17	47.74	11.20	18.72	19.42

Notes: *= High analysis fertiliser was not commonly used in these years

Sources: Calculated from information contained in MOA Pricing Unit gross margin analysis, MOA *Guide to Agricultural Production*, ASA, 1987/88, FAO trial results 1989/90, GOM Price Policy Document 1990/91, World Bank, 1990a (ADMARC records and Sahn *et al.*, 1990).
and deflated using Blantyre low income Consumer Price Index

Real Per Hectare Returns Using Grain as Seed

Table 17 also shows the real returns per hectare to using grain as seed, for local maize, groundnuts and beans; data is not available for soyabeans. Commercial grain has been valued at ADMARC consumer prices to represent the opportunity cost of using seed saved on-farm and the actual cost of buying commercial grain, the planting material most small farmers have access to.

Returns per hectare to local maize production declined so the relative profitability of local maize and hybrid maize remained about the same, with local maize about three quarters as profitable as hybrid. The gap between the relative profitability of fertilised compared to unfertilised local maize reduced considerably, however, so the benefit to applying fertiliser to local maize virtually disappeared.

Real returns per hectare to planting commercial groundnuts rather than improved seed, were substantially higher at the beginning of the 1980s and during 1984/85–1985/86 and, importantly, gave better returns than both hybrid and local maize production between 1982/83 and 1986/87. But most recently the gap between consumer grain prices and seed retail prices has disappeared and so has the difference in returns. Using commercial beans rather than improved seed gave very substantially higher real returns per hectare until 1985/86 but, again, most recently the difference in price has disappeared so returns are now more comparable.

It is not agronomically necessary to replace seed every year for any crop except hybrid maize. Therefore, most correctly, the returns to using grain as seed should be compared with the returns to using improved seed at the replacement rates recommended by the MOA. These are every 2–3 years for groundnuts and every 5–6 years for beans (MOA, 1989). In the past, this distinction would have made an important difference, reducing the overall cost of using improved seed, particularly for beans. However, most recently, because of the minimal difference between consumer grain prices and seed prices, the influence of replacement rates on returns has ended.

Farmer Survey Results

Initially, it was intended to find out the influence of the level of seed prices on survey households' decisions to use improved seed, through questions designed to reveal households' price and income elasticity of demand for seed. However, few households use improved seed for non-maize crops and it proved impossible to discuss hypothetical changes in seed prices and income levels, so this approach was abandoned in favour of collecting more general information about how households finance seed purchases and the extent that the price of seed, as opposed to other factors, influences the use of outside sources of planting material. Price information collected is given in Table 18.

Other work on the uptake of improved seed by small farmers (see, for example, Heisey, 1991; Prain and Uribe, forthcoming) has established the

Table 18: Prices paid for planting material: survey households

Source	*Location*	*Year*	*Price (t/kg)*
Groundnuts			
Local people	Eswazini	1990	117
Local people	Eswazini	1990	20
ADMARC (seed)	National	1990	100
ADMARC (grain)	National	1990	110
Beans			
Local market	Kabwazi	1990	125
Local people	Kabwazi	1990	100
Local people	Eswazini	1990	100
ADMARC (seed)	National	1990	250
ADMARC (grain)	National	1990	110
Local market	Kabwazi	1989	50
Local market	Bembeke	1989	33
ADMARC (seed)	National	1989	n/a
ADMARC (grain)	National	1989	95
Soyabeans			
Local people	Kabwazi	1986	17
ADMARC (seed)	National	1986	139
ADMARC (grain)	National	1986	66
Mission	Eswazini	1989	66
ADMARC (seed)	National	1989	75
ADMARC (grain)	National	1989	n/a

Source: Seed survey

separateness in farmers' minds of decisions to obtain a new variety for the first time and decisions to continue obtaining replacement seed of an improved variety over time. This distinction is particularly important with respect to

farmers' assessment of seed prices and in discussions with survey households efforts were made to distinguish whether respondents' answers related to initial adoption or regular replacement of improved seed.

Hybrid Maize

A small majority of survey households perceive the net benefits of hybrid maize cultivation to be positive and stable over time, and a significant minority have recently been persuaded to try hybrid maize cultivation but found it not worthwhile continuing. Only one of the respondents who has never grown hybrid maize expressed the wish to try it.

90 per cent of long-term hybrid maize growing households previously bought entirely on credit. For the 1990/91 season, 40 per cent bought on credit (half of these also get some on cash) and 15 per cent bought on cash whilst 15 per cent are members of credit clubs currently in default. The remainder were planning either to recycle seed or not to grow hybrid maize.

From the information collected, it is possible to draw various conclusions concerning the influence of seed price on the decision to grow hybrid maize. Firstly, there seems to be a low awareness of prices amongst the survey households growing hybrid maize: over half the respondents commenting on hybrid maize seed prices could not remember or misquoted recent cash prices they had paid; a further third obtained seed on credit but quoted the cash price (which is 12 per cent less). Only one respondent was using the official price-setting system to his advantage by buying carry-over seed from the previous season before the new producer and input prices are announced in September/October.

Over half the respondents, all credit defaulters at the time of the survey, mentioned lack of cash resources to pay for seed as a significant factor limiting use of hybrid maize seed. One respondent also cited lack of cash to buy fertiliser as a constraint to hybrid maize uptake and another cited lack of cash to pay for the additional labour needed for hybrid maize cultivation.

This leads on to the vexed question of the influence of credit availability on small farmers' decision to grow hybrid maize in Malawi. The major points of the debate are the extent to which typical small farm households do need credit in order to grow hybrid maize, and for which parts of the hybrid maize 'package', viz. seeds or fertiliser or both. Although credit is technically available, and has in practice in the past been available, for purchasing seed for other crops, the current non-availability of improved seed for crops other than maize means no farmers are obtaining credit for seed for groundnuts, beans and soyabeans, at present.

The MCT at Chitedze Agricultural Research Station considers that a proportion of hybrid maize seed uptake is the result of small farmers' desire for credit, because all currently available credit packages contain seed for hybrid maize only, rather than their conscious decision to adopt hybrid maize as a new crop. This hypothesis is considered to be supported by data which

show some larger farmers, who are not so dependent on credit, grow only local maize.

The survey households are reasonably representative of smaller, poorer farm households in Malawi. One of the most interesting findings of the survey has been the response of hybrid maize growers to being debarred from credit. Nearly one quarter have stopped growing hybrid maize but over three quarters have continued, using other sources to finance seed purchases: cash from children or friends and income from other cash crop sales. It seems, therefore, that credit performs different functions in different households and is not well targeted towards only the neediest of households: for one third of defaulting households, credit is a bonus and seed purchases can easily be financed from domestic cash reserves; for nearly half the defaulting households, credit is useful but in an emergency the households can find cash from other sources to finance seed purchases; and for only just over one fifth of defaulting households has the withdrawal of credit cut off access to hybrid maize production immediately.

Local Maize

5 per cent of households growing local maize had bought maize grain from ADMARC in order to start growing the crop, 5 per cent had bought maize grain from a local market to replenish depleted seed stocks, 5 per cent had exchanged existing seed for a different, preferred, variety with a local person, and nearly 20 per cent had been given maize grain as a gift from relatives – two thirds of these to restock after a bad harvest and the remainder to change variety. The remaining households (20 per cent of the total) had done seasonal agricultural labour to get grain to plant. Two thirds of these, all in Kabwazi, are virtually destitute and get grain to plant this way every year. In 1990, they had received one plate (0.3 kg), for cultivating 0.4 ha or for one day's work. With the minimum daily wage at MK1.74 (World Bank, 1990a: Appendix Table 5.03), this equates to MK5.80/kg. Only 20 per cent of households obtaining local maize seed from off-farm sources specifically mentioned lack of cash resources as a constraint to obtaining local maize for planting from off-farm sources.

Groundnuts

Two thirds of the households obtaining seed off-farm cited lack of cash to pay for seed at current price levels as a constraint to using off-farm seed sources. All the households normally saving seed cited lack of cash as a constraint to obtaining seed off-farm. Although certified improved groundnut seed is not currently available on credit, nearly 30 per cent of households had obtained groundnut seed on credit in the past, but less than half of these cited the availability of credit as a significant advantage of obtaining seed from ADMARC. The same number gave this as an advantage of obtaining seed from private traders. One household said ADMARC seed is only affordable if

obtained using credit.

Overall, two thirds of all groundnut growers cited lack of cash as a constraint to purchase, but this may be because the net benefit is not clear as the material farmers are currently buying is not improved seed and even if it were, the incremental yield is low.

Beans

30 per cent of households obtaining planting material off-farm stated that lack of cash is a constraint and 10 per cent of households stated that this constraint specifically limits their access to new varieties, half of them obtaining beans as a gift to get round this constraint and half doing seasonal agricultural labour for the same reason. 70 per cent of the households using off-farm sources for bean planting material cited insufficient cash to pay for beans at current price levels as a major constraint to increasing purchases, either of varieties currently in use (60 per cent) or of new ones (10 per cent). None of the chronically insecure households mentioned price as determining choice of bean seed source but all mentioned lack of cash as a constraint to purchase. One third of households saving beans for planting cited cash as a constraint to obtaining planting material from off-farm sources. Only half the households buying beans from off-farm sources could cite the price they had paid.

Only one household had obtained bean seed on credit; most purchases are on cash terms, with some seasonal agricultural labour and gifts. Prices farmers pay are generally lower than ADMARC's but they are paying for commercial grain, not improved seed. There appears to be a relatively high level of price awareness. Similarly, price is quite widely perceived as a constraint to initial purchase and to changing varieties – but, again, the relevant prices are those for grain not seed.

Soyabeans

70 per cent of households had bought seed from ADMARC but only 20 per cent of these could cite correctly the price they had paid; the others all overestimated. Only 15 per cent of households considered the price of soyabean seed to be a factor worth commenting on, all citing the price advantages of obtaining seed from ADMARC (one household relating this to the availability of credit).

13
Preferred Sources of Seed

To try to understand the relative importance small farmers attach to different aspects of seed sector performance, survey households were asked to name their preferred source of seed for each crop and to detail the criteria on which they make this choice.

Hybrid Maize

Because hybrid maize seed is at present widely available for small farmers only from ADMARC markets, choice of seed source for hybrid maize is hypothetical and survey households found it difficult to discuss this nebulous concept. This was reflected in households' responses to questions about preferred seed sources: all cited ADMARC, because it is currently the only widespread source of hybrid maize seed. Also, a majority of households were unable to give a specific advantage or disadvantage to obtaining hybrid maize seed from ADMARC. The advantage cited by the largest number of households was the availability of credit, administered through the ADDs, to finance seed purchases. Other advantages cited were ease of access to seed, seed quality and price. 'Access' was being used by farmers in a very specific sense, to mean equality of opportunity in attempting to obtain the available seed, as distinct from economic access or physical access. This was a widespread and recurring concern, probably reflecting the fairly common habit of hoarding seed and distributing it outside the immediate family only to selected people. The disadvantage cited by the largest number of households was unreliable availability of seed. Other disadvantages cited were rationed access to seed and late delivery of seed supplies.

Groundnuts

Two characteristics of seed sources were clearly of most importance to small farmers obtaining groundnut seed from off-farm sources, these being physical availability of seed and the price of seed (including the availability of credit). Four other characteristics were cited: seed quality, timeliness of delivery, availability of particular varieties and, specific to groundnuts, whether or not seed is sold in shell. Two farmers' choice of seed source was influenced by their ability to get preferential access to groundnuts, one as a seasonal ADMARC buyer and one as a Traditional Authority.

The major advantage of obtaining groundnuts for planting from ADMARC was considered to be the availability of credit, although this has been of little relevance in recent years as few ADDs have offered groundnut credit packs, due to the non-availability of seed. Some households also mentioned good access to groundnuts, the majority for reasons to do with preferential access, as above, but some also as a source of seed in crisis. A range of other factors

were also cited: affordable prices, good quality groundnuts and, related to this, ADMARC's policy of selling confectionery groundnuts out of their shells, so the visual quality of seed is easily apparent – although this actually increases the dangers of physical damage and aflatoxin contamination and is not recommended by Seed Services. The main disadvantage of ADMARC as a source of groundnuts for planting is considered to be the unreliable availability of groundnuts. Late delivery, high prices and absence of preferred varieties were also cited.

The major advantage of obtaining groundnuts for planting from local people or local markets was considered to be reliable availability. In descending order of importance, the range of disadvantages given were: lack of credit; the practice of selling groundnuts in shell; and the unavoidability of buying mixed grain rather than distinct varieties.

Weighing up all these factors, half of the households gave stocks saved on-farm as their preferred source of groundnuts for planting, because this saves cash and provides farmers' preferred varieties. 40 per cent favoured ADMARC, most of these citing avoidance of 'pops' (by buying de-shelled groundnuts) as the main reason.

Beans

Factors cited as important influences on choice of bean seed source by households obtaining planting material off-farm were, in descending order of importance: reliable seed availability; access to seed;[17] seed price; seed quality; availability of preferred varieties; possibility of buying small quantities of seed.

ADMARC was preferred for price, quality and access and disfavoured for unreliable availability, large minimum purchases (viz. 1 kg) and non-availability of preferred varieties. Local people and local markets were preferred for reliable availability, availability of preferred varieties and possibility of small purchases, as well as for price and nearness. Relatives were preferred for reliable availability. No specific disadvantages were cited.

Taking all these factors into account, 40 per cent of households gave beans saved on-farm as their preferred source of planting material, 30 per cent favoured local people and local markets, nearly one quarter favoured ADMARC and the remainder preferred using a variety of sources. Relatives were not cited as a preferred source by any household.

The reasons given for preferring saved beans were: no cash needed, known and constant variety, timely availability and access. ADMARC was preferred for access, and for quality and price equally, together with – for farmers in Eswazini – the lack of any alternative source. Local people and local markets were preferred for availability of preferred varieties, possibility of small purchases and, equally, quality, reliable availability and nearness.

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17. Access was the single most important factor in Bembeke.

Soyabeans

The two most commonly cited advantages of using ADMARC for initial supplies were access and reliable availability. Nearness was also mentioned. However, some households made the opposite assessment and considered the disadvantages of ADMARC were the unreliability of seed supply and the distance to the nearest market.

The most commonly cited reason for using local people and local markets as an initial source was that they were the only available source of seed at the time. Some households also mentioned their nearness. The one disadvantage cited of using local sources was the restricted access to seed due to hoarding. The main advantages of using ADMARC for planting material for soyabeans now are considered to be the availability of credit and price levels. Unreliable availability of seed is still seen as a major disadvantage of ADMARC.

Overall, half the households gave seed saved on-farm as their preferred source of seed whilst one third gave ADMARC, and the remainder did not specify a preference. The reasons given for preferring saved seed were that no cash is needed (one family said specifically that they prefer to save the cash they have for seed purchases to spend on hybrid maize seed rather than other crops) and the seed is not worse in quality than that available from off-farm sources. The reasons given for preferring ADMARC were availability of credit, price, seed quality, nearness and equality of access.

14
Conclusions

Seed Varieties

Farmers have well-articulated preferred attributes for the crops they grow. For hybrid maize these are high yield, large kernels, early maturity, poundability, storability and low external input requirements. For groundnuts they are high yield, large kernels, early maturity and palatability. For beans, high yield, taste, early maturity, fast cooking time and storability. And for soyabeans, large grains, palatability and visual appearance. However, other factors besides physiological attributes influence farmers' variety choice; most importantly the physical availability of varieties at ADMARC. Often, there is only a limited selection of hybrid maize varieties available and only very limited quantities of improved groundnut, bean and soyabean seed.

Progress towards making varieties available with the characteristics desired by small farmers is limited and varies considerably between crops. For hybrid maize, the MCT is now actively breeding for small farmers' preferred attributes and has already produced two new flinty hybrids that store and process better under small farm conditions. The NBP at Bunda College is now well aware of farmers' preferred variety attributes and is working towards this; it was one of the first crop breeding programmes to include non-production characteristics in its formal breeding objectives. But progress has been hampered by the focus on making selections from local varieties rather than breeding new varieties. In particular, there is a need to pursue component breeding, to accommodate the complex role of beans in the small farm farming system in Malawi, and a need to ensure sufficient quantities of seed are produced. Work on soyabeans has been newly reconstituted after a lapse of more than a decade. Relatively little is known about farmers' preferred variety attributes, and the continuing conflict between promoting soyabeans as a food and as a cash crop makes the breeders' task more difficult. From what is known, namely that farmers rank large grains and palatability amongst the most important variety attributes, the Minor Legumes breeding programme objectives seem compatible with farmers' expressed needs. The groundnut breeding programme, however, is still oriented towards breeding varieties for export sales and little work has been done on varieties suitable for domestic consumption or local sales. In particular, varieties are needed with lower oil content, and with smaller seeds to combat the 'pops' problem.

A particular problem with increasing yields of non-maize crops by using improved seed is the low standard of management on small farmers' plots. This does not apply for hybrid maize seed, however, as agronomic standards are high because of its dominance in the small farm farming system.

Quantities of Seed

For most crops, the agreed initial allocations of seed at national level have departed significantly in at least some years from the requests made by ADDs. From a rough calculation, the allocations do not cover large proportions of the hectarages under any crop. And the survey results appear to show that farmers' greatest complaints with regard to seed supply concern inadequate access to the quantities they require. In most areas, farmers wishing to obtain seed from off-farm sources have access to improved seed only for hybrid maize: for groundnuts, beans and soyabeans, most of the material farmers buy to plant is simply commercial grain. The general consensus is that this material is readily available, except for groundnuts. Availability of bean seed at ADMARC is considered particularly bad (but it is considered a good source of soyabeans for planting).

Thus, although there has been good growth in hybrid and composite maize seed sales over time, the area down to each crop planted with improved seed remains very low. This begs the question of to what extent this modest performance has been the result of the organisation of the physical distribution of improved seed to small farmers in Malawi, compared to the organisation of other parts of the seed chain, particularly the production of seed and the procedures for estimating demand for seed. Most of the organisations involved in the estimates process consider the estimation methods used are themselves satisfactory and other factors are the major causes of the wrong quantities and types of seed being delivered to ADMARC selling points. These are said to be ADMARC's unwillingness or inability to commit enough funds to buy the necessary quantities of seed from NSCM; the low level of physical supplies of seed available from NSCM; and, related to both these factors, the annual bargaining process used to reconcile available funds and supplies with estimated demand. The time official producer prices for the coming agricultural season are announced is considered further to make the early accurate estimation of demand for seed difficult. Thus although overall, as with all estimation procedures, there is room for improvement (in particular, the influence of producer prices and weather need to be incorporated), Malawi has a relatively good estimates procedure in place.

NSCM seed production data is available only for maize. This shows a consistent shortfall compared to allocation and a consistent mismatch between requests for particular varieties, particularly single cross hybrids, and quantities made available, which tend to be mainly domestic and imported three-way crosses. However, part of the explanation for this performance must be the difficulty of balancing minimal carry-over stocks with fluctuating demand estimates, with the allied problem of insufficient quantities of growers willing to produce maize seed under contract. SSMS production of groundnut, bean and soyabean seed remains too small to have a significant impact on seed availability at present.

The seed distribution exercise is also critically dependent on ADMARC's co-

operation as the Corporation is the only organisation with infrastructure appropriate to the task and, in the medium term at least, large numbers of individual private traders are unlikely to become involved given the current structure of retail seed prices. ADMARC's role in seed distribution is simply to deliver the allocation of seed set out in the seed estimates to its parent/area markets; it does not have any responsibility for estimating what these allocations should be. ADMARC does always deliver the allocations required, so it bears no responsibility for the failure of supply to meet demand for seed. Its responsibility is therefore more for the timely delivery of seed: it does not help the difficult mid-season reallocation process by finding it almost impossible to move surpluses that emerge to deficit selling points.

At the same time, ADMARC does influence allocations via what it agrees to buy from NSCM. Staff at ADMARC headquarters confirmed that the Corporation buys only those varieties for which demand is known to be strong; the Corporation maintains that it has been forced to operate this policy as it has had to bear the cost of all carry-over seed and seed losses in storage. This responsibility was transferred to NSCM in 1988, so the Corporation should now be able to offer a wider range of varieties and larger quantities of seed in total, to ensure demand is met.

Pack Size

It is widely held that the size of the packs in which seed is sold has an important influence on small farmer demand for seed. In particular, the current hybrid maize seed pack size of 10 kg, which is sufficient for 0.4 ha, is considered to be too big: for example, the official credit programme operated by the Smallholder Agricultural Credit Administration (SACA) feel the need to offer credit packages for 0.2 ha but can only do this by asking farmers to share seed. Further evidence of the demand for smaller packs is provided by the recent development of private retail traders re-bagging seed into small packs (*Daily Times*, 12 November 1990). NSCM has consistently argued against small packs, chiefly on the grounds of cost: the Company could provide small packs only in cheap plastic bags, which ADMARC refuses to handle due to their lack of robustness. Hence, NSCM has produced only 10 kg hybrid maize seed packs since 1982. It re-bags imported maize seed to meet this criterion, and to aid product identification and, it maintains, to keep standards high as its own bags are more robust than those of the Zimbabwe Seed Co-op, from which most maize seed imports come.

Three quarters of households commenting on the 10 kg pack size said it is not satisfactory, two thirds of these saying it is too small. This is a significant contradiction to the prevailing assumption that 10 kg packs are too large for many farmers to make use of. The proportion of households commenting on the 1 kg minimum quantities in which groundnuts, beans and soyabeans are available from ADMARC were not significant. Ultimately, the results of the survey concerning the influence of credit and price on small farmers' decisions

to obtain improved seed show that there is a proportion of small farmers who at present cannot afford seed whatever the pack size.

Seed Quality

There is little emphasis within the MOA on activities to promote awareness of the differences between grain and seed, or to promote good seed saving practices on-farm. Perhaps reflecting this, a majority of seed survey households were unable to specify particular attributes used to select seed and did not detail any special seed selection practices (treatment, storage, etc.).

Of the seed samples provided for assessment, less of the retained groundnut seed was very good compared to that obtained off-farm. For beans, a higher proportion of retained seed was very good compared to planting material obtained off-farm, and most farmers treated retained bean seed. None of the retained soyabean seed was very good, but few samples were provided. All the material obtained off-farm was grain not improved seed.

The quality of seed coming out of NSCM seems to be acceptable. ADMARC's new arrangement with NSCM for dealing with carry-over seed stocks should minimise problems at distribution level, but poor storage conditions and lack of control over re-bagging at local level are problems that still need addressing. Nonetheless, the survey households generally expressed a high degree of confidence in the quality of the NSCM seed reaching them.

SSMS seed reaches virtually no small farmers at present. It does seem to achieve acceptable quality standards and the major problem appears to be the inability of Seed Services to cope with the field inspection workloads. Indeed, insufficient funding and autonomy of Seed Services seem to be major constraints to ensuring seed quality in Malawi and, given that such an independent body is essential for this function, this could become a major problem if the production and uptake of improved seed does increase significantly in the future.

Maintaining the by-and-large good reputation for seed quality that NSCM, ADMARC and the SSMS have amongst small farmers in Malawi at present, and rectifying the remaining seed quality problems, is of course important. However, this must be set in the context that virtually no improved seed is reaching small farmers in Malawi at present, apart from the relatively small proportion of small farmers growing hybrid maize. Thus seed access problems have to be addressed more urgently. Whilst the major thrust has to be on increasing the physical availability of seed, increasing small farmer awareness of the benefits of using improved seed is a very important part of the equation. At present, there does not appear to be any extension work on the value of quality seed or on on-farm seed maintenance and selection techniques.

Locational Issues

All hybrid maize seed is currently bought from ADMARC selling points. Most survey households are within 5 kms of their nearest selling point. Over half the farmers have had to travel further to reach an ADMARC selling point since the 1987 retrenchment, but the modal increase in distance is only 2 kms. Distance to ADMARC markets selling hybrid maize seed does not appear to be an issue for most households. Local sources, either individuals or markets, are the nearest source of groundnuts for planting for most households. ADMARC selling points are the next nearest and relatives the furthest. There are no significant differences in this between geographical areas. Distance was not mentioned at all in farmers' listings of advantages and disadvantages of different groundnut seed sources. The distance travelled to obtain beans for planting from local sources and from relatives was significantly greater than for other crops but only one household cited distance as a factor influencing choice of seed source. Initial sources of soyabeans were local sources 5–10 kms distant and nearby ADMARC selling points. A majority of households are now saving soyabean seed so distance is not an issue. The results relating to the influence of distance on choice of source were contradictory.

In general, as individual households using ADMARC selling points tend to travel to the same limited number that are within reach locally to source seed for all crops, there is no variation in distance of selling points used for different crops. Relatives, used primarily for groundnuts and beans, are furthest away, perhaps because households are prepared to travel to get a particular type of seed or to take advantage of kinship obligations to obtain seed. Local sources for groundnuts are the nearest, and nearer than ADMARC selling points; they are also relatively near for soyabeans, but further away than ADMARC. They are quite far away for beans, perhaps because households are willing to travel further to source the range of varieties needed to maintain bean portfolios.

Overall, current distances travelled do not appear to influence households' choice of seed source. It therefore does not appear to be a significant problem that the density of ADMARC markets has decreased fourfold since liberalisation. This may be because most households obtaining planting material from ADMARC are in fact buying commercial grain, which they can do from seasonal markets: the density of these has apparently changed only little in practice after liberalisation so that the majority of small farm households are still within 8 kms of some kind of ADMARC facility.

Timeliness of Seed Delivery

For all crops in all areas, the survey farmers want to obtain seed ready for planting considerably in advance of the planting dates recommended by the MOA, but their success in achieving this is mixed.

Farmers want to have hybrid maize seed ready by September/October, considerably in advance of the recommended planting date of mid-November,

but deliveries are rarely available at this time. They want to have groundnut seed by about October/November (there was some variation), again in advance of the recommended planting date of early December, and again they can rarely obtain groundnut seed by this time. The preferred deadline for obtaining beans also varied; the mode was November/December. This is also in advance of the recommended planting date of late January. There seems to be considerable variation between areas in the actual availability: in Kabwazi beans are usually available at this time; in Bembeke they are sometimes but not always; and in Eswazini, they are never available at this time. The preferred deadline for soyabeans varies between areas: October in Kabwazi and December in Bembeke, in contrast to the recommended planting date of late December. In both areas, soyabeans are usually available at the required time.

The ADMARC staff at the markets visited all found that farmers try to buy seed as soon as the markets open, i.e. in early July, so they can buy seed at the same time as selling produce, but deliveries have in the past continued into December and January, when seed sales have virtually ceased. None of the markets visited had received seed deliveries in 1990 before the end of November. Visited in late November and early December, none had seed stocks of any size left and one had run out completely.

All the available evidence suggests that seed distributed through ADMARC's market network is not, at present, reliably available for small farmers to purchase as early in the season as they wish. It is alarming that the system does not seem to be able to deliver on time even the small quantities of seed currently available to small farmers, never mind the much larger quantities that are likely to be available in the future.

Seed Prices

The returns to growing local maize are higher than indicated in the MOA gross margin calculations and seed costs as a proportion of total variable production costs are minimal. Growing local maize using seed saved on-farm continues to provide a substantial positive return for small farmers and at the local maize yields currently being recorded in Malawi, the best bet for small farmers still remains using retained local maize seed, either with or without fertiliser.

Obtaining local maize seed from off-farm sources is an issue only for the small proportion of households that are chronically seed insecure. These households are getting commercial grain and paying consumer grain prices; although costs are lower than indicated in the MOA gross margin calculations, the returns as yields from planted commercial grain, which is a mixture of hybrid, composite and local varieties, must be significantly lower than from saved seed. Three quarters of the survey households providing information cited cash as a constraint to obtaining local maize for planting from off-farm sources. Providing the 55 per cent of Malawi's small farm households who are on the borderline of viability (World Bank, 1989) with economic access to planting material for local maize therefore requires an integrated assessment

of consumer/producer price ratios for local maize and the other factors known to be critical for them.

There is a clear yield advantage to using hybrid maize seed and the seed cost is a small proportion of total variable costs if fertiliser is used. However the economic advantage in real terms of using hybrid maize seed is small. The credit issue is clearly illustrated with respect to hybrid maize: it appears that although a majority of small farmers growing hybrid maize do so using credit, many of them are able to find alternative means of financing production relatively easily if credit is withdrawn.

Because farmers must use seed purchased from ADMARC to grow hybrid maize successfully, i.e. the decision to grow the crop and to use improved seed is one and the same, the design of the farmer survey did not allow accurate investigation of the influence of seed price on farmers' decision to use purchased hybrid maize seed: nonetheless, from asking growers only, it has emerged that 60 per cent of households do grow hybrid maize, most regularly, and most can find alternative sources of cash to buy seed if necessary. This suggests:

- seed price has not deterred 60 per cent of households;
- lack of credit is not a problem for those households already growing hybrid maize;
- the critical requirement now is to find out why 40 per cent of households are not growing hybrid maize, and to focus on credit for these households, if appropriate.

Seed costs are a high proportion of total variable production costs for groundnuts. But there is no great yield advantage to using improved groundnut seed under small farm conditions and real returns are low at official prices; returns to production of groundnuts sold through private traders rather than ADMARC, however, are much higher, as are returns to using saved seed or planting material purchased as grain. Indeed, the groundnut breeders in the DAR maintain it is the high seed price which is the main reason for the widespread recycling of groundnut seed in Malawi. This seems to be a major constraint to encouraging greater use of improved groundnut seed. Only just over half the survey households obtain groundnuts for planting from off-farm sources. Evidence on the influence of price on seed use is inconclusive: two thirds of all growers cited cash constraints as the reason for using saved seed, but this may also be linked to the small yield advantage of using purchased improved seed.

There is no yield advantage under small farmer conditions from purchasing improved bean seed and real returns are barely positive, whilst seed costs are a high proportion of total variable production costs if seed is bought. A major problem appears to be that local market bean prices are lower than ADMARC prices for bean seed and for commercial beans and therefore they represent

better value for money for small farmers, because of the low yield advantage of improved seed from ADMARC – even though beans from local markets are commercial grain rather than seed. In these circumstances, demand for improved seed is likely to be low but the survey evidence is confusing. There is a high level of price awareness amongst survey households but, although over three quarters of households cited cash constraints as the reason for not purchasing beans for planting from off-farm sources, off-farm seed sources are widely used by survey households, mainly by choice. This may be because of the common practice amongst small farmers of maintaining portfolios of a large number of bean types and varieties, which requires greater use of off-farm sources.

Soyabean production using improved seed provides real net returns that are a serious challenge to local maize, groundnuts and beans. But, even though soyabean seed costs as a proportion of total variable production costs are modest, currently there is no yield advantage to using quality improved soyabean seed under small farmer conditions, so money may be spent to greater effect on inoculant – especially as soyabean seed can be recycled successfully over a number of seasons.

Overall, the gross margin analysis suggests there is minimal benefit to purchasing groundnut and bean seed and seed costs have been a much higher proportion of variable costs than at first assumed. Both these factors may well have contributed to lower than anticipated demand for improved seed. The alternative is retaining seed on-farm.

However, as retail seed prices have been competitive with consumer grain prices in recent years, there is no clear financial benefit to using grain rather than seed and therefore if seed is available small farmers should not reject it on price grounds alone. From the survey results, there appears to be considerable unwillingness to allocate scarce cash resources to purchasing seed. However, this may well be more strongly influenced by the lack of a clear yield advantage from using improved groundnut, bean and soyabean seed under the sub-optimal small farm management conditions generally pertaining for these crops in Malawi. Thus, although using improved seed may provide clear national development benefits for certain crops, the incentives to individual small farmers to do so are not at present strong in price terms.

The exact nature of the relationship between seed price and economic returns varies between crops, depending on the balance between ADMARC seed price levels, official producer and consumer grain prices and private trader grain prices, as well as on incremental yield from improved seed and other specific agronomic factors. In some cases, for example groundnuts and beans, the main requirement for increased seed use appears to concern breeding and the production of varieties with increased potential yield. In others, seed issues are relegated to minor concern by physiological factors: the greater need for inoculant for soyabeans, for example. In some, the benefit of using improved seed will not become apparent until small farmer management

practices change to allow better expression of potential yield. In others, such as hybrid maize, seed prices do appear to have an important influence although mainly via their relationship to producer prices and other input prices. Thus, seed prices are not the only factor, nor even the major one, and in any case it is not the absolute level of seed prices but their relationship to other agricultural producer and input prices that has the most significant impact on the use of improved seed.

This is all useful to know for the medium term as it can be used to ensure that any manipulation of agricultural price policy to encourage the use of improved seed is targeted on those crops where it will have an impact. It also shows the limitations to encouraging increased uptake. But, in the immediate future, the more significant problem for small farmers is the absolute shortage of and untimely access to improved seed.

Part IV

Organisational Efficiency Issues

15
NSCM's Internal Efficiency

Anticipated Seed Prices, Sales and Profitability at Appraisal

The official project appraisal for NSCM was carried out in 1978. It was planned that NSCM would be controlled by ADMARC, with 51 per cent of the equity holding. The UK CDC was to hold the remaining 49 per cent and provide the Company's expatriate staff. This system operated from 1981 until 1988, when Cargill took the majority 51 per cent shareholding. ADMARC and CDC each now hold 24.5 per cent. Cargill has taken over responsibility for all staff.

The initial establishment finance required was MK2.44m at 1977/78 prices. This included MK445,000 that ADMARC had already spent on developing its seed activities which was to be 'returned' to the Corporation in the form of shares to the equivalent value. The peak demand for seasonal finance, which would occur at peak processing time in August/September each year, was estimated at MK320,000 at 1977/78 prices and was to be met from bank overdraft.

At the time of the appraisal, the proposed policy on seed pricing was to:

- pay estate contract growers prices sufficient to ensure adequate quantities of hybrid maize seed were provided to the company on a permanent basis. Annual increases in contract grower prices would have to be 7 per cent to keep pace with inflation;
- use small farmer growers to produce composite maize seed, groundnut and bean seed, as the pre-existing level of retail seed prices for seed of these crops would not allow sufficient remuneration to estate contract growers using more capital intensive seed production systems. Even using this system, the financial viability of composite maize seed and bean seed production was anticipated to be severely constrained. Groundnut seed production of any kind was considered to be unviable. As a compromise the Company was to produce only basic seed for multiplication up to certified seed by small farmers, with the losses on basic seed production to be recovered through the charge the Company would make for processing it;
- tobacco seed and legume seed produced by the Company was to be priced at levels providing the Company with sufficient return;
- grass seed production, for estates and the export market, was anticipated to be a profit centre for the Company.

Thus the critical influence of retail seed price levels on NSCM's performance was recognised. Based on these price assumptions, the discounted cash flow rate of return on capital invested for the Company was estimated at 9.75 per

cent. It was recognised that the prices at which the Company could viably produce seed would be too high for small farmer seed users to bear and would need subsidising. It was proposed the cost of this would be met by ADMARC from the Corporation's produce marketing margins and this is the system which operated until 1987, when ADMARC was restructured and the Treasury became responsible for subventing this cost.

The other critical requirement for the Company's long-run financial viability was considered to be its achievement of the level of seed sales forecast in the appraisal, which in turn was seen as depending very much on the success with which the MOA achieved its targeted adoption rates for improved seed.

Over two thirds of total contribution to overheads and financing charges was to come from hybrid maize and tobacco seed production, these lines being considered to be the essential basis for the successful development of the seed company. In particular, it was considered essential for the Company's financial viability that it be given the sole right to organise the production, processing and sale of tobacco seed. Without the value of tobacco seed production, it was estimated the discounted cash flow rate of return for the Company would be only 5.6 per cent.

Actual Performance 1979–1991

NSCM's seed price policy has been a bone of contention since the Company was established. The opinion outside the Company seems to be that the retail prices NSCM charges for seed are unjustifiably high and kept so by the Company in order for it to maximise profits. In this Section, we piece together the available information about NSCM's internal cost structure in order to form a view on its economic efficiency and assess the validity of the argument. This view is as objective as we can make it with the information available to us; it might vary in detail were more complete data to become available.

NSCM's Cost Structure (see Boxes 2 and 3)

Production of breeder and certified seed.[18] NSCM bulks up breeder seed to basic seed mainly on its Lilongwe seed farm and also uses the farm for some certified seed production. However, a large proportion of certified seed production is contracted out to estate growers, for hybrid maize seed, and to smaller farms for composite maize seed. The rationale for using smaller farms for composite maize seed production is that lower contract grower prices can be paid because for these farms certified seed production is not in competition with tobacco production; they are considered unsuitable for hybrid maize seed production due to the higher levels of management required for this crop. The Company changed from using the seed farm to using contract growers for

18. A guide to seed nomenclature is given in Appendix 2.

Box 2: NSCM seed production cost build-up

- **Breeder seed.** Chitedze Agricultural Research Station used to charge for the breeder seed it supplied to NSCM but does not any longer.

- **Basic and certified maize seed produced on NSCM seed farm**

Average production costs per ha

1989/90	*(MK)*	%
land preparation	84.98	10
fertiliser, chemicals	117.00	14
fuel	124.12	15
labour	283.00	33
miscellaneous	235.90	28
total	845.00	
1990/91	1,556.00	

Source: NSCM records.

- **Certified seed produced by contract growers**

Contract grower seed prices est. at appraisal

single cross	30t/kg
composite	10t/kg
groundnuts	40t/kg

Contract grower seed prices 1989/90

single cross	MK2.10/kg
three-way cross	MK1.20/kg
composite	55t/kg

Contract grower seed prices 1990/91

single cross	MK2.40/kg
three-way cross	MK1.40/kg
composite	60t/kg

Notes:
1. Contract growers pay for delivery to NSCM processing plant at Kanengo, Lilongwe.
2. NSCM pays for planting material and Seed Services field inspections (although from 1990/91 a nominal charge for seed will be made to composite maize seed growers as an incentive to more effective use of the seed).

Sources: NSCM and Seed Services records; MOA, 1990.

Box 2: NSCM seed production cost build-up *Continued*

- **Average returns to contract growers from production of certified maize seed**

Average production costs 1979/80 (MK/ha)

	Actual	*Est. at appraisal*
hybrid maize	235	273
groundnuts	359	296
beans	138	218
soyabeans	174	218

average returns to contract growers 1990/91 (MK/ha)

single cross hybrid	2,034	(58% margin)
three-way cross hybrid	1,524	(49% margin)
composite	–116	
flue-cured tobacco	1,500	(18% margin)
burley tobacco	905	(10% margin)

Assumptions

1. Contract grower maize seed prices as above. Average yields 1.5 tonnes/ha for single cross hybrids, 2.2 tonnes/ha for three-way cross hybrids and 2.4 tonnes/ha for composites.
2. Average maize seed production costs per hectare same as NSCM's and same for all varieties (this is not true in practice).

Sources: CDC, 1980; Limbe Leaf Tobacco Co. Ltd.; own calculations.

most certified groundnut and bean seed production soon after establishment due to the much higher than anticipated costs for these crops on the seed farm.

NSCM has made detailed estimates of contract grower production costs and the gross margins at given grower seed prices. Machinery and chemicals account for over half total variable production costs for maize seed; labour and chemicals are the major cost items for bean and soyabean seed; and machinery and labour for groundnut seed (which is not fertilised). Basic seed costs have been around 5 per cent for maize and just under 15 per cent for the other crops. However, the importance of individual items in variable costs has changed over the years reflecting the differential rates at which costs have increased. This is shown by comparing Box 2 with Table 19. Taking production of certified *MH12* seed as an example, comparing 1979/1980 estimates with those for 1990/91, the grower is no longer expected to pay for basic seed, chemical costs as a proportion of the total have declined significantly from one half to just over one eighth and in their place labour costs have increased to

Box 3: NSCM seed processing cost build-up

- **Average certified maize seed production costs per tonne (MK)**

		1989/90	*1990/91*
single cross hybrid	– seed farm	563.33	1,037.33
(MH12, MH15, MH16)	– grower	2,100.00	2,400.00
three-way cross hybrid	– seed farm	384.09	707.27
(NSCM41, MH17, MH18)	– grower	1,200.00	1,400.00
composite	– seed farm	352.08	648.33
(UCA, CCA)	– grower	550.00	600.00

Assumption: Average seed yields as given in Box 2.

- **NSCM's margin of seed retail prices over prices paid to contract growers 1990/91 (MK)**

per ha	*single cross*	*three-way cross*
economic cost of basic seed provided free to contract growers	11.00	11.00
field inspections by Seed Services	15.00	15.00
transport to processing plant	paid by contract grower	
price paid to contract growers for seed produced	3,600.00	3,080.00
per tonne	2,417.00	1,411.82
NSCM processing costs, temporary storage, overheads, etc.	960.00	560.00
distribution & marketing costs	paid by ADMARC	
total cost	3,377.00	1,971.82
price received from Admarc	3,100.00	2,500.00
NSCM's net margin	–8.9	+21.2

Assumptions:

1. Seed rate not less than 25 kg/ha thus cost to NSCM of seed provided free to contract growers is MK11 per ha in 1990/91 (650 + 235 /2 /1000 x 25) (economic cost of basic seed produced by NSCM from breeder seed provided free by Chitedze).
2. NSCM due to pay Seed Services MK50,000 in 1990/91 for field inspections of 165 contract growers. Average area cultivated by contract grower is 20 ha therefore average inspection cost per grower is MK15 (50,000 /165 /20), although in practice it is relatively higher for three-way cross and lower for single cross.
3. According to NSCM, the price paid to contract growers is 5/7 of total production costs, therefore if the former is MK2,400 and MK1,400 per tonne for single cross and double cross respectively, the latter is MK960 and MK560.

Sources: NSCM records; Seed Services records; MOA, 1990.

Table 19: Costs of production and grower prices for seed crops grown under contract for NSCM 1980 (Mk/ha)

	MH12	%	*UCA/CCA*	%	*Groundnuts (Manipintar)*	%	*Soyabeans*	%
Basic Seed	25	6	13	4	52	13	40	14
Fertiliser	209	49	117	33	–	–	93	33
Crop Chemicals	27	6	20	6	56	14	14	5
Tractor	102	24	102	29	65	16	103	37
Labour	52	12	28	8	170	42	24	9
Miscellaneous	15	3	15	4	60	15	9	3
Total Cost of Production	430		354		403		283	
Total Income	960		523		680		720	
Gross Margin/ha	530		169		277		437	
Estimate at appraisal	462		220		115		n/a	

Sources: CDC, 1983; CDC, 1978

one third of total. The margin of income over these variable costs has increased slightly over this period from 55 per cent to 65 per cent. In real terms, this means that growers' actual gross margins per hectare for certified *MH12* maize seed are now MK1,805 compared to the MK1,196 per hectare anticipated at appraisal.[19] Growers' gross margins have been consistently higher than estimated at appraisal for hybrid maize and groundnut seed production and lower for composite maize. Contract growers' fixed costs have not been calculated as regularly but are estimated to be equal to 30 per cent of total income.

Taking production of certified *Manipintar* groundnut seed as another example, comparing 1980/81 estimates with 1983/84, although the proportion of costs accounted for by basic seed and chemicals remained the same, machinery costs as a proportion increased significantly to nearly half the total whilst labour costs declined to less than 20 per cent. (Transport costs for groundnut seed growers are higher because seed is moved in shell.) The margin of income over these variable costs decreased to just less than 30 per cent.

19. MK1,196 = 1977/78 estimated gross margins increased by 15 per cent per annum 1977/78 – 1990/91 to reflect the average annual rate of inflation during this period.

It is important to remember, however, that these estimates relate only to seed production: contract growers can be assumed to use or sell as grain any material unusable as seed (in 1983, for example, it was estimated 315 kgs out of the average per hectare *Chalimbana* groundnut yield of 1,500 kgs would be used in this way) so total returns to production will be higher than those indicated here. In addition, growers of all types of seed are expected to meet the cost of transporting seed to NSCM's processing plant at Kanengo, Lilongwe.

Seed processing. The only figures comparable to those in Box 3 available for non-maize seed production relate to certified *Chalimbana* groundnut seed production in 1983/84. These are given in Table 20, opposite.

As it is not possible to build up total current production costs on exactly the same basis as those calculated at appraisal, it is not possible to compare NSCM's current seed processing costs with those anticipated at appraisal. However, comparing NSCM's overall margin on seed production with that anticipated at appraisal for the two crops for which we have been able to construct comparable figures, we find margins are lower than those anticipated for single cross hybrid maize (–9 per cent compared to 43%) but not as bad for groundnuts (–10 per cent compared to –52%[20]).

The processing costs estimated at appraisal for single cross hybrid maize were MK11.50 per tonne, equivalent to MK70.76 per tonne at 1990/91 prices. Obviously the residual attributable to processing costs in the calculation above is more than this, but the likely reasons for this are difficult to ascribe accurately. At worst, the residual does not accurately reflect NSCM's true processing costs and instead includes a substantial profit element; or, NSCM's processing costs are genuinely considerably higher than estimated at appraisal, due to technical inefficiency on the part of the Company. Possibly, the difference reflects an unrealistically low estimate of processing costs at appraisal. More likely, NSCM's processing costs have genuinely increased at a rate substantially higher than the average annual rate of inflation of 15 per cent estimated at appraisal. For example, between 1980 and 1981, NSCM's wage costs increased by 55 per cent, fertiliser costs increased by 38 per cent and all other chemical costs increased by up to 43 per cent. Between 1979 and 1981, petrol costs increased by 73 per cent and diesel costs by 90 per cent (CDC, 1983). The annual rates of inflation were, respectively, 19 per cent and 12 per cent.

Retail seed prices. From the start of operations, NSCM's retail seed prices have been lower than those recommended at appraisal and have been considered by the Company to be 'very competitive'. NSCM operates a tiered retail price structure, with different prices charged for factory gate sales and sales to

20. Which was to have been covered by cross-subsidisation.

Table 20: NSCM groundnut seed processing costs 1983/84 (%)

price paid to grower for seed produced	80
processing plant labour	1
packaging	3
NSCM administrative costs	13
selling expenses	1
miscellaneous	2

NSCM's net margin	–10

Source: McGuire, 1983.

estates; for export sales; for onward selling through general wholesalers and retailers; and for onward selling through ADMARC (see Table 21). The prices charged to ADMARC were initially set at prices considerably lower than those recommended at appraisal, probably due to the need to fit in with the retail seed price structure existing in Malawi when NSCM started operating. Prices to ADMARC have increased substantially more than the 7 per cent per annum recommended at appraisal but, at the same time, the average annual rate of inflation in Malawi has been 15 per cent. Furthermore, it is difficult to estimate

Table 21: NSCM seed distributors' margins 1990/91 (MK/kg)

Variety	*NSCM Price to ADMARC*	*NSCM Price to Chipiku*	*NSCM Price to Retailers*	*NSCM Price to PTC*	*Retailers' Selling Price*	*PTC Selling Price*
MH12	2.20	3.95	4.30	n/a	5.10	n/a
NSCM41	1.80	3.25	3.55	n/a	4.05	4.20
R201/215	1.80	3.25	3.55	2.57	4.05	n/a

Note:
- Retailers are strongly encouraged to sell at NSCM's recommended retail prices, as above; PTC sells at a higher price as it considers the margins at the recommended retail price are inadequate.
- n/a = not available

Sources: NSCM records

the appropriate rate of inflation by which to deflate NSCM's nominal seed prices as the cost of many production items has increased substantially faster than 15 per cent, exacerbated by the impact of continuing devaluation on the high proportion of items that are imported. NSCM's nominal retail seed prices have not kept pace with inflation and currency devaluations faced by the Company and real retail seed prices have in fact been declining, as was shown in Table 16.

NSCM Seed Sales

At least until 1983, NSCM does not appear to have kept full and accurate records of domestic seed sales and this hampers performance assessment. Available records are given in Table 22. In the early years, sales of hybrid maize seed outstripped forecasts but they tailed off from the mid-1980s onwards. Sales of composite maize seed were very significantly less than forecasts (10 per cent of forecast in 1983/84, for example): it is impossible to assess how much this was due to demand being lower than anticipated and how much it was due to NSCM's preference for producing seed for the more profitable hybrid maize varieties. Although it must be difficult to strike a balance between creating shortfalls and excessive carry-over stock, NSCM does seem to have production problems, with low yields on contract growers' plots and shortfalls on target areas under production (see Table 11).

ADMARC's sales records for groundnut seed are for approved and certified seed whereas the appraisal estimates for NSCM sales are for the basic seed required for further multiplication by small farmers. Therefore, ADMARC sales can be compared instead to the NRDP seed sales forecasts on which the appraisal estimates for basic seed were based. ADMARC sales are only 55–65 per cent of these estimates although they increased considerably in 1985 and 1986, years which the forecasts did not extend to. Now, for small farmers, NSCM provides groundnut seed only for SSMS production.

Bean seed sales have been consistently considerably below forecast. Estimated sales of soyabean seed were not indicated separately in the appraisal document. NSCM no longer provides either for the small farm sector.

Thus NSCM has not achieved the sales projected at appraisal. The Company puts forward two main reasons for this (Gray, 1985):

- domestic seed maize sales are closely related to the level of credit supplied by the government to the small farm sector, which has been insufficient to bring forth the anticipated demand for seed;
- domestic sales of all kinds of seed are almost entirely in the hands of NSCM's selling agent, ADMARC, and problems have arisen each season with the timely collection and distribution of seed through this channel.

Table 22: NSCM seed production and sales 1980/81–1989/90 (tonnes)

	1980/81	*1981/82*	*1982/83*	*1983/84*	*1984/85*	*1985/86*	*1986/87*	*1987/88*	*1988/89*	*1989/90*
Maize seed production	2,100	1,680	1,800	3,560	2,740	40	480	600	**	3,472
Hybrid maize										
Forecast sales	900	1,040	1,180	1,330	1,740	**	**	**	**	**
Sales to ADMARC	**	1,242	1,463	1,275	1,515	1,401	882	1402	1691	3,361
Factory seed sales	**	**	**	**	**	**	**	**	**	**
Total domestic sales	2,181	1,385	1,544	1,447	1,441	1,548	1,179	1,824	2,422	3,360
Sales including exports	**	**	1,338	1,277	1,807	2,182	1707	**	**	**
Composite maize										
Forecast sales	1,590	1,870	2,110	2,350	2,590	**	**	**	**	**
Sales to ADMARC	**	433	492	233	1,491	225	149	191	581	191
Factory seed sales	1,995	**	2,190	**	**	**	**	**	**	**
Total domestic sales	781	630	490	238	166	105	154	779	416	190
Groundnuts										
Forecast sales	630	1,840	2,145	2,545	2,880	**	**	**	**	**
Sales to ADMARC	**	1,584	1,802	1,967	1,933	2,614	3,213	**	**	**
Factory seed sales	1,112	**	184	**	**	**	**	**	**	**
Sales including exports	**	**	852	443	184	77	167	**	**	**
NRDP estimated demand for seed	1,882	2,352	2,882	3,700	**	**	**	**	**	**
Beans										
Forecast sales	63	470	750	990	1,180	**	**	**	**	**
Factory seed sales	24	**	29	**	**	**	**	**	**	**
Sales including exports	**	**	24	7	29	15	10	**	**	**
Soyabeans										
Factory seed sales	8	**	**	**	**	**	**	**	**	**

Notes: ** = not available

Sources: *Production*: NSCM records; *Forecast Sales*: CDC, 1978; *Sales to ADMARC*: ADMARC and NSCM records; *Factory seed sales*: CDC, 1983; *Total domestic sales*: NSCM records; *Sales including exports*: Gray, 1985; *NRDP estimated demand for seed*: CDC, 1978

NSCM's Overall Profit and Loss

NSCM's overall operational goal, according to the shareholders' agreement made with ADMARC when the Company was set up, is to provide a 15 per cent return on capital employed and to distribute as dividend 66 per cent of any profits earned. To achieve this return, NSCM aims to achieve an operating gross margin of 30 per cent for its business as a whole – and the Company will not produce any seed variety that would actually lose money. However, within this overall strategy, there is an element of cross subsidisation and the Company allocates fixed costs and sets target gross margins for individual product lines with some flexibility, making relatively higher allocations to varieties used primarily by the estate sector and to those with low seed rates (CDC, 1983). Generally, the Company allocates lower proportions of costs to low density crops with high labour input, high sales and quick turnover, e.g. hybrid maize, and higher proportions to high density crops handled in low volumes with high management time input, e.g. tobacco. However, the Company also takes into account the value attached to the crop by the market and the social system within Malawi and will accept lower margins for seed of crops, such as maize, that are of strategic importance.

NSCM does not publish annual accounts and it provides financial results only to shareholders, so there is no time series information in the public domain with which to assess the Company's overall performance. Results up to 1984/85 show that in no year did NSCM achieve the target 15 per cent rate of return on average capital employed. Operating profits were between 70 and 85 per cent of the estimate at appraisal excluding 1983/84, a year of almost complete production failure for NSCM.

During the time ADMARC was the major shareholder in the Company, i.e. up until 1988, the shareholders' agreement meant in practice that if NSCM achieved a return greater than 15 per cent, the excess passed to ADMARC and if the return was less than 15 percent, as was the case in most years, ADMARC provided a subvention to the Company. Since 1985/86, however, changes in the membership of NSCM's Board have allowed the Company to increase seed retail prices and the 15 per cent return on capital has been achieved.

Comparing actual performance with respect to operating margins and seed sales, the cause of NSCM's overall financial performance being poorer than estimated at appraisal appears to be a combination of the higher than anticipated prices offered to contract growers and seed processing costs, the lower than recommended retail seed prices and the lower than expected quantities of seed sold via ADMARC. The Company itself considers low sales, together with external pressure to keep retail seed prices low, is the main reason why it has not achieved the planned 15 per cent return on capital and has had to turn to export sales of seed.

16
Smallholder Seed Multiplication Scheme

SSMS Organisation and Structure

There has been some small farmer involvement in organised seed multiplication in Malawi at least since the late 1960s. Until the late 1970s, this was confined to a limited number of master farmers in the Lilongwe area, producing maize and groundnut seed on contracts supervised by LLDP staff. The groundnut seed operation continued after the formation of NSCM in 1979, with small farmers responsible for multiplying up basic seed produced by estate contract growers (although apparently all NSCM involvement with small farmer seed growers has now lapsed, due to problems of quality control and economics). By the mid-1980s, the potential was recognised for an organised Smallholder Seed Multiplication Scheme operating on a wider scale, to produce seed of improved varieties of self-pollinated crops that are not sufficiently financially attractive to NSCM. The basic goal of the SSMS is to decentralise seed production so that each ADD can be self-sufficient in improved seed of acceptable quality. Farmers are selected for the Scheme by ADD Field Assistants on the basis of being located in a suitable agro-ecological zone, being 'co-operative' farmers for the purposes of supervision and control, and not being credit defaulters. They are provided with the necessary inputs for 0.4 ha production on credit, in the form of a standard credit package for the relevant crop, and are expected to contribute themselves the extra labour required for planting the higher plant populations and for the extra weeding. The seed provided to small farmer growers for multiplication is normally basic seed, produced by NSCM in the case of groundnuts and by the NBP at Bunda College in the case of beans. For some crops in some years, the seed inputs have been ordinary certified seed and even, in some cases, recycled 'approved' seed from the previous season's SSMS.

The original aim was to decentralise seed quality control, as well as seed production, but this does not seem to have materialised in practice: it is still Seed Services from Lilongwe who do all the field inspections. The seed crop is inspected three times in the season by them. It is not formally certified and instead is called 'approved' seed, on the basis of these field inspections. It is transported by growers to their nearest ADMARC market, where it fetches a price slightly above the official producer prices paid by ADMARC for grain and above the retail prices at which seed is sold to small farmers (see Table 23). The margin between the price growers receive for SSMS seed and the ordinary producer price varies significantly between crops: although the margin for SSMS groundnut seed has increased recently, it still remains low at less than 20 per cent, whereas the margin on SSMS bean and soyabean seed has decreased, but from much higher levels: 100 per cent in the case of beans

Table 23: SSMS seed grower prices 1987/88–1990/91 (t/kg)

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

Notes: Groundnuts = *Chitembana*, unshelled
Beans = All Recommended Varieties
n/a = Not Applicable

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

and nearly 50 per cent in the case of soyabeans.

ADMARC sells the seed at the standard official retail seed price, absorbing the losses incurred from the price differential and from its internal storage and handling costs. There are no additional transport costs, however, as SSMS seed remains at the market where it has been bought.

Training of ADD extension staff, ADMARC seed marketing staff and small farmers in aspects of seed technology was also one of the original aims of the SSMS but this has not been possible in practice. Consequently, problems do occur with poor storage and, in particular, during busy periods, mixing of SSMS seed with commercial grain being bought at the same time.

SSMS Production

The available data on quantities of seed produced under the SSMS were given in Table 13. SSMS production levels are still not high enough to make a substantial contribution to small farmer seed needs and, in fact, a high

proportion is reserved as seed stock for the following season and does not become available for sale to the general public.

The Economics of SSMS

Since the subsidy on the retail seed prices of many crops was removed in 1988, the prices NSCM has to charge to cover all its production costs are passed on in totality by ADMARC to small farmers and these are considered to be prohibitively expensive for them. The argument is that seed of self-pollinated crops could be produced to the same quality standards but much more cheaply under the SSMS. But it has been difficult to keep track of SSMS production costs over time, due to the MOA's practice of not operating a separate budget for the Scheme, and there is now concern that SSMS seed production costs are as high as NSCM's, if not higher. The concern is that the only way attributable costs have been kept down is by making parent Departments responsible for many cost items. For example, field inspection staff costs are met by Seed Services, travel costs are met by the ADDs' general transport vote, etc.

An attempt is made here to estimate the actual economic cost of SSMS production, and returns to SSMS seed growers; the results are given in Box 4. These can be compared with NSCM and ADMARC retail seed prices given in Table 16. For groundnuts, SSMS-produced seed costs only 5 per cent of the NSCM equivalent and per hectare returns to growers are in the region of 20 per cent higher than returns to commercial groundnut production at official producer prices. SSMS-produced bean seed costs 20 per cent of the NSCM equivalent and per hectare returns to growers are nearly double returns to commercial bean production. SSMS soyabean seed also costs about 5 per cent of NSCM soyabean seed, whilst per hectare returns to growers are about 30 per cent higher than returns to commercial soyabean production. These figures can be aggregated up to provide the estimated total net cost of the SSMS for a typical ADD, compared to the funding for the Scheme actually received; in the case of MZADD, the budget for the SSMS is about half the total cost of the Scheme. This works out at a total shortfall (or additional cost) in funding of 15 tambala per kg of seed produced, a significant addition if this had to be added to the retail price at which SSMS seed is sold.

SSMS Performance

The original intention behind the Scheme was to show that it is possible for smallholder seed production to generate both the quantity and quality of seed required and that there is real demand for it from small farmers, as well as serving to publicise the importance of using high quality seed and improved varieties (Sibale and Mtambo, 1989). The general consensus is that the quality of seed produced under the SSMS is good and as such the Scheme presents a viable alternative to relying on NSCM production. However, there are a number of other problems which hamper the efficient operation of the Scheme.

For some crops, particularly groundnuts, strong private trader demand for

Box 4: SSMS production costs 1990/91 (MK per hectare)

Borne by ADD		*Borne by farmer grower*		
Groundnuts				
Item	*MK*	*Item*	*MK*	*MK*
Inputs	100.00	Inputs	112.00	(112)
Field visits	14.60	Extra labour	27.25	(nil)
Price paid for seed	700.00			
Storage, handling	77.00	Transport from/to market	22.40	(22.4)
less		*less*		
Credit repayment	112.00			
Price received for seed	700.00	Price received for seed	770.00	(630)
Net cost	149.60	Net return	608.35	(496)
(per kg)	0.21	(per kg)	0.87	(0.71)
Beans				
Item	*MK*	*Item*	*MK*	*MK*
Inputs	285.00	Inputs	319.20	(68.4)
Field visits	14.60	Extra labour	39.95	(nil)
Price paid for seed	770.00			
Storage, handling	77.00	Transport from/to market	36.40	(13.2)
less		*less*		
Credit repayment	34.20			
Price received for seed	770.00	Price received for seed	770.00	(270)
Net cost	342.60	Net return	374.45	(188)
(per kg)	0.49	(per kg)	0.53	(0.42)
Soyabeans				
Item	*MK*	*Item*	*MK*	*MK*
Inputs	72.00	Inputs	80.65	(65.5)
Field visits	14.60	Extra labour	35.46	(nil)
Price paid for seed	800.00			
Storage, handling	80.00	Transport from/to market	30.52	(28.5)
less		*less*		
Credit repayment	80.65			
Price received for seed	800.00	Price received for seed	800.00	(600)
Net cost	85.95	Net return	653.37	(506)
(per kg)	0.09	(per kg)	0.65	(0.51)

Notes: 1. For assumptions used in calculations see Appendix 3.
2. Figures in ( ) are normal small farmer costs for commercial production.

Source: Own calculations.

produce makes commercial production a much more attractive alternative at current grower seed prices. For example, in MZADD – where SSMS groundnut production ceased in 1989/90 because of these problems – private traders have been offering the same price for ungraded groundnuts as ADMARC does for Grade A, which is only marginally less than the grower seed price.

On the demand side, in some areas, the Scheme has had very poor sales. One reason for this is rectifiable: the lack of awareness of the Scheme amongst small farmers, due to the lack of promotion work by ADD staff and the fact that most Schemes are still very small-scale and localised. However, the other reason is more intractable, namely that there is little incentive to buy SSMS seed because the yield advantage from using currently available improved varieties of most of the crops is very small, and minimal under small farm conditions.

Although there are plans to institute processing for certain crops using simple low-cost technologies, at present SSMS seed is not processed. This is not considered to compromise quality but, in the absence of empirical testing, it does weaken the argument in favour of greater use of SSMS seed.

Shortage of seed inputs is sometimes a problem for the Scheme. In some years NBP at Bunda has either not been able to produce sufficient bean seed or has not been given sufficient advance warning by an ADD of its requirements (this can happen, in particular, when the ADD's own crop fails at the last minute, as with *Red Canadian Wonder* seed in MZADD in 1986/87, for example). Similarly, there is some fluctuation in the availability of seed inputs from NSCM, either because the ADDs have failed to collect supplies previously ordered, which NSCM maintains happens quite frequently, or because the Company does not produce on cost grounds.

A major constraint to the efficient operation of the Scheme is that it has no separate budget or staffing allocation at Ministry level or within the ADDs. The ADD staff responsible for operating the Schemes – the Crops Officers and the Field Assistants – all have a full complement of other responsibilities. The same goes for the Seed Services staff, to which SSMS inspections were added to their normal workload. Funding for Seed Services time and travel is provided by the ADDs from general votes. This limits it and makes rapid disbursement difficult.

The other major problem is the scattered location of the growers' plots within each ADD. For example in NADD in 1989/90 the total area of the Scheme was 84 ha but this was scattered over 240 separate plots. This adds significantly to supervision and inspection costs and thus to the overall cost of the seed.

17
ADMARC's Internal Efficiency

ADMARC's Seed Distribution Mandate

ADMARC was set up by Act of Parliament in 1971 as a statutory body with a primary mandate to purchase and sell small farmers' crops, but also to do this profitably and to use the financial surpluses generated for development investment within Malawi.[21] It has never had a formal buying monopoly in domestic agricultural produce, except for tobacco and cotton, although it has for export sales of small farmer produce; however, private trade has been discouraged in practice and the majority of small farmers have sold the majority of their produce to the Corporation, because of the advantages it appears to offer.

ADMARC is the major outlet for seed for small farmers in Malawi. It was given this task in the early 1970s, when the first national arrangements for providing improved seed to small farmers were made. Seed was distributed through the Corporation's existing produce markets using its existing staff, although now it has in addition a small number of Input Sheds and Regional Farm Inputs Officers in charge of supervising the distribution of seed, fertiliser, crop chemicals and farm implements. Market staff now receive some training in the specialist techniques needed for handling seed. The overall Farm Inputs Controller, operating from ADMARC's headquarters in Limbe, Southern Region, reports to the Assistant General Manager of the Primary Marketing division, one of the four within the Corporation. Until the establishment of NSCM in 1980, ADMARC also had responsibility for a proportion of seed production, on the Corporation's farms, in collaboration with Department of Agricultural Research breeders. Now, it handles seed provided by NSCM and the SSMS.

The scope of much of ADMARC's seed distribution activity is circumscribed by factors external to the Corporation: the quantities to be provided; the prices at which seed is to be sold; and the locations at which it is to be available are all determined by other bodies, although ADMARC is represented on most of them. In this context, the onus is on the Corporation to organise transport, handling and storage as efficiently as possible within the parameters set for it.

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21. Only the most basic facts concerning ADMARC and its changing role in the Malawi economy are given here. For the government's policy decisions concerning ADMARC and the reasons for them see: World Bank, 1986; Christiansen and Stackhouse, 1987; Kandoole, Kaluwa and Buccola, 1987; Bowbrick, 1988; Christiansen and Southworth, 1988; Mkwezalamba, 1989; Scarborough, 1990.

ADMARC's Structure and Control Over Time

When ADMARC was set up, it was conceived primarily as a marketing agency, although subsequently wider economic development functions were added to its mandate; and it was supposed to be run on basically commercial terms, although the Government was to make good from public funds any losses the Corporation made in carrying out Government policy. In practice, during the next decade and a half ADMARC's financial position became increasingly complex, as it became involved in many different areas of the Malawi economy through investment and equity holdings, as well as through its crop trading operations. ADMARC increasingly saw itself as the development arm of the Malawi government. It was not until the mid-1980s that ADMARC was placed under the Government's economic restructuring programme and classified as a commercial organisation required to operate on a self-sustaining basis (Christiansen and Southworth, 1988:12).

During the 1970s, ADMARC was able to fulfil its broad mandate by subsidising non-commercial activities using the substantial surpluses arising from the difference between the prices it received for small farmer produce sold on the international market and the prices it paid to small farmers. From 1974/75 to 1978/79 ADMARC's net profit averaged 31 per cent of sales value (World Bank, 1986:32). However, in the early 1980s, ADMARC's position deteriorated rapidly due to the downturn in international commodity prices, problems with its investment portfolio, internal operational difficulties and increases in the quantity of maize having to be cleared from the domestic market at a loss, caused by producer price increases. Losses of MK9m on overall operations were recorded in 1980/81 and a World Bank report of the time described ADMARC in 1985 as a 'fiscal time bomb waiting to explode' (World Bank, 1986:4). In 1985, the Corporation had to borrow the equivalent of $45m to finance crop purchases (Christiansen and Stackhouse, 1987:9). And by 1986, ADMARC was unable to repay seasonal borrowings, made to finance crop purchases, equal to 12 per cent of Malawi's domestic money supply (*ibid*) and the Corporation made losses in the order of MK25m (World Bank, 1986:32). A substantial part of the problem was ADMARC's subsidisation of the strategic grain reserve and its very limited profits on its development and investment activities.

The redefinition over time of ADMARC's functions and the policy framework in which it operates have had a significant impact on the Corporation's overall financial performance, as it has been expected to go beyond profit maximisation to help achieve national development objectives. However, ADMARC's internal efficiency has also been an important determinant of its performance. This has manifested itself in various ways.

For much of the 1970s and early 1980s, ADMARC's Board did not exercise the degree of control over the Corporation's corporate strategy typical of the Board of a commercial organisation (World Bank, 1986:6). The internal reporting systems did not provide meaningful or timely information to

management; systems and procedures were not written down; and they needed updating and making more responsive to the needs of a commercial organisation. Similarly, the internal management and decision-making structures were centralised and there were no clearly defined lines of authority. In addition, senior management spent a lot of time interfacing with the Government and local and international institutions, so little time could be given to systematic business planning. Staffing levels increased rapidly, only partly in response to the increased volume of crops traded: between 1980/81–1982/83 and 1985/86–1987/88, staff increased by 58 per cent while annual purchases increased by only 5 per cent (Christiansen and Southworth, 1988:18-22). A World Bank review in 1986 concluded there was considerable scope for reducing staffing levels through simplification of the management structure, avoiding duplication of tasks and overmanning and better training to improve individual staff performance (World Bank, 1986:11).

Starting with Malawi's first Structural Adjustment Programme in 1981, ADMARC has undergone a fundamental restructuring: its Board of Directors has been reconstituted, training has been improved, several thousand seasonal and permanent employees have been cut and a number of managerial changes have been made to increase individual accountability and performance. In addition, there has been a substantial programme of asset rationalisation to return ADMARC to its original function as an agricultural trading organisation; the Government has taken over responsibility for the Strategic Grain Reserve; and more formal arrangements have been made for subventing the cost of the fertiliser and seed subsidies. At the same time, ADMARC's internal organisation was the subject of review, with the aim of restructuring the Corporation on a basis which would allow it to operate commercially and on a self-sustaining basis.

The main aims of the 1987 market liberalisation were to reduce the burden placed on ADMARC by its *de facto* monopsony in crop marketing in Malawi (to improve its operational efficiency, in the same way as the restructuring of its investment portfolio was designed to improve its overall financial performance), and to reduce the cost and improve the quality of the crop marketing service provided to Malawi's small farmers by involving private traders. To this end the restructuring involved the closure of those ADMARC markets through which little trade was done and the institution of a two-tier producer price system to serve as an incentive to private traders to become involved in primary purchases in place of the Corporation.

The Effect of Economic Reform on ADMARC Seed Distribution

Until the reforms of the 1980s, ADMARC's ability, desire and need to monitor the internal efficiency of its individual activities – such as its seed distribution work – was limited, and information relating to this was not in the public domain. In addition, although there have been a number of reviews of ADMARC's technical efficiency in its crop trading activities, the comparable

figures for its input marketing activities are not as easily available. So it is difficult to form an accurate view about the internal efficiency of ADMARC's involvement in seed distribution. However, from the various data that are available[22] it is possible to piece together a general picture of the way the Corporation carried out its seed distribution function.

Between 1982/83 and 1986/87, total seed distribution costs increased by 300 per cent (see Table 24) whereas the total quantity of seed sold increased by only 200 per cent (as was shown in Table 9). However, seed distribution costs remained a very small proportion of ADMARC's total costs. The maize seed subsidy was also a small proportion of total expenses: in 1985/86, for example, it was equivalent to just 1.1 per cent of total other expenses. In 1988/89, the total maize seed subsidy cost ADMARC MK1.4m (ADMARC records) whereas the fertiliser subsidy cost MK12m (Christiansen and Southworth, 1988:29).

However, the costs of seed distribution showed an opposite trend to the movement in buying and direct costs for crop trading, which declined substantially due to the sharp increases in volumes of crops traded (World Bank, 1986:8). And their value as a proportion of ADMARC's total buying and direct expenses on its combined crop accounts increased. This suggests that in the period immediately prior to reform, the seed distribution exercise did not benefit from the increased internal efficiency that contributed, together with increased volumes traded, to the improvement in the Corporation's operating expenses as a proportion of sales. How are the reforms likely to have impacted on this performance?

Part of the performance record in seed distribution must be due to the same set of factors that have influenced overall performance: the redefinition over time of ADMARC's functions and the policy framework in which it operates; its level of internal efficiency; and *ad hoc* external developments beyond its control. Amongst the latter, some of the most important have been the increase in the cost and difficulty of obtaining transport, resulting from increased domestic vehicle, spare parts and fuel costs; and the increased availability of lucrative international and relief haulage for local contractors (due to the conflict in Mozambique). Both these factors have increased the rates ADMARC has to pay to private hauliers to move seed from NSCM. Despite this, the Corporation still has difficulty in recruiting hauliers and this blocks speedy seed distribution: between 29 August and 3 September 1990, for example, only two lorries and 16 light vehicles turned up to move seed from NSCM, causing a large build-up in stocks at a critical time of year for seed distribution (ADMARC records). Added to this, ADMARC's input transport costs have increased as it has had to send a greater proportion by road in order to serve the growing Northern Region market which is not served by rail.

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22. In World Bank, 1986; Christiansen and Stackhouse, 1987; Deloitte, Haskins and Sells, 1987; Christiansen and Southworth, 1988; Scherer, 1988a and b; ADMARC records.

Table 24: ADMARC seed distribution costs as proportion of total costs 1981/82–1985/86 (MK '000)

	1981/1982	*1982/1983*	*1983/1984*	*1984/1985*	*1985/1986*
Sales					
Export	n/a	8,899	28,004	52,972	49,644
Local	n/a	52,682	67,268	70,191	90,955
Total	61,145	61,580	95,272	123,163	140,599
Selling Expenses					
Auction Floor Charges	906	861	684	1,493	n/a
Insurance	12	38	48	51	n/a
Railage Freight	2,238	1,161	3,505	5,154	n/a
Bags Twine Hessian	302	355	2,508	3,409	n/a
Total Selling Expenses	3,459	2,415	6,745	10,107	4,520
Sales Less Selling Expense	57,686	58,165	88,527	113,056	136,079
Movement of Stock	5,513	8,001	(7,781)	16,334	0
Strategic Maize Stock	n/a	12,650	n/a	n/a	n/a
Net Sales	**63,198**	**79,816**	**80,746**	**129,390**	**136,079**
Buying and Direct Expenses					
Purchase of Crops	28,859	41,940	46,048	74,263	79,321
Marketing	4,532	4,580	5,278	7,097	6,603
Depot and Storage	1,701	1,886	2,034	2,837	2,601
Bags Twine and Hessian	1,313	489	801	5,568	2,468
Grading, Ginning & Milling	3,765	3,370	3,026	4,823	5,944
Transport of Crops	7,133	7,864	9,356	11,405	11,378
Fumigation	357	411	505	529	692
Insurance	61	140	203	266	330
Seed Distribution	252	159	320	850	753
Total Purchases and Buying Expenses	47,972	60,839	67,571	107,637	110,090
Gross Profit (Loss)	15,226	18,977	13,175	21,753	25,989
Net Administration Expenses	6,363	6,758	6,624	8,901	8,571
Net Profit (Loss)	8,863	12,219	6,550	12,852	17,418

Note: n/a = not available

Source: World Bank, 1986:65

A change in the policy framework affecting ADMARC has been the requirement that any outside funds required for the Corporation's seed activities are borrowed at commercial rates of interest. This further limits financial viability: in 1988, for example, carry-over seed stocks alone cost ADMARC MK80,000 in interest payments (Scherer, 1988a). This problem is exacerbated when ADDs pay ADMARC late for seed issued to their farmers on credit (as they commonly do), so that ADMARC has to borrow money to pay NSCM for seed. For example, in June 1990 ADMARC was owed MK1.7m by ADDs for maize seed issued on credit (ADMARC records).

At the same time, the seed distribution exercise was suffering from ADMARC's general internal inefficiencies arising from overstaffing, expansion in its number of market outlets, lack of control over and incentives for efficient performance and insufficient management expertise. The management control system has been improved in recent years especially in financial areas, although there is still no formal system for reviews or operational planning. In addition, most of the documentation and procedures for transport, storage and sale are manual, and therefore time-consuming at peak periods and requiring considerable staff training and supervision. And monitoring of the overall progress of the seed distribution exercise is still carried out from ADMARC's head office without travel in the field to verify progress on the ground.

Other problems are peculiar to ADMARC's seed distribution activities. The single most contentious issue is the operation of the seed subsidy, which has various different dimensions. One is the increasing gap, after 1988, between the prices paid to NSCM for maize seed and the prices at which seed is sold to small farmers: the Corporation has no longer been able to limit the rate at which NSCM's retail seed prices are increased via its position on the Company's Board. For *MH12* maize seed, for example, the subsidy (price at which seed is purchased from NSCM less price seed is sold to small farmers, not including transport, handling and storage) has increased from zero in 1981/82 to 35 per cent in 1990/91. The maize seed subsidy increased in total terms, from MK169,335 in 1985/86 to MK1.4m in 1989/90 and is estimated at MK3.2m for 1990/91 (MOA, 1990), as shown in Table 25. For a long time, ADMARC had to bear the cost of selling seed at the subsidised prices dictated by the MOA without support from the Government. A system for paying monthly subventions from the Treasury to ADMARC in respect of seed was instituted in 1987 but there continue to be problems with timely payment of the subvention.

The way ADMARC is involved in the seed subsidy arrangements is one of the main causes of difficulty in assessing the Corporation's internal efficiency in its seed distribution activities. ADMARC's seed transport, handling and storage costs, together with the 'actual' seed subsidy, are included in the subvention calculation. In 1987/88, the 'actual' seed subsidy was MK1.3m and the costs of transporting seed from Kanengo to primary distribution points was MK117,400 or less than 10 per cent of this. In 1988/89 transport, handling and

Table 25: NSCM and ADMARC seed selling prices 1988/89–1990/91 (MK/10 kg)

Year	*MH12*			*NSCM41*			*UCA*		
	NSCM	*ADMARC*	*A/N*	*NSCM*	*ADMARC*	*A/N*	*NSCM*	*ADMARC*	*A/N*
1989	1.70	1.15	32	1.40	1.00	29	0.90	0.65	28
1990	2.20	1.55	30	1.80	1.40	22	1.15	0.90	22
1991	3.10	2.00	35	2.50	1.81	28	0.50	1.30	13

Note: A/N = 100–(ADMARC price as proportion of NSCM price).

Source: MOA, 1990.

storage costs totalled MK7.4m, five times more than the 'actual' seed subsidy of MK1.4m. This suggests secondary distribution and handling and storage costs take up by far the greatest proportion of the total. As costs per tonne of seed sold, these figures show an increase from MK73/tonne in 1987/88 to MK1,209/tonne in 1988/89. Originally, it was intended ADMARC's seed distribution costs could be covered by a 10 per cent margin on ADMARC's purchase price of seed from NSCM (Scherer, 1988b:10) but in practice by 1990 the subvention requested includes a margin of up to 35 per cent.

The non-separation of ADMARC's internal seed distribution costs from the 'actual' seed subsidy in the subvention must be a strong disincentive to controlling costs better. However, it is difficult to estimate the relative influence of internal inefficiency and other factors, such as the imposition of development functions (moving seed to remote locations, etc.), on these costs.

There are other 'seed-specific' factors affecting ADMARC's efficiency. For its current seed operations, ADMARC's storage is inadequate and badly located: it is insufficient to store maize crop purchases alone, never mind other crops and inputs; and storage density reflects ADMARC's development out of the Farmers' Marketing Board which concentrated on tobacco marketing in Central Region.

In addition, there have been large quantities of carry-over seed: in 1988, carry-over seed stocks were worth MK1.1m (Scherer, 1988b:3). Considerable progress has been made in controlling carry-over stocks more effectively and a new agreement between ADMARC and NSCM has placed financial responsibility for all carry-over stocks failing re-certification tests with the seed company. The problem of ADMARC's market staff's limited ability and incentives to respond to local seed shortages by moving seed from areas of surplus remains, however, and will continue to contribute to larger than necessary carry-over stocks.

ADMARC's seed marketing efforts have been minimal but this has not been the Corporation's official responsibility. Since Cargill became involved with

NSCM in 1988 the Company has made much greater efforts to support the marketing of seed sold through ADMARC, including a national seed advertising campaign.

Part of the reason why problems with ADMARC's seed distribution have continued despite restructuring and liberalisation is that ADMARC's role in seed distribution was apparently not the subject of specific study during the period of restructuring. Simultaneous but independent work on fertiliser distribution in Malawi caused some changes in the Corporation's financial involvement in supplying this input but the specific attention paid to seed supply was very limited: a United Nations Development Programme (UNDP)/FAO agricultural produce marketing project produced one set of recommendations for improving ADMARC's seed marketing arrangements and another for the involvement of private trade in agricultural inputs generally (Scherer, 1988a; Scherer, 1988b). Partly as a result of this, in 1988 ADMARC renegotiated to its advantage the agreement between it and NSCM for the supply of seed. This improved ADMARC's position in a number of ways. Until 1988, ADMARC paid NSCM within one month for all seed it took from the Company. After the renegotiation, ADMARC pays only for the quantities of seed it actually sells. Similarly, ADMARC was previously responsible for ensuring the timely re-testing of carry-over seed stocks by Seed Services; now, this is NSCM's responsibility. Also, the responsibility for absorbing the cost of failed carry-over seed stocks has been transferred from ADMARC to NSCM. And NSCM is now responsible for the expensive task of reconciling seed stocks at the selling points at the end of the seed marketing season.

However, although ADMARC and those involved with its restructuring apparently initially assumed private traders would become involved in input supply to reduce the Corporation's burden in the same way as for produce marketing (the assumption private traders would take over is one of the main reasons why the subvention issue was never properly sorted out), this has not been the case and as yet no specific arrangements have been made for this to happen.

18
Conclusions

National Seed Company of Malawi

Our chosen measure of NSCM's internal efficiency is the extent to which the Company covers its costs of production. It would appear that the Company is not currently covering production costs for the four seed crops we are concerned with. This does not necessarily represent the Company's overall position as these crops are known to be its less profitable ones; certainly, up until the mid-1980s the Company made operating profits, although it did not meet the target rate of return on capital that it had set itself.

Malawi is unusual in that contract grower seed prices for maize have to be set in relation not to commercial grain prices but to prices for a completely different crop, tobacco, and contract grower seed prices for groundnuts have to be set in relation to the premium commercial prices offered by Lever Bros, Malawi's major cooking oil manufacturer. On a per hectare basis, hybrid maize seed production is competitive with tobacco production but returns are not very significantly higher at present.

NSCM's margins of seed selling prices over prices paid to contract growers cannot be considered excessive, assuming the Company's processing operation is technically efficient. Our calculations clearly indicated the much greater profitability of three-way cross over single cross hybrid maize seed production.

From the available information, production does seem to be the main cost element for NSCM seed (as the Company maintains), and the margins for processing, storage and administration are relatively modest. As for any seed company, the main production cost elements for NSCM, whether faced indirectly by the contract growers or by the Company itself, are labour, fuel, and crop production and processing chemicals. The price levels of these are all substantially determined by factors outside the Company's control viz. by minimum wage regulations, currency devaluations and general price rises. Frequently these result in costs increasing quite substantially above the general rate of inflation in Malawi. Therefore, even assuming NSCM's and the contract growers' use of labour, fuel and chemicals is reasonably technically efficient, these external factors have increased production costs for NSCM more rapidly than the general rate of increase in inflation and, to maintain performance, the Company would need to pass on these increases in the form of higher retail seed prices.

Smallholder Seed Multiplication Scheme

There are a number of problems currently hampering the efficient operation of the SSMS. However, the majority of these have relatively straight-forward solutions, as long as the impetus exists to make the necessary organisational

changes. The rough calculations of the economics of SSMS production done here should provide this impetus as they appear to show SSMS seed production is a much lower cost alternative than NSCM production for all three crops, with acceptable returns to SSMS growers for beans and soyabeans as well. However, returns to growers for SSMS groundnut seed production need to be compared with private trader commercial groundnut prices before it can safely be assumed that SSMS groundnut seed production is equally feasible.

These results, as long as quality can be maintained and there are no diseconomies of scale in production costs, suggest that the scale of SSMS production should be increased, if the overall objective is to make greater quantities of improved seed available to small farmers in Malawi at least cost: at the moment, SSMS seed production consumes a lot of ADD and Seed Services time and resources for very little quantitative benefit for the majority of small farmers. The most critical need for this to be improved is for the funding of the Scheme to be increased and formalised. The data from MZADD show clearly that current funding levels are inadequate by a significant margin. Options for achieving this are discussed later.

ADMARC

The scope of much of ADMARC's seed distribution activity is circumscribed by factors external to the Corporation and transport, handling and storage emerge as the controllable factors critical to the efficiency of seed distribution. We can hypothesise that the overall restructuring and tightening-up of ADMARC's operations must have had a knock-on effect and improved efficiency in seed distribution too, but there are no comprehensive data against which to test this, largely due to the way in which ADMARC is subvented for the total cost of its seed operations by the Treasury. The limited amount of data and allegorical evidence that are available suggest that the direct transport costs of primary and secondary seed distribution are continuing to increase rapidly and problems with the co-ordination of secondary distribution continue to hamper performance. ADMARC's margin for transport, handling and storage has increased significantly and a very substantial part of this appears to be attributed to the latter two elements.

Overall, the Corporation's performance continues to be strongly influenced by external factors, both *ad hoc*, such as increased transport costs, and policy-induced. In general terms, both the external and policy environments have not moved in ADMARC's favour. ADMARC is being held to commercial operational standards, i.e. being expected to avoid losses, while continuing to have responsibility for loss-making development functions – especially providing seed at many low volume, remote market outlets and operating within the confines of Malawi's weak and small-scale private transport sector and poor primary and secondary road network. As one recent report concluded, 'As long as ADMARC is required to carry out these (inherently

non-commercial) functions and to pay for them with expensive commercial overdrafts the goal of financial viability will be unattainable' (Christiansen and Southworth, 1988:14).

Ultimately, it is impossible to assess performance accurately and there will be little incentive for ADMARC to do so until the subvention calculations allow for tracking of the Corporation's internal seed distribution costs and seed issues are given a specific focus in policy, especially given that seed distribution costs are such a small proportion of ADMARC's total costs. This leads on to questions of the development value of the seed subsidy and ADMARC's involvement in seed distribution and away from questions of internal efficiency alone: is the seed subsidy necessary to make the use of improved seed attractive? Is it the best method of doing this? Is it mainly better off farmers, who get seed through credit, that benefit? Are non-price constraints to uptake of improved seed more important? These questions are considered in subsequent Sections.

Part V

Factors Influencing Seed Sector Performance

19
The Influence of Location-Specific Factors

Malawi's Agro-Ecology

Malawi's agro-ecology is not so extreme as to place severe constraints on seed production and storage. Nonetheless, it does have some impact. Demand for improved seed of groundnuts, beans and soyabeans is constrained by the ease with which small farmers can save seed on-farm. Agro-climatic conditions over most of Malawi assist on-farm seed selection, the exceptions being the Lakeshore and the Shire valley where the hot, humid conditions make storage difficult. Storage is a potential problem for soyabean seed for small farmers because the seed deteriorates rapidly in hot conditions. Field and storage pests and diseases, particularly bruchids, are a major problem in Malawi for beans and have given rise to a number of evasive strategies used by small farmers.

As well as putting constraints on on-farm bean seed maintenance, the prevalence of field and storage pests and diseases in Malawi substantially increases the cost of formal sector bean seed production, requiring it to take place in the dry season under irrigation. Less directly, agro-climatic conditions increase the cost of NSCM's maize seed production, under the current method of organisation using estate contract growers, as the favourable conditions in Malawi for tobacco production cause maize seed grower prices to be kept high to compete with tobacco. As with on-farm maintenance of soyabean, storage in hot conditions similarly increases wastage of soyabean seed at ADMARC seed selling points.

The Small Farm Economy

The basic limitation to increased uptake of improved seed in Malawi is the fact that the incremental yields of the varieties of groundnuts, beans and soyabeans currently available are low under small farm management conditions, so farmers have little incentive to use them. This is true both with respect to the incremental yield derived from the genetic potential of the improved varieties, which is expressed only under conditions of high management and high applications of complementary inputs, and, for beans and soyabeans, with respect to the yield gains which are normally to be derived from improved disease and pest resistance because, for both these crops, currently available certified and approved seed is not of improved varieties but selections from locally-collected material. Thus, for many crops grown under small farm conditions in Malawi, it is things other than improved seed that have the most significant impact on yield. For maize, for example, it is fertiliser use; for soyabeans, it is the use of *rhizobia* inoculant.

Yield is an important criterion by which small farmers judge performance, but other factors still retain influence due to the complex economics of the

small farm farming system in Malawi. Other desired attributes include the crushability of confectionery groundnut varieties; the flintiness of maize; and a wide range of agronomic and organoleptic attributes that small farmers require in their bean seed portfolio to display. Overall, therefore, for most crops small farmers require small quantities of seed of a number of different varieties to provide all these different attributes. One long-standing conflict caused by the role of maize in the small farm economy in Malawi, is between small farmers' expressed preference for flinty single cross hybrids such as *MH12* and NSCM's preference for producing the cheaper three-way cross hybrids such as *NSCM41*.

The small farm seed market is potentially large in quantitative terms relative to the estate sector and already, even though the amounts sold are small in relation to the small farm cropped area, it takes up 80 per cent of NSCM's total seed production. However, the market is less important in value terms as significant proportions of NSCM's two most profitable lines, tobacco and maize seed, are sold at unsubsidised prices to the estate sector. There is almost certainly an amount of unsatisfied small farmer demand for seed at present, due to ADMARC's problems with making sufficient seed of preferred varieties available in time for planting; but this is likely to be small because of the low incremental yield obtained from improved seed under small farm conditions.

20
The Influence of National Economic Policy

Macro-Economic Policy

The Structure of the Malawi Economy

'The private sector is alive and well in Malawi and owned by the government' (USAID, 1983:vi) is the over-used but succinct quote that summarises the structure of the Malawi economy up until the early 1980s. Until this time, the economic dominance of various quasi-public institutions in Malawi, particularly Press Holdings, significantly affected the business environment in general and in particular the operations of parastatal organisations such as ADMARC and NSCM. Whether they liked it or not, their complex relationship to these institutions – through equity holdings, loans and other financial arrangements – made it very difficult for such organisations to monitor their own internal performance and to operate in a conventionally profitable manner.

This was part of a general pattern of limitations on conventional commercial operations, created by the national development functions these organisations were expected to perform, which the economic reform programmes starting in 1981 sought to redress. A much greater emphasis on commercial viability can be expected in both organisations now. Cargill has already given NSCM a primary focus on its profitable product, hybrid maize seed, and it has succeeded in getting the Company's retail seed prices back onto an upward trend in real terms. NSCM seed is also being actively marketed in Malawi for the first time. ADMARC has undergone considerable internal reorganisation, embracing both management changes and changes in working practices, and the Corporation seems to have accepted its new commercial orientation fully. Nonetheless, various development functions – such as the operation of the subsidy on maize seed retail prices continue to be imposed on it.

Disincentive to Private Trade

Government policy discouraged private retail trade in agricultural commodities and inputs directly and indirectly until the mid-1980s. At the same time, government and quasi-government organisations have dominated the economy, making access to investment funds, working capital and technical advice difficult for small-scale traders (Scarborough, 1990:27; Mkwezalamba, 1989; Najundan, 1988; Cromwell, 1992:8). Since the 1987 market liberalisation, the official attitude towards private trade in agriculture has reversed and it is intended that private sector participation in small farmer product markets should increase (Christiansen and Stackhouse, 1987:12-14). However, donor pressure on the government to liberalise the market for small farmer

agricultural products rapidly in 1987 resulted in some teething problems and progress has not been smooth since then. Traders were unable to obtain licences in the first year; they were promised assistance with start-up capital and business training which did not materialise; and the original intention that they would perform a middle function at regulated prices, buying from small farmers and selling to ADMARC, did not happen in practice. The margins the regulated prices provided were small and traders sold instead to large-scale commercial buyers, such as Chibuku brewery and Grain and Milling Company, or on the urban consumer market (Christiansen and Stackhouse, 1987:19–20, 26–27; Lavers, 1988).

In addition, private traders have clustered in urban and peri-urban areas and ADMARC has had to continue its expensive buyer and seller of last resort functions in the more remote small farm areas. The total number of private traders involved has in any case been small (Scarborough, 1990:4), as the limited initiatives to deal with the long-standing problems of inadequate access to investment funds and working capital, such as the Agricultural Marketing and Estate Development Project and the various provisions under the 1990 Agricultural Sector Adjustment Programme (ASAP), have had little impact to date. Because policing this kind of activity is expensive and difficult, and because of the relatively small numbers of traders taking advantage of the chance to trade in agricultural products, there has been exploitation of small farmers through offering less than the regulated prices. This has been difficult to control, particularly in the immediate post-harvest period when on-farm storage can be problematic and ADMARC markets have not opened, providing small farmers with a strong incentive to sell.

Although it was at first assumed that the 1987 liberalisation would include agricultural input markets, this did not happen in practice and small farmers continue to use the ADMARC network for supplies of subsidised seed and fertiliser. The 1990 ASAP addressed this and there are now plans to involve private traders in supplying agricultural inputs, the first step in this direction being the establishment of an Inputs Section in the MOA, to co-ordinate input distribution for small farmers. In practical terms, more attention has been paid to preparing for the handover of the distribution of fertiliser inputs, which has included the recent reconstitution of the Smallholder Farmers Fertiliser Revolving Fund (SFFRF) as a legally independent trust (World Bank, 1990b:28). Whether private traders will be as interested in dealing with seeds inputs remains to be seen.

This history of discouragement of private trade has limited the possibilities for cutting seed distribution costs by devolving more responsibility for seed distribution on to an existing independent private sector. However, ADMARC's market infrastructure was already relatively densely distributed, so the withdrawal of seed from the seasonal markets as part of the 1987 retrenchment had little impact in real terms: most small farmers remained within acceptable walking distance of a market (Christiansen and Southworth,

1988:25), and a proportion of markets were not actually shut. Most importantly, according to the survey results, distance is not a problem for survey households, and other factors are given greater emphasis.

Operating Costs

Overall, Malawi's macro-economic distortions have been relatively mild in comparison to those in similar economies in Eastern and Southern Africa, and much progress has been made in the last decade, in restoring macro-economic equilibrium through the economic reform programmes.[23] Nonetheless, for much of the period that ADMARC and NSCM have been operating, the operating costs of both organisations have been affected by these distortions.

Movements in interest rates and statutory wage rates have not imposed additional costs on the organisations as they have been negative in real terms. Similarly, investment in transport has been given a high priority in the Malawi government budget so transport infrastructure has been good. However, the national transport fleet has remained small and this has given rise to difficulties in hiring private vehicles for seed distribution work at competitive rates. This means that serving the small farmer seed market has been difficult and expensive. Recently, NSCM has invested in expanding its own marketing network through increasing the number of registered private trader seed retailers and supporting the ADMARC network. This has increased the effectiveness of the seed distribution exercise at relatively low cost, but was necessitated in the first place by the communications difficulties being experienced at the field seed selling points. Although there are now a lot of registered trader seed outlets in proportion to the number of ADMARC seed selling points, this is unlikely to have much impact on small farmers as a large proportion of them are in urban and peri-urban areas and they sell seed at the full NSCM retail price. NSCM is apparently not interested in expanding the registered trader network further in the foreseeable future due to the cost of supplying and supervising it.

The reason NSCM does not rely entirely on its own seed distribution system is precisely because of the heavy investment and running costs this would entail in a country with low private trader activity and commensurately low storage and private transport capacity (World Bank, 1990b:23–24; Scarborough, 1990a:25–27; Christiansen and Stackhouse, 1987:35). Despite a relatively good road network, the number of large transporters remains low, capital and spare part costs and fuel prices remain high for all vehicles, and many private hauliers have been attracted to working the more profitable international routes and aid-financed relief distribution work in Southern Malawi (Cromwell, 1992:35). Instead, it is ADMARC, as the distributor of all NSCM

23. For discussions of Malawi's macro-economy and reform programmes see Kydd and Hewitt, 1986; Kydd with Hewitt, 1986; Kydd, 1988; World Bank, 1990a; Sahn, Arulpragasam and Merid, 1990; Cromwell, 1992.

seed stocks for the small farmer market, that has faced these problems. They have had a significant impact on the Corporation's performance in both the primary and secondary parts of the seed distribution exercise.

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

ADMARC at first benefited from the macro-economic distortions, through its ability to cross-subsidise less profitable operations with surpluses from buying smallholder produce cheap and selling it dear for export. Subsequently, however, it too was badly affected by declining international commodity prices and the devaluations that formed part of the economic reform programme. In addition, its role as the premier parastatal in Malawi made it prone to over-staffing, low quality management and operational policy determined by national development and other non-commercial objectives.

The situation has now changed for both organisations due to the economic reform programme. For NSCM, increasing real interest rates have increased the cost of seasonal borrowing; and increased statutory minimum wage rates have increased seed farm and factory labour costs, and the same applies to contract growers, who require compensating in the form of increased grower seed prices. Continuing exchange rate devaluation also increases the kwacha cost of imported production and processing chemicals (although at the same time making NSCM's seed exports more competitive internationally). The simplification of foreign exchange allocation procedures will have reduced the real cost of using foreign exchange to purchase imported inputs. On balance, however, the net impact of the reform programme is likely to have been an increase in NSCM's operating costs, as the downward distortions have been removed on many macro-economic variables.

For ADMARC, the devaluations will have made international exports of small farm produce more competitive and, as for NSCM, changes in statutory wage rates will have increased the wage bill. However, for ADMARC, the public sector institutional reforms have had an even greater impact than the changes in macro-economic variables. These have included the streamlining of ADMARC's activities, staffing levels and conditions of employment. More generally, the aim of the reforms has been to re-establish ADMARC on a commercial basis, so this has included the requirement that all ADMARC's borrowing is now done at commercial rates of interest. This type of change will have increased the Corporation's operating costs but, overall, the reforms are intended to allow more efficient and lower cost operation. However, this process is not yet complete and, in particular, ADMARC has a continued obligation to fulfil certain high cost national development functions.

The reform programme has had a mixed impact on the seed transport situation. It has increased the cost of imported new vehicles, spare parts and fuel. However, it has reduced the bureaucratic difficulty of obtaining foreign

exchange allocations to purchase them, and it has not changed the relatively high proportion of the government development and recurrent budgets allocated to transport infrastructure (Cromwell, 1992:35). Overall, however, the impact of the reform programme on the transport situation has not been as severe as the impact of the conflict in Mozambique, which forces the use of more expensive routes into Malawi for the import of vehicles and spare parts and creates a more lucrative option, the supplying of the Mozambican refugee camps in Southern Malawi, for domestic hauliers.

Agricultural Policy

The net impact of agricultural policy on factor costs has been to distort them in favour of using improved seed. The land small farmers use is designated customary land, to which they have no legal title, so access to land involves minimal economic cost for small farmers. The main input used by small farmers is chemical fertiliser, the cost of which continues to be subsidised – although this is likely to end as part of the current Agricultural Sector Support Programme (ASSP). This reduces the cost of fertiliser in absolute terms, although for a long period during the 1980s fertiliser costs were increasing relative to food crop producer prices (Sahn and Arulpragasam, 1991:222). The wage rates for the hired agricultural labour required on many farms at planting time and harvest generally conform to the statutory minimum (Vaughan and Chipande, 1986) and this has been declining in real terms until the end of the 1980s. At the same time, there has been over supply in the seasonal agricultural labour markets (Mkandawire and Chipande, 1988) which has further depressed wage rates. For small farmers seeking agricultural credit, the major source has been the funds available through the ADDs' farmer credit club system, as there are few other organisations willing to make loans to small farmers. Interest rates charged have followed commercial bank rates and these have been negative in real terms for most of the 1980s. However, membership of the credit clubs has tended to be confined, by peer group pressure, to those better-resourced farmers who can guarantee to repay loans and this has made access to credit difficult for many smaller farmers (Murison, 1987). On balance, therefore, the impact of agricultural policy has been to distort small farmers' factor costs downwards. However, the long-term decline in the fertility of much customary land, due to the low use of chemical fertiliser even at subsidised prices, and due to the prevalence of continuous maize monocropping as a result of population pressure, has meant physical returns to production have also been declining (World Bank, 1990c; World Bank, 1989:4).

At the same time, official agricultural producer prices for small farmers have been declining in real terms and this has put downward pressure on returns to production. Although the reform programme has now partially reversed this trend, there will always be a limit on producer prices for the main small farmer commodity, maize, imposed by the policy of maintaining export parity

in a land-locked country with high external transport costs (Lavers, 1988; Harrigan, 1988; MOA 1988). The encouragement of private trade in agricultural commodities has done little to increase producer prices, with the important exception of groundnuts; this is due to the requirement that trade is conducted at regulated prices, the small number of private traders that have become involved, and the weak negotiating position of the majority of small farmers.

Structural policy relating to the agriculture sector has tended to serve as an incentive to use improved seed. The general policy has been to discourage rural–urban migration: statutory wage rates have been declining in real terms; the opportunities for employment off-farm in the formal sector have been declining during much of the 1980s; there has been over-supply in the rural agricultural labour market; and the opportunities for independent off-farm commercial activity in the rural areas have been limited by the general constraints on private trade and the small size of the market (Cromwell, 1992:39–41). Traditionally there has been a large amount of fixed-term migration from Malawi, mainly to the mines of South Africa, but it is unclear in the current economic climate how long this will continue.

All these factors make the position of the majority of small farmers in Malawi atypical to that of similar farmers in other countries in the Eastern and Southern African region. For these latter, according to the model of household economics developed by Low (1986), on-farm agricultural production activities are organised primarily to fulfil the domestic consumption needs of the household, utilising family labour that has lowest opportunity cost in terms of gainful employment in off-farm activities and the minimum of other production resources. For most Malawi small farm households, however, the opportunities for productive off-farm employment are minimal and households turn instead to maximising the output from domestic agricultural production, to supply both domestic needs and maximum cash returns. In this context, there is a strong incentive to use improved seed as part of this strategy. In addition, there has been an emphasis on promoting hybrid maize production by small farmers, which has increased the market for NSCM's most profitable product substantially beyond what it is likely to have been otherwise.

Seed Sector Development Policy

The general consensus is that the MOA does not make as much use as it could of its statutory powers of control and influence over the seed sector. There are no well-defined policies for seed sector development, other than promotion of the blanket recommendation that all farmers should use improved seed. In particular, there are no policies on how seed shortages should be dealt with, in contrast to the situation for other items such as fertiliser inputs. In fact, the situation could be described as one of policy inertia. Part of the problem is the high staff turnover between Ministries, as part of the common service of the civil service. Another is the lack of specialist expertise of many general agricultural staff to engage in constructive debate with the major actors in the

seed sector, such as NSCM.

On the demand side, seed sector development policy itself is likely to have had significantly less effect than agricultural pricing policy and other more general policy and non-policy influences: the original core of seed sector development policy as it related to seed pricing, seed availability, etc. has been altered quite substantially by these other influences. For example, the subsidy on seed for oil groundnuts was removed in 1988, as part of a blanket removal for a range of crops, despite the original premise that a price subsidy would be required permanently for groundnuts, due to the mismatch between the small benefits from use of improved seed to individual farmers and the larger national benefits. Similarly, it was originally not intended to attempt to provide improved bean seed for small farmers because of the low benefit and high cost of doing so, but in recent years NSCM has had to resist considerable pressure to do so. The aspect of seed sector development policy that does continue to have a direct and undiluted influence on demand for seed is the deliberate limitation, by the Variety Release Committee, of the number of varieties released for each crop: this simplifies the distribution exercise and reduces carry-overs but, given the range of agronomic and economic functions small farmers require individual crops to perform, it is likely to be limiting overall productivity too.

On the supply side, the critical issue is whether the direction of seed sector development policy has made economically viable seed production and distribution impossible, by imposing additional economic costs on seed organisations without compensation.

National Seed Company of Malawi

Via the Seed Technology Working Party and other formal and informal links with the MOA, some pressure is placed on NSCM to produce seed of all the varieties released for use by small farmers in Malawi. However, from NSCM production records, the Company does seem to have been able to focus to a significant extent on production of the more profitable seed crops, such as three-way cross hybrid maizes, and sale of the higher cost crops in the more lucrative markets, for example aid-financed exports of groundnuts and composite maize to other African countries. Indeed, NSCM no longer provides any certified groundnut, bean or soyabean seed for sale to small farmers through ADMARC.

NSCM does bear the additional cost of operating Malawi's national ten-year strategic reserve of tobacco seed, although the small, dense nature of the seed and the profitability of tobacco seed sales means that the cost of maintaining the reserve is relatively insignificant. NSCM is supposed to operate a similar reserve, equivalent to 25 per cent of annual requirement, for maize seed. However this no longer exists because NSCM considers it too expensive in the absence of government support. No reserves are held for other crops.

NSCM sets its own retail seed prices but, until 1988, the dominant position

of ADMARC on NSCM's Board (as major shareholder) effectively limited the possible increases in seed prices. After 1988, however, real prices have increased again. The remaining policy influence on NSCM's price structure is its continuing obligation to provide ADMARC with large discounts on the prices of seed purchased for distribution to small farmers.

In the absence of the regulations needed to implement the 1990 Seed Act, Malawi is still using the 1976 Seed Rules as its basic seed legislation. These do not impose any atypical constraints on NSCM's performance and NSCM remains under no obligation to provide a legal guarantee of the quality of its seed. NSCM benefits from the absence of breeders rights in Malawi, which are officially considered counter-productive to seed sector development, and continues to get all its breeder seed free from Chitedze Agricultural Research Station.

There is no legal protection of NSCM's *de facto* monopoly position in seed production in Malawi, but a natural physical monopoly operates for maize seed caused by the processing, storage and eating qualities required of maize that are unique to Malawi and parts of Southern Tanzania and Eastern Zambia. This is strengthened at present by ADMARC's agreement to buy from NSCM all the seed it requires to distribute to small farmers at subsidised prices.

On the other hand, NSCM complains that Malawi's variety release rules are too strict and cumbersome and serve to prevent the Company from introducing potentially beneficial material into Malawi. The VRC was set up in the 1970s in reaction to a one-off importation of undesirable material. It requires material to be trialled for three years, after which the decision whether or not to release it for use by small farmers is made. It is known to disfavour making many different varieties of the same crop available, based on the premise that small farmers will become confused if provided with too many varieties to choose from. In addition to being cumbersome, this system is felt by some to be unnecessarily strict as far as regional trade in seed is concerned, as all the countries in the Eastern and Southern Africa region have the same seed standards. It is also considered to be flawed because material imported in an emergency does not pass through the VRC system, and neither does material imported by or for the estate sector. The objective of minimising the range of varieties available to small farmers appears to be questionable, given the evidence from the survey results of small farmers' ability to evaluate varieties and to maintain complex variety portfolios to meet their range of different needs.

ADMARC

ADMARC's operations are very significantly influenced by seed sector development policy. This includes the obligation to distribute the quantities of seeds estimated by the ADDs, the requirement to share the trading risks of the seed distribution exercise with NSCM and the pressure put on ADMARC by the ADDs to reserve available stocks of seed for potential credit recipients. The

aspect of seed sector development policy with the single greatest influence on ADMARC's operations is ADMARC's obligation to operate a retail price subsidy for seed distributed to small farmers.

The retail price of seed to small farmers has been subsidised since NSCM was established. The objectives of the MOA Pricing Unit in setting seed retail prices for small farmers are clearly set out (MOA, 1990):

- for crops such as beans and most types of groundnuts, where the yield increase from using improved seed is small, the objective is to discourage farmers from using their own seed or consuming or re-selling seed bought from ADMARC. This is to be achieved by maintaining the seed retail price close to the ADMARC producer price, except where – as for groundnuts – the producer price offered by private traders is much higher, in which case the seed retail price should be above the ADMARC producer price in recognition of this;
- for crops such as hybrid and composite maize, where the yield increase from using improved seed is large and farmers are aware of this difference, and/or seed cannot be produced on-farm, seed retail prices can exceed the ADMARC producer price. The level at which the price is set will depend on the actual cost of supplying the seed and the amount of subsidy considered necessary to encourage the use of improved seed;
- all seed selling prices should at least cover the cost of the seed to ADMARC, except where – as for hybrid and composite maize – encouraging the use of improved seed is a key policy objective.

How to meet these objectives is reassessed each year in the light of relative changes in other agricultural prices. Thus, in 1990 for example, maize seed selling prices were set at a level designed to limit the impact on small farmer returns of the increased seed prices for 1990/91 announced by NSCM. However, they still represented up to a 44 per cent increase over 1989/90, compared to a 4 per cent increase in the maize producer price and a 14 per cent increase in fertiliser prices. Over time, the range of seeds for which price subsidies are provided has been reduced, so that by 1989 they had been removed completely on oil groundnuts, although they remained on maize and soyabean. The removal of the remaining subsidies is not directly addressed in the new ASAP but the arrangements being made for the future of the fertiliser subsidy are being taken as applying to the seed subsidy; these include applying broad limits to the size of the subsidy and active discussions about how it may be removed altogether.

Three elements affect the size of the seed subsidy bill: the difference between the cost of NSCM seed to ADMARC and the price at which seed is sold to small farmers; an estimate of ADMARC's transport, handling and storage costs; and the total volume of seed distributed. The problems with continuing the seed subsidy are generally perceived to be its drain on Treasury

resources, the uncertainty of which is exacerbated by NSCM's almost complete freedom to set its own retail seed prices; and its obfuscation of ADMARC's efficiency in seed distribution. ADMARC itself appears to be against the continued operation of seed subsidies (Scherer, 1988b), because of the restrictions they impose on commercial operation.

ADMARC bears the cost of all three subsidy elements for NSCM seed and for SSMS seed distributed through its selling points. The Corporation was simply expected to absorb the cost until ADMARC was reorganised in 1987, when a formal arrangement was made for Treasury to subvent the cost monthly. This subvention covers the cost of all three subsidy elements for NSCM seed (and ADMARC does receive a substantial discount on the seed it purchases from NSCM) – but not for SSMS seed, for which there is no specific funding for ADMARC's handling and storage costs, nor for the ADDs' and Seed Services' inspection costs. In addition, the subvention sometimes reaches ADMARC late. For example, in February 1988 ADMARC had still not been paid anything at all under the new arrangement, so it was withholding from its own payments to government the MK1.34 million it was owed (ADMARC records). As at November 1990, the problem was continuing so that, in practice, ADMARC was receiving the benefit of the theoretical seed subsidy subvention in the form of written-off loan repayments.

Overall, the value of the price subsidy element of the seed subsidy is relatively small; equivalent to 1.1 per cent of ADMARC's total expenses.[24] The general consensus is that, in contrast to decisions about the fertiliser subsidy, the cost of the price subsidy should not influence decisions about whether or not it should be retained. However, whether it should be continued and how it should be calculated are important seed sector development policy issues because the subsidy allows ADMARC to continue operating less efficiently than it could. The basic question is whether the subsidisation of seed retail prices for small farmers is still necessary – and, if so, for which crops.

Removing the remaining subsidies on seed for confectionery groundnuts, beans and soyabeans would have minimal impact on real returns because the subsidy is already minimal, so seed prices would increase only to broadly the same level as prices for consumer grain, the alternative source of planting material either as seed saved on-farm or as grain purchased from ADMARC. Put another way, the subsidy would have to be much bigger than it is currently in order to create seed prices sufficiently low compared to grain prices to increase the uptake of improved seed. This is probably not worthwhile for most of these crops given the low incremental yield from the currently available varieties under prevailing small farm management conditions. But it could be worthwhile where the quality of the crop, as well

24. The maize seed price subsidy accounts for about 90 per cent of this. The cost of the continued free distribution of tobacco and cotton seed are additional to those given here; the exact costs are not known.

as total yield, is important nationally, for example for crops such as groundnuts for which exports are an important source of foreign exchange for Malawi.

The other influence on the need for subsidies on the retail prices of groundnuts, beans and soyabeans has been the advent of the SSMS. As SSMS production costs are much lower than NSCM's, were selling prices to be reduced accordingly, and the SSMS could substitute fully in quantity terms for NSCM seed, there would not be any need for seed prices to be subsidised.

Contrary to earlier calculations (for example, DANAGRO, 1987:88), we conclude that removing the subsidy on hybrid maize seed would have a significant impact, because net returns to hybrid maize production (fertilised or unfertilised) even at current subsidy levels are only 25 per cent higher than returns to unfertilised local maize production using saved seed. The removal of the retail price subsidy for hybrid maize seed might produce a substantial reduction in hybrid maize production, which could have a damaging impact on national food security.

Rather than ending subsidies completely, the more appropriate action may be to target subsidies for specific groups of farmers more carefully, through organisations working closely with the smallest poorest farmers, whilst allowing the majority to purchase at the full NSCM retail price. This is one option being considered by the MOA Pricing Unit: the unit estimates up to 25 per cent of small farmers do not need the price of maize seed to be subsidised. The two more radical alternatives – to recognise that the current emphasis on encouraging hybrid maize production is a distortion of Malawi's natural comparative advantage and accept that, without alternative interventions, removing the maize seed subsidy will cause the production of hybrid maize to decline even further; or substantially to increase the producer price of maize – are not options given the current direction of Malawi's national food security policy and the need to maintain maize prices at approximately export parity. Even were the subsidy on maize seed prices not to be removed altogether, its implementation could be modified to reduce its impact on ADMARC's performance. Some of the options for doing this are discussed in Part VI.

Smallholder Seed Multiplication Scheme

It was a deliberate policy decision to start the SSMS to provide seed of self-pollinated crops more cheaply than NSCM. In particular, it was an enlightened policy decision to create a new class of 'approved' seed to deal with SSMS production, which it would be impossible to certify formally, so that despite lack of formal certification it could still be distributed to small farmers as improved seed. However, the Scheme has suffered severely from a lack of follow-through in policy towards its development. In particular, the continued lack of a separate allocation within the ADD budgets provided by the MOA hampers both forward planning and speedy field work. Of course, creating votes on central government revenue and development accounts may not be

feasible given other competing demands and the added expenditure constraints imposed by the economic reform programme. However, alternatives could perhaps be pursued, such as the establishment of an SSMS revolving fund replenished from sales receipts: and, according to our estimates, SSMS grower prices could be reduced and retail seed prices increased – to create a margin to fund SSMS development – without damaging returns to growers or the uptake of seed by small farmers. The current performance of the Scheme is further hampered by the need to pay Seed Services for their field inspection work as they too lack their own budget. This appears to have resulted from the failure to follow through the original Seed Services development policy, which was to cover the Services' operational costs through charges for every tonne of seed passing through the NSCM processing plant.

21
The Influence of Linkages with Associated Organisations

Seed Varieties

The suitability of the seed varieties supplied to small farmers by NSCM and ADMARC continues to be determined primarily by the orientation of the DAR's breeding programmes for the various crops, as breeding work by other organisations, such as NSCM, has started only recently and remains small-scale and specialised. The varieties of many small farmer crops produced by the DAR have tended to have high potential yield but a limited range of other attributes required by small farmers. In part, this has been due to the orientation of the agricultural research stations, until recently, towards conventional breeding criteria rather than the more complex needs of resource-poor small farmers. This orientation has not been challenged by feed-back from farmers themselves because of the lack of strong links, until recently, between the DAR and the MOA extension service. And, although this is now changing, the extension service itself for a long time focused primarily on its training role and paid little attention to obtaining feedback from farmers on the usefulness of new technologies. In particular, there has been little feedback for the imported varieties, such as the three-way cross maize hybrids *R201* and *R215*, due to the ADDs' practice of planting only Malawi varieties in demonstration plots at block gardens and training centres.

With the reorganisation of the DAR in the mid-1980s, and the implementation of various projects to improve the relevance of agricultural research, the situation has now improved dramatically. The only crop for which breeding objectives remain unlikely to fulfil small farmers' requirements is groundnuts, where the continued focus is on oil and confectionery nut varieties for export with high potential yield, which are of little relevance to many small farmers.

Although non-yield attributes are important for small farmers for many crops (so varieties with these attributes are required for particular niches in the small farm farming system), the structure of the small farm economy in Malawi means that yield is now also an important criterion for many small farmers in their evaluation of varieties. In this situation, the low incremental yield derived from using many of the available improved varieties under small farm conditions remains a severe constraint to the widespread uptake of improved seed.

Seed Quality

Quality control standards for seed are appropriate and implemented to a high standard. The major problems concerning seed quality both stem from the nature of linkages between organisations. The lack of funding in the MOA budget for Seed Services is one, which will have a much greater adverse impact if the quantity of improved seed distributed in Malawi is increased beyond the current relatively low levels. The Services also consider that their lack of operational autonomy is a major impediment to their work. Since the reorganisation of the DAR into Commodity Teams, Seed Services has formed part of the 'Services' Commodity together with the Department's library, the Natural Resources College and the crop storage and pathology units, and this forces the Services to compete for Commodity funds against these other unrelated activities with dissimilar organisational needs. The low level of specialist training provided for the ADMARC market staff who handle and store NSCM and SSMS seed is the other major linkage problem, which leads to unnecessarily high seed distribution costs and high spoilage of seed.

Seed Prices

ADMARC's retail seed prices, and NSCM's in the past, are strongly influenced by the nature of the organisations' linkages with the MOA. However, from the available evidence, it would appear that the level of retail seed prices are of less importance to farmers at present than their difficulty in getting access to the relatively small quantities of seed being distributed, and making effective use of it under prevailing small farm conditions.

Timeliness of Seed Delivery

The late delivery of seed to ADMARC selling points is one of the most important ways in which the seed sector currently performs poorly for small farmers. The major cause of this is not a linkage problem but rather ADMARC's internal problems.

Access to Seed Selling Points

Even after the 1987 retrenchment, the geographical coverage of ADMARC's seed selling points has remained comprehensive enough for physical access to seed selling points not to be a problem for small farmers, according to our seed survey results.

Quantities of Seed Supplied

The quantities of seed made available for distribution to small farmers remain small compared to total cropped area for each crop. In part this is because of the small quantities of breeder seed made available to NSCM from the DAR, and of basic and certified seed made available to the SSMS from NSCM and the DAR breeders. The inaccuracy of the seed estimates provided by the ADDs, and in particular the over-emphasis on credit recipients' seed needs to

the detriment of cash purchasers, is another linkage factor which affects performance. The unwillingness of NSCM to produce groundnuts, beans and soyabean seed for small farmers, to produce large quantities of maize seed (that may have to be carried over) and to produce seed of less profitable varieties are additional linkage shortcomings.

The Influence of Credit on Seed Uptake

In 1989/90, MK49 million was provided by the Smallholder Agricultural Credit Administration to small farmers as short-term seasonal credit for the purchase of inputs, reaching nearly one quarter of all small farmers with an average individual loan of MK156 (SACA, 1990:15); the provision of similarly large amounts of credit has been an important part of Malawi's NRDP since its inception in 1978. But it is not clear whether credit is in fact necessary to enable widespread use of improved seed, and whether the benefits of providing it outweigh the apparently negative impacts its administration has on the timely availability of sufficient quantities of seed for credit recipients and cash purchasers. This Section expands on these issues.

The availability of credit for the purchase of seed inputs might be expected to increase demand for seed. However, the seed survey results do not confirm this. They show that for non-maize crops, although there is considerable unwillingness to allocate scarce cash resources to purchasing seed, this is strongly influenced by the lack of a clear yield advantage from using improved seed under prevailing small farm management conditions, and by the level of seed retail prices relative to producer prices, other input prices and consumer grain prices – not only by their absolute level. Furthermore, in the ADDs for which records are available, the substantial majority of groundnut, bean and soyabean seed purchases in recent years have been on cash. The availability of credit was cited as an important criterion determining choice of seed source only for survey households having to obtain planting material from off-farm sources in times of domestic crisis.

The situation for hybrid maize is different in that at least 70 per cent of all seed purchases have been made on credit in recent years, with this proportion remaining constant as the total quantity of seed made available has increased. But the seed survey results show that when households are denied credit, due to membership of a club in default, a clear majority continue growing hybrid maize by financing seed purchases from other sources. Results from other studies also confirm the limited real impact of credit on seed uptake. In 1989/90, maize seed accounted for only 7 per cent by value of total credit disbursed by the Smallholder Credit Authority (SACA, 1990:3) (separate records are not kept for non-maize crops). And a recent review of the NRDP found that, nationally, less than 25 per cent of farmers taking credit in 1986/87 accepted hybrid maize seed, and amongst those households growing maize primarily as a food crop for domestic consumption, the proportion fell to 6 per cent (World Bank, 1989:7). The review concluded that it was not lack of credit,

for purchase of either seed or fertiliser, which discouraged uptake of hybrid maize seed at this time but its storage and processing qualities.

In any case, credit is in practice rarely available to farmers with small holdings, both because of the relatively high value of the minimum credit package and because of the mutual responsibility of club members (all seasonal credit is disbursed to clubs) for repayment, which makes members exclude farmers who seem less able to repay. In 1986/87, about 80 per cent of seasonal credit went to farmers with more than one hectare of land (World Bank, 1990a:10).

The administration of credit funds provided through the ADDs has a significant impact on several supply-side aspects of seed sector performance. The ADDs are keen to provide credit packages to as many farmers as possible and a considerable amount of staff time and resources is allocated to estimating demand for credit, supervising disbursements and repayments and co-ordinating repayment. ADMARC maintains this reduces its ability to satisfy demand for seed, as the ADDs are consequently relatively less concerned with making estimates of cash demand for seed: ADMARC considers most ADD estimates are based on historical trends in credit distribution, with minimal allowance for cash sales. From the evidence from MZADD and LADD available to the study, the total estimates of seed requirements put forward to the Inputs Section by the ADDs in recent years have certainly included allowances for cash sales, although records for many years are incomplete or contradictory for actual cash purchases. For the non-maize crops, these allocations are significantly larger than those for purchase on credit; for maize seed the opposite is the case. Total allocations are small in comparison to the areas planted to each crop in the two ADDs, but it is impossible to form an objective view on whether this reflects unrealistically low estimates of real cash demand for seed or accurate estimates of the small number of farmers who wish to purchase improved seed.

Another credit administration issue is considered by ADMARC to contribute to the Corporation's problems with the timely reallocation of seed from areas of surplus to deficit during the selling season. This is the late supply of revised demand details to ADMARC by the ADDs, which is caused by the ADDs delaying the final estimate of the number of credit recipients as late as possible in years where repayment of previous loans is poor (non-repayment debars clubs from receiving further credit). In the past, Malawi's credit programme had exceptionally high repayment rates, frequently higher than 90 per cent, resulting from the practice of disbursing funds to clubs, which created peer pressure amongst club members for timely repayment of individual loans; and from the practice of stationing ADD staff outside ADMARC produce markets to collect repayments immediately farmers sold produce. Recently, repayment performance has deteriorated (for example, at September 1990 only 78 per cent of 1989/90 seasonal credit loans and 86 per cent of 1988/89 loans had been recovered (SACA, 1990:1)), due to a series of poor seasons and the ending of

ADMARC's *de facto* monopsony on produce purchases, meaning many farmers now sell direct to private traders without using ADMARC markets at all.

Another issue is the ADDs' informal practice of asking ADMARC to reserve seed at field selling points for credit recipients, in the hope that defaulting clubs will pay off their loans and become eligible for credit in time for planting. Both ADMARC staff at the field selling points visited by the survey and survey households themselves confirmed that this practice is widespread and, particularly for hybrid maize seed, can debar potential cash purchasers from buying available stocks. There was no quantitative data to support this.

And late payment by the ADDs for seed provided to small farmers on credit by ADMARC increases ADMARC's seasonal finance requirements, thus further limiting its performance. ADMARC has asked NSCM to take over direct responsibility for collecting payment from the ADDs, in order to reduce these finance costs. This would be analogous to the arrangement currently in operation for fertiliser provided by the SFFRF, but NSCM is unwilling to take on the cost of this responsibility.

At present, few ADDs are providing significant numbers of credit packages for non-maize crops, partly due to the difficulty of obtaining supplies from NSCM and the SSMS, so more general supply and distribution problems are having a more important impact on seed uptake for these crops. Not withstanding this, ADDs' inordinate concern with seed sales on credit, and the difficulties this causes organisations such as ADMARC and NSCM, does not seem to be justified from the available evidence which shows the small role credit plays in seed uptake. From a seed sector perspective, the credit system needs reorganising to have a less negative impact on the operations of seed organisations and to have a more positive impact on the significant minority of small farm households that are chronically seed insecure, or dependent on off-farm sources because of domestic crises, and thus likely to need credit for seed purchases but unable to get access to it through the present system.

Seed Organisations' Operating Costs

NSCM's operating costs continue to be affected by the ability of the ADDs to estimate demand for seed accurately and the ability of ADMARC to move the required quantities to the locations where it is needed on time: both these linkages have a significant effect on NSCM's ability to minimise costly carry-over stocks and, more broadly, to plan production in advance in order to achieve maximum efficiency. More directly, NSCM's finance costs are also affected by the continuing difficulties ADMARC has in paying NSCM on time for seed distributed to the Corporation's selling points. In December 1990, for example, ADMARC owed NSCM MK6m for seed sold through ADMARC selling points during the 1990/91 selling season (NSCM records). The main source of this difficulty is, in turn, the ADDs' tardy payments to ADMARC for seed distributed to small farmers on credit.

ADMARC's links are with NSCM and the ADDs. The nature of its links

with NSCM do not themselves have a direct negative impact on performance now, although the situation was different prior to the sale of ADMARC's majority shareholding in NSCM to Cargill in 1988 and the resulting re-negotiation of its agreement with NSCM. In particular, these rearrangements have removed ADMARC's obligation to cover NSCM's operational losses; they have provided it with a formal mechanism for receiving compensation for the financial cost of operating the seed subsidy; and they have shared the seed trading risk more equally between ADMARC and NSCM.

However, the nature of ADMARC's links with the ADDs, continue to affect its operating costs, via the cost of excessive carry-over seed in years when the ADDs' estimates of seed demand prove to be inaccurate; and via the financial cost to ADMARC of the ADDs' late payment for seed supplied to small farmers on credit.

The most influential links are, however, not the operational ones but the strategic links stemming from the influence of MOA policy on ADMARC's operations. Even now that ADMARC has been reorganised to operate on a more commercial basis, MOA policy continues to impose national development functions on ADMARC that take out of the Corporation's control many of the decisions normally made by the internal management of commercial organisations. This imposes additional economic costs relating to the quantities of seed ADMARC supplies to small farmers; the price at which it is sold; and the locations at which it is made available. The additional cost of fulfilling these functions is supposed to be covered by the subvention provided to ADMARC by Treasury but this provides only a partial compensation; there is no allowance for the handling and storage of SSMS seed; and the subvention is often paid late, increasing the amount of bridging finance ADMARC has to borrow at commercial rates of interest.

Thus the nature of ADMARC's links with other organisations has a major influence on the organisation's operating costs.

The SSMS's operating costs are influenced by a range of other factors as well, but the nature of its linkages with the ADDs' extension services are particularly influential, as the current low emphasis placed by the extension service on publicising the availability and value of SSMS seed is an important factor limiting demand for SSMS seed.

22
The Influence of Internal Operational Efficiency

National Seed Company of Malawi

As early as 1971, the government decided that seed production in Malawi should be organised on a commercial basis. To this end, when it was decided at the end of the 1970s to co-ordinate formal seed production and distribution through the formation of the NSCM, NSCM was set up as a private Company to operate on commercial lines. All the preliminary appraisal of the potential viability of the Company was conducted on the assumption that it would be expected to achieve a commercial rate of return on the equity investment that would be the source of its capital funds. Commensurately, operational and strategic decisions were to be the responsibility of an independent Board of Directors. However, from the time NSCM started operating in 1981 until the late 1980s, the Company never achieved the target rate of return. As NSCM does not publish annual accounts or otherwise make information relating to its financial performance available in the public domain, it is not possible to establish categorically the causes of this poorer than anticipated performance. But some likely causes can be identified from the information that is available relating to its physical operations.

Most of the factors influencing performance are not related to the efficiency of its internal operations and, rather, stem from the higher than anticipated prices paid to contract seed growers; the higher seed processing costs due, in large part to the increased cost of imported seed treatment chemicals and other inputs; the lower than expected sales via ADMARC, because the increase in seed sales to small farmers planned as part of the NRDP did not materialise; and declining real seed retail prices. NSCM's broad technical competence and technical efficiency are not in doubt. However, performance was almost certainly affected by the Company's difficulty in obtaining adequate investment funds until 1988: difficulties in obtaining the injection of capital necessary for the Company to recover from the serious supply problems experienced in 1986/87 was a major reason for NSCM seeking new outside involvement in the Company, in the form of Cargill, as ADMARC – the then majority shareholder – had serious funding problems of its own at this time and no additional funds available to invest in NSCM.

Other causes that are related to the internal efficiency of the Company can be hypothesised. NSCM can be criticised for allowing too many of the functions that a private commercial company would normally expect to perform itself to be carried out by other organisations which, with seeds not their primary concern, do not devote particular attention to them. For example, until recently little was done by the Company to market seed to small farmers:

NSCM relied on ADMARC and the MOA extension service to do this work. In addition, the distribution of 80 per cent of the seed produced by NSCM was left to ADMARC, which had difficulties in achieving timely delivery of the right quantities to the right places. And market investigation, of the varieties small farmers want and of the quantities they require, was left to the MOA, which for a long time did little regarding the former and experienced problems with providing accurate estimates of the latter. Also, NSCM did not appear to capitalise on export opportunities and seed sales to estates as much as it could have done, to cross-subsidise the less profitable supply of seed to small farmers. These inefficiencies appear to have been partly responsible for the 1986/87 crisis with hybrid maize seed supply and the knock-on effect of seriously damaged relations between NSCM and its contract seed growers, on whom the Company is critically dependent for a large proportion of production.

However, since Cargill became involved in 1988, NSCM has acted to deal with many of these problems. It now has its own breeding programme, which should help to create a broader base – additional to the work of the DAR – for generating new varieties suitable for small farmers. It has started its own high profile marketing campaign. It has instituted a system for monitoring directly the distribution of seed to ADMARC selling points in the field. It has also increased the number of registered private traders retailing seed independently of the ADMARC network. At the same time, it has increased the qualifications of its technical and professional staff and improved staff incentives, via increased salaries that are now competitive with the private sector. The freedom of the Board to set higher retail seed prices and give the Company to a primary focus on maize seed production has resulted from ADMARC's departure as majority shareholder.

External developments have also affected performance, as described in earlier Sections. Ultimately, however, even were these remaining constraints to be removed, NSCM is left with the basic production conflict of whether to maximise cost recovery by focusing on the production of cheaper, more profitable three-way cross maize hybrids, such as *NSCM41*, or to limit cost recovery, fairly severely, by focusing on the production of single cross hybrids, such as *MH12*, that are more expensive to produce and less profitable but preferred by small farmers. This illustrates clearly the dilemma of a company, such as NSCM, which is expected to operate commercially but at the same time to perform national development functions, with little direct compensation.

NSCM is sometimes criticised for abusing its monopoly position for its own ends and to the detriment of national agricultural development. Complaints centre around NSCM's supposed refusal to produce certain varieties and crops, its high retail seed prices and its sourcing of all its breeder seed free of charge from the DAR. However, ultimately, these criticisms illustrate that blame for the perceived and real problems with NSCM's role in seed production and distribution lies not only with the Company and its objectives but also with the

conflict between the national development objectives of government and the economic viability objectives of the Company. The solution must be to make the objectives of both sides more explicit, in order that appropriate strategies for fulfilling them can be developed co-operatively.

ADMARC

From its inception, the government was to make good from public funds any losses ADMARC made in carrying out government policy. Soon, wider economic development functions were added to the Corporation's mandate and it came to see itself more and more as the development arm of the Malawi government. So profit maximisation was never ADMARC's primary goal. Monitoring financial performance was difficult as ADMARC's loans and investments portfolio became increasingly committed to funding other government and quasi-government activities. There was no incentive to monitor the technical efficiency of the Corporation's activities as internal organisational decisions concerning, for example, staffing levels, were based more on national development rather than on internal efficiency criteria.

The general consensus is that, until the mid-1980s, there was indeed considerable inefficiency in ADMARC's operations. This affected the Corporation's seed distribution activities and, in particular, can be assumed to have been the major cause of ADMARC's problems with excessive deterioration of seed in store; and of the Corporation's poor record of timely distribution of seed to field selling points.

The way seed distribution is currently organised appears to lead to a situation where, although staff at all stages in the distribution chain are well aware of the importance of timely distribution of seed, and ADMARC's overall performance is much better than many other parastatal marketing organisations in sub-Saharan Africa, the central administration does not, and probably cannot, effectively monitor field-level distribution activity. On top of that, the central administration appears not to consider that there is a real problem with timeliness of delivery, as its own targets for primary distribution are well met. However, major delivery delays at field level remain, to the extent that ADD and NSCM staff consider this to be ADMARC's major seed distribution problem. The central administration's argument for devolving responsibility for field-level seed distribution to the regional depots and their market network is that the big trucks hired to move seed from NSCM to the regions cannot travel on the narrow, rough roads to the field selling points. Whilst this is probably true, it still leaves the regional depots and parent markets with the problem of finding sufficient smaller private transporters who are willing to move seed relatively short, and therefore less profitable, distances along these roads, to augment their own small transport fleets. Often, they fail to achieve this and the ADDs are forced to make their own transport available for seed distribution work at the last minute.

The regional depots and parent markets also have the additional problem of needing to move seed between selling points quickly as the season

progresses, to tailor supply to actual demand and avoid carry-overs, in difficult physical communication and transport conditions. Scheme and unit Market Supervisors and those at other field selling points are supposed to tell their parent market Divisional Supervisors by letter when they are running out of seed, whose responsibility it is to find surplus supplies elsewhere within the parent market area and transport them to the market that is short. If there are no surplus supplies left, Supervisors are supposed to inform their Regional Managers, who can order up to 25 tonnes of seed direct from NSCM if necessary, without going through ADMARC's central administration. This system is physically time-consuming and hard work to implement – market clerks usually have to deliver letters by hand and are expected to travel by bicycle. The system is in addition liable to up to three sets of bureaucratic delays (selling point → parent market; parent market → regional market; regional market → NSCM) even before dealing with the problem of finding transport to move the seed to the relevant selling point. Because of this, it must also be liable to lack of motivation on the part of market clerks at distant selling points.

The restructuring programme has gone a long way towards improving ADMARC's internal efficiency, although it is still under way and there is scope for further work on improving the internal efficiency of the seed distribution exercise, most particularly on improving the efficiency of the secondary distribution from area/parent markets to field selling points. But external factors will continue to affect ADMARC's performance in various ways. The national development functions that the Corporation is expected to perform is one set of factors; and the problems with transport in Malawi remain.

Ultimately, whilst there is definitely scope for ADMARC further to improve its performance in seed distribution through internal reforms, it has come a long way in less than a decade – from being told what to do, when and how, having most of its operational losses covered by the Malawi government and being unable to trace its own performance – to being a commercially-oriented operation competing in the market place. However, the Corporation is still expected to perform without compensation certain national development functions which impose significant additional economic costs. The next stage in ADMARC's development must surely be the clarification of the cost of and appropriate compensation for these functions.

Smallholder Seed Multiplication Scheme

The study has not been able to establish whether from its inception the SSMS had clearly defined operational objectives, and on what financial basis it was originally intended that it should operate. However, it is certain that it has never been autonomous managerially or financially. The Scheme's financial performance cannot have been an important issue because, as well as having no budget of its own, making performance almost impossible to monitor, SSMS grower prices have been set consistently higher than or equal to seed retail prices, so that there is no margin for handling or storing the seed.

Our tentative performance estimates for the one Scheme for which financial data is available (see Box 4), suggest SSMS production can in fact be financially viable, at least for beans and soyabeans seed, and it is up to 25 times cheaper than NSCM production – although this is in part because, in contrast to NSCM seed, SSMS seed is not processed or formally certified and neither is it transported from the area of production. Nonetheless, the current organisation of SSMS does create problems that restrict the operational efficiency of the Scheme.

There are difficulties with organising the timely supply of the necessary quantities of seed inputs from the DAR breeders, and from NSCM, stemming from the ADDs' inability to co-ordinate early requests and to pay for and move seed supplies once they have been made available, as well as from the absolute shortage of certain types of seed (for example, the new bean selections from the NBP). Also, the selection of growers with little consideration for their geographical position relative to each other adds significantly to supervision costs, as they tend to be located scattered over a wide area in each ADD. And, most importantly of all, the absence of separate budget and staffing arrangements means time has to be spent justifying funds on an *ad hoc* basis for each activity; allocations are often below the amounts requested due to overall shortage of funds or over-expenditure on other activities; timely field supervisions are made more difficult by the delays in arranging transport; and staff often have conflicting demands on their time from their other responsibilities.

External factors also affect performance, however. In particular, they make SSMS for groundnuts totally infeasible because of price competition for groundnuts from private traders. This is an important problem given the overall scarcity of planting material for groundnuts from local sources in most communities, combined with the high price of NSCM certified seed caused by high formal sector production costs for groundnut seed. More generally, the low incremental yield derived from using improved seed of non-maize crops under small farmer conditions creates a disincentive to small farmers to try to obtain SSMS seed – and many have little awareness of it, in any case, due to the low amount of promotion the Scheme has received from the extension service. On the supply side, Seed Services' own budgetary problems have a knock-on effect on the operation of the SSMS, because the Services are usually unable to travel independently to carry out SSMS field inspections and require funding from the ADDs to do this.

Thus, if there is a case for continuing with SSMS seed production, the biggest current constraint to increasing its impact on small farmers is its internal operational inefficiency, caused by the *ad hoc* organisation and management of the Scheme. If its funding and organisation were regularised and made more autonomous, the Scheme would almost certainly provide a least-cost and financially viable means of producing improved seed for small farmers.

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Conclusions

In Part V, we have considered the extent that seed sector performance is determined by the internal technical and economic efficiency of the seed organisations themselves, relative to the influence of location-specific factors, government policy, and linkages with other institutions involved in the seed sector. This Chapter summarises the findings and weighs up the advantages and constraints of the present organisational structure of the seed sector. The aim is to make clear which are the issues that need to be addressed to improve performance. In particular, we are concerned with establishing to what extent it is internal efficiency problems that are limiting the seed organisations' performance, which would need to be addressed by changing their structure, organisation and ownership, compared to other influences which may need different types of solutions.

National Seed Company of Malawi

The technical and managerial competence of NSCM has never been in doubt. Although scope for marginal improvement in the Company's internal efficiency remains (in particular, greater involvement in marketing and distributing its own seed), many aspects of this are already being dealt with by Cargill since they became involved in the Company in 1988, and it is factors external to NSCM that now have most influence on performance.

Some of these, most importantly the strong competition between tobacco and maize seed production, which requires relatively high prices to be paid to NSCM's contract growers, and the prevalence of field and store bean pests in Malawi which require formal sector seed production to be done more expensively in the dry season using irrigation, stem from Malawi's agro-ecology and so have to be worked around rather than dealt with. Others are the result of policy. For example, the decline in NSCM's retail seed prices in real terms over much of the 1980s, which was one of the factors limiting the Company's financial performance, resulted from ADMARC, in its then position as Chair of NSCM's Board, implementing the MOA policy of keeping seed prices for many crops as low as possible. Agricultural policy more generally, via its influence on factor costs, producer prices and structural factors, was partly the cause of the much lower than anticipated sales of seed, which further limited NSCM's financial performance. The way NSCM's linkages with other organisations have worked, particularly with ADMARC and the ADDs, has also had an important influence. In particular, the Company's fear of amassing large, expensive carry-over seed stocks due to reliance on the ADDs' over-optimistic seed estimates – which it did in the mid-1980s with disastrous consequences – has in recent years caused it to limit seed production for the small farmer market. Also delayed payments for seed by ADMARC have also often increased NSCM's seasonal finance requirements.

Thus, external factors of various types have had an important influence on NSCM's own financial performance and on its willingness and ability to provide a seed service that deals with small farmers' specific needs. Nonetheless, it seems to have been able to operate along relatively commercial lines. Most of the time, it has produced quantities of seed that minimise its carry-over stocks; it has produced more of the cheaper three-way cross maize hybrids and less (none for the small farm sector in recent years) of the more expensive groundnut, bean and soyabean seed; and it has been able to share with ADMARC a very substantial proportion of its trading risk. In this context, it is not further changes in NSCM's ownership and internal organisation that is needed as much as a reassessment of seed sector development policy. Policy needs, first, to make explicit and prioritise the development functions NSCM will need to continue to carry out in order that small farmers are served with seed and, second, to establish what mix of compensation mechanisms, incentives and controls will best ensure NSCM does this.

ADMARC

ADMARC is explicitly oriented towards providing a seed service geared to the particular needs of small farmers and, as a parastatal with a national market network already in place, it should be able to provide this service at a lower overall cost than other organisations. However, internal organisational problems continue to add to the cost of ADMARC's seed distribution activities and to reduce the quality of the service it provides. The reorganisation of the Corporation in 1987 considerably improved its performance in general terms, but a number of problems have still not been completely solved. Those that most affect seed distribution are the lack of central co-ordination of secondary seed movement from regional depots and parent markets to field selling points; inadequate communication and transport arrangements at these selling points; and delays in responding to seed needs that arise during the selling season, caused by the bureaucratic organisation of ADMARC's management structure.

Many of these structural problems stem from the influence of wider development policy objectives. As ADMARC was not at first expected to operate commercially, and many development functions were added to its mandate over time, until the reform programmes of the mid-1980s there was little reason for ADMARC to be concerned with its internal efficiency, and it was difficult for it to monitor this in any case. The responsibilities assigned to it whilst it was majority shareholder in NSCM – for subventing NSCM's losses and carrying the major burden of risk associated with distribution of NSCM seed – further added to the cost of its seed activities. This was a direct result of the major role in the seed sector assigned to it by seed sector development policy. The same policy also required it to bear the cost itself of providing NSCM seed nationwide at fixed, subsidised prices; of handling and storing SSMS seed; and of supervising the distribution of seed on credit. Some of these arrangements have been reorganised in ADMARC's favour since 1987 but it

still has to meet the costs of SSMS seed and co-ordinate with the ADDs on credit distribution, and there have been problems with the practical implementation of its new subvention for subsidising, transporting, handling and storing NSCM seed. Added to this, the long-standing difficulty with obtaining sufficient cheap transport contracted from private hauliers has been an external factor with a substantial influence on ADMARC's seed delivery performance. However, given the poor level of development of the private trader network in Malawi, using some kind of national parastatal distribution system will continue to be necessary, so the emphasis must be on improving ADMARC's performance in seed distribution, rather than on changing the structure of seed distribution fundamentally.

Smallholder Seed Multiplication Scheme

The creation of the SSMS was an explicit policy response to the problem of producing improved seed of self-pollinated crops cheaply using NSCM. Organising seed production in this way was considered to offer substantial advantages: decentralised production would reduce transport costs and orient production better to local needs; the lower margins SSMS growers accept would also provide opportunities for reducing the cost of seed to purchasers; but quality would not be adversely affected, because of the production of self-pollinated crops. However lack of follow-through in policy development since its establishment seems very significantly to have hampered the SSMS' internal performance and the service it provides to small farmers. Thus, although from tentative estimates of the economic cost of SSMS seed it seems the operation of the Scheme could be financially viable, lack of funding and weaknesses in the organisation of the Scheme have meant that so far the quantities produced have been so small they have had little impact on the overall availability of improved seed to small farmers, and the Scheme has been a drain on the general budgets of the ADDs operating it.

In this context, it seems that some relatively straightforward policy changes would make the most significant improvement in both the financial performance of the Scheme and the service it provides to small farmers. (These are described in Chapter 22.) Nonetheless, external factors will continue to affect performance – particularly with respect to groundnuts, where the strong price competition from private traders limits the attractiveness of the Scheme. And the scope for improving the Scheme's linkages with other organisations, particularly the method of payment for Seed Services' field inspection work, also needs to addressed.

Sectoral Issues

For all three seed organisations, location-specific factors, government policy and linkages with other organisations as well as their own technical and economic efficiency have important impacts on their own performance and on the quality of the seed service they provide to small farmers.

The basic problem with encouraging the increased use of improved seed

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

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

The continued difficulty with creating a policy environment that encourages private trade outside urban areas has a knock-on effect on NSCM and, in particular, on ADMARC. It means that seed distribution has to continue to be organised through the parastatal's market network, which imposes additional costs on both organisations. Where widespread private trader networks exist in other countries in the Eastern and Southern Africa region, seed distribution costs have in many cases been considerably reduced by handing over responsibility for some part of the distribution chain to the private sector (Ruigu, 1988; Friis–Hansen, 1991). However, this is unlikely to be feasible in Malawi in the near future.

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

Part VI

Conclusions
The Scope for Organisational Change to Contribute to Improved Seed Sector Performance

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Seed Sector Performance in Malawi

Three tiers of problems with current seed sector performance can be distinguished. Most obviously, the absolute quantities of improved seed made available are small, particularly for non-maize crops; the blend of maize seed varieties provided does not match small farmers' expressed preferences; and the available quantities and varieties are frequently delivered late. But underlying this, there is a second tier of problems concerning the relationship between the prices of seed and other agricultural products and inputs. For the majority of small farmers who wish to obtain seed from off-farm sources periodically, for replacement or to source different varieties, the absolute level of retail seed prices is not the major constraint; however, for the significant minority who are chronically seed insecure, because the resources available to them are insufficient to generate surplus domestic production, finding cash to pay for seed is a major problem and special help is needed to enable them to do this.

Ultimately, however, the third and most significant tier of problems remains that the benefits from using the currently released varieties of seed of non-maize crops are minimal at current official producer prices and at current levels of small farmer agronomic management: allocating scarce cash to other purchases, for example of inoculant for soyabeans, generates better real returns.

Given this background to using improved seed, small farmers evaluate different potential sources of seed using a clear and consistent range of criteria which is ranked, similarly for all crops, as: reliable availability of seed; 'fair' prices (compared to the bench-mark of official seed retail prices); good seed quality; availability of preferred varieties; and timely delivery. Interestingly, distance to selling points does not rank as an important criteria influencing choice of seed source. In addition, there are certain special criteria for individual crops: option to purchase out of shell for groundnuts; option to purchase small quantities of individual varieties for beans; and availability of credit for hybrid maize seed purchases.

Hybrid maize is unique in the small farm farming system in Malawi: the decision to use hybrid maize seed is part and parcel of the decision to grow the crop, unlike for other crops; seed has to be replaced every year; and it is available at subsidised prices only from ADMARC selling points. Therefore farmers have little choice concerning seed source and the decision for small farm households is whether or not to grow the crop – not whether or not to use improved seed, nor which source of seed to use. Because of this the survey results are biased in favour of ADMARC as they represent only the opinions of the two thirds of survey farmers who have found hybrid maize an attractive crop to grow.

Against small farmers' criteria, ADMARC's performance, compared to other potential seed sources, is assessed as being good on price and availability of credit, and good on freedom of access and seed quality. It is considered to perform poorly compared to other sources on reliability of availability, timeliness of delivery and availability of preferred varieties. This assessment is common across all crops. Crop-specific disadvantages include the rationed access to hybrid maize seed at many ADMARC selling points (particularly where available seed is reserved for credit recipients), and the 1 kg minimum purchase limit as it affects purchases of beans for planting. On the plus side, ADMARC's provision of groundnuts out of shell is considered to be an advantage.

This assessment translates into a clear set of preferences relating to seed source. Except for hybrid maize (because it has to be replaced every year for agronomic reasons and is available only from ADMARC), farm saved seed was preferred for all crops, the reasons cited being that cash is not required and the variety is known. ADMARC was the next best source, in survey households' estimations, for groundnuts and soyabeans. But there was a clear preference for local sources for beans.

These preferences can be compared to the actual sources used, as shown in Table 3. For groundnuts, more households use seed saved on-farm as their primary source than express a preference for this source. Of those using off-farm sources, ADMARC is the most commonly used source, conforming to expressed preferences. For beans, substantially more households use on-farm sources than cite this as their preferred source. Of the off-farm sources, local people and local markets are used by many households, conforming to expressed preferences, but, importantly, most households who source seed off-farm because of some kind of domestic crisis use ADMARC instead. For soyabeans, again more households source on-farm than give this as their preferred source. Most of those using off-farm sources use ADMARC, consistent with expressed preferences.

Thus, a greater proportion of households, very substantially so for beans, rely on seed saved on-farm than give this as their preferred source, suggesting there are practical constraints limiting the use of off-farm seed sources. For those that are able to make use of off-farm sources, the sources used conform to expressed preferences. But the use of ADMARC by most households sourcing beans for planting off-farm in times of crisis suggests the Corporation performs an important security function, too, for this crop.

The available evidence thus shows that small farmers have a range of particular requirements of the services providing seed to them which all affect the cost to the seed organisations providing the service.

In addition, the survey results have shown that there are distinct groups of small farmers with different seed needs: those that always save seed on-farm; those that obtain seed off-farm only at times of domestic crisis; those that obtain seed off-farm regularly by choice, to replace seed or to obtain different

varieties; and those that are chronically seed insecure and have to piece together supplies of seed from off-farm sources every year in a haphazard way. Each of these thus has different requirements from the formal seed sector and this further adds to the cost of serving the small farm market.

The way the seed sector in Malawi is currently organised does have certain benefits in terms of serving small farmers' needs but, in overall terms, the sector cannot be said to be strongly oriented towards these specific needs, much less can it be considered to be 'demand-led'.

Improving seed sector performance so that small farmers' seed needs are better met, and the seed organisations themselves operate as efficiently as possible, clearly requires a range of initiatives, to overcome the constraints affecting different aspects of performance: changes in national policies and changes in the way allied institutions contribute to the sector, as well as changes in the operation of the seed organisations themselves. However, a significant problem with controlling and directing activity towards the needs of small farmers has been the lack of an explicit, coherent and influential seed sector development policy. When work first started in the early 1970s on organising a formal seed sector, various policies were formulated for dealing with the factors affecting seed sector performance. However, many of these were not followed through and important variables influencing the performance of the sector, such as seed prices, were allowed to be determined largely by non-seed concerns. There was no co-ordinated body with effective power to press for policies and actions favourable to the seed sector (the only such body, the Seed Technology Working Party does not have executive authority). Furthermore, after the initial work in the 1970s, new initiatives to improve seed sector performance were fairly limited: the establishment of the SSMS was the main one.

Drawing together these various concerns, it seems that the need now is to draw up an effective seed sector development policy. This should deal not only with seed production, pricing and distribution but also with the numerous linkage issues that are so influential in the seed sector. And it should contain mechanisms for ensuring seed policy is reassessed over time, to keep pace with the dynamics of change in the sector itself and in the institutions with which it is linked. The subsequent Chapters in Part VI are intended to provide food for thought in this process, by highlighting some of the most important issues that could be addressed in the short term and some of the issues that will need to be dealt with in a more considered way in the long run.

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Short-Run Adjustments

ADMARC

Improving ADMARC's internal efficiency in its seed distribution activities would go a long way towards improving the timeliness of seed delivery to small farmers, and to containing the costs of the seed distribution exercise.

ADMARC rejects the claim that it is responsible for late delivery of seed: it maintains that it delivers the allocations requested of it on time and that the real problem is the need for supplementary deliveries during the course of the selling season to match supply to actual demand. Therefore, changes could be made to provide a better set of incentives and controls for Market Supervisors to encourage them to be pro-active in sourcing seed when supplies run out mid-season and, similarly, in disposing of seed surplus to requirements. As well as performance-related incentives, the top-down management structure could be changed. For example, market clerks could be allowed to source limited quantities of seed themselves independently, by equipping them with LPOs to enable them to respond quickly to sudden increases in demand (following the start of the rains, for example) by ordering seed direct from NSCM.

But more resources also need to be allocated to the secondary distribution exercise in the form of better communication facilities for Market Supervisors, particularly radio phones to communicate with field selling points, and the need for better transport facilities should also be investigated; it may be that better control over the use of existing transport would be sufficient. Control of the greater resources at the disposal of market clerks under this new system could be achieved by using peripatetic staff to make random checks on seed stocks and on clerks' performance. And market staff need proper training in seed handling and storage techniques, beyond the one day pre-marketing seminars currently organised by Seed Services. Overall, a system that overcame the problems of getting information through imperfect communication links from a wide range of locations would allow much more detailed operational planning and therefore control. In particular, this would help to expose the relative influence of internal and external factors on ADMARC's performance.

ADMARC's problems with seed distribution have also arisen from factors outside the Corporation's control, so these would need to be addressed too. One major problem is the high prices that ADMARC is having to pay to private hauliers, and the difficulty in contracting them and ensuring that they carry out the work as intended. These have definitely led to transport inefficiencies, particularly in the North. Since 1989, the rates ADMARC can offer to private transporters have been decontrolled, so the Corporation can now compete for the available transport more successfully; however, obtaining

transport is increasingly costly due to the general shortage of private hauliers and the greater attraction of the relief distribution work generated by the Mozambican refugee camps. ADMARC cannot try to cut its transport costs by organising bulk transport, as it is doing for grain maize, as certified seed must remain sealed in its 10 kg packs to guarantee its quality. But it could provide better incentives for the contractors to work on seed delivery by increasing the opportunities for private transport contractors to double-load, taking recently purchased produce back to Lilongwe on the return journey from delivering inputs.

Another part of the transport problem for ADMARC has been the relative unattractiveness to private hauliers of moving seed from the regional depots and parent/area markets to the field selling points. Because of the seasonal nature of ADMARC's input distribution operation it would not be sensible for it to operate its own national transport fleet. However, given the very significant difficulties the Corporation experiences with organising private transport for secondary seed distribution, it may be worthwhile to invest in a modest fleet of tractors and pick-ups for this part of the exercise. If bought, these could be in use from June, with the start of the produce buying season, to March, at the end of the seed selling season, so they would be well-used – and they could be hired out at other times. Alternatively, it might be possible to reduce the impact of transport costs on ADMARC's performance by operating differential input pricing. If seed was priced more cheaply at ADMARC's regional depots and parent/area markets, in a reverse of the policy currently operating for maize grain, this might provide an incentive to private traders or groups of farmers to collect seed, obviating or minimising the need for a secondary seed distribution exercise. This is likely to be relatively simple to operate as it would not have any knock-on effects on other prices in the seed chain and our survey results show farmers are already prepared to travel significant distances to fetch seed.

Were the SSMS to be expanded significantly, to take over seed production for self-pollinated crops, this would provide another means for reducing ADMARC's secondary seed distribution costs, as SSMS seed production is decentralised and seed is not moved out of the area where it is produced (although this would serve to limit the increase in future costs arising from expanded supply of non-maize seed, more than serving to reduce current costs, as very little seed of self-pollinated crops is currently distributed through ADMARC).

Regardless of the changes that are made, the lack of incentives to improve the efficiency of seed transport, handling and storage will remain as long as the seed subvention paid to ADMARC by the Treasury continues to be calculated on a cost-plus basis. All the incentives at present are for ADMARC to minimise costs by providing the minimum acceptable service. Thus, one of the main requirements in the short run is to decide an appropriate balance between the development and efficiency functions ADMARC is expected to perform and appropriate compensation for them.

Smallholder Seed Multiplication Scheme

If the assumptions on which the SSMS are based are accurate, namely that there is strong demand for improved seed of self-pollinated crops amongst small farmers; that SSMS production methods can provide seed of acceptable quality; and that seed production using small farmers can provide sufficient returns to growers to be attractive at the same time as being cheaper than formal production methods, then the Scheme should be expanded (whilst the latter two assumptions are valid, the evidence from the seed survey households raises severe doubts about the accuracy of the first assumption). The main policy requirement for achieving this on a sustainable basis is to deal with the current internal inefficiencies in the Scheme's operations. Specifically, this requires: sorting out the existing internal inefficiencies; deciding an acceptable margin for growers vis-à-vis ADMARC SSMS retail seed prices, to ensure sufficient supply of seed; and organising proper funding for an expanded but more efficient Scheme.

Improving the efficiency of the Scheme would involve regularising its funding. It would also involve cutting costs, by training ADD Crops Officers, or possibly even EPA Development Officers and Field Assistants, to inspect seed – to enable them to do this work on their normal field visits instead of needing a special trip with Seed Services; by zoning growers to cut travel costs; and by creating a separate vote for the SSMS within ADD budgets.

Although it would be desirable to reduce seed losses at the ADMARC storage stage, realistically it is probably not possible to do anything about this without a major training and facilities improvement operation by ADMARC. A compromise could be to arrange separate days for small farmer growers to present seed at ADMARC, to minimise the risk of admixtures. If growers are zoned, it should be relatively straightforward to identify one ADMARC market for them to travel to and a certain day on which to do this. Proper labels and sacks for SSMS seed are a fairly cosmetic change but would improve its image to potential purchasers.

More actively preventing SSMS growers from selling their production as grain is probably best achieved by increasing growers' margins, but it may also require more vigilant policing by ADD staff. A realistic solution for the current lack of processing facilities for SSMS seed would be to establish for which crops processing is really a priority and provide low-cost processing equipment only for these. Improving the timeliness of seed input requests requires better co-ordination between the ADDs and the suppliers. Inspection costs could be reduced by the ADDs doing the inspection work themselves: Seed Services maintain this is quite feasible as only self-pollinated crops are involved.

The options appropriate for improving growers' margins and cutting seed retail prices vary between crops. For groundnuts, either the SSMS grower seed price must be increased dramatically, to be competitive with private trader prices for commercial grain – probably by the MOA returning to the policy of subsidising the difference between the grower and retail seed price; or small

farmer growers could be allowed to sell seed themselves, at whatever price the market will bear – but it would be very difficult to ensure production was sold as seed rather than as grain for domestic consumption For beans and soyabeans, our calculations in Box 4 suggested that it should be possible to reduce SSMS grower prices to avoid losses on retail seed prices as currently returns are high.

Having agreed a seed pricing policy for SSMS seed, and the principle of a separate budget for the Scheme, the next step would be to decide how this may be funded at least cost. In part, the increased internal efficiency of the Scheme will help in reducing the total funding requirement. The first obvious source of external funds is the proportion of the current Treasury subvention to ADMARC assigned to groundnut, bean and soyabean seed distribution. It should be feasible to reassign this to the SSMS, because increasing the proportion of seed produced under the SSMS will reduce ADMARC's total seed transport, handling and storage costs. However, the total amount available from this source is likely to be relatively small, as the greatest proportion of the subvention is for the maize seed subsidy, an open-pollinated crop which the SSMS will not be able to produce.

The other means of making it easier to provide a separate budget for the Scheme would to return the receipts from sales of SSMS seed to the Scheme, as a contribution towards off-setting its costs. According to data from MZADD, the sums likely to be generated in this way are not insignificant, as shown in Table 26. This suggests there is considerable scope for funding the Scheme from a proportion of sales receipts, although in the near future, as at present, a proportion of seed is likely to be kept back from sale to serve as future seed stocks. The critical requirement will be to establish what proportion of the current margin can be passed on to seed growers in the form of higher prices, as an incentive to production, and what proportion must be retained by the Scheme to ensure ADDs' and Seed Services' costs are covered.

But first a decision must be made, based on more accurate information than is currently available, as to whether the improved varieties of groundnut, beans and soyabeans produced under the SSMS provide any real benefit to small farmers under average management conditions, either in terms of increased potential yields or in terms of more indirect benefits such as better disease resistance, better germination, etc.

The constraints to uptake of SSMS seed by small farmers would also need rectifying. Primarily, this would involve increased promotion amongst small farmers of the availability and benefits of using SSMS seed. This could involve special campaigns, however this is a short-run solution and unlikely to have very much impact; or it could involve breeding varieties that give higher yield and other preferred attributes. This is more likely to have a lasting impact in the long run as it more directly deals with the basic demand constraint.

Table 26: MZADD costs and returns of SSMS production 1990/91

Costs

144 ha groundnuts	@	MK149.60 each	=	MK 21,542
85 ha beans	@	MK342.60 each	=	MK 29,121
				MK 50,663

Returns

144 ha groundnuts	@	MK700.00 each	=	MK 100,800
85 ha beans	@	MK770.00 each	=	MK 65,450
				MK 166,250

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

Source: Data in Box 4 and own calculations.

Changing the Role of NSCM

NSCM is an efficient seed organisation and there is only minor potential for increasing its contribution to national development objectives by changing its internal structure and organisation. The main problem is the basic conflict of interest between NSCM, which has to be increasingly concerned with its own financial performance, and government, which is concerned with the seed needs of small farmers from a development perspective. The changes in NSCM's organisation which came about as a result of the transfer of control of the Company from ADMARC to Cargill in 1988 have increased this conflict.

The main option for improvement therefore appears to be changing the role NSCM is expected to perform in the seed sector in Malawi, through a revised system of policy controls and incentives. There are three main restrictions which might usefully be imposed on NSCM. First, the Company could be required to take on a greater proportion of the trading risk associated with seed distribution, so that this is more fairly shared between the Company and ADMARC. Related to this, it could be required to make a greater investment in the practical marketing of its seed to small farmers, rather than leaving this to the extension service, which does not have the time, resources or training to do this effectively. NSCM could bear some of ADMARC's costs of handling, storage and transporting its seed on a commissioned service basis. The present system, in which all costs are paid by ADMARC, means NSCM is not paying for the marketing and distribution of 80 per cent of its seed sales (except indirectly via the discount it gives to ADMARC). This could be done on a

similar basis to the one that the implement supplier Agrimal already uses for paying ADMARC for distributing its farm implements. However, covering ADMARC's costs of serving the remotest locations may continue to require government support.

Second, NSCM could be required to undertake a greater proportion of its seed maize production directly on its own seed farm, as it is clear that the current system of relying primarily on contract growers is, in Malawi, expensive and risky and direct production is much cheaper. To the extent that this requires the area on which it can grow seed to be expanded, NSCM should be assisted with obtaining access to the land necessary for this.

Third, responsibility for the production of seed of self-pollinated crops could be transferred away from NSCM to the SSMS, which can produce much more cheaply. This would only be formalising an arrangement which already operates in practice, but it would have the advantage of allowing the Company to concentrate its cross-subsidisation efforts on the one product, hybrid maize seed, for which it is most needed.

Higher retail seed prices as compensation for these three restrictions are not really feasible. Instead, as well as expecting NSCM to contribute to controlling the costs of small farmer seed supply through its own internal cross-subsidisation of product lines, the cost to it of the three controls outlined above should be off-set by providing the Company with a new incentive: greatly increased access to profitable export markets.

NSCM has had a mandate to export seed as well as to supply the domestic market ever since it started operating and in some years its export earnings have been substantial. In 1988, for example, it imported MK30,000-worth of seed but exported seed valued at MK1.5 million. It has had a wide range of export contracts: cucumber seed to The Netherlands; composite maize seed to Mozambique and Angola and other war-torn areas in the Eastern and Southern African region; groundnut seed to Sudan, Tanzania and Mozambique; and grass seed to Japan and various Arab states. However, NSCM has not appeared to capitalise on export opportunities as much as it could have done, to cross-subsidise the less profitable supply of seed to domestic small farmers. In particular, after the problems it experienced with over-exporting maize seed in 1987, NSCM's policy now is not to arrange maize seed exports until it is clear that domestic demand will be met. Furthermore, the Company considers that, whilst some of the seed crops it produces have been competitive regionally in the past, none are now due to the high prices contract growers have to be paid in Malawi, and other high production costs, which do not apply elsewhere in the Eastern and Southern region. For example, in Zimbabwe production costs are lower because landed fertiliser costs, etc. are lower; tobacco prices are not yet as high (to provide competition on growers' returns); and much higher yields are obtained because production is irrigated. However, NSCM may become more competitive in the future as the Company anticipates its own production costs will even out and those of its competitors

(mainly Seed Co-op) will increase: tobacco prices in Zimbabwe are forecast to rise, and an increasing proportion of Zimbabwean seed production will pass out of the large-scale commercial sector. Furthermore, NSCM foresees that the Zimbabwe Seed Co-op will have to change its current structure of production, further increasing costs, because its present policy of giving growers responsibility for dressing and packing seed is leading to low quality, unattractively packed seed.

For non-maize crops, NSCM either overproduces with the deliberate aim of exporting seed as well as selling domestically, or produces expressly for export, in the absence of any domestic market. For example, 80 per cent of groundnut and grass seed production is currently exported. The export market for non-horticultural crops is very largely dominated by international aid donors, determined by the requirements for emergency relief distribution of seed, so will be fairly strong in the medium-term future.

As well as its own marketing policy and high domestic production costs for certain lines, the regulatory constraints on all export activity in Malawi have also limited the Company's ability to exploit export markets for seed. This is in contrast to other seed organisations in the Eastern and Southern African region, such as Seed Co-op in Zimbabwe, which receive export subsidies to maintain their competitiveness in international markets. NSCM should be allowed greater freedom to produce for export and to arrange export contracts – possibly with the additional incentive of being allowed to retain foreign exchange.

Direct Participation by Government

As well as influencing operations in each part of the seed sector through policy, the government can choose to become involved more actively through direct participation in breeding, multiplication, processing and distribution. This approach has been not been pursued to any great extent in Malawi, compared to other countries in the Eastern and Southern African region. Most involvement has been at arms-length, via ADMARC in seed distribution and via ADMARC's involvement in NSCM in seed multiplication. With the increasing moves towards market liberalisation in the 1980s and 1990s, the trend has been very much towards less government involvement in the sector, however, it is sometimes asked whether national development objectives might better be served by putting certain parts of the sector under the direct control of government. Usually, it is those parts of the sector that provide support functions that are considered here: basic plant breeding research, seed certification services, distribution of non-hybrid seed and distribution to economically marginal groups of seed users.

The issue of the appropriate mix of public and private sector activity in seed distribution has to a large extent already been dealt with in Malawi: for the foreseeable future, there is unlikely to be sufficient private sector activity for handing over significant amounts of seed distribution from ADMARC, so the

emphasis has to be on continued parastatal involvement and improving ADMARC's performance instead.

The appropriate blend of public and private sector activity in plant breeding work depends on a large number of factors: purely economic questions concerning the relative efficiency of each sector in producing new varieties have to be balanced against other more sensitive issues that are outside the remit of this study, such as control of plant genetic resources, plant breeders' rights and royalty payments on seed. In practical terms, NSCM's own breeding work has only just started in Malawi whereas the DAR, particularly in its maize breeding work, is emerging from a period of reorganisation with a strong portfolio of hybrid maize varieties specifically tailored to the requirements of the small farmer seed market. Private seed companies – NSCM or otherwise – are unlikely to be interested in supplying these. Therefore it is difficult to see how reducing government involvement in plant breeding could provide any significant benefits at present.

The one function which might usefully be considered for reorganisation is the quality control and certification function performed by Seed Services. The inability of Seed Services to perform effectively within a government bureaucratic structure is a major limitation to current quality control work, and this will become more accentuated if formal seed production and distribution is expanded. Seed Services needs to be able to respond to requests for field inspections and laboratory tests rapidly, by controlling its own budget. It could also off-set a significant proportion of its operating costs by the charges it makes for its services, were it able to retain this revenue and to charge for all its activities. At the same time, it needs to maintain its independence from other seed organisations. Seed Services might therefore usefully be considered for conversion to agency status: a small core grant from government would provide an element of guaranteed funding and of independent government control over its activities; otherwise, it would be self-funding by charging for its services and free to determine its own operational strategy.

Policy Adjustments

As well as the internal organisational issues considered above, improved performance in the seed sector could be helped by adjustments in some of the policies affecting it. Foremost amongst these, is a re-examination of the policy of providing small farmers with credit for seed purchases. For reasons that we have already outlined, the costs of doing this – in terms of bureaucratic complications and delays – seem to outweigh the benefits. As well as the delays in the release of seed from the field selling points, both ADMARC and NSCM have increased seasonal financing charges resulting from the ADDs' late payment for seed provided to small farmers on credit. This problem could be circumvented by obliging ADDs to pay NSCM direct for seed received for credit distribution, but it is difficult to see how this would have any effect on the ADDs unless they were also required to collect the seed themselves, which

is unfeasible at present. If it is decided to continue providing seed on credit nonetheless, means should be investigated of better targeting it to seed insecure households. Our survey results suggest it is only a small minority of households, those that are chronically seed insecure and those needing to obtain seed off-farm at times of domestic crisis, which need credit to obtain seed – but currently it is not these groups that obtain credit for seed purchases.

Supporting Traditional Seed Systems

Achieving significant increases in the quantities of improved seed reaching small farmers, and changes in the wide range of variables affecting farmers' ability to make use of it, is not a feasible short-run objective. Most small farm households are going to continue to save most of their seed needs on-farm for some time to come. Indeed, for some crops, particularly groundnuts, because of the combination of strong self-pollination with high private trader market prices, and for local maize, it is unlikely whether full regular replacement of seed from formal sources will ever be achievable. At the same time, many households are prepared to take considerable care over on-farm seed selection and storage. But current extension policies place little emphasis on providing information about the various techniques involved in on-farm seed saving. In the short run, therefore, it may be helpful to incorporate information and training about on-farm seed saving techniques in extension work and in ADD farmer training courses. These would have to be geared to demonstrating strategies small farmers can realistically employ on-farm.

26
Long-Run Restructuring

Agricultural Price Policy

The very small difference between consumer grain prices and retail prices of non-maize seed, the relatively low level of producer prices and the low incremental yield from using improved seed combine to minimise the incentive for small farmers to purchase improved seed. Until on-farm conditions allow better expression of improved varieties' potential yields, there will be little value in subsidising the price of non-maize seed but if a greater proportion of seed production is taken over by the SSMS, lower production costs will reduce the need for retail price subsidies.

However, as long as national policy remains to promote domestic maize production, the subsidy on the price of hybrid maize seed to small farmers will have to continue. The cost of the subsidy is not large and it appears to have a very significant positive impact on the profitability of hybrid maize production for small farmers. Therefore the issue, for the foreseeable future, is not how to remove the subsidy but how to minimise its impact on the performance of the various seed organisations.

The way ADMARC is subvented for the cost of the maize seed subsidy at present almost certainly increases the cost to Treasury and provides no incentive to ADMARC to track and control its internal operational costs. To improve this situation needs a two-pronged approach: the introduction of better internal control systems for ADMARC's seed distribution exercise, as discussed earlier, and the substitution of a cost-basis arrangement for calculating the subvention, instead of the current percentage basis, as an incentive to implement these controls. At the same time, ADMARC's handling and storage costs for SSMS seed, which are outside the current subvention arrangement, need to be included. As we saw earlier, these costs might best be covered within the SSMS itself.

ADMARC no longer sells inputs at seasonal markets so it has already cut the costs associated with supplying these more remote selling points. There is therefore no need to help ADMARC further with external support for cost-cutting; it is up to the Corporation to improve the efficiency of its seed distribution activities itself.

A more fundamental alternative would be to change the incidence of the subvention from ADMARC to another seed organisation. The obvious candidate is NSCM. Subsidising the price of seed 'at source' at NSCM might be logical but, in practice, it would almost certainly increase the cost of the subsidy as NSCM is unlikely to be willing to continue providing large discounts on the ex-factory price of the seed that it provides for the small farmer market. Furthermore, administering the subvention would become more complex as two organisations would be involved: ADMARC would still

require subventing for the cost of its seed transport, handling and storage activities. However, there is one important reason why changing the incidence of the subsidy might be considered worthwhile: it would be the only feasible means of allowing private traders to compete with ADMARC in providing hybrid maize seed to small farmers: currently private traders have to sell seed at NSCM's retail seed price, which is almost twice ADMARC's price.

Apart from the subsidy issue, the continued policy of setting controlled seed selling prices has important implications for the ability of the Ministry of Agriculture to generate accurate seed estimates, via the influence of the timing of the price announcement on ADMARC's ability to move the necessary quantities of seed to its field selling points. At present, the MOA pricing exercise is timed to release official agricultural producer and input prices for the forthcoming season in the September / October prior to the start of planting in November. The responsiveness of small farmers to changes in relative prices means that this announcement can significantly affect the quantities of seed of different crops that they subsequently buy. Were the time of the announcement brought forward to, for example, July it would be much easier for final seed estimates to be revised, in the light of the announcement, in time for the necessary quantities of seed to be moved out to the field by November. However, as the final price announcement is itself influenced by the progress of ADMARC purchases after harvest in July, it is difficult to see how this might realistically happen.

Liberalising the Seed Market

Since the partial liberalisation of small farmer agricultural produce markets in 1987, there has been increasing debate in Malawi about the likely advantages and disadvantages of further agricultural market liberalisation. The small farmer seed market has been considered as part of this. From a national development perspective, liberalisation of the seed market would be advantageous if it brought about either a reduction in retail seed prices to small farmers or an improvement in the quality of the seed service provided, in terms of the types of seed provided, their quality, timeliness of delivery, physical accessibility, etc. It would also affect the viability of the seed organisations themselves. Thus, there are two parts to the market liberalisation process to consider: the deregulation of participation in the market; and the decontrol of prices. These can be applied either to seed production or to seed distribution. This combination of choices creates a range of possible scenarios for liberalisation; some of the most important likely effects of these are discussed in the following Sections.

Deregulation of Participation in Seed Distribution at Controlled Prices

Encouragement of registered private seed retailers within the existing seed sector structure is the scenario most commonly discussed at present. It would require the establishment of a wholesale seed distribution system to supply the retailers. This could be operated either by NSCM, which would involve a

massive new investment in marketing infrastructure; or by new private sector seed wholesalers, who would require sufficient margins to take on this task (this may well be feasible using the system currently operated for NSCM by Chipiku); or by ADMARC using its existing primary seed distribution network of regional depots and parent/area markets. This last is probably the most feasible option under a controlled price system.

However, this change alone would have very little positive impact on the quality of the seed service provided to small farmers other than possible reductions in the distance to seed selling points. However, distance is not a major concern for most small farmers. In addition, without a significant increase in the number of private traders dealing in agricultural produce and a commensurate liberalisation of fertiliser distribution, farmers would still have to travel to ADMARC markets to sell produce and buy fertiliser. This scenario would be unlikely to reduce seed distribution costs significantly, as private seed retailers would need a margin on the seed they sold and almost certainly ADMARC would need to provide a wholesale distribution service, and so would not be able to reduce its transport, handling and storage costs significantly.

Ultimately, without a very substantial increase in the number of private traders operating in the rural areas, deregulation of participation in seed distribution at controlled prices is unlikely to be a realistic option.

Deregulation of Participation in Seed Production and Distribution at Controlled Prices

The type of organisations which might become involved in seed production as well as distribution fall into two camps. On the one hand, there are formal seed organisations such as national specialist large-scale seed producers and distributors; foreign large-scale seed importers; and national small- and medium-scale local seed producers and distributors who may also be involved in other trading activities. On the other hand, there are decentralised semi-formal operations, such as the SSMS and community level seed production and distribution initiatives.

At controlled prices, the formal seed organisations would face the same problem as NSCM of high seed production costs. In addition, the Malawi small farm seed market is probably not big enough to support other companies besides NSCM; and they would have to reach agreement with the DAR on access to and payment for breeder seed (they could not use their own breeder seed for maize, because of the specialist attributes required of hybrid maize by small farmers in Malawi). Unless arrangements were made for ADMARC to sell many different organisations' seed, new entrants to the market would also need to set up a parallel seed distribution system, either of their own or using private traders. The former would clearly be extremely expensive and there is unlikely to be sufficient capacity for the latter in Malawi for some time to come. This combination of factors is likely to be a significant disincentive to

participation. The national development gains from this are also questionable. These organisations would probably want to focus on the more profitable lines, such as three-way cross hybrid maize, which would not coincide with small farmers' needs. In addition, their production costs for self-pollinated crops would be higher than less formal alternatives so there would be little economic benefit to their involvement.

Encouraging local small- and medium-scale seed producers and distributors is likely to have the greatest potential in the long run. These operations could use larger small farmers as contract growers and so reduce the contract grower price that would have to be paid. They may also be able to reduce the transport component of seed production costs by organising multiplication very locally. And, for traders adding seeds to existing trading operations, the unit costs of storage and transport for their seed operations are likely to be lower. Thus, these traders could probably work within a system of controlled seed prices, as long as they were allowed to sell seed at subsidised prices by transferring the incidence of the subsidy from ADMARC.

However, the more informal decentralised operations would probably remain the lowest cost options for producing seed of self-pollinated crops. (These operations would not be feasible for open-pollinated and hybrid maize crops because of the inability to guarantee isolation distances in the small farm areas in Malawi.) They could produce more cheaply than formal organisations, and their transport costs from production site to distribution point would be lower on account of operating in a decentralised way. Also, they would not need to be involved in the complexity and cost of a parallel national distribution network.

Deregulation of Production and Distribution and Decontrol of Prices

This option would provide much greater incentives for formal sector seed organisations to compete with NSCM in supplying seed in Malawi. However, it is unlikely that providing small farmers with the specialist seed services they need at prices they can afford would be a priority for formal organisations and decentralised operations will be able to undercut them on price in any case.

The most likely result of decontrol of seed prices, therefore, would be a significant reduction in small farmers' economic access to seed because the market would be too small to attract sufficient participants, so those organisations that did become involved would be likely to charge, in the absence of competition and with no price control, significantly higher prices for seed.

Deregulation of Seed Production and Distribution and Adjustment of Controlled Prices

Given the small number of new entrants likely to become involved in supplying small farmers with seed in a deregulated seed market, and given small farmers' lack of economic power as long as producer prices remain

controlled, then the most beneficial form of seed market restructuring is likely to be deregulation of production and distribution with continued, but adjusted, price control.

Seed prices for self-pollinated crops could continue to be un-subsidised but, as most seed would be produced by the lower-cost SSMS and/or community-level seed groups, retail seed prices could actually be reduced in practice without endangering growers' margins. This would protect small farmers' economic access to improved seed. Physical access and timely delivery would be improved via the decentralised organisation of SSMS and community seed production. From the available evidence, seed quality would not be adversely affected.

Maize seed prices would have to continue to be subsidised as long as producer prices remain low. But the incidence of the subsidy would need to be transferred from ADMARC to the seed producing organisations, so they could supply maize seed to small farmers on equal terms with NSCM. The involvement of small- and medium-scale enterprises in maize seed production and distribution appears to offer significant advantages so this might be further encouraged, given the relatively poor level of development of private sector capacity in Malawi, with selective support for investment in transport and storage and access to working capital.

Finally, in the long run, the seed sector needs to become more oriented towards the specific needs of small farmers. Means of allowing small farmers to exert greater influence on the market should be investigated. One of the most obvious, that would be particularly relevant were seed distribution to be decontrolled, would be the creation of bulk seed-buying groups. These could be organised through existing community groups or with initial support from non-governmental organisations.

Agricultural Technology Development

The underlying problem with seed sector performance in Malawi is that the incremental yield from using the improved varieties and selections of non-maize crops currently available is minimal under average small farm management conditions. Although Malawi's small farm economy is not 'post-Green Revolution' in the conventional sense of being a "dynamic technical and economic environment" oriented towards yield maximisation, dependent on large quantities of external inputs and on a steady stream of new crop varieties (Ali and Byerlee, 1991), the paucity of opportunities in other parts of the economy has meant that a large proportion of the population has remained in the small farm agricultural sector and become increasingly oriented towards maximising production under conditions of limited land and labour availability. Despite this, for individual small farm households there is little incentive to use improved seed of non-maize crops as the current dominance of maize in the farming system means the management of other important small farmer corps, such as groundnuts, beans and soyabeans, suffers and the

potential yield of improved varieties is not expressed.

Therefore, for the use of improved seed of non-maize crops to become worthwhile for individual small farm households, so that demand for seed increased in the long run, there needs to be more work on developing agricultural technologies and techniques that are relevant to the constrained conditions faced by many small farmers.

One of the most important requirements is for workable strategies to draw in fertility from outside small farmers' plots by, for example, using inorganic fertiliser, nitrogen-fixing annual food crops and leguminous trees, or physical soil erosion control. In terms of plant variety development, for maize the need is to develop short-season varieties that can be planted late in order to stagger planting as well as flinty varieties that meet farmers' non-yield requirements. For groundnuts, the need is to produce short-season varieties, for the same reason, and varieties with better disease resistance and culinary qualities.

Only in this way will Malawian small farmers obtain a real benefit from using improved seed, through being able to use management techniques that allow incremental yield potential to be expressed and through using plant varieties that are better adapted to the agro-ecological and socio-economic environment in which small farmers operate.

APPENDICES

Appendix 1
Malawi Seed Study Farmer Survey

EPA ..... Date .....

Name of Interviewee (s) .....

Relationships to HH ..... Sex (es) .....

No. of people in HH ..... Children (U15) ..... Adults .....

Holding size ..... Credit recipient .....

What crops do you usually grow? (in order of importance)

Crop	Economic function(s)*	Variety/ies
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....

THE NEXT PART OF THE SURVEY TO BE CARRIED OUT SEPARATELY FOR EACH CROP LISTED ABOVE

Function

Eaten .....

Other domestic use, grain (name) .....

Other domestic use, non-grain (name) .....

Attributes – what are the main reasons you grow this variety?

Yield in good year .....

Yield in bad year .....

Early maturing .....

Cob size .....

Cooking .....

---

* 1 = Eaten
2 = Other domestic use, grain
3 = Other domestic use, non-grain
4 = Sold

NSCM/SSMS seed attributes and quality **Crop** ..... **Variety** .....

Function					
To eat					
Other domestic use, grain (name)					
Other domestic use, non-grain (name)					
To sell (for what)					
To sell (to whom)					
Attributes					
Yield in good year					
Yield in bad year					
Early maturing					
Cob size					
Cooking					
Taste					
Poundability					
Disease/pest resistance					
Storage					
Market price					
Residue					
Need of fertility					
Other					
Quality					
Purity					
Germination capacity					
Vigour					
Health					

1 = Good; 2 = OK; 3 = Bad

Taste .....

Poundability .....

Disease/pest resistance .....

Storage .....

Market price .....

Residue .....

Need of fertility .....

Other .....

(NOW COMPLETE NSCM/SSMS ATTRIBUTE AND QUALITY QUESTIONS)

Seed saving and seed quality

How often do you buy new seed? .....

How do you select seed? .....

How do you store seed? .....

Do you treat seed (in granary) .....

(before planting) .....

Our visual assessment of purity .....

health .....

other .....

(NOW COMPLETE NSCM QUALITY QUESTIONS)

How do you think the quality of your seed compares to the quality of NSCM seed? (w.r.t. purity, germn. cap., vigour, health) .....

.....

Seed sources

Saved seed .....

Friends/neighbours .....

- seasonal agricultural labour .....
- gift .....
- exchange .....
- buy with cash .....

Commercial outlet (specify location and distance)

- ADMARC depot (cash : credit) .....
- seed retailer .....
- local market .....

Other (specify) .....

Advantages of getting seed from this source .....

.....

Disadvantages of getting seed from this source .....

.....

Where would you like to be able to get seed from? (why?) .....

.....

Quantities

Do you always get the amount you want? .....

What size pocket do you buy? .....

Do you split this with friends/neighbours? .....

Would you like to be able to get a different size? (specify) .....

.....

Timeliness

When do you want to get seed? (nearest fortnight) .....

Is seed available at this time? (Always, Some years, Never) .....

Price

What price do you pay? (specify quantity) .....

What is the maximum price you would pay? .....

If your income were double, how much seed would you buy? .....

.....

If your income were half, how much seed would you buy? .....

.....

Wrap up

Why don't you buy seed? (if approp.) .....

.....

What sort of things would help you to buy seed? .....

.....

Appendix 2

Appendix Table 2.1: Major nomenclatures for seed generation control

Generation	*OECD*	*Responsibility*
1	Breeders	Breeder responsible for producing breeder seed from original parental or nucleus material and for maintaining this latter to provide fresh releases.
2	Pre-basic	In the US system, the second generation may be a later multiple of breeder or an earlier multiplication of foundation seed.
3	Basic	Selected growers produce this generation from supplies provided by the breeder and under their close supervision.
4	Certified 1	Produced on large-scale by seed organizations and sold for commercial crop production. Number of generations of multiplication depends on multiplication factor of particular species but should not be more than 2.
5	Certified 2	Further multiplications outside this controlled generation system, or multiplications that failed to meet quality control standards, are not certified. To maintain this system of multiplication requires a regular release of breeder seed.

Note: OECD = Organization for Economic Co-operation and Development

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

Appendix 3
Assumptions Used in Calculating Economics of SSMS

1. Inputs : costed at ADMARC input selling prices, including for seed.

2. Seed rates : standard, not higher, are assumed in the credit package formulation: groundnuts and beans at 100kg/ha; soyabeans at 90kg/ha.

3. SSMS seed producer prices and ADMARC retail seed prices : taken from MOA *Price Policy Document* [GOM, 1989].

4. Yields : groundnuts at 700kg/ha (average recorded in SSMS 1984/85 — 1986/87 according to Sibale and Mtambo [1989] — this is higher than in the *Guide*); beans at 700 kg/ha (average grain yield in *Guide*); and soyabeans at 1,000kg/ha (half maximum potential yield given in *Guide*).

5. ADMARC storage and handling costs : 10 per cent of cost of seed, as used in ADMARC's national seed storage and handling costings.

6. Labour : extra labour theoretically needed for planting and weeding but, as standard seed rates used, assumed needed only for weeding. Assumed weeding takes up approx. 33% of total time input normally and requirement is doubled under SSMS, so total labour input increased by 17%. Labour input figures per ha taken from AES [1987], as used in MOA *Price Policy Document*, costed at minimum rural daily wage per hour, assuming 5 hour working day (as recommended in AES, 1987).

7. Transport : costed at 2.8 t/kg for weight of inputs and produce, as used in MOA *Price Policy Document*.

8. Field inspections : average price paid by NSCM to Seed Services for field visits to contract maize growers was MK14.60 per ha in 1989/90 [Seed Services records, NSCM records]. This figure is used for SSMS as dealing with non-certified self-pollinated crops probably reduces costs but dealing with scattered plots increases them at the same time.

9. Gross margins : SACA credit package cost for commercial (not seed) packages taken; average small farmer yield (not higher seed yield); so transport costs reduced on both counts; commercial producer price.

10. Cost of seed in credit packages : the actual cost of this could not be calculated so the price charged to small farmers has been taken.

Appendix 4
Interviewees

Barrett, Mr T., British Development Division in Southern Africa
Blackie, Dr M., The Rockefeller Foundation
Bulla, Mr, Socio-economist, Adaptive Research, Chitedze Agricultural Research Station
Chisala, Mr E., Planning Division, Ministry of Agriculture
Conroy, Ms A., The Rockefeller Foundation
Elisa, Mr S., Seed Production Manager, National Seed Company of Malawi
Gray, Mr R., General Manager, National Seed Company of Malawi
Harawa, Mr D.M., Financial Controller, ADMARC
Hazleden, Mr T., Executive Director, National Seed Company of Malawi
Heisey, Dr P., Regional Economist, CIMMYT
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References

ActionAid (1993), Malawi Drought Relief Seed Distribution Project: Project Evaluation. London: ActionAid.

Adaptive Research Team (1990), '1990–91 Cropping Season Workplan'. Chitedze: Adaptive Research Team, Department of Agricultural Research, Ministry of Agriculture.

Agro-Economic Survey (1987), *A Production Cost Survey of Smallholder Farmers in Malawi*, AES Report No.55. Lilongwe: Agro-Economic Survey, Ministry of Agriculture.

Ali, M. and Byerlee, D. (1991), 'Economic Efficiency of Small Farmers in a Changing World: A Survey of the Evidence', *Journal of International Development*, Vol.3, No.1.

Barnes–McConnell, P.W. (1989), *Culture and Agriculture in Northern Malawi: Social Contributions to the Maintenance of Genetic Diversity in Beans*. East Lansing: Bean/Cowpea CRSP, Michigan State University.

Bolton, A. and Bennett, A.J. (1974), *Reports on Ministry of Overseas Development Research Project R2415: Maize Breeding and Agronomy: Malawi 1971 to 1974*. London: Overseas Development Administration.

Bowbrick, P. (1988), *An Economic Analysis of the Impact of Private Traders on Agricultural Marketing*. Lilongwe: Planning Division, Ministry of Agriculture.

Carr, S.J. (1989), *Technology for Small-Scale Farmers in Sub-Saharan Africa*, Technical Paper No 109. Washington: World Bank.

Christiansen, R. and Southworth, V.R. (1988), *Agricultural Pricing and Marketing Policy in Malawi: Implications for a Development Strategy*, Paper presented at a symposium on Agricultural Policies for Growth and Development, Mangochi, 31 October–4 November.

Christiansen, R. and Stackhouse, L.A. (1987), *The Privatization of Agricultural Trading in Malawi*. New York: United Nations Development Programme.

Commonwealth Development Corporation (1983), *National Seed Company of Malawi Ltd: Visiting Adviser Report No.1*. London: Commonwealth Development Corporation.

Commonwealth Development Corporation (1980), *Visiting Adviser's Report on Visits to the National Seed Company of Malawi in October and December 1979*. London: Commonwealth Development Corporation.

Commonwealth Development Corporation (1978), *Appraisal of Proposed National Seed Company – Malawi*. London: Commonwealth Development Corporation.

Cromwell, E.A. (1992), 'Malawi', *in* Duncan, A. and Howell, J. (eds) (1992), *Structural Adjustment and the African Farmer*. London: James Currey.

Cromwell, E., 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.

DANAGRO (1987), 'Malawi', Southern Africa Development Coordination

Conference Regional Seed Production and Supply Project Vol. IID. Copenhagen: DANAGRO.

Dean, E. (1966), *The Supply Response of African Farmers: Theory and Measurement in Malawi.* Amsterdam: North Holland Publishing Company.

Deloitte, Haskins and Sells (1987), *The Agricultural Marketing and Development Corporation: Summary of Findings and Recommendations.* London: Deloitte, Haskins and Sells.

Edje, O.T., Mughogho, L.K., Rao, Y.P. and Msuku, W.A.B. (1981), 'Bean Production in Malawi', Paper presented at a regional workshop on the Potential for Field Beans in Eastern Africa held in Lilongwe, 9–14 March.

Edje, O.T. and Mughogho, L.K. (1974), 'Agronomy Experiments on Phaseolus Beans', *Research Bulletin of Bunda College of Agriculture,* Vol.5.

Ferguson, A. (1987), 'Socio-Economic Factors Influencing Genetic Diversity in Malawian Bean Landraces, Central Region', Malawi CRSP Project 1987 Detailed Annual Report. East Lansing: Bean/Cowpea CRSP Management Office, Michigan State University.

Friis–Hansen, E. (1991), *The Performance of the Seed Sector in Zimbabwe: an Analysis of the Influence of Organisational Structure,* ODI Working Paper. London: Overseas Development Institute.

Government of Malawi (1988), *Development Account Budget Estimates 1988–89.* Zomba: Government Printer.

Government of Malawi (1987), *National Physical Development Plan,* Vol.I. Zomba: Government Printer.

Gray, R.W. (1985), 'National Seed Company of Malawi Limited'. Lilongwe: National Seed Company of Malawi.

Harrigan, J. (1991), 'Malawi: A Special Survey', *Africa Economic Digest,* Vol.12, No.22, July.

Harrigan, J. (1988] 'Malawi: The Impact of Pricing Policy on Smallholder Agriculture 1971–88', *Development Policy Review,* Vol.6, No.4, December.

Heisey, P. (ed.) (1991), *Accelerating the Transfer of Wheat Breeding Gains to Farmers: A Study of the Dynamics of Varietal Replacement in Pakistan,* CIMMYT Research Report No.1. Mexico: International Maize and Wheat Improvement Center (CIMMYT).

Kandoole, B., Kaluwa, B. and Buccola S. (1987), 'Market Liberalization and Food Security in Malawi'. Zomba: Chancellor College, University of Malawi.

Kydd, J. (1989), 'Maize Research in Malawi: Lessons From Failure', *Journal of International Development,* Vol.1, No.1, Jan.

Kydd, J. (1988), 'Policy Reform and Adjustment in an Economy Under Siege: Malawi 1980–87', *IDS Bulletin,* Vol.19, No.1.

Kydd, J. with Hewitt, A. (1986), 'Limits to Recovery: Malawi After Six Years of Adjustment 1980–85', *Development and Change,* Vol.17.

Kydd, J. and Hewitt, A. (1986), 'The Effectiveness of Structural Adjustment Lending: Initial Evidence From Malawi', *World Development,* Vol.14, No.3.

Lavers, G. (1988), *Marketing and Price Policy: An Economic Analysis of the Maize*

Sector. Lilongwe: Planning Division, Ministry of Agriculture.

Low, A. (1986), *Agricultural Development in Southern Africa: Farm-Household Economics and The Food Crisis*. London: James Currey.

Maize Commodity Team (1990a), *Report of a Survey of Maize Agronomic Practices Carried Out in Kasungu and Lilongwe Agricultural Development Divisions From 14–23 February 1990*. Lilongwe: Maize Commodity Team, Department of Agricultural Research, Ministry of Agriculture.

Maize Commodity Team (1990b), *Information Survey Into Maize Agronomy Practices in Ngabu Agricultural Development Division*. Lilongwe: Maize Commodity Team, Department of Agricultural Research, Ministry of Agriculture.

Ministry of Agriculture (1990), *Producer Price Proposals for Smallholder Agricultural Commodities and Inputs for the 1990/91 Growing Season*. Lilongwe: Planning Division, Ministry of Agriculture.

Ministry of Agriculture (1989), *Guide To Agricultural Production in Malawi 1989–1990*. Lilongwe: Extension Aids Branch, Ministry of Agriculture.

Ministry of Agriculture (1988), *Producer Price Proposals for Smallholder Agricultural Commodities and Inputs for the 1988/89 Growing Season*. Lilongwe: Planning Division, Ministry of Agriculture.

Mkandawire, R.H. and Chipande, G.H.R. (1988), 'Smallholder Agricultural Development in Malawi: the Case for a Targeted Approach', Paper presented at a symposium on Agricultural Policies for Growth and Development, Mangochi, 31 October–4 November.

Mkwezalamba, M. (1989), *The Impact of Liberalisation on Smallholder Agricultural Produce Pricing and Marketing in Malawi*. Lilongwe: Ministry of Agriculture.

Mloza Banda, H.R., Mtambo, P.J. and Chavula, K.M. (1988), 'Seed Research, Certification and Movement in Malawi', *in* Namponya, C.R. (ed.) (1988), *Seed Research, Certification and Movement in SADCC Countries*, Proceedings of a SACCAR workshop held in Lusaka, 13–17 June. Gaborone: SACCAR.

Murison, S. (1987), 'Malawi: Seasonal Credit For Smallholders', UNCDF Report No.MLW/79/CO2. New York: UNCDF.

Mzuzu Agricultural Development Division (1990), 'Proceedings of extension operation review and crop development planning workshop held at M'mbelwa Farm Institute, Hora, 10–14 September 1990'. Mzuzu: Mzuzu ADD.

Nanjundan, S. *et al.* (1988), *Industrial Sector Study and Project Formulation Mission MLW/87/001*. Lilongwe: UNDP/MTIT.

National Seed Company of Malawi (1990), 'Seeds Catalogue 1990/91'. Lilongwe: National Seed Company of Malawi.

Ndengu, J.D., Mwafulira, D.S., Mughogho, W.C.C., Chankika, C.S.M. and Zimba, A.W.C. (1984), *Farming Systems Overview for Thiwi/Lifidzi Rural Development Project: Results of an Exploratory Survey April 1984*. Lilongwe: Chitedze Research Station.

Overseas Development Administration (1973), *Report to the Government of*

Malawi on Proposals for Establishing a National Seeds Programme. London: Overseas Development Administration.

Pachai, B. (1978), *Land and Politics in Malawi*. Ontario: Limestone Press.

Pervis, D.W. and Nyondo, F. (1985), 'Toward Comprehensive Sector Studies of Groundnuts in Countries of Southern Africa, with Specific Reference to Malawi', Paper presented at the Regional Groundnut Workshop for Southern Africa, Lilongwe, 26–29 March 1984. Pantacheru: ICRISAT.

Peters, P. (1988), 'The Links Between Production and Consumption and the Achievement of Food Security Among Smallholder Farmers in Zomba South', Paper presented at a workshop on Household Food Security and Nutrition held at the Centre for Social Research, Zomba, 29–31 August 1988.

Phiri, B., Singini, M.E. and Kanaventi, C.M. (1990), *Rumphi North Mzimba Rural Development Project Background Information, Zoning and Informal Survey*, MZADD/ART Working Paper No.4. Mzuzu: Adaptive Research Team, Mzuzu Agricultural Development Division.

Phiri, B., and Mwafulirwa, E. (1988), *South Mzimba Rural Development Project Background Information, Zoning and Informal Survey*, MZADD/ART Working Paper No.2. Mzuzu: Adaptive Research Team, Mzuzu Agricultural Development Division.

Phiri, C.D. (1991), 'An Economic Evaluation of smallholder Farming Systems in Chinguluwe Settlement Scheme, Malawi' *in* WIAD (1991], *Issues in African Rural Development*. Morilton, Arkansas: African Rural Social Sciences Research Network, Winrock Institute for Agricultural Development.

Prain, G. and Uribe, F. (forthcoming), 'The Trials and Errors of Potato Seed Distribution', *in* Prain, G. and Horton, D. (eds) (forthcoming] *On-Farm Trials With Potatoes: Farmer Participation and Institutional Impact*.

Ruigu, G.M. (1988), 'The Kenya Seed Industry: Evolution, Current Status and Future Prospects', Paper presented at a seminar on Technology Development and Changing Seed Supply Systems, 22 June, Tilburg. Tilburg: IVO Development Research Institute.

Sahn, D.E. and Arulpragasam, J. (1991), 'The Stagnation of Smallholder Agriculture in Malawi', *Food Policy*, Vol.16, No.3, June.

Sahn, D.E., Arulpragasam J. and Merid, L. (1990), *Policy Reform and Poverty in Malawi: A Survey of a Decade of Experience*, Monograph No.7. Ithaca: Cornell Food and Nutrition Policy Programme.

Scarborough, V. (1990b), *Domestic Food Marketing Liberalisation in Malawi: A Preliminary Assessment*. Ashford: ADU Occasional Paper No.13, Wye College, University of London.

Scarborough, V. (1990a), *Agricultural Policy Reforms Under Structural Adjustment in Malawi*. Ashford: ADU Occasional Paper No.12, Wye College, University of London.

Scherer, A. (1988b), *Recommendations for the Improvement of the Seed Marketing Arrangements of ADMARC*. Limbe: UNDP/FAO Project MLW/85/018.

Scherer, A. (1988a), *Recommendations for the Incorporation of Private Trade*

Participation in the Sale of Agricultural Production Inputs. Limbe: UNDP/FAO Project MLW/85/018.

Seed Services (1988), *Annual Report 1988*. Lilongwe: Seed Services, Ministry of Agriculture.

Sibale, P.K. and Mtambo, P.J. (1989), 'Production of Certified Chitembana and Mawanga Groundnut Seed by the Smallholder Farmer: the Malawi Experience', in *Proceedings of the Third Regional Groundnut Workshop for Southern Africa, 13–18 March 1988, Lilongwe, Malawi*. Patancheru: ICRISAT.

Smale, M. (1990), *Chimanga Cha Makolo, Hybrids and Composites: Farmer Adoption Characteristics in Kasungu, Blantyre and Mzuzu Agricultural Development Divisions, 1989–90*. Lilongwe: CIMMYT.

Smallholder Agricultural Credit Administration (1990), *Quarterly Report July–September 1990*. Lilongwe: Smallholder Agricultural Credit Administration.

United States Agency for International Development (1983), *The Private Sector and the Economic Development of Malawi*, AID Evaluation Special Study No.11. Washington: USAID.

Variety Release Committee (1986), *A Description of Crop Varieties Grown in Malawi*. Lilongwe: Variety Release Committee, Department of Agricultural Research, Ministry of Agriculture.

Vaughan, M. and Chipande, G. (1986), *Women in the Estate Sector in Malawi*, World Employment Research Programme Working Paper. Geneva: International Labour Organisation.

Wilson, A.T. (1991), 'The Influence of Improved Seed on Maize Yields in Kenya and Malawi'. London: Overseas Development Institute.

World Bank (1990c), *Project Completion Report: Malawi Smallholder Fertiliser Project (Credit 1352-MAI)*, Report No.8534. Washington: World Bank.

World Bank (1990b), *Report and Recommendations of the President of the International Development Association to the Executive Directors on a Proposed Credit of SDR 52.6 Million to the Republic of Malawi for an Agricultural Sector Adjustment Programme*. Washington: World Bank.

World Bank (1990a), *Malawi: Growth Through Poverty Reduction*, Report No.8140-MAI. Washington: World Bank.

World Bank (1989), *Malawi: National Rural Development Programme (NRDP) Technical Issues Review*, Report No.7539-MAI. Washington: World Bank.

World Bank (1986), *Malawi: Improving Agricultural Marketing and Food Security Policies – A Reform Proposal*, Report No.6083-MAI. Washington: World Bank.

ODI Research Studies

Malawi faces the challenge of increasing agricultural production to keep pace with population growth and maintain export income, while more than half of the nation's farmers have plots of less than half a hectare. To achieve this aim the government has promoted the use of certified seed of improved, high-yielding varieties, but during the 1980s takeup of this improved seed was limited. Now the seed sector is being affected by the many structural changes taking place in the agricultural sector as a whole. Are these changes likely to favour the use of improved seed? Will seed supply be able to keep pace with demand? What are the implications of Malawi's experience for other countries in the Eastern and Southern African region contemplating reform of the seed sector?

In *The Performance of the Seed Sector in Malawi*, the authors present the results of the first ever study of the seed sector in Malawi and seek to answer these and other questions. They assess the sector's overall performance – including the appropriateness of seed varieties, quantities and quality, the accessibility of improved seed and its cost to farmers – as well as assessing the operational efficiency of the major seed sector institutions. Detailed profiles are presented of how farm families make their seed sourcing decisions and of the range of factors which influence them. The relative impact of exogenous factors, including agro-ecological and socio-economic conditions in the small farm sector as well as national economic and agricultural policy is evaluated.

They conclude by assessing the extent to which the changes in Malawi's seed sector brought about by macro-economic reform can themselves be expected to improve performance, and they suggest other short-term amd long-term adjustments for the seed sector to fulfil its intended role in Malawi's agricultural development.

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