Centre technique de coopération agricole et rurale ACP-UE
Technical Centre for Agricultural and Rural Cooperation ACP-EU
CTA

The role of smallholder farmers in seed production systems

Report and recommendations of a study visit to Zimbabwe, 15–26 February 1999



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Report and recommendations of a study visit
organised by the
Technical Centre for Agricultural and Rural Cooperation (CTA)

Zimbabwe, 15–26 February 1999

Technical Centre for Agricultural and Rural Cooperation (ACP-EU)

The Technical Centre for Agricultural and Rural Cooperation (CTA) was established in 1983 under the Lomé Convention between the ACP (African, Caribbean and Pacific) Group of States and the European Union Member States.

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A farmer in the Chivi area, discussing the seed production process on her smallholding with the study visit participants

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The organisers of the study visit wish to express their gratitude to Zimbabwe's Ministry of Lands and Agriculture, particularly the Department of Research and Specialist Services (DR&SS) and the agricultural extension service, Agritex, and to the farmers and national and international experts whom the participants met during the field visits. Special thanks are due to Dr N.R. Gata, Director of DR&SS, and Mr Marcus Hakutangwi, Head of Training at Agritex, for their assistance. During the visit each participant acted as rapporteur for one day and thus contributed to recording the events of the visit; their contribution to this report is gratefully acknowledged. The organisers also wish to thank the host organisations, public and private, and all others who in various ways assisted during the study visit.

1.1

INTRODUCTION

Background and context

Sub-Saharan Africa continues to suffer from food deficits and poverty despite a wealth of natural resources – large tracts of arable land, abundant water and a large pool of human resources. Nearly 70% of the population lives in the rural areas and is engaged in agriculture. Therefore, it is on the agricultural front that efforts to alleviate poverty and achieve food security must be concentrated.

It has been widely recognised that improved seeds, more than any other input, hold the key to enhanced farm productivity and increased income generation. However, in spite of decades of efforts by governments, the private sector and donors to develop national seed programmes, the seed situation in sub-Saharan Africa remains dismal. The formal seed sector, represented by seed parastatals, seed companies and donor seed projects, has had a considerable impact on the production and supply of hybrid maize and the seeds of other high-value crops such as wheat, soybean and sunflower. But many small-grain and other indigenous crops grown by smallholder farmers have been neglected, largely because of their low financial returns. Considering that in most countries these crops hold the key to household and national food security, denying smallholder farmers continuous availability of high-quality seeds implies that food security will remain unattainable.

In east and southern Africa there has emerged an awareness of the need to help smallholder seed producers play an enhanced productive and constructive role in national seed systems and to establish adequate links with the formal seed sector in order to build strong and inclusive national seed systems that will make an effective contribution towards the attainment of food security at all levels. Zimbabwe is representative of those countries in the region which have advanced formal seed sectors but have also recently taken steps, with the assistance of private seed companies, non-governmental organisations (NGOs) and donors, to help smallholder seed producers address the seed constraints facing small-scale farmers. Zimbabwe was therefore seen as a suitable location for a study visit focusing on enhancing the role of smallholder seed producers by identifying problems and devising possible solutions and practical programmes.

The study visit was organised by the Technical Centre for Agricultural and Rural Cooperation (CTA) as part of its mandate to strengthen the agricultural sector in ACP countries through enhancing the flow of information, and in recognition of the urgent need to address seed security issues, especially as they affect smallholder farmers in east and southern Africa.

Objectives of the study visit

The overall objective of the study visit was to expose seed experts and smallholder seed producers from east and southern Africa to an advanced seed production system, such as that in Zimbabwe, and thus equip them with the experience and knowledge necessary to formulate strategies likely to have a positive impact on their own national seed systems.

The specific objectives were:

- To assess the development status of Zimbabwe's seed industry, particularly the extent to which smallholder seed producers are contributing to the industry, and to analyse the constraints facing the informal seed sector, especially factors which hinder its optimum integration into the formal sector;

- To improve the participants' ability to develop appropriate technological packages and guidelines likely to have a positive impact on smallholder seed production, especially with regard to indigenous crops;

- To acquire the necessary expertise for the mass mobilisation of village communities to undertake activities aimed at achieving seed security and indigenous germplasm conservation and utilisation;

- To propose recommendations which would ensure that greater attention was paid to priority information themes in seed programme strategies at national and regional levels;

- To improve the information exchange mechanisms among the main stakeholders in the national seed industries.

Planning and participation

Preparatory activities

The planning process for the study visit began with a visit to Zimbabwe by Mr André Vugayabagabo, Deputy Head of CTA's Seminars and Studies Department, from 16 to 20 March 1998. Hosting arrangements were discussed with the Department of Research and Specialist Services (DR&SS), within Zimbabwe's Ministry of Lands and Agriculture, and tentative sites to be visited and options for logistic support, including the appointment of a local conference and tour operator, were explored. Two national consultants, Dr N.R. Gata, Director of DR&SS, and Mr Marcus Hakutangwi, Head of Training at Agritex, were recruited to help implement the local preparatory arrangements.

An international seed consultant, Mr Josiah Wobil, based in Accra, Ghana, was then recruited and given the responsibility for planning the itinerary and the technical and scientific content

of the study visit. He attended a meeting at CTA Headquarters in Wageningen, The Netherlands, on 29 July 1998 to discuss his preparatory visit to Zimbabwe and the preparation of documents which would be used to announce the study visit, to invite participants and to describe the technical and scientific basis of the study visit.

The consultant's preparatory visit to Zimbabwe took place between 16 and 30 August 1998. The aim of the visit was to:

- Identify and select sites and projects to be visited;
- Prepare background material on the selected sites;
- Prepare the overall programme of the study visit;
- Prepare the itinerary, including detailed timing for each site visit;
- Collect information on accommodation facilities at the selected sites.

The consultant was assisted in this work by the two national consultants, Dr Gata and Mr Hakutangwi. On his return from Zimbabwe he prepared and sent the following to CTA:

- Background information for the study visit;
- Guidelines for participants in their preparation of national reports;
- Descriptions of the projects and sites selected;
- An evaluation form to be completed by participants at the end of the visit.

Invitations were sent to prospective participants in October 1998. Those who accepted the invitation were asked to prepare reports on seed production in their own countries, according to the prescribed guidelines, and these papers were then synthesised to give an overall picture of smallholder seed production in east and southern Africa. The synthesis paper was used as background material for the study visit.

Participants

Eighteen seed production experts, representing the public and private sectors, NGOs and the smallholder farmer community, took part in the study visit. They came from eight countries in the east and southern African region: Ethiopia, Malawi, Mozambique, South Africa, Tanzania, Uganda, Zambia and Zimbabwe. In addition, representatives of some of the host institutions in Zimbabwe joined the group during field visits. A list of participants is given in Appendix 4.

Programme

The study visit programme began with an Opening Ceremony on 15 February 1999 at which speeches were given by the CTA representative and Zimbabwe's Minister of Lands and

Agriculture. The participants then presented their country papers; these were discussed in detail and the exchanges were recorded by a rapporteur.

From 16 to 25 February the participants travelled extensively in Zimbabwe to visit the sites selected to enhance their understanding of the factors to be addressed in efforts to improve seed production systems in the region, especially with regard to the role of smallholder farmers.

The programme was based on a step-wise progression from germplasm management, seed quality control and variety development to seed utilisation, training and extension in the public, private and informal sectors. The 19 selected sites were categorised according to the five priority information themes for ACP agriculture identified at the CTA seminar in Wageningen in 1996: these themes determine the scope and content of CTA's activities.

Each day ended with discussions on the sites visited and the lessons learnt, and these exchanges were recorded by the rapporteur of the day.

On the last day, 26 February, the participants discussed their findings, drew conclusions and formulated recommendations based on the insights gained during the study visit. In addition, and of particular importance, each participant then described a study visit impact activity which he/she would carry out, based on one of the lessons learnt during the study visit. The proposed impact activity had to have the potential of rapidly disseminating the benefits of the study visit upon the participant's return to his/her country and of strengthening an area of weakness in that country's national seed programme. The details of the participants' proposed activities are given in Appendix 2.

The participants then completed the study visit evaluation forms. A synthesis of their responses is given in Appendix 5. The study visit ended with a closing statement by the CTA representative and a vote of thanks from the participants.

1.2

SUMMARY OF FINDINGS AND CONCLUSIONS

Analysis of the seed production system in Zimbabwe

The participants recognised that the formal seed sector in Zimbabwe is highly developed and competitive, and operates in an extremely liberalised market. It makes a significant contribution to the national economy by ensuring seed security for the major commercial crops (such as maize, soybean and wheat) which are suited to higher-potential agro-ecological areas, and by exporting seed to many neighbouring countries. There are large areas of Zimbabwe, however, which are occupied by communal farmers, are characterised by poor soils, erratic rainfall and small farm sizes and are not suited to the crops catered for by the formal seed sector. Although a large proportion of hybrid maize seeds is sold to communal farmers, it would appear that a reliable supply of seeds of open-pollinated maize varieties and of small-grain crops such as millet, sorghum and cowpea would make a greater contribution to household food security in communal areas. With these crops more or less neglected by the formal sector, the source of seeds for smallholder farmers has long been the informal seed sector; this sector supplies 90% or more of the seeds of the indigenous crops.

With the assistance of NGOs and donors, and the active participation of extension and research personnel, the age-old practice of farmer-saved seeds is gradually giving way to a better organised system of seed production and supply through farmers' own efforts. The participants agreed that when the informal seed sector is given the resources it needs to generate high-quality seeds for the nearly 90% of farmers in Zimbabwe and neighbouring countries who presently rely on this source, it will exert a huge impact on national food stocks and make the goal of food security far more attainable.

Constraints to be addressed in the informal seed sector

The participants identified many constraints that need to be addressed if the potential of smallholder seed production in east and southern Africa is to be realised. These include:

- *Policy constraints:* Existing legislation and policies need to be reviewed with the aims of fostering the participation of smallholder farmers in seed production and strengthening the collaboration and links necessary to develop the informal sector;

- *Technical constraints:* There is a need to develop adequate and appropriate methodologies for on-farm seed multiplication and handling, and to train farmers in the use of these methodologies;

- *Marketing constraints:* Marketing arrangements for both seeds and crops need to be strengthened to ensure the sustained patronage of seed and enhance income generation among rural dwellers;

- *Utilisation constraints:* The utilisation of minor crops needs to be enhanced so as to increase the demand for them for both domestic and commercial purposes and thereby improve seed supply sustainability.

Efforts by NGOs and donors to mobilise communities with regard to on-farm seed production have contributed to a rapidly growing awareness of the impact of good-quality seeds and have improved the availability and utilisation of these seeds by communal farmers. Work still needs to be done, however, to ensure the sustainability of such activities after external support has been withdrawn

1.3

LESSONS LEARNT DURING SITE VISITS

The specific lessons learnt during the visits to the selected sites are grouped according to the main activity of the host institutions/enterprises.

1 *Germplasm conservation and seed certification*
(Seed Services, including the gene bank)
- Licensing trained private seed inspectors to carry out some seed certification functions minimises the burden on the public service;
- The Seed Act is hindering the development of the informal sector.

2 *Research*
(ACFD, CIMMYT, DR&SS, ICRAF, Matopos Research Station, Rattray Arnold Research Station, SADC/ICRISAT Sorghum and Millet Improvement Program)
- There is too much emphasis on research aimed at meeting the needs of commercial farmers rather than those of communal farmers;
- International research has developed a wealth of technologies for varietal research which is not being fully utilised by national programmes; of particular note are the use of open-pollinated maize varieties, and soil nutrient opportunities in agroforestry.

3 *Commercial seed activities*
(Farm and City, Seed Co, Stapleford Farm)
- Commercial seed activities are highly efficient and competitive and make an important contribution to national food security, but their contribution to household food security is restricted by their neglect of seeds of indigenous crops;
- The need to isolate seed farms to avoid contamination is becoming a problem for some seed producers;
- Commercial seed outlets are playing an important role in seed distribution but they need support to meet the quality standards set by law.

4 *Community seed activities and smallholder seed producers*
(Domboshava Agritex farm, ITDG project, Magama, Tsholotsho, UMP)
- Inadequate collaboration among NGOs, extension services and some donors has resulted in conflicting messages being transferred to the farmer;
- Arrangements for renewing starter seed stocks are inadequate;
- Seed training on a massive scale for farmers, extension workers and NGO staff is urgently needed;
- Community efforts to initiate seed bank activities are crucial step in conserving genetic resources at grassroots level and in achieving seed security;

- Community and smallholder seed production schemes need to incorporate capacity-building mechanisms in order to ensure long-term sustainability.

5 *Community agricultural projects*
(Mtekedza community)
- A holistic approach in rural development is important if efforts to alleviate hunger and poverty are to be effective.

6 *Development of smallholder seed businesses*
(Agricultural Seeds and Services, Gutu smallholder contract seed production scheme)
- A contractual arrangement between smallholder seed producers and the seed companies is a good start in fostering entrepreneurship among the smallholders;
- Seed legislation needs to be amended in such a way as to encourage the development of smallholder seed producers;
- Government assistance is needed in exploring marketing opportunities;
- Training of extension staff by DR&SS is necessary to ensure that smallholder seed producers understand the technical basis of their work;
- It is important that agencies such as NGOs and extension services consider the cost/benefit implications of their activities aimed at assisting farmers;
- Groups of progressive smallholder seed producers should be encouraged to acquire the basic resources needed to form self-sufficient and sustainable seed enterprises;
- The arrangements under which several hundred tonnes of good-quality seeds are being produced by smallholder farmers as the basis for a viable export business by Agricultural Seeds and Services is proof that smallholder farmers can not only produce good-quality seeds but can also do so profitably and for crops which the formal sector has ignored.

1.4

SUMMARY OF STUDY VISIT RECOMMENDATIONS

Based on the lessons learnt, the participants drew up the following recommendations for national seed programmes:

1 National seed policies should continue to encourage the growth of the formal sector to minimise the effects of fiscal constraints in the public sector, but efforts must be made to enhance the incorporation of more of the minor crops into the formal seed sector.

2 National seed policies should recognise the role of smallholder seed producers and the informal seed sector as a whole in achieving food security. Legislation and practices that hinder the development of the informal sector should be reviewed with the aim of removing the hindrances and introducing enabling policies and strategies. In addition, links and collaboration among stakeholders need to be strengthened to foster the rapid, orderly and effective development of the informal sector.

3 National seed programmes should support community participation in biodiversity conservation, particularly with regard to community seed farms and seed banks as they ensure germplasm conservation and contribute to seed security.

4 National seed programmes should view plant breeders' rights (PBR) legislation as necessary not only to encourage private research and development in the formal sector but also as an opportunity to ensure that the commercial use of publicly bred varieties generates funds which can be used to support smallholder farming, especially informal seed sector activities.

5 National seed programmes should initiate technical expert consultations to develop methodologies for on-farm seed multiplication suitable for particular crops and areas and to disseminate them among participating farmers. A considerable amount of information, especially technical guidelines, has been generated recently by seed experts in SADC and could be useful in this context. The need to train extension and NGO staff in on-farm seed production is crucial if smallholder farmers are to receive adequate guidance.

6 Open-pollinated maize varieties have been shown to be suitable for certain agro-ecological areas and socio-cultural contexts, and their potential in this regard needs to receive greater attention in national seed programmes.

7 As soon as farmers have been adequately trained in good seed production practices, they should be assisted in developing effective seed marketing arrangements in order to

ensure sustainability. In this respect, governments will need to provide assistance in such areas as improved marketing and utilisation, reasonable pricing of farm inputs (especially fertilisers and chemicals), and fair product pricing.

In addition to these recommendations, the participants remarked upon the impact made by the CTA publication, *Seed Programmes and Projects in ACP countries*, and recommended that donor funding be obtained to produce a new edition incorporating a more comprehensive analysis of information on the informal seed sector at regional and/or international level.

1.5

STUDY VISIT IMPACT ACTIVITIES

The participants agreed that they should undertake activities upon their return home aimed at broadening the impact of the study visit on national seed programmes, particularly with reference to smallholder farmers. These activities were categorised as follows:

1 *Organising mini seminars and field days in national programmes*

- To present the findings and recommendations of the study visit to their colleagues;
- To disseminate the output of the study visit to the wider group of farmers, colleagues, national authorities, agencies, NGOs and donors involved in the informal sector in their countries;
- To find ways of assessing the impact of this information dissemination activity.

2 *Applying the lessons learnt to selected activities*

- Through revisions of strategies and policies;
- Through technical revisions.

The participants then put forward specific proposals for impact activities under existing projects, based on the lessons learnt. Details of these proposals are given in Appendix 2. The proposed activities focused on:

1 Strengthening the marketing aspect of the Farmer-based Seed Production and Marketing Scheme (FBSPMS) (Ethiopia)

2 Enhancing the involvement of smallholder farmers in quality seed production (Ethiopia)

3 Strengthening smallholder seed production (Malawi)

4 Strengthening seed production at farmer level in Nampula Province (pilot project for two districts) (Mozambique)

5 The production of seeds of maize, sorghum and indigenous grains (South Africa)

6 Smallholder seed production (Tanzania)

7 Sustainable smallholder seed production and supply (Uganda)

8 Farmer-saved seed production and seed quality improvement (Uganda)

9 Workshop for key stakeholders in Zambia's seed industry to review the study visit findings and recommendations (Zambia)

10 Training farmers and extension staff in seed issues (Zimbabwe)

11 Reviewing seed legislation and the Plant Breeders' Rights Act (Zimbabwe)

12 Encouraging community seed production and storage for distribution to vulnerable groups (Zimbabwe)

Part 2

ANALYSIS OF SEED PRODUCTION SITUATIONS IN PARTICIPATING COUNTRIES

2.1

BACKGROUND INFORMATION

The following analysis emanates from a synthesis of the papers prepared and presented by the study visit participants on the seed production situation in their countries. As these countries provide a good representation of east and southern Africa, the analysis can be viewed as a summary of the seed production situation in the region as a whole.

Population and climate

The economies of the countries of east and southern Africa are based largely on agriculture, although natural resources, especially minerals, are of immense economic importance in some of them, especially Botswana, Namibia, South Africa and Zambia.

In the eight countries the populations vary from 11 million in Malawi to 57 million in Ethiopia. In most countries 70% or more of the population live in the rural areas, often on marginal lands and in very disadvantaged circumstances. The problem of rural-urban drift in search of better living conditions is common to all eight countries under survey. The problem is well illustrated by Zambia, where 50% of the population live in the urban areas, giving the country an unenviable rural/urban ratio of 1:1, as shown in Table 1.

The climatic conditions in the eight countries exhibit many similar characteristics. The climate is largely sub-tropical, allowing for the cultivation of a wide range of crops, both temperate and tropical. Rainfall is unimodal, except in Ethiopia where it is bi-modal but with more than 85% of food being produced in the season from June to September. The mean annual rainfall is closely linked to agro-ecologies; all the countries have several agro-ecological zones, based on altitude, with the low altitudes receiving less rain than the higher areas.

Table 1 POPULATION AND LAND FEATURES

Country	Total land area (millions of ha)	Arable land (% of total land)	Population (in millions)	Rural dwellers (% of total population)
Ethiopia	113	65	57	85
Malawi	9.4	56	11	90
Mozambique	n/a	n/a	15.6	77
Uganda	241	68	20	85
Zambia	39	n/a	12	70

The agriculture of the area under study is mainly rainfed and thus rainfall is the main determinant of agricultural performance. The crops that can be grown in a particular agro-ecological zone are determined by rainfall amounts; often, in the very low-altitude agro-ecological zones, rainfall is so low that only pastoral activities and the cultivation of arid-land crops can be undertaken. The mean annual rainfall also fluctuates considerably, and in recent years the region has suffered from extreme droughts alternating, in some countries, with sporadic flooding.

Farm sizes and farming systems

Farm sizes fall into two broad categories: large-scale commercial farms and small-scale or communal farms. The commercial farms tend to be freehold, are in productive agro-ecological zones, and are highly mechanised; most are owned by descendants of settlers, some are owned by urban businessmen. By contrast, the communal farms are in the less favourable agro-ecological zones and range from 1 to 3 ha per farm family; they tend to have a large subsistence component, and mixed farming is common.

Farming systems vary considerably, depending on the farming sector, the agro-ecology and farm sizes. A wide range of crops is grown, reflecting the diversity in growing conditions in the eight countries. The main crops are maize, wheat, barley, rice, sorghum, millet, tef, beans, groundnuts, soybeans, sunflower, tobacco, cassava and pigeonpeas; smaller quantities of many other cereals, legumes, pulses and horticultural, herbal and forest crops are cultivated. Livestock and fisheries are important components of the agricultural sector. Cereals dominate the crops and, with the exception of Ethiopia, maize is the dominant cereal, often occupying 70% or more of the total arable land and being forcibly cultivated even in agro-ecologies which are more suited to the production of small grains.

Food security status

The whole of east and southern Africa is extremely prone to drought and crop failure, and thus food security is an important issue. Many of the countries produce less than they consume, and so are in an almost permanent state of food insecurity. Drought, declining soil fertility and poor quality seeds are often cited among the root causes but lack of political direction and ineffective agricultural and population policies also play a role. All the countries under study, except South Africa and Zimbabwe, lack comprehensive and permanent food security arrangements, although a few ad hoc donor-sponsored food security projects are now being initiated in some countries. Overall, east and southern Africa is becoming a net importer of food from other regions, often with donor assistance, particularly during the emergencies which have become more prevalent in recent years.

2.2

SEED SOURCES

Variety adoption

Traditional agriculture, whereby the farmer saves a portion of his harvest for planting the succeeding crop, is very entrenched among small-scale farmers in all eight countries. As these farmers are in the majority, the use of traditional varieties is extremely high, often in excess of 90%, except for maize where the introduction of hybrids since the late 1940s has led to high rates of improved seed adoption (often 60–80%) among all categories of farmers. This is especially so in the countries where commercial farming is deeply entrenched and the hybrid culture has a long history, as in Zimbabwe, South Africa and Zambia. The use of improved seed is also high for cash crops and high-value crops because of quality requirements dictated by marketing and utilisation. Table 2 (*pages 20 and 21*) shows the quantities of seed used and their status (improved or indigenous).

The formal seed sector

All eight countries have a formal seed sector comprising public and private sectors, producing improved seed and exhibiting most of the conventional characteristics of a modern seed programme. The private sector seed industry in South Africa and Zimbabwe is as advanced as that in many developed countries. In other countries, such as Mozambique and Tanzania, the private sector is relatively small and plays a very limited role in seed production, having a small market share and limited land area. In some countries, such as Malawi, there is a sophisticated seed programme for export crops, but food crops, apart from hybrid maize, are almost totally ignored by the private seed companies. The result is that while formal seed sector is the prime source of hybrid maize seeds and other seeds for commercial farming, the informal sector provides 90–100% of the seeds of traditional crops.

Another neglected area is the vegetable seed programme. In all eight countries, vegetable seeds are imported on a massive scale by the private sector, with no effort being made to exploit the region's potential to produce a wide array of vegetable seeds itself, particularly tomato, cucumber, muskmelon, watermelon, pepper, sweet pepper, onion, spinach, amaranthus, okra, kale, eggplant, aubergine, squash and pumpkin. Intervention by small-scale entrepreneurs should be being encouraged and supported by governments but such support is currently lacking.

Table 3 (*pages 22 and 23*) focuses on seed sources, dividing them into formal and informal and then subdividing them into public and private for the formal sector and smallholder

Table 2a SEED USAGE BY TYPE

Country and crop	Total land area (ha)	Total quantity of seed used (tonnes)	Estimated % by seed type Improved	Indigenous
Ethiopia[a]				
Tef	2,036,310	61,089.3	1.18	98.92
Barley	800,790	100,098.8	0.34	99.66
Wheat	807,890	121,183.5	7.24	92.76
Maize	1,234,090	37,022.7	7.50	92.50
Sorghum	1,179,460	11,794.6	2.20	97.80
Haricot beans	94,250	7,540.0	0.90	99.10
Pulses and oil seed	1,499,260	129,414.2	0.04	99.96
Malawi				
Maize	1,297,062	32,427.0	25.00	75.00
Groundnuts	140,887	12,678.0	1.60	98.40
Beans	148,650	11,892.0	8.00	92.00
Tobacco	114,051	62.0	95.00	5.00
Rice	42,189	3,164.0	69.00	31.00
Wheat	2,483	199.0	5.00	95.00
Pigeonpeas	123,088	984.0	30.00	70.00
Soybeans	40,829	–	16.00	84.00
Cassava	151,941	3704.0 metres	34.00	86.00
Mozambique				
Maize	1,247,309	37,419.0	3.00	97.00
Sorghum	479,895	3,839.0	4.00	96.00
Rice	180,952	14,476.0	0.20	99.80
Millet	101,089	808.0	18.00	82.00
Beans	408,020	12,240.0	2.50	97.50
Groundnuts	285,538	17,132.0	0.10	99.90

Note: a Ethiopian figures based on annual sales of improved seed. Data on use of improved seed resulting from diffusion effect not available

commercial and on-farm saved seed for the informal sector. The table illustrates the dominance of the informal sector, especially for on-farm saved seed, in all the countries and in all the crops except for hybrid maize, tobacco and cotton. This highlights the urgent need for the development of the informal sector if seed and food security are to be achieved.

Policy and legislation

The seed programmes in the eight participating countries vary in their degree of comprehensiveness, those in South Africa and Zimbabwe being among the most developed

Table 2b SEED USAGE BY TYPE

Country and crop	Total land area (ha)	Total amount of seed used (tonnes)	Estimated % by seed type Improved	Indigenous
Uganda				
Maize	454,000	9,080	9.32	90.68
Sorghum	255,000	1,275	2.35	97.65
Millet	407,000	2,035	0.79	99.21
Wheat	54,000	3,240	100.00	0.00
Beans	552,000	32,120	1.00	99.00
Field peas	27,000	1,080	1.00	99.00
Cowpeas	51,000	3,570	1.00	99.00
Pigeon peas	64,000	3,200	1.00	99.00
Grounduts	187,000	18,700	0.50	99.50
Soybeans	65,000	4,550	0.75	99.25
Simsim	150,000	7,500	0.50	99.50
Zambia				
Maize	600,000	12,000.00	65.00	35.00
Beans	43,444	708.80	10.00	90.00
Sorghum	35,864	358.64	40.00	60.00
Millet	90,047	450.26	10.00	90.00
Rice	9,065	135.98	0.00	100.00
Groundnuts	154,682	3,093.64	40.00	60.00
Sweet potatoes	10,000	400 mil. vines[b]	40.00	60.00
Cassava	116,709	1.17 bil. ctngs[c]	40.00	60.00
Zimbabwe				
Tobacco	98,000	0.50	100.00	0.00
Maize	1,223,800	40,000	99.00	1.00
Cotton	295,000	5,000	100.00	0.00
Soybeans	64,000	7,000	75.00	25.00

Note: b Million vines
c Billion cuttings

in Africa. These two countries are the only ones with PBR legislation in place, but all the countries have seed policies and legislation at various stages of development and implementation. Some have a single, well-defined and comprehensive seed policy document, others have seed policy statements incorporated into various official documents, particularly agricultural policy. Generally, all the countries recognise the importance of a seed policy and seed-related legislation, including PBR legislation, and most of them are taking steps to address weaknesses in their seed policies. Table 4 (*page* 24) summarises the status of seed policy and legislation in each of the eight countries.

Table 3a SEED USAGE BY SOURCE

Country and crop	Estimated % by seed source			
	Formal		Informal	
	Public %	Private %	Smallholder/ commercial %	On-farm saved seed %
Ethiopia				
Tef	1.08	–	–	98.92
Barley	0.34	–	–	99.66
Wheat	7.24	–	–	92.76
Maize	5.59	1.56	–	92.50
Sorghum	2.20	–		97.80
Haricot beans	0.90	–	–	99.10
Pulses and oil seeds	0.04	–	–	99.96
Malawi				
Maize	5.00	10.00	10.00	75.00
Groundnuts	0.20	0.40	1.00	98.40
Beans	3.00	1.00	4.00	92.00
Tobacco	0.00	95.00	0.00	5.00
Rice	69.00	0.00	0.00	31.00
Wheat	5.00	0.00	0.00	95.00
Pigeonpeas	6.00	15.00	9.00	70.00
Soybeans	4.00	9.00	3.00	84.00
Cassava	10.00	24.00	0.00	66.00
Mozambique				
Maize	–	3.00	–	97.00
Sorghum	–	4.00	–	96.00
Rice	–	0.20	–	99.80
Millet	–	18.00	–	82.00
Beans	–	2.50	–	97.50
Groundnuts	–	0.10	–	99.90

Participating agencies

Oversight agencies such as a National Seed Committee, a Variety Release Committee and a Seed Quality Control and Certification agency are in place to a limited or advanced extent in all eight countries. Other participating agencies include seed multiplication agencies, seed marketing agencies, agricultural extension, donors and NGOs. Research is largely publicly funded, although private research is well developed in South Africa, Zambia and Zimbabwe.

As already mentioned, the role of the private sector is pronounced only in those countries with advanced seed industry programmes. Thus in Ethiopia, Mozambique, Tanzania and

Table 3b SEED USAGE BY SOURCE

Country and crop	Estimated % by seed source: Formal – Public %	Formal – Private %	Informal – Smallholder/ commercial %	Informal – On-farm saved seed %
Uganda				
Maize (o.p.)	–	1.50	49.00	49.50
Maize (hybrid)	–	80.00	20.00	–
Sorghum	–	1.00	1.00	98.00
Finger millet	–	1.00	1.00	98.00
Rice	–	1.00	80.00	19.00
Wheat	–	1.00	80.00	19.00
Beans	–	2.00	1.00	97.00
Field peas	–	–	2.00	98.00
Simsim	–	0.50	0.50	99.00
Groundnuts	–	1.00	1.00	98.00
Zambia				
Maize	5.00	60.00	5.00	30.00
Beans	–	5.00	5.00	90.00
Sorghum	5.00	50.00	5.00	40.00
Millet	5.00	10.00	5.00	80.00
Rice	–	–	40.00	60.00
Groundnuts	5.00	10.00	20.00	65.00
Sweet potatoes	5.00	–	5.00	90.00
Cassava	5.00	–	5.00	90.00
Zimbabwe				
Tobacco	0.00	100.00	0.00	0.00
Maize	0.00	99.00	0.00	1.00
Cotton	0.00	100.00	0.00	0.00
Soybeans	0.00	75.00	15.00	10.00
Sunflower	0.00	10.00	90.00[a]	
Sorghum	0.00	25.00	75.00[a]	
Groundnuts	0.00	5.00	95.00[a]	
Millet	0.00	1.00	99.00[a]	

Note: a No accurate data available on further subdivision of source

Uganda the role of the private sector is minimal, whereas in South Africa, Zambia and Zimbabwe it is dominant for maize and other high-value cereals, soybeans, sunflower and cash crops. Malawi, which has an otherwise small formal sector, has a well-developed seed programme for tobacco, tea and sugar cane because of the importance of these three export crops in the national economy.

Table 4 STATUS OF POLICY AND LEGISLATION

Country	Seed policy	Seed legislation	Plant breeders' rights legislation
Ethiopia	Fully developed and functional	In place and functional	Not enacted but under serious consideration
Malawi	In place and functional	Enacted but not fully functional due to absence of supportive regulations	Not enacted
Mozambique	Not developed but relevant provisions entrenched in agricultural policy	In place and functional	Not enacted
South Africa	Not in place. Some aspects incorporated into agricultural policy	In place and functional	In place and functional
Tanzania	Comprehensive document adopted	In place and functional. Certification optional	Not enacted but being considered
Uganda	Some aspects incorporated into Seed Act. Not fully functional	In place but low-key implementation	Mentioned in Seed Act but of little effect as breeding is fully public
Zambia	Recently drafted for government consideration	In place and functional	Drafted, under discussion for over two years
Zimbabwe	Not developed as a separate document but entrenched in various official statements and laws.	In place and fully functional	Enacted and fully operational

The overall seed supply problem in east and southern Africa, which will lead to hunger and starvation in rural communities if it is not addressed, has encouraged donors and NGOs to establish seed projects.

Table 5 lists the types of participating agencies in the eight countries, with comments upon their effectiveness.

Table 5 ROLES OF PARTICIPATING AGENCIES

Country	National seed committee	Variety release	Quality control/ certification	Crop research	Seed multiplication agencies	Seed marketing agencies	Extension	Donors	NGOs	Private sector
Ethiopia	In place and functional	In place and functional	No independent body. Internal checks only	Largely public and supportive	Parastatal function with limited private involvement	Parastatal seed co., private sector and NGOs	Effective and supportive	Assistance by IDA, IFAD and DDA	Assistance in distribution, development and credit	Negligible
Malawi	In place and functional	In place and functional	Optional except for tobacco and hybrid maize	Largely public and supportive	Public and private	Mainly private	Involved at smallholder level	Huge support mainly for informal sector	Very active in informal sector	One private co. in production. Several in distribution
Mozambique	In place and functional	Establishment pending	In place. Independent and functional	Public and private and supportive	Mainly private but with NGO/ research participation	Private and NGOs	Involved in quality control of informal sector	Supportive of informal sector	Supportive of informal sector	Dominant but limited coverage
South Africa	Not in place. Some functions under SANSOR	In place and functional	In place and functional	Mainly private but some public sector support	Private	Private	Active and supportive	Insignificant	Very limited	Dominant and very active
Tanzania	In place but inactive	In place and functional	In place and functional	Mainly public. Serious lack of resources	Public and private	Public and private	Not very active in seed programme	Support shifting to informal sector	Supportive of informal sector	Small but active and growing
Uganda	Not yet appointed	In place and functional	Internal set-up in Uganda Seed Project only	Solely public	Public sector and NGOs	Uganda Seed Project and private dealers	Supportive of seed programme but ineffective marketing	Record of active support for public sector	Very limited	Confined to sales of imported vegetable seeds
Zambia	Not yet constituted	In place and functional	In place and functional	Strong. Public and private	Public and private	Mainly private	Active and supportive	Support limited to informal sector	Supportive of informal sector	Active and growing
Zimbabwe	In place and functional	In place and functional	In place and functional	Public and private and very effective	Mainly private. Many companies	Private. Very elaborate network	Very effective and supportive	Limited to informal sector	Limited to informal sector	Dominant force

Activities and strategies

Research and variety development

Research and variety development is largely a function of the public sector. In South Africa and Zimbabwe, however, and now to some extent in Zambia, the private sector is important in this field, especially for crops in which the private seed sector is active. An important feature of publicly funded research in the eight countries is its mandate to cater for the research needs of all the crops not covered by private research. Thus, for seeds required by the smallholder farming sector, public research is almost the only source of new varieties and other necessary supportive technologies.

Supply of breeder and foundation seed

The supply of breeder and foundation seed is well organised in the formal seed sector, especially where there is a private research component. The supply of breeder seed from public research is also fairly satisfactory in all the countries for maize and for commercially important crops, but is grossly insufficient for indigenous and subsistence crops. Where breeder seed for such crops is provided, the supply is erratic and often selective with regard to the beneficiaries. In many cases it is really not breeder seed at all but harvests from on-farm trials and demonstration plots.

In addition, outside the formal sector, foundation seed production and supply arrangements are inadequate, and seed multiplication tends to go on for prolonged generations without reverting to fresh foundation seed.

Certified seed production

Certified seed, as progeny of foundation seed, is the most abundant and visible of the seed industry products. It is produced on large-scale seed multiplication farms in both the public and private sectors. In South Africa, Zambia and Zimbabwe this is a highly commercial activity for the main crops. In Mozambique it is also a private sector function, although it is currently fairly limited. In the other countries seed multiplication is either a parastatal or public function, but even in these countries there is an emerging private sector interest in seed multiplication, especially for hybrid maize, vegetables and other high-value crops.

Seed processing and storage

Seed processing and storage strategies depend on the status of the seed industry. In the commercialised seed programmes, seed processing is highly mechanised and storage

facilities are elaborate and widespread. In some countries, the public sector has a modern seed infrastructure similar to, or sometimes more elaborate than, that in the private sector, but poor management has resulted in disrepair and/or under-utilisation, as in the case of Tanzania. Strategies adopted by Mozambique and Zambia to transfer their public seed sector facilities into the private sector have ensured that such facilities are still fully utilised.

At the stockist level there appears to be inadequate capacity or know-how in some of the countries for proper seed handling to maintain germination and other seed qualities. Storage temperatures are usually high for long periods and this tends to reduce the shelf life of the seed. Generally, storage facilities at the stockist level would not have been designed for seed storage and may be storing other commodities such as fertilisers and chemicals; obviously, this has an adverse effect on seed viability.

Seed marketing and pricing

For the 'profitable' crops handled by the private seed sector, seed marketing is fairly well organised in the eight countries, mainly through country-wide stockists and seed outlets. For less favoured seeds, the situation is very inadequate; contributory factors include poor distribution networks, inadequacy of seed stocks, inefficiency in planning and management, ineffective seed promotion, and low commercial crop prices. Seed prices are fully liberalised in most of the countries and market forces are allowed to determine price levels. Where NGOs are involved in seed distribution, they have succeeded in reaching remote areas with low-priced seeds. The areas covered by NGOs and the seeds carried by them are generally neglected by private companies due to low financial returns.

Seed promotion and extension

Seed promotion is a major tool for increased sales by the private sector and is supported by radio, newspaper and brochure advertisements and by information leaflets. Seed promotion is supposed to be an important aspect of extension activities, but in general extension workers are faced with too many logistic and manpower constraints to be able to play this role adequately.

Credit

Inadequate credit has been cited as a major hindrance to the development of the seed industry. In most of the eight countries, particularly where the private sector is absent, there are almost no arrangements for credit from formal banking sources; these sources tend to impose conditions and interest rates that prohibit the availability of credit to seed farmers and dealers. Even in the private sector, which has access to bank finance, the high rates of

interest have begun to have a serious effect on the seed sector; this is happening, for example, in South Africa and Zimbabwe.

Generally, the recovery of farm credit where it has been available has been very poor. Small-scale farmers in particular have shown an unwillingness to pay back loans, and thus it is assumed that a system offering credit to farmers via a government programme is likely to fail. In Zambia, a rural finance programme is being established with assistance from the United Nations Development Programme (UNDP) to extend credit to smallholder farmers in the form of input supplies instead of cash.

Training

Like most of the rest of Africa, the eight countries in this study lack the facilities for high-level training in seed industry subjects. However, in some cases donors offer such training to leaders in the industry and where there is a strong private sector such training has, in recent years, been complemented by well-organised corporate in-house training which has produced high-calibre seed experts.

But where training is now most urgently required is among small-scale seed producers who have little access to fellowships and corporate training. Such training would be best organised by the national seed services. This is being done in Zambia where the Seed Control and Certification Institute (SCCI) has established a section to handle training with the aim of broadening the understanding of quality seed production among staff in the extension service, seed companies, NGOs, seed stockists, farmers and other facets of the seed industry. In many of the countries, however, the national seed service is becoming increasingly ineffective as a result of inadequate resources, and may not be able to take on the additional responsibility of providing training for small-scale seed producers. Extension workers could play a role, especially in training farmers in on-farm seed multiplication techniques and seed utilisation, but they themselves need adequate training in order to play this role effectively.

The informal seed sector

The informal seed sector is made up of unregulated and uncontrolled seed operations. These operations consist largely of on-farm seed selection and multiplication efforts by the farmer himself, seed exchanges among farmers, and the use of planting material saved from previous harvests and set aside as seed to be sown in the succeeding cropping cycle. The sector is characterised by the absence of official interventions, it has no links with research and seed quality control, it is confined to the seeds of crops generally considered unprofitable by the formal sector, it depends mainly on indigenous cultivars and it lacks any sophisticated infrastructure. For decades, the sector was neglected by national seed programmes in spite of its record of providing nearly 90% of the total seed requirement in Africa as a whole. The

potential of this sector for improving seed delivery has now been recognised, however, and along with this recognition have come wide-ranging efforts by national and international agencies, in collaboration with NGOs, to strengthen the sector.

Government policy

In Zimbabwe, the Seed Act and its enabling regulations do not recognise the informal seed sector. The activities of this sector are therefore conducted outside the law but the official system seems to condone them because of their importance to smallholder farmers. A similar situation prevails in South Africa. In Zambia there is official recognition of the role of the informal sector but the necessary legislative amendments needed to give this recognition a legal basis have yet to be effected. In Mozambique, government policy stresses the promotion of on-farm seed production and of storage techniques for seed conservation among smallholder farmers. A similar approach has been adopted in Ethiopia. The most dynamic step in this context has been taken by Malawi, where the Seed Act has been amended to allow smallholder farmers to multiply and trade in all seeds. As a result, improved seeds of crops hitherto neglected by seed companies now reach all farmers at affordable prices.

Current activities

Community initiatives

In Malawi, Tanzania, Zambia and Zimbabwe, NGOs have been very active in the informal seed sector, training farmers in simple improved on-farm seed multiplication techniques and, with extension support, introducing them to the concepts of quality control and collaborative links with research. Such training has also formed part of a few donor-assisted projects. Other activities include community-based seed production systems, village seed stores and seed banks, assistance in enhancing crop utilisation, improved storage practices, and education in simple methods of ensuring and monitoring seed quality.

Individual farmer practices

Individual farmer practices take the form mainly of on-farm seed multiplication. The farmer saves some of his harvest, prepares it, and then stores it as seed for planting the succeeding crop or for exchange with his neighbours. In all the countries under study, this is by far the most important source of seeds in the informal sector.

A relatively new feature of the informal sector is the development of smallholder commercial seed activities. Some smallholder seed producers have established good links with research and extension and have built up a reputation for quality and reliability that enables them to

sell their seeds in their communities, often up to district level. This fledgling group normally deals in seeds not covered by the formal sector. Although still a very small group, it represents an important catalyst in the transition from subsistence practices to modern crop improvement practices.

In Zimbabwe, many smallholder seed producers are emerging as contract growers producing seeds of indigenous crops for further processing and marketing by seed companies. Many of these growers have the potential to become smallholder commercial seed farmers. However, many smallholder commercial seed activities currently thrive mainly as a result of NGO and donor support. Most of the countries under study recognise the need to enhance capacity building to enable such operations to continue to thrive when external assistance ends.

Sources of varieties in the informal sector

The main sources of varieties in the informal sector are the farmers themselves or their neighbours. For generations, farmers have selected cultivars most suited to their particular growing conditions and to their preferences with regard to palatability, cooking and other end-uses. Thus they possess landraces and cultivars with attributes they consider more important to them than those selected by the research station. These form the stock which is multiplied to obtain seed for the next planting.

Advances and constraints in the informal sector

Variety development, release and utilisation

A major feature of the informal sector is the absence of formal links with research. Although some progress has been made in a few countries, such as Zambia, in general this constraint is likely to be a hindrance for a long time to come. It is presumed that advances in the smallholder commercial sector minimise the effect of this constraint. The real test, however, is whether or not research will start developing and releasing farmer-preferred varieties. Until it does, the adoption by smallholders of research-generated varieties will continue to be low. The low adoption rate is due not only to inappropriate varieties being developed from the point of view of the farmer, but also to prices of improved varieties, inadequate stocks, and poor distribution. For the time being, therefore, the only method of varietal development suited to the informal sector will remain on-farm cultivar selection by farmers themselves, imperfect as their methods may be compared to modern practices.

Seed production

Except in the cases of community seed farms and smallholder seed enterprises, seed multiplication in the informal sector is just part of the normal crop production process, only

with a little more attention paid to the starter seed and to the location to be harvested for seed. The amount of material harvested per farmer is very small as the main aim is self-sufficiency.

Seed processing

Orthodox seed processing involves capital-intensive equipment and large seed volumes, and thus is not a feature of the informal sector. Traditional practices such as manual cleaning, threshing, shelling, winnowing and dusting are still prevalent in this sector. With the growth of the smallholder commercial sector, however, a few low-capacity seed cleaners and treaters are being introduced.

Seed storage

Seed storage at the farm level continues to improve, with effective technologies developed through on-farm storage improvement programmes and projects being widely disseminated. The emergence of village seed banks with supportive storage structures has also contributed to improved seed storage in rural communities. However, there is still room for improvement with regard to controlling pests, minimising mechanical admixtures and monitoring seed quality. In addition, in times of drought and food shortages seeds tend to be consumed as food; this is a serious constraint which needs to be tackled with innovative actions.

Seed marketing

Seed quantities produced at the smallholder level are often small and tend to be determined by the farmer's own requirements, not by marketing conditions. Most seeds are bartered for other seeds or grain. The growth of smallholder commercial seed activities and community seed initiatives in some of the countries under study are exposing some seed marketing problems in the informal sector. In Malawi, for example, the monolithic parastatal which guaranteed purchases of all seeds produced in the country is no longer in operation and farmers themselves are not yet properly organised to deal with market dynamics. At present, NGOs buy most of the seeds produced by seed growers in Malawi. This is not sustainable and the need to strengthen farmer associations and their ability to liaise with traders and develop market strategies has been recognised.

Seed quality control

As a result of the requirements of seed production legislation, the informal seed sector is largely cut off from official seed quality control arrangements. Nevertheless, through the

activities of NGOs and smallholder seed projects, seed quality in the informal sector continues to improve, though much more needs to be done if this sector is to benefit from the application of modern quality control practices. For example, cultivar selection criteria, isolation and rogueing, stacking and monitoring of seeds in storage all need to be improved through training and through collaboration with relevant agencies.

Extension and seed promotion

With the informal seed sector so cut off from the formal seed sector, the onus falls on extension to provide the guidance and support that farmers in this sector need. Extension services tend to work more closely with the informal sector than with the formal sector, partly because extension workers are often more familiar with the crop production practices in the informal sector than they are with those used by large-scale commercial enterprises. This is true also of NGOs and donor-assisted projects.

With regard to seed promotion, there is little to promote because, as noted earlier, there is very little to market, the seed trade being conducted largely on a barter basis. As the smallholder commercial seed sector becomes more developed, however, it is likely that the need for seed promotion will become more apparent.

2.3

FUTURE TRENDS AND NEEDS IN SMALLHOLDER SEED PRODUCTION

All eight countries in the study recognise that smallholder seed production plays an important role in their national agricultural systems and that, with proper guidance and an appropriate policy framework, it has the potential to have an even greater impact on crop production. An example is provided by Zimbabwe, which has recognised the need to amend the Seed Act to elevate the role of the informal sector and to cater for the needs of smallholder seed producers. It is expected, however, that the informal seed sector will continue to exhibit most of the characteristics which make it attractive to small-scale farmers and which have allowed it to survive, almost unchanged, for countless generations. The positive changes that are likely to occur are that it will acquire a slightly more commercial dimension and will establish stronger links with research and quality control agencies.

There is also a need for a strong policy backing from government, including arrangements to improve access to credit (especially among smallholder commercial seed producers), ensure good producer prices for grain to enhance seed usage, and ensure a reliable, timely and affordable supply of fertilisers and other chemicals to increase productivity.

The impact of village and community seed banks has been very positive and this concept needs to be expanded as part of the efforts to introduce improved practices into the informal seed sector.

2.4

SUMMARY OF DISCUSSIONS ON COUNTRY PAPERS

During the discussions on the country papers, it was pointed out that as many as 80% of the participants involved in small-scale seed multiplication projects in Zimbabwe supported by the German development agency, Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), are women, thus satisfying the gender concerns expressed by some participants.

On seed certification in Zimbabwe, the participants sought clarification on the extent of coverage by Seed Services and the role of private companies. They were told that seed certification covers all classes of seeds of the scheduled crops. Seed companies participating in seed certification do so under licence and the general supervision of Seed Services. Other aspects of seed production in Zimbabwe that were discussed included the benefits of seed research by Seed Services, the relevance of community action in food and seed security, and the methodology used by GTZ project managers to ensure continuity and sustainability.

In the discussions on Ethiopia the focus was mainly on updating data previously submitted. Updated figures on seed usage based on improved seed recycling or the diffusion effect were provided. It was also noted that seed certification in Ethiopia should be seen as an independent function because the mandated body, the National Seed Industry Agency (NSIA), is not itself involved in seed production.

The discussions on Zambia, where a smallholder seed entrepreneur development project has recently been launched, centred on whether there are success stories elsewhere where this approach has been adopted. The examples of Gambia and Ghana were cited but it was clear that the concept is very new. The discussions showed, however, that when properly structured, such approaches can lead to sustainable and successful smallholder commercial seed production.

The participants also discussed seed prices, especially with regard to price escalation and price control mechanisms. It became clear that in almost all the countries, seed prices have been deregulated. It was concluded that in a properly developed seed industry, where market forces determine prices, price deregulation does not necessarily lead to price hikes as the farmer may have wider and better choices under this regime. Only in Uganda and Mozambique are there still some vestiges of seed price control but these will soon disappear as the economies of these two countries become more liberalised.

Part 3

VISITS TO SELECTED SITES

Site 1 Seed Services

Owner:	Government of Zimbabwe
Location:	Harare
Principal function:	Seed testing and quality control
Host official:	Dr B. Mpofu, Head, Seed Services

Summary by host official

Background: Seed Services was established in the early 1970s, initially under the Plant Protection Institute, to cater for the commercial sector. After independence in 1980, the list of crops it covered was expanded, and since the mid-1990s the focus has shifted to cover the seed certification needs of small-scale seed production. A gene bank was added to the facility in 1995 and is now an integral part of Seed Services.

Overall objective of activities: To ensure that seeds meet the quality requirements contained in the Seed Act, in order to promote good crop performance.

Relevant priority information theme: Promoting market-led development.

Summary of participants' findings and conclusions

Seed inspection: Seed Services has the mandate to inspect all crops specified in the crops schedule of the Seed Act and to determine whether a particular crop meets the minimum standards. At present, only 10% of certified seed crops are inspected, but 100% of seed crops intended for export are inspected. Some agencies, such as Seed Co, are authorised to conduct field inspections and to certify seeds under the general supervision of Seed Services.

Seed testing: All seed crops harvested are tested by the official seed testing station; a fee is charged for this service. The characteristics tested include purity, germination and moisture content, and prescribed standards need to be met before the seed is certified.

Referee testing: This is conducted by Seed Services as a check on seed companies licensed to conduct official seed testing. At present, only Seed Co has such a licence but Pioneer Seed is currently being investigated and will be licensed if it displays consistent adherence to the prescribed standards.

National gene bank: The function of the gene bank is to collect and conserve genetic material to be used in crop improvement programmes. The main focus is on food crops. The bank collaborates with breeders, scientists, farmers and NGOs, all of whom help to collect germplasm for the gene bank. Collected seeds are registered, cleaned and tested for moisture

and then stored in conditioned storage facilities, usually deep freezers. When germination falls below acceptable levels, the seeds are regenerated through multiplication. When moisture rises above 7%, the seeds are dried.

Lessons learnt

The site visit gave participants the opportunity to study a comprehensive seed quality control programme incorporating seed inspection, seed testing, germplasm conservation and referee testing, all important activities in a successful seed industry.

Summary of discussions

The discussions centred mainly on the use and management of the gene bank and the agencies with which it is linked. The participants learnt that the gene bank is linked to the SADC gene bank based in Zambia. It was noted that researchers make requests from time to time for indigenous lines maintained in the bank for incorporation into newly developed varieties. Participants were also told of methods of renewing the viability of seeds in storage, through monitoring and seed regeneration, and of plans to incorporate roots and tubers in the gene bank programme.

On seed testing, the participants learnt that the staff carried a heavy workload, which includes seed health testing, and that at peak periods it could take up to 15 weeks for results to be made available to a client.

Site 2 DR&SS Research Station

Owner:	Government of Zimbabwe
Location:	Harare
Principal function:	Variety development and evaluation
Host officials:	Dr A. Mashiringwani, Research Officer
	Mrs Nyakanda, Research Officer

Summary by host officials

Background: The research station was established in the 1940s to cater for commercial agriculture. Since independence in 1980, the focus has shifted towards catering for the whole agricultural sector and the work at the station now includes breeding, evaluation and the

production of breeder seed of maize, wheat, barley, sunflower, groundnut, soybean and bean varieties. The station is funded by the government, with some support from farming bodies and donors.

Overall objective of activities: To develop high-yielding, adapted varieties and make them available to farmers.

Relevant priority information theme: Intensifying and optimising production.

Summary of participants' findings and conclusions

The station develops varieties suited to all types of farmers and farming systems in Zimbabwe. New varieties include long- and short-season groundnut varieties; the former require high inputs (e.g., irrigation) while the latter are rainfed. The station also works with lines that respond well to low nitrogen regimes, using them to develop varieties that will thrive under such regimes.

Although there is legislation governing plant breeders' rights, the varieties released remain government property because the station is owned by the government, not the breeders.

The maize programme is 100% hybrid. Work on breeding drought-resistant maize varieties is carried out in the low-rainfall, drought-prone district of Chizumbanje.

Lessons learnt

The participants felt that the research station had the capacity to do much more if the funding and manpower situation could be improved.

The needs of smallholder farmers appeared to be catered for by the publicly funded breeding programme.

Summary of discussions

The participants were told that there is very little involvement of farmers in variety development because of budget limitations and that the research programme does not work on open-pollinated maize varieties. In a discussion on plant breeders' rights and breeders' remuneration, they learnt that breeders are paid their normal salaries only, as the government owns any new variety developed. However, the government has an arrangement to pass all new material to Seed Co in return for a seed security mandate by Seed Co, although this arrangement is presently being reviewed.

Site 3 CIMMYT-Zimbabwe Research Station

Owner:	CIMMYT
Location:	Harare
Principal function:	Research, variety development and technology transfer aimed at increasing farm productivity
Host official:	Dr D. Jewel, Head of Station

Summary by host official

Background: The station was established in 1985 under a Memo of Understanding with the Ministry of Agriculture. Presently, the station has 40 ha under plant breeding trials with germplasm from east and southern African countries. CIMMYT has contributed about 50% of the germplasm used in the region, 40% of which is incorporated in improved seeds. Although the station deals with open-pollinated varieties of maize, CIMMYT has contributed many lines for hybrid maize development.

Overall objective of activities: To develop superior varieties and technological packages which will assist national programmes in their efforts to enhance farm productivity.

Relevant priority information theme: Strengthening national agricultural systems.

Summary of participants' findings and conclusions

The station develops advanced lines of maize. The breeding work includes screening for disease resistance (grey leaf spot, maize streak virus) and response to low nitrogen levels. An advanced stage has been reached in developing quality protein maize lines. Susceptibility to weevils has been shown to be linked to the hardiness of kernels, not to whether the maize is dent or flint. The biotechnology programme has contributed to *Striga* control.

The materials tested and improved by the station are available to all who want to use them but priority is given to national programmes. CIMMYT does not release varieties; it is up to national programmes to ask for lines from CIMMYT and use them as they see fit. CIMMYT is undertaking similar activities in other countries.

Lessons learnt

The participants noted that the focus on open-pollinated maize varieties will help national programmes develop varieties that will benefit smallholders. Breeding maize lines that are tolerant of low nitrogen regimes will cut costs for smallholders because it will reduce the need for fertilisers.

Through its close collaboration with regional seed experts, CIMMYT understands regional germplasm needs and incorporates this into its research strategy. Through such collaboration CIMMYT has now included research on the economics of seed production in its programme.

Summary of discussions

The topics discussed included the impact of CIMMYT's research work on farmers, collaboration with NGOs, the merits of open-pollinated maize varieties and the yield reductions occasioned by replanting hybrids. The participants were informed that CIMMYT germplasm has been incorporated into the maize grown on 6 million ha of land globally.

With regard to the issue of open-pollinated varieties versus recycled hybrids, it was explained that the issue is complex but it does give farmers a wider choice of seed types. Farmers who plant seed from their harvested crops need to be aware that the recycled seed of hybrids reduces yields by up to 40% depending on the number of recyclings and on whether the hybrid is single-, double- or three-way cross. Yields from recycled open-pollinated varieties, however, are stable over much longer periods.

The participants asked about work on quality protein maize, which had apparently been abandoned for some years. They were told that work had stopped because of a problem with pollen contamination, leading to the breakdown of the controlling gene which is recessive. However, there had been a breakthrough in this area in Ghana, where up to 30% of the commercial maize crop is now quality protein maize, and this bodes well for other countries.

Site 4 Africa Centre for Fertiliser and Development (ACFD)

Owner:	Organisation of African Unity (OAU)
Location:	Harare
Principal function:	Work on improving the nutrient balance in farm lands to enhance productivity
Host official:	Dr S. Muchena, Director

Summary by host official

Background: The ACFD was founded in 1990 by the OAU, and the premises in Harare were completed in 1993. The centre is staffed by local experts but international consultants are engaged periodically. Links have been established with the Semi-Arid Food Grain Research

and Development (SAFGRAD) institute in Burkina Faso, the OAU Science and Technology Commission based in Nigeria, research institutes in the Consultative Group for International Agricultural Research (CGIAR) system, NGOs and private research centres. Although Africa accounts for 14% of the world's population it uses only 3% of the world's fertiliser stocks. The ACFD was established to help Africa overcome constraints in fertiliser procurement and utilisation and thus improve food security.

Overall objective of activities: To improve the welfare of farming communities by increasing food production and the opportunities for income generation.

Relevant priority information theme: Intensifying and optimising production.

Summary of participants' findings and conclusions

The work at the ACFD focuses not only developing fertilisers but also on marketing and using them. The centre's mandate is to contribute to the improvement and stabilisation of agriculture through its work on the production, promotion, distribution and use of fertilisers. On average, smallholder farmers apply only 10kg/ha of the 200 kg/ha of fertiliser said to be required for good crop performance. The centre believes, however, that Africa should find its owns solutions with regard to types of fertilisers and optimal application rates, rather than importing ideas and practices from elsewhere which are not tailored to African conditions.

The centre trains agri-business personnel in the development and marketing of fertilisers and other agricultural inputs. The training covers crop production, demand forecasting, and bookkeeping.

Work at the centre on the development of dwarf maize varieties has now reached an advanced stage, with research being conducted not only in Zimbabwe but also elsewhere in Africa. Dwarfing the plant reduces the requirement for inputs such as fertilisers and water and yet boosts yields.

Lessons learnt

By participants: Fertiliser development has to be approached holistically, incorporating such issues as agronomy and crop breeding. The development of dwarf maize varieties and trials on intercropping are good examples of this approach.

By host institution: ACFD staff agreed that the centre needs to disseminate its findings faster to other African countries and to conduct more activities elsewhere in Africa. They were also aware that the study visit participants felt that the centre was putting far more emphasis on plant breeding than fertiliser development.

Summary of discussions

In discussions with ACFD management, it was clear that there is great potential for fertiliser development in Africa and that the centre has an important role to play in this regard. The participants also learnt more about ACFD activities, especially with regard to training the staff of agro-business enterprises. In general, ACFD activities have focused on identifying the weak links in agricultural systems and finding ways to strengthen them. It was revealed that the work of the centre has slowed down considerably in recent years because of financial constraints.

Site 5 Stapleford Farm

Owner:	Mr R.E. Davenport
Location:	23 km west of Harare
Principal function:	Maize and soybean seed production
Host official:	Mr C.M. Davenport, Farm Manager

Summary by host official

Background: Stapleford Farm has a mixed farming system and grows commercial and seed maize, seed soybean and seed potatoes. The farm has for many years been contracted by Seed Co to produce maize and soybean seed.

Overall objective of activities: To operate a profitable commercial farm and contribute to Zimbabwe's food production efforts.

Relevant priority information theme: Intensifying and optimising production.

Summary of participants' findings and conclusions

Maize: During their tour of the farm, the participants learned about the seed contract arrangements and the technical requirements of growing hybrid seed; the varieties grown are SC 609, an older variety, and SC 607, a new high-yielding hybrid (5 tonnes/ha). The discussions focused on resistance to grey leaf spot, a major problem (SC 607 is more resistant than SC 609); isolation requirements, especially the use of male barriers; strategies for mechanically planting male and female lines simultaneously; synchronising pollen shedding and silking; detasselling female lines; removing all male plants after pollination is completed;

quality control, especially field inspection; and manual harvesting of female lines after the removal of male lines. On some farms the stalks and other parts of the male plants are used as livestock feed, but on Stapleford Farm the plants were discarded.

Soybean: The soybean variety grown on the farm is very high yielding and resistant to all the major diseases except rust; to combat rust, plants are sprayed as soon as it becomes visible. The soybean seed crop was said to be much simpler to grow that the hybrid maize seed crop because of less stringent isolation requirements. The soybean crop is harvested manually.

Lessons learnt

The space needed for isolating seed crops is posing a considerable problem for commercial seed producers. This problem also affects smallholder seed production.

Summary of discussions

The discussions centred mainly on the yields of the various hybrids, income expectations, the use of male barriers and rows, and the causes of grey leaf spot. The participants learnt that there is a pricing formula which ensures that all seed growers obtain a reasonable income per hectare, irrespective of the hybrid grown. Forest barriers are not officially recognised since it would be difficult to standardise them. With regard to grey leaf spot, the farm manager said that it is possible that the disease was carried by a cyclone from Natal in South Africa via Mozambique and into Zimbabwe. Two applications of the spray (Punch Extra) per season appear to be relatively effective in controlling the disease.

Site 6 Seed Co

Owner:	Seed Co (Pvt) Ltd
Location:	Harare (head office)
Principal function:	Seed processing, storage and marketing
Host official:	Dr B. MacCarter, Managing Director

Summary by host official

Background: The company grew out of the Seed Co-op, which has more than 50 years' experience in seed production and marketing. It runs its own research, conditioning, storage

and seed testing facilities, and has links with Seed Services and government research stations. The crops covered include hybrid maize, soybean, wheat, sorghum and finger millet. Seed Co has a wide network of contract seed growers, eight seed depots, 20 wholesalers and 2,000 dealers.

Overall objective of activities: To produce high-quality seeds to support modern agriculture in Zimbabwe and for export.

Relevant priority information theme: Promoting market-led development.

Summary of participants' findings and conclusions

The company is Zimbabwe owned. Recent developments which have necessitated changes include amendments to the tripartite agreement the company has with the government. For example, the company has intensified its research effort because it is about to lose its monopolistic access to publicly bred materials.

Other changes include a move from being a cooperative to a public company listed on the stock exchange, and an expansion programme involving an injection of US$40 million to purchase equipment and improve the company's financial situation.

Seed Co is also diversifying its activities to include small grain research and production, partly to meet smallholders' needs, and to this end it has acquired the Kadoma Research Station. Contract seed growers now include smallholders who grow small-grain crops. A survey is being conducted to identify the needs of smallholder farmers in dry and marginal areas.

The company has invested outside Zimbabwe, and now operates in Mozambique and Zambia. It has plans to operate in other countries in the region.

Seed testing laboratory: The participants found the facilities for testing seed purity and germination to be simple but efficient. The number of seed analysts working in the laboratory at any time depends upon the workload and the type of activities being conducted. Seed price is determined by the costs of production. There is increasing pressure on the land, which is making space isolation a problem. Although time isolation is being used to some extent, it is impractical in most cases because neighbouring farmers will generally use their land as they please.

Processing plant/warehouse: In the warehouse the participants were shown various storage areas and saw carry-over stock being fumigated and seed samples from the stocks being taken for re-testing. Carry-over stock is washed to remove the chemical dressing and fed to pigs.

Seed drying is done *in situ* on farms but natural drying is continued in the factory for four months before packaging.

The seed processing plant is divided into the processing section and the packaging section. The processing section has a capacity of 20 tons per hour. Soybean seeds are not treated, but wheat seeds are treated with Vitavax and maize seeds are treated with Thiram. Seeds are packaged in clear, well-labelled polythene bags (1, 2, 5 and 10 kg). Bag breakages were reported to be a major problem.

Summary of discussions

When the participants asked about the performance of seed producers in marginal areas they were told that, for commercial reasons, seed growers are generally located in higher-potential areas, particularly for maize, soybean and wheat; other crops were seen as not very profitable in commercial seed production.

In the discussion on the licensing of Seed Co to carry out its own laboratory testing, the managing director said Seed Co had been adjudged competent and suitably equipped to conduct official seed testing after a lengthy assessment by Seed Services.

The main challenge facing Seed Co since its establishment has been the fluctuation in the strength of the Zimbabwean dollar and the effect this has had on contract seed growers and producer pricing. There is a pricing strategy in place to ensure that changes in the exchange rate for the Zimbabwean dollar do not affect seed prices; some seed producers have asked for fixed pricing in US dollars but this has not been possible because Seed Co does not operate in a US dollar market as this would jeopardise the pricing structure. The company does work closely with seed producers, however, and makes adjustments when possible and justifiable. The main guideline in pricing is the cost of production.

With regard to future isolation strategies to address the problem of encroachment along borders, Seed Co is considering using time isolation strategies rather than space isolation strategies as a possible solution in some cases, because what is important is the avoidance of foreign pollen.

A participant observed that the seed handled by Seed Co is almost exclusively maize, and yet small-grain cereals provide the basis for food security for small-scale farmers in Zimbabwe. Seed Co's managing director noted that the company's newly opened Kadoma Research Station had been acquired to address the small grains situation. Currently, open-pollinated varieties of maize are being investigated there and hybrids for some of the small grains will be introduced. The managing director added, however, that the problem with small grains is not a lack of seeds but poor demand for them, and that what was needed, therefore, were novel seed marketing strategies.

Site 7 Rattray Arnold Research Station

Owner:	Seed Co
Location:	Arcturus, near Harare
Principal function:	Variety development and evaluation
Host officials:	R. Oliver, K. Cunliffe, G. Hildebrand and P. Rupende, Research Officers

Summary by host officials

Background: The station site was acquired in 1973 to serve as a testing site for government-bred materials. Maize breeding was started on the station in that year; in 1980 soybean and wheat breeding were added. The breeding programme was further expanded in the early 1990s to include beans, sunflower, sorghum, cowpeas and pigeonpeas. There is also some research work on seed production agronomy, and on developing methodologies and seed production strategies which will enhance the efficiency of Seed Co's operations. The station organises open days for farmers to give them an opportunity to learn about the different variety options available. In 1996, a substation was established in Kadoma to cater for seed production in the drier parts of the country.

Overall objective of activities: To develop crop varieties superior to those currently available.

Relevant priority information theme: Intensifying and optimising production.

Summary of participants' findings and conclusions

Maize: The station is in an ecological zone which has an annual rainfall of about 900 mm and is suited to maize. However, as 80% of maize seed in Zimbabwe is used by smallholders living in dry/marginal areas, the new station at Kadoma will breed varieties suited to these areas. The research officers showed the participants numerous demonstrations and trials involving a wide range of varieties, some with excellent yields, others with medium-level yields. Some were open-pollinated varieties and hybrids dating from the 1930s such as SR 52 and Southern Cross which are still being used in breeding. The hosts also explained the stages in the production of a hybrid variety, the problems involved in recycling hybrids, and the advantages and disadvantages of using open-pollinated varieties. The parent plants of the hybrids produced at the station come from many sources, especially the CGIAR international research centres, and they differ in their tolerance of a wide range of diseases and growing conditions.

Small grains: Seed Co has recently embarked on developing hybrids for sorghum and millet using varieties obtained from international research centres such as ICRISAT. Early maturity and high yields are the main target characteristics.

Wheat: The emphasis has changed from breeding varieties with high yields to those with high protein content.

Soybeans: Work started in the mid-1960s with imported varieties for poultry and pig feeds. Since then, the station has developed high-yielding varieties which are non-lodging or shattering and which have short-day photoperiods and pods above the ground to facilitate mechanised harvesting. Varieties resistant to the disease known as frog eye have been bred, and work on developing rust-resistant varieties is continuing.

Groundnuts: The strategy with groundnuts has been to develop short-season varieties, such as the Spanish types which mature in 100 days, rather than the long-season varieties which take between 160 and 200 days to mature.

Beans: The station is breeding varieties resistant to numerous seed-borne fungal, bacterial and viral diseases.

Sunflowers and cowpeas: Early-maturing sunflower hybrids with a high oil content and cowpea varieties with export qualities are being bred.

Lessons learnt

Single hybrids are more expensive and more difficult to produce than three-way crosses, but the latter are susceptible to waterlogging, which results in slow growth of female lines and thus to poor synchronisation of pollination and fertilisation. Three-way hybrids are also susceptible to grey leaf spot, and the most recent varieties bred at the station carry resistance to this disease. However, it is difficult to develop resistant varieties from susceptible open-pollinated varieties. For small grains and non-major crops, the main characteristics sought in breeding are adaptability to dry areas and early maturity.

The prices of hybrids have been kept low to maintain their marketability, unlike the situation in Kenya where the prices have escalated, leaving many farmers unable to buy the seeds. It was noted that smallholders prefer 1–2 kg packets of seed, whereas 10–50 kg packets were more suitable for commercial producers.

Summary of discussions

In view of the high cost of developing hybrids, the participants wanted to know how the cost of hybrid seed is being kept low enough to be affordable by the average farmer. The research officers said they managed to keep production costs low by various means, such as using disease-resistant female lines, maximising yields, and using only good seed growers. They added that the research station only releases easy-to-grow hybrids.

When asked about the quantity of wheat grown in Zimbabwe and how much of this is grown by smallholder farmers, the participants were told that because it is a high-input crop the amount grown by smallholders is not significant. About 400 tonnes per season is produced in winter under irrigation.

Site 8 Community seed bank

Owners:	Chiunze II and Mwanza Wards
Location:	Chingwinyiso Village
Principal function:	Long- and short-term community seed production activities and germplasm storage
Host officials:	Mr J. Chataika, Research Assistant, Commutech Mr Zinanga, Project Officer, Commutech

Summary by host officials

Background: With assistance from Commutech, an NGO, the community embarked upon a project to address seed security problems. The project comprises a community seed bank, community seed multiplication activities, and community on-farm trials.

Construction of the seed bank started in 1997 and it was operational by the end of 1998. The community provided the labour and some local materials, while Commutech provided purchased building materials. The seed bank will store landraces, local cultivars and some modern varieties, and it will also serve as a storage facility for seed produced by smallholders, as a meeting place for the management committee and as an outlet for selling seeds.

Commutech works with poor communities to reduce poverty and achieve food security through facilitating access to high-quality seed, focusing on: germplasm collection as a security against plant genetic erosion at community level; strengthening the capacity of communities to conserve and utilise useful materials; and encouraging seed multiplication and distribution at community level.

Overall objectives of activities: To conserve indigenous cultivars and other valuable varieties for use by the community, to develop a community seed source and to encourage seed adoption through farmer-managed on-farm trials.

Relevant priority information theme: Mobilising the civil society.

Summary of participants' findings and conclusions

The seed bank facility comprises a conference room, a short-term seed storage room, a sales room and two long-term germplasm storage rooms. The main issues discussed during the visit to the seed bank centred on maintaining low temperatures in the storage room, strategies for collecting landraces, and agencies involved in the sustainable use of the seed bank, such as Agritex, Commutech and DR&SS.

The participants visited sorghum seed multiplication fields and were briefed by a farmer who had been selected to grow seed for sale to his neighbours. He described the process of selecting farmers who would produce seed for the community, the quantities and terms under which initial seed is provided, the contribution to the seed bank after harvest, seed quality control (particularly the removal of rogue plants), performing germination tests and the agronomy of seed production. Seed farmers are selected on the basis of hard work, interest and the confidence the community has in them. Field inspections are performed by Commutech and Agritex, and germination tests are conducted by DR&SS in the seed testing laboratory in Harare. Because the area has poor soils and low rainfall, plant densities are low.

The participants also visited variety trials managed entirely by a farmer, with the active involvement of some other farmers in the area. The 11 entries in the trial consisted of the traditional long-maturing variety as well as improved varieties provided by SADC and ICRISAT. The farmer was very enthusiastic about the exercise, saying it gave him and his colleagues an unbiased opportunity to make informed choices on varieties, especially with regard to yield, disease tolerance and adaptability.

Lessons learnt

The participants were of the opinion that farmer-managed trials, when properly planned and managed, have considerable potential in improving seed adoption rates. It was felt, however, that there was a need for more technical guidance to avoid distortions which would lead to inaccurate conclusions.

Summary of discussions

The participants wanted to know how the seed bank operators decided what cultivars and landraces to store. They were told that the seed collection group made up of Agritex, Commutech and DR&SS staff liaises with the farmers in determining what to conserve.

The discussions on maintaining temperatures at a low level in the storage rooms revealed that the ceilings are made of very thick concrete and that there is dead air between them and the roof, which ensures good insulation against heat incursion.

In the sorghum field the discussions centred on the number of farmers engaged in seed multiplication in the province, the agronomic practices employed by the farmers, yield expectations and the status of seed quality control. The participants learnt that only those farmers who show an interest in the seed multiplication programme and who can boast excellent crop performance on their own farm are selected to participate in the programme. The programme appears to have run smoothly, the only significant problem arising being the difficulty in mobilising the community to contribute towards the building of the seed bank facility.

At the farmer-managed variety trial plots, the participants discussed the methodology which is being used to compare varieties and made suggestions for improvements. They emphasised the need to always use freshly sourced seed of the local variety which acts as a check.

Site 9 ICRAF-Zimbabwe agroforestry project

Owners:	ICRAF and the Government of Zimbabwe
Location:	Domboshava
Principal function:	On-station experimentation and training in the cultivation and use of multipurpose trees
Host official:	Dr E.A. Ayuk, Head of Project

Summary by host official

Background: The project focuses on soil fertility improvement and the provision of adequate feed in the dry season through the development of agroforestry and improved fallow systems incorporating nitrogen-fixing trees. The aim is to help smallholder farmers achieve increased and sustainable crop production levels. Studies on the domestication of indigenous fruit trees are being undertaken as part of the efforts to promote biodiversity.

The project began in 1989 with a diagnostic and design phase. Planting and trials started in 1991–92. The project is located at two DR&SS sites in Zimbabwe, Domboshava and Makoholi. There are also stations in Malawi, Tanzania and Zambia undertaking specific complementary tasks.

Overall objective of activities: To improve soil fertility and the availability of dry-season fodder for rural and peri-urban dairy farms through better management of soil biomass and agroforestry systems.

Relevant priority information themes: Protecting the environment and managing natural resources; mobilising the civil society.

Summary of participants' findings and conclusions

Project research results have shown that *Sesbania seban* improves soil fertility significantly in improved fallow systems. They have also shown that raising tree seedlings using the bare-root method is appropriate for smallholder farmers because it is easier and cheaper than other methods. ICRAF's work on indigenous fruit tree production includes a *Vaparka kirkiana* improvement trial.

Over the past 7 years the project has developed a number of agroforestry technologies which show great potential in terms of helping smallholder farmers improve crop productivity and production levels. These technologies include fodder banks, improved fallows, biomass transfer technologies and the domestication of indigenous fruits.

Elaborate dissemination techniques involving stakeholders have been developed to encourage the wide adoption of agroforestry technologies by farmers.

Lessons learnt

Soil fertility, and hence crop production, can be improved by fallowing with *Sesbania sesban*, a good alternative to artificial fertilisers. With the decrease in farm sizes there is a need for far more research on the cultivation of indigenous fruit trees.

Summary of discussions

The participants expressed considerable interest in the use of *Sesbania* fallow and its impact on soil fertility. They were impressed by the fact that maize can be grown for 4 years after the fallow and that, although the yield starts decreasing after the second year, the overall production in any year is far higher than is the case with other fallows. The participants also discussed the various systems of transplanting, especially the advantages of the bare-root system.

The head of the project informed the participants that there are a number of opportunities now for the project to collaborate with industry if sufficient interest can be aroused. He cited the example of the marula fruit and how, through collaboration between industry and agroforestry in developing the potential of this fruit, it came to be used to make wine and many other products now on the market.

Site 10 Domboshava Agritex farm

Owner:	Government of Zimbabwe
Location:	Domboshava
Principal function:	Practical training for farmers and verification of research results
Host official:	Mr I. Pompi, Officer-in-Charge

Summary by host official

Background: The station was originally a training facility for white farmers. It was later taken over by the Public Services Commission and is now used for a wide range of training activities. Agritex uses it to train farmers on specific topics and crops, and maintains field plots where it carries out on-site training for farmers, particularly on field days. Agritex also uses these plots to verify variety trial results obtained by researchers and to compare the performance of different varieties; farmers are encouraged to visit the plots to see for themselves how the varieties perform and to select varieties accordingly. The farm is divided into various sections focusing on horticulture, field crops, apiculture, livestock and projects being undertaken in collaboration with agencies such as CIMMYT, GTZ and ICRAF.

Overall objective of activities: To improve farming expertise in collaboration with DR&SS and the farming community.

Relevant priority information theme: Strengthening national agricultural systems.

Summary of participants' findings and conclusions

The participants toured the field plots where maize, groundnut and soybean varieties from various seed companies and organisations had been planted to demonstrate their comparative performance to farmers and students. They attended a lecture on apiculture and were shown various materials, tools and protective clothing necessary for bee-keeping.

Lessons learnt

This station is meeting the need for unbiased verification trials to ensure that farmers make the choices that suit their particular conditions. The methods used to train farmers, replicating smallholder conditions, has been very successful. Diversification is important in smallholder production and apiculture is an activity which suits many farmers wanting to diversify.

There is a need for the station to ensure the proper maintenance of open-pollinated varieties of maize (collected from smallholder farmers) by providing adequate isolation.

Summary of discussions

The participants commented on the serious shortage of improved groundnut varieties among smallholder farmers and recommended that the station take steps to improve this situation. They also discussed how seed production could benefit from bookkeeping activities.

Site 11 Farm and City

Owner:	Consolidated Farming Investments
Location:	Kadoma
Principal function:	Selling a wide range of products, including those required by farmers, such as hardware, seeds and chemicals
Host official:	Mr R. Cherai, Assistant Manager

Summary by host official

Background: Farm and City was previously called the Farmers' Coop and used to stock farm requirements of all kinds. When it became a public company it expanded its operations and now offers products required by city dwellers as well. Although it is a public company, farmers retain a considerable proportion of the shares. There are 38 branches, all of which sell seeds, tools, fertiliser and other farm inputs. The seed range includes products from various companies, such as Seed Co, Cargill, Pioneer, Pannar and Mayford.

Overall objective of activities: To operate a profitable sales outlet that caters for the needs of both farmers and city dwellers.

Relevant priority information theme: Promoting market-led development.

Summary of participants' findings and conclusions

Farm and City branches enable farmers to purchase the goods they require for both the farm and the home from one outlet. The products sold are obtained from various sources, mainly on a credit basis. Farm and City is linked to the extension services and to the Commercial Farmers Union (CFU) and the Zimbabwe Farmers Union (ZFU). Training staff to improve their knowledge of farming issues is a priority. The company is licensed to sell seeds by Seed Services; the licence is renewed annually and seed inspections are conducted as part of the licensing agreement. Farm and City bases current seed requirements on the previous year's sales and on information gathered from farmer associations such as the CFU and the ZFU.

Lessons learnt

By participants: Farm and City uses various strategies to improve seed distribution, such as seed discounts, strategic citing of outlets, a wide product range, and staff technical training on seed utilisation and production, which enables them to offer useful guidance to customers. Quality control monitoring of seed stocks, especially carry-over stocks, needs to be improved.

By host institution: Links with extension and research need to be reinforced and continuous. The policy of training staff on seed production and utilisation will serve to improve the company's credibility among the farming community.

Summary of discussions

In a discussion on the terms of collaboration between Farm and City and the seed companies, the participants were told that the companies provide seed to Farm and City on credit. With regard to forecasting demand, Farm and City bases its projections on performance in the previous year as well as through contacts with the farmers' unions.

The participants had noted that some carry-over seed was poorly stored, and wanted to know if sales staff were trained to be aware of the need for storage and handling practices which complied with the standards set by the Seed Act. They were told that Farm and City staff are sent to attend courses run by seed companies on seed storage and marketing.

The participants also learnt that members of the former co-operative had been given the option to become shareholders of Farm and City.

Site 12 SADC/ICRISAT Sorghum and Millet Improvement Program

Owners:	SADC and ICRISAT
Location:	Matopos
Principal function:	Crop improvement through research, training and capacity building
Host officials:	Dr Ngoma and Dr Obilana

Summary by host officials

Background: The SADC/ICRISAT Sorghum and Millet Improvement Program (SMIP) was initiated in SADC countries in 1983–84 following moves by member countries to strengthen

national research capabilities in the region. The station at Matopos had been established after the droughts of the late 1970s and early 1980s when the need to develop drought-resistant crops became urgent. There are three substations under SMIP in Zimbabwe, and regional testing sites in Botswana, Malawi, Tanzania and Zambia.

SMIP's mandate is to improve sorghum and millet for the semi-arid regions, and it has now completed three 5-year phases. The main achievements over this period include research capacity building in the SADC region and the development of superior varieties of sorghum and pearl millet. In Phase IV the goal is to strengthen the region's scientific capacity for technology generation and the exchange of information with the aim of increasing farm-level productivity and income. To achieve this, SMIP has adopted a participatory approach whereby all stakeholders are involved in planning and implementation, reflecting a demand-led process of technology change.

Overall objective of activities: To contribute to food security in SADC countries by developing improved sorghum and millet varieties.

Relevant priority information themes: Strengthening national agricultural systems; promoting market-led development; intensifying and optimising production.

Summary of participants' findings and conclusions

The participants were shown evaluation plots with entries of sorghum and millet lines/cultivars from SADC countries and outside the region. The station works closely with national agricultural research systems (NARS) in the region, providing training for scientists and facilitating the exchange of information among NARS. It maintains breeders' seeds of varieties of mandate crops for member countries. Close collaboration between SMIP and Zimbabwe's NARS has led to the development of varieties suitable for Zimbabwe.

The participants considered that the traditional seed delivery system has worked well for smallholders and is the most sustainable way of supplying seed to areas the formal sector does not reach. They also felt that the seed policy in Zimbabwe needs to be reviewed to encourage the participation of the informal sector; this sector is currently not recognised in official seed policy.

Lessons learnt

By participants: Farmer participation in variety evaluation through demonstration plots was an important aspect of the SADC/ICRISAT programme. A lot of progress had been made by SMIP in the development of improved sorghum and millet varieties, and it was now up to stakeholders to discuss the release of the seeds of these varieties with their NARS.

Further collaboration between national seed programmes and ICRISAT in various areas, including designing and evaluating seed production and distribution systems, should be encouraged.

By host institution: Direct collaboration with the research and seed programmes of co-operating countries benefits ICRISAT in terms of implementing its mandate effectively and exchanging useful information on various issues.

Summary of discussions

In discussions on some of the varieties developed under SMIP, the participants were told that the sorghum variety Macia yields about 1.5–2.5 tonnes/ha in areas with an annual rainfall of less than 400 mm, such as the Matopos. In areas where rainfall exceeds 400 mm, the yield potential is 4–5 tonnes/ha.

The pearl millet variety Okashana has not been released yet because it is still undergoing advanced trials. However, farmers are growing the variety even before it has been officially released. It is highly adaptable to many environments and is being considered for release in other African countries, including Tanzania and Somalia.

Site 13 Matopos Research Station

Owner:	Government of Zimbabwe (DR&SS)
Location:	Matopos
Principal function:	Livestock research and crop variety development
Host official:	N. Mangombe, Research Officer

Summary by host official

Background: The Matopos Research Station was established in 1903. In the early years, the work focused on livestock and range research, but later a crop improvement unit concentrating on small grains was added. The activities of this unit revolve mainly around sorghum and millet improvement and the production of breeder seed. From the 1940s to the late 1960s most of the work at the station concerned variety testing; the first plant breeder was appointed in 1969. The severe droughts which occurred in the 1970s and 1980s halted breeding activities at the research station; they were moved to Kadoma and were not resumed at Matopos till 1997.

The main objective of the sorghum and millet programme is to develop production technologies for both commercial and small-scale farmers. The focus is on analysing agronomic practices and their suitability to various categories of farmers. Seed is obtained from ICRISAT and tested on farmers' fields. The research team collaborates with ICRISAT to maintain and provide seed to NGOs and other interested parties for further seed bulking. The actual breeding work is conducted by the ICRISAT team.

Overall objective of activities: To develop superior varieties and recommend improved practices suitable for various categories of farmers.

Relevant priority information theme: Intensifying and optimising production.

Summary of participants' findings and conclusions

The participants visited sorghum and pearl millet seed multiplication plots. They noted that neither of the currently popular varieties, Macia (sorghum) and Okashana (pearl millet) had been released as both of them were still under variety trials. Farmers have already adopted these varieties, however, especially through NGOs and following research demonstrations. The participants felt that it was taking too long to release these varieties and that variety release in general needed to be accelerated.

Lessons learnt

By participants: The participants learnt that in on-farm situations, where the isolation distance necessary for seed production may be difficult to achieve, isolation can be achieved by harvesting seed from an area of the farm which is furthest away from sources of contamination.

By host institutions: The research team acknowledged the need for involving the informal seed sector in seed delivery because seed companies are not doing much to promote improved seeds of sorghum and millet. This effort will need the collaboration of NGOs, as well as the development of a seed delivery system which is both sustainable and cost-effective.

Summary of discussions

The discussions centered mainly on the delivery of improved sorghum and millet seed to farmers. The participants were told that only very small quantities were delivered to farmers, through the DR&SS team which gives the seed to small-scale farmers for demonstration plots. It was thought that it would be better for an NGO or seed company to multiply the seed for bulk distribution.

With regard to how seed specialists can reinforce the informal seed distribution system, it was noted that the informal seed sector accounts for over 70% of seed production and distribution in many parts of Africa. This system has worked well for smallholder farmers for hundreds of years and is the most sustainable system. There is therefore a need to work within the system and to strengthen it, especially in areas which commercial seed companies do not reach. Seed policies in Zimbabwe need reflect the importance of the informal seed sector.

Site 14 Smallholder seed production / Tsholotsho

Owner:	Mr Nkomo
Location:	Tsholotsho
Principal function:	On-farm production of sorghum seed
Host official:	Mr Nkomo, farmer

Summary by host official

Background: Mr Nkomo was among the few farmers in the Tsolotsho area who had been selected to grow sorghum seed for the community. He volunteered for this task during a training workshop. His sorghum plot is 0.25 ha. Although he had followed all the recommendations (on weeding and fertiliser application, for example), and the crop had been planted early enough (mid-November), germination was poor, hence the poor crop stand.

Overall objective of activities: To produce good seeds for sale to farmers in the community.

Relevant priority information theme: Intensifying and optimising production.

Summary of participants' findings and conclusions

The sorghum in the plot appeared to be irregular in terms of height and maturity, probably because of soil fertility problems. The farmer was conversant with basic seed production principles such as isolation and roguing but said he needed further seed-related training. The initial seed used was supplied by GTZ/Commutech and therefore of good quality.

The farmer said the demand for sorghum seed was high in the neighbourhood and this could be the basis of a good business for him. It appeared that other farmers who helped him with weeding also had some control over the crop, but the Commutech officer insisted that only Mr Nkomo had ownership of the crop.

Post-harvest issues dominated the interactions with the farmers gathered at the site. They were keen to know how other countries process and store seed. There was general agreement that, for smallholders, traditional methods are adequate for short-term storage needs but the community needs to develop seed banks to cater for long-term storage needs.

Lessons learnt

By participants: The smallholder seed production venture appeared to be well organised and was having a positive impact on community mobilisation. The farmers appeared to trust each other and were not in any doubt that the host farmer would give them part of the seed produced.

By host: It was recognised that the seed production and distribution activities needed improvement through further training provided by stakeholder institutions. This could be achieved through organised seed workshops and by providing farmers and extension workers with more information on the work of successful smallholder seed producers in neighbouring countries such as Zambia and Malawi.

Summary of discussions

The participants wanted to know whether the host farmer saw his seed production venture as a business or a community service. He felt there was the potential for it to become a business, particularly if the number of plots could be increased.

In response to a participant's question as to whether there are examples of smallholder seed production ventures becoming successful businesses, the group was told of one such venture being operated by the Bulimi seed growers association in Zambia. These farmers produce, process and market their groundnut seed to farmers and commercial seed companies, and may soon start exporting seeds to Malawi.

The host farmer said he did not have marketing problems at present because all the seed was purchased by neighbouring farmers. With regard to training, he said that he needed more training, specifically on seed production. The extension worker described how trainee farmers are selected from participating villages (one per village) to attend a 1-day workshop or demonstration on one or more seed topics.

On measures to safeguard the crop against animal grazing, the farmer reported that the village headman had announced new rules whereby livestock owners would be punished if their animals strayed into the sorghum plot. He added that no one in the community would deliberately try to destroy the crop as they all realised that it could benefit the whole community.

Site 15 Smallholder seed production / Magama

Owner:	Mr Bhebe
Location:	Magama Village
Principal function:	On-farm production of sorghum seed
Host official:	Mr Bhebe, farmer

Summary by host official

Background: The farmer was among a group of smallholders selected and trained as part of a Commutech project to grow sorghum seeds for the community.

Overall objective of activities: To produce good seeds for sale to farmers in the community.

Relevant priority information theme: Intensifying and optimising production.

Summary of participants' findings and conclusions

As in the case of Mr Nkomo's farm (Site 14), there was considerable assistance being given to the farmer by the community, especially with regard to weeding. No artificial fertilisers were being used, but the crop stand was impressive. Sorghum is preferred to pearl millet in this area because millet is attacked by quelea birds. The farmer did not appear to appreciate the value of the seed crop he was growing; he said he would use part of it for food, give 1 kg each to the farmers who assisted in weeding, and sell the rest as seed or food.

It appeared that the seed plot was a communal plot because of the labour contribution by other farmers, but when the farmer was asked about this he said that helping each other was part of their culture and that the crop belonged solely to him. The participants had some doubts about the sustainability of the project because it appeared to put little emphasis on entrepreneurship; its overriding goal appeared to be the rapid distribution of seed.

Lessons learnt

By participants: As in the case of Mr Nkomo's farm, the seed production venture appeared to be well organised and was having a positive impact on community mobilisation. The farmers appeared to trust each other and were satisfied that the host farmer would give them part of the seed.

An interesting feature was that farmers in this area did not use fertilisers and did not express any wish to do so. It would be useful, however, in spite of the inherent good nutrient status

of the soil, if Commutech staff encouraged farmers to use fertilisers in seed crops so that the full benefit of seed production could be realised.

By host: The farmers appreciated that the production problems they had were also experienced in other countries. This encouraged them not to despair but to continue to work hard. Commutech felt it worth paying more attention to marketing because the consumption of seed for food may imply inadequate demand for seed or lack of awareness of the benefits of community production of seed.

Summary of discussions

The topics of the discussions included labour availability, storage, choosing sorghum instead of millet, and sustainability. It became clear that the normal practice in the area was for farmers to assist each other and thus there was no need to hire labour. The farmer being assisted provides food during the field work and gives free seed to his helpers. On storage, there did not appear to be any problems as the seed remains dry after harvesting. There was a problem with threshing, however, because floor space is limited.

The farmer explained that he had chosen sorghum for seed multiplication because the alternate small-grain crop, pearl millet, tends to attract birds, and bird scaring is a costly and time-consuming problem. On the sustainability of the project once Commutech's involvement ends, the Commutech official considered that the farmers would continue to produce seed so long as they received appropriate training, particularly in seed storage.

Site 16 ITDG small-scale seed production project

Owners:	Farmers, ITDG and GTZ
Location:	Chivi
Principal function:	Seed production of small-grain crops
Host official:	Mr Chirunga, Senior Officer, ITDG

Summary by host official

Background: The Chivi area has marginal soils and very low rainfall. In 1992, the Intermediate Technology Development Group (ITDG) asked the Chivi District authorities to allocate it an area for a development project. Ward 21 was allocated and in-depth studies were carried out involving discussions between ITDG and various stakeholders (including potential

beneficiaries and institutions) in an effort to identify the development gaps that needed to be filled. Initially, the goal was to build viable community institutions which would help achieve household food security. This goal was later expanded to include a significant commercial component and to make relevant institutions, particularly research institutions, aware of the problems of the area and the need to adopt a holistic approach. The project now has over 30 seed producers who are being assisted in various ways by the Matopos Research Station and SADC/ICRISAT with regard to research, and by GTZ with regard to the provision of starter seed, training, technical supervision, field days and the costs of transportation.

Overall objective of activities: To promote the growth of smallholder seed production as a basis for achieving food security at community level.

Relevant priority information theme: Mobilising the civil society.

Summary of participants' findings and conclusions

The participants were taken on a tour of a sorghum and pearl millet seed farm. The farmer, Mrs Fatima Thamai, described the steps involved seed production; her description displayed a good grasp of the subject and was a reflection of the quality of the training she had received. All aspects of the farm practices she used, from variety selection, agronomy and quality control to processing, storage and marketing, were eloquently explained and conformed to accepted norms. The sorghum and millet varieties she grew were ones she had selected herself after being shown the full range of available varieties at Matopos Research Station; this degree of farmer participation is very much part of the ITDG approach.

Lessons learnt

By participants: Smallholder farmers will be able to adhere to seed production procedures, even under adverse conditions, if they have been well trained. The impact of the capacity-building project on farmer confidence was amply displayed by Mrs Thamai and her keenness to apply her new knowledge to a much larger area of land than that currently available to her.

By host officials: The farmers said there was an urgent need to find a way of introducing fresh basic seed into the system on a far more regular basis than has been the case hitherto, and ITDG promised to assist in this context.

Summary of discussions

The participants congratulated Mrs Fatima for the professional and eloquent way she had described her seed production work, saying that her expertise was as good as that of any of

her visitors and that her work was ample proof that smallholder farmers, with proper guidance and the right training, can perform as ably as their large-scale counterparts. The group also congratulated ITDG and the collaborating agencies, especially the research stations, on what had been achieved here. They wanted to know from the farmer whether she was unique among the farmers involved in this project, and how she thought would cope if she had a larger area of land.

The farmer thanked the participants for their complements. She said any other seed farmer in the project would have performed just as well as she had because they had all gone through the same training, had all taken the training seriously and had seen demonstrated on their farms the benefits that would flow from implementing what they had learnt. On the question of land size, she said that considering what the farmers had achieved under such harsh conditions, if they were given larger amounts of land they would definitely rise to the challenge and show what they could do to assist in the national agricultural effort.

Site 17 Gutu smallholder contract seed production scheme

Owner:	Gutu community
Location:	Gutu
Principal function:	Smallholder seed production of open-pollinated varieties
Host official:	Mr L. Ziembe, Programme Organiser

Summary by host official

Background: The smallholder seed production scheme, involving a large number of communities in the Gutu District, was established by Agricultural Seeds and Services, a company which produces only open-pollinated crop seeds. The production base is almost completely small-scale, using communal farmers; Mr Ziembe is the initiator and chief development and operations agent in the Gutu area. The scheme started in 1993 with cowpea variety IT18; it involved a small number of farmers and managed to survive a severe regional drought. It now covers cowpea, sorghum, sunflower, sun hemp, field beans and pigeonpeas. The forecasted production figure for 1999 is 4,800 metric tonnes of seed.

In operating a smallholder contract seed production scheme the main points to note are:

- *Trust between producer and the company:* Communal farmers are not familiar with contracts and much of the success of a contractual arrangement depends on the trust the grower has in the company. This takes years of patience to build.

- *Organisation and management:* Small-scale farmers need help with general management, agronomic practices and the provision of services. They tend to know little about contracts and so it is up to the company to educate them in this respect. Because there are many farmers, each with a small area of cultivated land, problems arise with coordinating production and selling the whole crop. The company needs to ensure that everything runs as smoothly as possible. Prompt payment of farmers is extremely important.

- *Effectiveness of communal farmers as seed producers:* Agricultural Seeds and Services, which exports seeds to many southern African countries, depends almost entirely on smallholder farmers. To quote Mr Ziembe: "Our experience with communal and small-scale farmers has convinced us that they are very capable of producing the seeds of a number of crops. It is true that the production of more complex seeds, such as hybrids and others where isolation is of great importance, presents problems for the smallholder farmer. However, for a large number of crops, communal and small-scale farmers can be excellent growers. In fact, they may be the only farmers who can produce certain seeds economically. Large-scale commercial farmers are generally not interested in producing such seeds as sorghum, millet, cowpea, jugobeans, etc. Further, smallholders are much better placed to deliver high-quality seed for crops such as groundnuts and beans compared with large-scale farmers due to their ability to hand-shell and hand-sort. What they need is encouragement, trust, continuity and fair remuneration. Supply these and you will have enthusiastic growers. Give them guidance and help with the production of their crops and they will rapidly become capable and reliable seed producers."

Overall objectives of activities: To multiply improved varieties provided by Agricultural Seeds and Services under contractual arrangement.

Relevant priority information theme: Mobilising the civil society.

Summary of participants' findings and conclusions

The participants visited some of the smallholder contract seed growers in the Gutu area and inspected their crops. The population of the area is about 250,000 and the estimated area under crops is 715,945 ha. The crops include maize, finger millet, sorghum, groundnut and cowpea. A village forum was organised to facilitate discussions between the participants, the farmers, the village leaders and Mr Ziembe, and two farmers gave short speeches on seed production and the benefits they had derived from it.

Lessons learnt

By participants: The production of the seeds of open-pollinated crops by smallholder farmers can be profitable if it is well organised. Seed marketing is a critical issue in determining

whether or not smallholder seed production will be sustainable. With proper training, Agritex field staff could make a significant contribution to smallholder seed production.

By host: Farmers at the forum were very aware of the importance of training in seed production.

Summary of discussions

The discussions centred mainly on organisation and management, source of initial seed, marketing, income, and long-term entrepreneurship development.

The participants learnt that Seed Services plays an important role in seed quality control but thought that the growers should be more involved in determining producer prices. With regard to incomes, the participants considered that with good management the income from seed production could compare favourably with income from cash crops. A good example was cowpea. Before this scheme began, the income expectation from cowpea was insignificant. However, since the scheme had started, three of the farmers had raised Z$48,000 through seed production and were using the money to connect electricity to their homes. They also grew traditional varieties but these were just for household food needs.

There was general consensus that it should be possible for the growers to move eventually from being contract growers to forming their own seed production associations.

Site 18 Mtekedza community Zunde project

Owner:	Mtekedza community
Location:	Mtekedza, Chikomba District
Principal function:	Community mobilisation for food security
Host official:	Chief Mtekedza

Summary by host official

Background: The Mtekedza area has a population of 27,000 and is served by 26 primary schools and 13 secondary schools. The area is under-developed and has little infrastructure. The chief and people of the area have embarked on a programme based on the ancient concept of Zunde, which is aimed at ensuring food security for the elderly and disadvantaged, especially in bad times. Food which is communally grown is harvested and

stored, usually at the chief's place, and is released to the target beneficiaries when necessary. The Zunde project has now been expanded to include seed production to ensure seed security. The DR&SS, together with ACFD, CIMMYT and ICRISAT, provide support for the project, especially through the supply of improved seeds for multiplication.

Overall objectives of activities: To address food security issues, eradicate poverty and tackle environmental problems.

Relevant priority information themes: Mobilising the civil society; protecting the environment and managing natural resources.

Summary of participants' findings and conclusions

The participants were briefed at a gathering of the community elders and then taken to the demonstration plots, which also served as seed multiplication plots. Several varieties were being tested, including finger millet, pearl millet, sorghum, dwarf maize, open-pollinated varieties of maize and some maize hybrids. The initial seed and fertiliser were obtained free-of-charge from ACFD, CIMMYT, DR&SS and ICRISAT. Next season, the project will buy its own seed as well as using seed it has saved and planting materials (cuttings).

At the seed bulking site at Masasa, the participants visited two sections devoted to seed security. They were also briefed on the religious aspects of the project, which appear to be a key element of it. The unity of the community is based partly on the chieftaincy which is held in high regard and partly on the community's adherence to Christian teachings.

The Zunde project plans to extend its activities into fish farming, food processing and the construction of chalets, and will add cassava to the crops it covers. The DR&SS currently has a rapid cassava multiplication programme through tissue culture.

Lessons learnt

The main lessons learnt were that good community mobilisation can enhance rural development, and that a holistic approach towards rural development is important in alleviating hunger and poverty.

Summary of discussions

The participants asked about the sustainability of the project and were informed that although it received the starter seed and fertilizer free-of-charge, in the coming years all inputs would be purchased with cash generated from the sale of project outputs.

With the strong project focus on Christianity, the participants wanted to know what role non-Christians played. It was explained that the primary basis for the unity of the community is the chieftaincy. Christian values build on this by cementing the respect between individuals and helping to ensure the smooth running of the project. They seem also to have contributed to the very low incidence of conflict in the area, political or otherwise.

Site 19 Agricultural Seeds and Services

Owner:	Agricultural Seeds and Services (Agriseeds)
Location:	Mount Hampden, Harare (seed processing plant)
Principal function:	Seed processing and storage
Host official:	Dr Kelly, Managing Director

Summary by host official

Background: Agricultural Seeds and Services was established in 1988 to process seeds produced by smallholders, mainly for the export market. The crops covered include sorghum, millet, beans, groundnuts, soybeans, okra, sunflower, paprika, grass seeds, jatropher and sesame. Agricultural Seeds and Services was set up partly because these crops had hitherto been neglected by the big seed companies, and partly to create employment – hence the reliance on labour-intensive processing methods. Priority is given to employing women (90% of the processing plant employees are women).

Overall objective of activities: To facilitate the proper processing of seeds produced by smallholders to meet the standards of quality required by modern agriculture.

Relevant priority information theme: Promoting market-led development.

Summary of participants' findings and conclusions

All the seeds being processed at the plant had been produced by smallholder contract farmers in Gutu (Site 17) and similar schemes elsewhere. The plant follows the standard seed processing flow but has a large labour component because much of the work is done manually, unlike the highly mechanised plant at Seed Co. The absence of hybrids was very conspicuous. The plant deals only with open-pollinated varieties of maize, small grains, cowpeas and other crops aimed at the export market. It has a small oil mill where sunflower oil extraction is carried out as an additional source of income.

One problem in the contractual arrangements with smallholder farmers is their tendency to sell valuable seed to commercial grain traders when there is a price advantage, in spite of their contract with the company. Tackling this problem requires keeping in extremely close contact with them, especially during the purchasing period, and ensuring there is a high degree of flexibility on both sides. Despite this problem, Dr Kelly considered that, technically, there was no reason why smallholder farmers could not be contracted to grow seed for the big seed companies.

Lessons learnt

By participants: The participants gained valuable insight into the pros and cons of smallholder contract seed production, especially with regard to breaching contractual provisions. They also saw that with adequate training, good extension back-up and, in particular, effective follow-up, smallholder seed producers can perform as well as their large-scale counterparts.

By host officials: Dr Kelly and his colleagues learnt from the participants that the problem of breaching contractual obligations is being experienced in all the countries represented by the participants. In Zambia, for example, the Zambia Seed Company was having similar problems in that it found it was sometimes competing with traders for groundnut seed grown by contract smallholders. The participants expressed the view that regular contacts as well as the provision of transport and funding at the critical period of seed harvesting might help to minimise the problem.

Summary of discussions

As the company specialises in open-pollinated varieties and exports most of the seeds processed, the participants wanted to know whether there was a market for the varieties in Zimbabwe. They were told that the local market is very complex; it is possible that there is a limited market but this is difficult to ascertain.

Some participants felt that the farmers were suffering from the historical legacy of whites undervaluing the produce of black communal farmers, and asked what the company's views on this were. The host replied that it is trying to apply a win-win business relationship with communal farmers based on trust. He said communal farmers sometimes do not have a clear understanding of the trading system, but the company has gradually shown that it is possible for both parties to emerge as winners in this business.

Appendix 1

SPEECHES AT OPENING AND CLOSING CEREMONIES

Opening statement

Mr A. Vugayabagabo, Deputy Head of the Seminars and Studies Department, Technical Centre for Agricultural and Rural Cooperation (CTA)

On behalf of Dr R.D. Cooke, the Director of CTA, and on my own behalf, I welcome you to the inauguration of the study tour on "The Role of Smallholder Farmers in Seed Production Systems". We are proud to have organised this activity in cooperation with the Government of Zimbabwe. As you may know, it is an activity that falls within CTA's mandate to improve the flow of information on agriculture and rural development among ACP countries, with the aim of improving food security and alleviating poverty. In particular, this study visit forms part of our efforts to promote contact and the exchange of experiences among CTA's partners in rural development.

The theme of this study visit, perhaps more than any other agricultural productivity theme, lies at the heart of achieving of our shared agricultural development goal. The issue of seeds, especially as it relates to the masses of smallholder farmers in developing countries, particularly the ACP countries, has loomed high on national and international agenda, with often far-reaching social, economic and political implications.

In addition, although great strides have been made in the formal seed sector throughout the ACP countries since the 1960s, the stark reality today is that 90% or more of all small-scale farmers still rely on the informal sector for their seed requirements, and are thus denied many of the benefits of modern crop improvement programmes. It is therefore widely recognised that it is the informal seed sector that must now be targeted by national and international agencies if the inequalities that have persisted in smallholder seed production are to be dramatically reduced.

Although smallholder seed production is an age-old practice in farming, it is only recently that it has begun to receive the attention of policy-markers, donors and technicians. The need for information is crucial. We need to learn from the farmers and understand the dynamics which make the informal seed sector their seed source of choice, and then use this knowledge to enable the informal sector to play an even greater role in seed production and ensure complementarity between it and the formal sector.

We are grateful for this opportunity to see what is being done in Zimbabwe to address these issues. Efforts are being made in other countries in the region to address similar issues – some more successful, other less so. But in the two-week period that we shall be on the road, visiting carefully selected sites dealing with research, seed multiplication, germplasm conservation, seed marketing, etc., as well as sharing experiences, we hope we learn enough to develop strategies which are sharply focused and likely to have an even greater impact on the national efforts.

In this regard, CTA considers it important that the study visit participants develop a methodology for disseminating lessons learnt when they return home. Also, we need to give some thought to the need for

short- and long-term evaluations of the impact of this study visit in the countries represented by the participants and how to go about conducting such evaluations.

I would like to express CTA's profound gratitude to the Government of Zimbabwe for hosting the study visit and to all participants for finding the time to take part in it. May I wish all of you a good visit and seminar. It is my hope that we shall all carry out our daily assignments diligently to ensure the effective and productive outcome of our efforts during the study visit.

Keynote address

Dr K. Kangai, Hon. Minister of Lands and Agriculture, Zimbabwe

Allow me first of all to express my appreciation on behalf of the Government of Zimbabwe for the opportunity to host this important study visit on "The Role of Smallholder Farmers in Seed Production Systems". I sincerely hope that those of you visiting Zimbabwe for the first time will find the weather pleasant, and the environment conducive to good work, and that you will be able to participate effectively.

Seed is a very fundamental input in crop production. Indeed, there can be no food security without seed security. The production potential and other desirable characteristics of seeds set the limits on production. Other inputs such as fertilisers, pesticides and overall crop management only help fulfill the production potential of seeds. The success of farmers is therefore highly dependent on the quality of seeds they plant, since good management cannot produce good yields from low-yielding, poorly adapted varieties.

Considering that good-quality seeds are so critical to farming, it is a sad indictment that most of Africa's farmers are seriously marginalised with respect to access to improved seeds, their movement through commercial channels, and the availability of seeds of traditional crops which are important for household food security, especially in times of disaster.

Disasters such as droughts, floods and storms have in recent years devastated large tracts of Africa and made food shortages an almost annual occurrence in many countries. The farmer's own saved seed, his traditional source of seed, has not been spared, but this age-old traditional practice is now under threat, with dire consequences not only for food production but also for the conservation of the continent's plant biodiversity. In view of the recurring disasters, as well as declining soil fertility and the rapid population growth which places increasing pressure on very fragile seed sources, there is a need for African nations to formulate strategies to secure smallholder seed supply. It is not possible to address issues such as poverty, environmental protection or food security without transforming seed production at the smallholder level in developing countries.

The attainment of seed security requires the development and maintenance of strong crop breeding programmes as well as a strong seed sector. As you are aware, Zimbabwe has one of the strongest seed sectors in Africa. It is particularly well developed for hybrid maize, tobacco, cotton, wheat, barley, soybeans, groundnut, sunflower, sorghum, millets and vegetables. The seed sector was built on the strength of a cooperative arrangement between seed producer associations and government breeders.

Seed producers were given free access to government-bred varieties in exchange for their agreement to participate in an annual production schedule which assured a minimum national seed supply and seed security stock of 20% for maize and 30% for other crops relative to national seed sales. The development of a well-organised and efficient seed industry grew from this arrangement.

In the late 1980s the seed industry was opened up to other players. In recent years competition within the industry has grown with the establishment of several locally owned seed companies, such as National Tested Seeds and Agricultural Seeds and Services, and the establishment of seed production facilities by international seed companies such as Cargill, Pannar and Pioneer.

The major objective of the Government's seed policy is to facilitate the growth of the seed industry so as to foster greater production and distribution of seed for all crops grown. Specific objectives include the need to ensure that seed for distribution is readily available and that there is greater participation by smallholder farmers in production and distribution. Although Zimbabwe is self-sufficient in the seeds of the major crops, with small imports of vegetable and flower seeds supplementing local production, there has been an inadequate supply of seed for crops such as sorghum, millets, groundnuts and sunflower. These crops may be of little commercial interest but they are important for household food security and nutrition.

Zimbabwe's research services have developed several new varieties of sorghum, pearl millet, finger millet, groundnut and sunflower. However, it is not enough to produce top-quality seed. There must be an efficient marketing and distribution system which ensures that the seed gets to those farmers who need it. It would appear that, in the case of improved maize seed, the present system is working well in meeting smallholder needs. Several distributors appointed by seed houses countrywide, including rural retail shops, still tend to supply only hybrid maize. However, in semi-arid areas, sorghum and millets commonly account for more than half the total area under grain production, but food insecurity continues to be a problem. This is because most of the seed used is from traditional, unimproved varieties which have a low productive capacity.

I wish to express my concern at the continuing lack of any formal seed multiplication system for a number of smallholder food crops, particularly finger millet, bambara nut, cassava and sweet potato. I am aware that seed houses are pursuing a relatively more profitable hybrid seed market whereby farmers are likely to purchase new seed stocks every year. But some farmers do not have access to improved seed of the less popular crops. I believe that the argument that the seed of open-pollinated varieties is less profitable to produce and that farmers can obtain such seed from the previous year's harvest must be re-examined; it is not wise to ignore such a large proportion of farmers who lack access to improved crop cultivars.

I also wish to acknowledge the increasing interest of non-governmental organisations (NGOs) in the multiplication and distribution of these crop seeds. For example, I am aware that Environment in Development-Zimbabwe (ENDA-Zimbabwe) has worked with Seed Co to promote smallholder participation in sorghum, millet, groundnut and cowpea seed production. Other NGOs such as the Community Technology Association (Commutech), the Intermediate Technology Development Group (ITDG) and the Organisation of Rural Associations for Progress (ORAP) have also sponsored smallholder seed production schemes. Let me assure these NGOs that Government will continue to support their work through legislation to ensure that high-quality seeds are available for both local and foreign markets.

It is important to realise that, with regard to seed technology improvement and the type and quality of seed that can be produced, African countries have many things in common as well as many differences. This is the kind of capacity diversity that we should be looking to utilise for the benefit of all our countries based on people networking during events such as this study visit.

The study visit comes at a time when many African countries are deliberating on the implications of international conventions that they have ratified, such as the Convention on Biological Diversity and the TRIPs Agreement of the World Trade Organisation. Governments need to formulate strategies and action plans to contribute positively towards the actualisation of these instruments whilst taking cognisance of the socio-economic needs of their countries. There is a need for African countries to network as they review the implications of intellectual property rights regimes, farmers' rights, the conservation and sustainable use of biodiversity, and benefit sharing, particularly as it relates to the smallholder farmer.

Recently, an application for a patent on a technique that genetically disables a seed's ability to germinate when planted again was lodged in the USA. I understand that the technology switches a plant's reproductive process on and off, so that harvested seed will be sterile if farmers attempt to replant it. What will be the effect of this "terminator technology" on the many African farmers who depend on saved seed? Like any other technological development, many questions arise on the wider impact and implications of this technology. The world is clearly now involved in a technological battle between the haves and have nots.

Although this study visit is targeting the seed production systems of smallholder farmers, I wish to encourage all the participants to visit both the formal as well as the informal sector, to get a holistic picture of Zimbabwe's seed sector. I wish to applaud the broad range of expertise brought together at substantial expense to critically examine the role of smallholder farmers in Zimbabwean seed production systems. We have high expectations that this collective expertise can offer recommendations that will be useful to policy-makers and practitioners. I look forward to receiving the recommendations of your deliberations.

I wish to thank the Technical Centre for Agricultural and Rural Cooperation (CTA) for organising this important study visit. It now remains for me to wish you success in your deliberations and to declare this function officially open.

Closing statement

Mr A. Vugayabugabo, Deputy Head of the Seminars and Studies Department, Technical Centre for Agricultural and Rural Cooperation (CTA)

I wish to say a few words on behalf of Dr. R.D. Cooke, Director of CTA, on the occasion of the closing ceremony of this study visit.

Having travelled with participants these past two weeks and taken part in their discussions, their presentations and their interactions, I can only feel a sense of satisfaction that CTA chose to support this activity. During this period, the wealth of knowledge on the informal seed sector residing with small-scale farmers, with field workers and among the national experts gathered here has been brought to the

fore. I am happy that through the hard work and cooperation of participants, this store of information has been captured, analysed and recorded to benefit not only the countries represented here but those further afield.

We at CTA will play our part in disseminating the information gathered here but we call on the participants to play their role. They have proposed post-study visit activities in their countries aimed at spreading the impact of this study visit. I commend them on their proposals and hope their actions contribute towards the trend of making studies and seminars immediately productive for national programmes.

On behalf of Dr Cooke, I wish to thank again the Government of Zimbabwe for its cooperation in hosting the study visit and for placing at the participants' disposal the wonderful opportunities across the country. We would like to express our thanks to all the technical staff and all the farmers who received us and shared their experience during the field visits. We are especially grateful to Dr Gata, Director of DR&SS, who was able to travel with the group and whose contribution to the success of the visit has been invaluable. I would also like to express my gratitude to Mr Hakutangwi who, in collaboration with Dr Gata, carried out very useful preparatory groundwork. Special thanks are due to Mr Wobil who was the technical and scientific facilitator for this study visit.

Before I conclude, I would like to thank Conference and Travel very much for working so hard to ensure that all the logistics of the trip were satisfactory.

To the participants, I thank you for your collaboration, active participation and timeliness during the whole period of the study visit. I wish you a pleasant journey back home. Bon voyage.

We were fortunate to have the Honourable Minister with us during the opening ceremony and I am sure you all recollect the challenges of the future he elucidated when he was analysing the global seed situation. In our own small way, we have confronted the problems as they relate to countries in east and southern Africa, and as we move on to play our technical roles we hope that governments will play their complementary role with regard to policy issues to ensure long-term seed security and food security for our people.

Vote of thanks

B.B. Mugisa, study visit participant (Seed Production Manager, Uganda Seed Project)

On behalf of my fellow participants from Ethiopia, Malawi, Mozambique, South Africa, Tanzania, Uganda, Zambia and Zimbabwe, allow me to express our sincere and heartfelt appreciation to the Government of Zimbabwe for having agreed to host the study visit. This is a clear sign of the way Africa can work together to address our common goals. During the two weeks we have stayed here the Ministry of Agriculture has been responsible not only for Zimbabwe but for the other seven countries as well.

The Department of Research and Specialist Services, under Dr Gata's able leadership, worked tirelessly to ensure that all the technical logistics for the visit were in place. We also wish to thank the staff of Agritex for all the services they provided for us.

We are highly indebted to the following organisations, communities and individuals: CIMMYT, ICRAF, SADC/ICRISAT, ACFD, Seed Co, the Rattray Arnold Research Station, Stapleford Farm, Farm and City, Commutech, Agricultural Seeds and Services, and the communities and smallholder seed growers of UMP, Tsholotsho and Chivi, and the Chikomba District in Chief Mutekedza's area.

We have shared information with the Chief throughout our study visit and had fruitful and enriching discussions with all those mentioned above. We will return home having established a reasonable base from which to make a contribution to the seed programmes in our respective countries.

On behalf of the participants I wish to convey our deepest appreciation to the management and staff of CTA, especially the Director, Dr Cooke. CTA conceived, funded and helped implement the study visit. To Mr André Vugayabagabo I wish to say that we the participants and the countries we represent have been privileged to get to know more about CTA and the work it is doing for Africa, and we pray the organisation continues to greater heights. We ask that when you go back to CTA you convey to the Director and your colleagues that Africa is ready to cooperate with CTA in all fields.

We were privileged to have been guided by one of the distinguished sons of Africa, Mr Wobil, who has been the consultant on this study tour. He interpreted admirably every angle of the seed issues we discussed and has made a lasting impact on our careers in seed development.

We came to this great country and have been travelling for the past nine days to various places. A lot of planning and hard work has been put in by Conference and Travel of Harare. We particularly wish to thank Ms Mary Bvumbe and the two drivers.

Lastly, we thank the staff and management of Best Western Oasis Hotel, Harare, the Rainbow Hotel of Bulawayo, and the Great Zimbabwe Hotel. I wish, in particular, to single out the good cooks who have ensured our own food security during this visit.

Finally, we wish all of you the best in the struggle for the development of our continent.

Appendix 2

PROPOSED STUDY VISIT IMPACT ACTIVITIES

1 Strengthening the marketing aspect of the Farmer-based Seed Production and Marketing Scheme (FBSPMS)

Participant: Dabi Aboye Gurmu
Position: Advisor to the General Manager, National Seed Industry Agency (NSIA)
Country: Ethiopia

Objective: To find better ways of marketing seeds produced by smallholder farmers.

Description: Analyse the views of people involved in the available marketing channels (input distribution, distribution through regional agricultural bureaux, farmer-to-farmer seed exchange/distribution). Collect and analyse available data. Use the analyses to serve as a base for recommendations.

Expected output: Appropriate marketing channels will be recommended.

Strategy for evaluating output: Information on types and quantities of seed and their timely distribution will be collected and evaluated to measure improvement in seed and food security. The parameters that will be considered will include: crop types, varieties, timeliness in distribution, area covered, number of farmers reached, yield levels, and financial income.

2 Impact of study visit on the role of smallholder farmers in seed production

Participant: Alenu Getahun
Position: General Manager, Ethiopian Seed Enterprise (ESE)
Country: Ethiopia

Objective: To enhance the involvement of smallholders in quality seed production on a contractual basis with ESE.

Description: Give a summarised report of the study visit to relevant colleagues in ESE and at all sites, and in collaboration with them formulate ways of implementing the recommended strategies.

Expected output: Increased participation of smallholder farmers in quality seed production on a contractual basis with ESE.

Strategy for evaluating output: Collect data on smallholder farmers multiplying seeds for the crop season 1999–2000 and compare with data from previous years.

3 Strengthening smallholder seed production through the implementation of lessons learnt during the study visit

Participants: Essau Mwendo-Phiri and Fred Chizala
Position: Area Development Programme Manager, World Vision International (WVI); Head, Inspectorate Department, Seed Services, Chitedze Research Station
Country: Malawi

Objective: To enhance smallholder farmers' seed production capacity.

Description: Invite farmers and other stakeholders to a meeting where the study visit programme and findings will be described. Organise a visit for seed growers to research stations, hosted by Seed Services. Organise improved variety demonstrations. Provide support for farmers in setting up a Seed Growers' Association.

Expected output: Farmers will be able to make own variety selections based on what they see at variety demonstrations. A Seed Growers' Association will be formed.

Strategy for evaluating output: Conduct an assessment of the varieties selected and the number of farmers participating in the various aspects of the activity.

4 Strengthening seed production at farmer level in Nampula Province (a pilot project for two districts)

Participant: Marcelino A.S. Botão
Position: Project Agronomist, World Vision International (WVI)
Country: Mozambique

Objective: To improve the availability, at village level, of good-quality seed of the main crops over the next 2 years.

Description: Farmers interested in seed production will be organised into groups, and given training in group dynamics and the technical aspects of seed production and marketing. Communal seed stock facilities and a rural seed shop will be established. Other stakeholders in the area will be involved in this venture.

Expected output: The availability of good quality seed at village level will improve. The number of groups involved in seed production will increase, as will the number of shops selling seed that has been produced locally. A network involving staff from government agencies (SNS, extension) and NGOs will be established.

Strategy for evaluating output: Conduct a survey in 1999 to determine the current situation with regard to seed production and marketing at the village level. Establish the indicators to be used in the evaluation. Conduct a survey in 2001 to check the impact of the activity.

5 Production of seeds of maize, sorghum and indigenous grains

Participant: Harris Matsepe
Position: Cooperative Manager, Tafelkop Farmers Association
Country: South Africa

Objective: To produce good-quality seed for sale to small-scale farmers at reasonable prices.

Description: Since South Africa is not very familiar with smallholder seed activities, all the stakeholders will need training before any meaningful impact can be made in this area. The activity will involve making the stakeholders in the mandate area aware of the need for training, and using seed specialists, extension officers and research station staff to provide this training through study visits, workshops and seminars.

Expected output: Small-scale farmers will be mobilised and workshops will be organised. The activity will create an awareness among these farmers that they have the ability to produce seed not only for their own use but also for sale to other farmers by planting trials. Assistance will given in organising the marketing of the seed.

Strategy for evaluating output: Data will be gathered on annual amounts of seeds grown, used and sold, and on the impact of the activity on food security and incomes.

6 Smallholder seed production

Participant: Mariam R. Mongi
Position: Managing Director, Alpha Seed Company
Country: Tanzania

Objective: To enhance the production of seed for food security and/or income generation

Description: The farmers, key players and sites that will be involved in the activity will be identified, and the method of training the farmers in seed multiplication will be determined. The selected farmers will be provided with a supply of basic seeds for multiplication on chosen sites where there are good isolation conditions to avoid contamination. To ensure that the crop is well managed, key players such as extension officers and seed technologists will visit the sites regularly and will work closely with the farmers.

Expected output: The improved seed produced will benefit both the selected farmers and the rest of the villagers who will be able to buy the seed. Farmers using the improved seeds will be guaranteed some cash income from the sale of excess crops.

Strategy for evaluating output: The evaluation will involve studying changes in the ways the villagers live; for example, health of the villagers, cleanliness of homes, general appearance of the community, welfare of children and their school attendance record.

7 Sustainable smallholder seed production and supply in Uganda

Participant: Boniface B. Mugisa
Position: Seed Production Manager, Uganda Seed Project
Country: Uganda

Objective: To establish at least two small-scale seed production and supply activities in village communities within the next 9 months in collaboration with colleagues and with staff from relevant institutions.

Description: Draft guidelines on smallholder seed production for the Ministry to include in seed policy statements. Circulate guidelines to the stakeholders. Organise seed production training and seminars. Establish evaluation criteria.

Expected output: Guidelines approved and included in government seed policy. Some stakeholders adopt and implement the guidelines. The number of trained seed producers and traders increased. Evaluation criteria established.

Strategy for evaluating output: Strengthen local capacities so as to ensure that the seed production units are well managed and sustainable. Ensure that all operations are conducted on a purely commercial basis. Conduct a survey to determine the extent to which improved seed is used in the target communities.

8 Farmer-saved seed production and seed quality improvement

Participant: Dr Flavia Kabeere
Position: Senior Research Officer and Seed Technologist, Kwanda Agricultural Research Institute (KARI)
Country: Uganda

Objectives: To make improved seeds available to rural households, to improve agricultural production and enhance food and cash security, and to initiate agribusiness enterprises based on seed production.

Description: Share the study visit experience with colleagues. Establish links with institutions that are involved crop and seed production. Conduct a survey and carry out a community action plan. Arrange demonstrations of improved varieties for smallholder farmers. Organise training for farmers. Produce and market seeds.

Expected output: The use of improved varieties by smallholder farmers will increase; farmers will be better able to differentiate seed from grain; and their food and cash security situation will improve.

Strategy for evaluating output: Establish what the current situation is with regard to farmer-saved seed and seed quality. Formulate detailed strategies and goals, using verifiable indicators. Engage the monitoring and evaluation unit of the National Agricultural Research Organisation (NARO) to assess the output of the activity.

9 Workshop for key stakeholders in Zambia's seed industry to review study visit findings and recommendations

Participants: Mr Francisco Miti and Mr Harry Ngoma
Position: Senior Seeds Officer, Seed Control and Certificiation Institute (SCCI); Project Coordinator, Zamseed
Country: Zambia

Objective: To bring together the key stakeholders in the seed industry to discuss and adopt at least some of the resolutions of the study visit.

Description: The stakeholders will include people involved in seed programmes, seed quality control, seed companies, the policy and planning unit of Ministry of Agriculture, and agencies such as NGOs.

Expected output: Some resolutions will be adopted and the stakeholders will incorporate these resolutions into their work programmes.

Strategy for evaluating output: A year after the workshop, a questionnaire aimed at gathering information on how the stakeholders implemented the adopted resolutions will be circulated and will be used as a basis for evaluating the impact of the study visit.

10 Training of farmers and extension staff in seed issues

Participant: Marcus Hakutangwi
Position: Chief Training Officer, Agritex
Country: Zimbabwe

Objective: To provide farmers, especially smallholder farmers in the informal seed sector, with a working knowledge on seed issues.

Description: Collaborate with Seed Services, DR&SS and seed companies on devising the content, structure and funding of the training. Conduct follow-up visits to seed producers within the country and outside it. Persuade agricultural colleagues to include seed issues in their curricula. Produce a paper on the role of smallholder farmers in seed production and publicise it through the print and electronic media.

Expected output: Farmers and extension staff trained in seed production. Follow-up visits conducted. Resource and training manual on seed issues developed. The subject of seed issues well covered in the media.

Strategy for evaluating output: Analyse work by the DR&SS and the Ministry on open-pollinated varieties. Analyse the knowledge base of farmers and extension staff with regard to seed issues. Conduct surveys on the use of open-pollinated varieties and hybrids in marginal areas. Determine the extent to which seed issues form part of agricultural college curricula.

11 Review of the Seed Act and Plant Breeders' Rights Act

Participant: Bella Mpofu
Position: Head, Seed Services
Country: Zimbabwe

Objective: To incorporate recognition of the informal seed sector and its role in seed production in the Seed Act and the Plant Breeders' Rights Act.

Description: A document will be prepared with recommendations on the necessary changes to be made to current legislation in order to accommodate informal seed sector activities.

Expected output: A revised Seed Act and Plant Breeders' Rights Act, incorporating the necessary amendments.

Strategy for evaluating output: Conduct a survey of the level of activity in the informal seed sector in terms of the number of seed growers. Keep a check on the amount of seed produced by smallholder farmers.

12 Mutekedza community Zunde project

Participant: Andrew Zhakata (Chief Mtekedza)
Position: Traditional leader
Country: Zimbabwe

Objective: To encourage the community to produce and store seeds for distribution when needed to the elderly, the disabled and orphans.

Description: Growing maize and small-grain crops, with the emphasis on producing seeds as part of the overall goal of alleviating poverty.

Expected output: About 5 tonnes of maize and at least 5 tonnes of small-grain crops produced in the initial stages.

Strategy for evaluating output: Monitor the amount of maize sold and the amount maize and small grains stored for distribution to the above-mentioned vulnerable groups in the community.

Appendix 3

STUDY VISIT PROGRAMME

15 February 1999

SESSION 1: OPENING CEREMONY

8.30	Registration and seating of participants and invited guests
9.00	Introductory remarks by the chairperson, Dr N.R. Gata
9.30	Opening statement by Mr A. Vugayabagabo, CTA Deputy Head of Seminars and Studies Department
9.45	Keynote address by Dr K. Kangai, Hon. Minister of Lands and Agriculture, Zimbabwe
10.30	Group photograph
11.00	Tea break

SESSION 2: PRESENTATION OF COUNTRY PAPERS

11.30	Guidelines for country paper presentations, by Mr J. Wobil
11.45	Ethiopia
12. 00	Malawi
12.15	Mozambique
12.30	South Africa
12.45	Tanzania
1.00	Lunch break
2.30	Uganda
2.45	Zambia
3.00	Zimbabwe
3.15– 5.30	Discussions, conclusions and recommendations

SESSION 3: STUDY TOUR VISITS

16 February 1999

8.00–10.00	DR&SS sites (Seed Services and research station) (*Hosts: Dr Mpofu and Dr Mashiringwani*)
10.30–2.00	CIMMYT-Zimbabwe Research Station (*Host: Dr Jewel*)
2.30–4.00	African Centre for Fertiliser and Development (ACFD) (*Host: Dr Muchena*)
4.00–5.00	Discussions and conclusions

17 February

8.30–10.00 Stapleford Farm (*Host: Mr Davenport*)
10.30–12.30 Seed Co (*Host: Dr MacCarter*)
12.30–1.30 Lunch break
2.00–4.00 Rattray Arnold Research Station (*Hosts: Mr Oliver, Mr Cunliffe, Mr Hildebrande, Mr Rupende*)
4.00–5.00 Discussions and conclusions

18 February

8.30–10.00 Travel to UMP
10.30–2.30 UMP community seed activities (*Host: Mr Chataika*)
2.30–3.30 Lunch break
3.30–4.30 Discussions and conclusions
4.30–6.30 Travel back to Harare

19 February

8.30–9.30 Travel to Domboshava
9.30–12.00 ICRAF-Zimbabwe agroforestry project (*Host: Dr Ayuk*)
12.00–1.30 Lunch break
2.00–3.30 Domboshava Agritex farm (*Host: Mr Pompi*)
3.30–4.30 Discussions and conclusions
4.30–5.30 Travel back to Harare

20 February

8.00–11.00 Travel to Kadoma
11.00–12.00 Farm and City (*Host: Mr Cherai*)
12.30–2.00 Lunch break and discussions
2.00–6.00 Travel to Bulawayo

21 February

Rest day

22 February

7.00–8.0 Travel to Matopos
8.00–10.00 SADC/ICRISAT Research Station and Matopos Research Station (*Hosts: Dr Ngoma, Dr Obilana and Mr Mangombe*)
10.00–12.30 Travel to Tsholotsho (packed lunch)
12.30–1.30 Smallholder seed production (*Host: Mr Nkomo*)
1.30–2.30 Smallholder seed production (*Host: Mr Bhebe*)
2.30–3.30 Discussions and conclusions
3.30–6.00 Travel back to Bulawayo

23 February

7.00–12.00 Travel to Chivi (packed lunch)
12.00–3.00 ITDG small-scale seed production project (*Host: Mr Chirunga*)
3.00–4.00 Discussions and conclusions
4.00–6.30 Travel to Masvingo

24 February

7.00–10.00 Travel to Gutu
10.00–12.00 Smallholder contract seed production scheme (*Host: Mr Ziembe*)
12.00–1.00 Discussions and conclusions
1.00–2.00 Lunch break
2.00–5.30 Travel to Harare

25 February

7.00–11.00 Travel to Mtekedza
1.00–2.00 Community Zunde project (*Host: Chief Mtekedza*)
2.00–3.00 Lunch break
3.00–4.00 Discussions and conclusions
4.00–8.00 Travel back to Harare

26 February

SESSION 4: RECOMMENDATIONS AND EVALUATION

8.30–9.30 Agricultural Seeds and Services (seed processing plant) (*Host: Dr Kelly*)
10.00–11.00 Summary of findings and conclusions
9.30–11.30 Adoption of recommendations
11.30–12.30 Evaluation of study visit
12.30–2.00 Lunch break

SESSION 5: CLOSING CEREMONY

2.30 Introductory remarks by Dr N.R. Gata
2.45 Statement by Mr A. Vugayabagabo, CTA
3.00 Vote of thanks by Mr B. Mugisa, on behalf of participants

Appendix 4

LIST OF PARTICIPANTS

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Appendix 5

EVALUATION OF STUDY VISIT

1. EVALUATION OF ADMINISTRATION AND LOGISTICS	RESPONSES
1.1 When was the study visit announced to you?	Number of participants
–Before 1/11/98	1
–From 1/11/98 to 15/11/98	5
–From 15/11/98 to 31/11/98	2
–After 31/11/98	3
1.2 How and by whom were you informed?	
–By whom?	CTA (all participants)
–How?	By fax and letter
1.3 Was the communication announcing the study visit clear? If not, why?	Yes (all participants)
1.4 How do you evaluate the logistics of the study visit?	Mean rating
–Information made available before visit	5
–Daily information during visit	4
–Airport reception	4
–Travel within Zimbabwe	5
–Hotel accommodation: in Harare	5
during field trip	5
–Restaurant/meals: in Harare	5
during field trip	4
–Secretariat	4
Possible comments on number 1.4	

Mean rating: 1 = very unsatisfactory; 2 = unsatisfactory; 3 = average; 4 = good; 5 = very good

2. EVALUATION OF INSTRUCTIONS	RESPONSES
2.1 Were the instructions/guidelines for preparing country papers clear? If not, why?	Yes (all participants)
2.2 When did you submit the required country paper?	Number of participants
–Before 30/11/98	2
–From 30/11/98 to 15/12/98	3
–From 15/12/98 to 30/12/98	2
–After 30/12/98	4
2.3 How did you evaluate the site visits? (Rating from 1 to 5)	Mean rating
–Summary site description	5
–Briefing by host official	4
–Discussions/conclusions	4
2.4 Were periods allocated to various study visit activities insufficient (I), sufficient (S) or too long (L)	
–Briefing by host official	S
–Field visit	S
–Travel to the interior	S
–Discussions	S
–Conclusions/recommendations	S

Mean rating: 1 = very unsatisfactory; 2 = unsatisfactory; 3 = average; 4 = good; 5 = very good

3. TECHNICAL EVALUATION

RESPONSES

3.1 How do you evaluate the information you were receiving during the course of the visit?

	Mean rating
Theme 1: *Promoting market-led development*	
– Seed Services, Harare	4
– Seed processing plant of Agricultural Seeds and Services, Mt Hampden, Harare	4
– Seed Co, Harare	5
– Seed outlet	4
Theme 2: *Intensifying and optimising production*	
–Research plots of DR&SS, Harare	5
–Contract seed grower (Seed Co)	4
–Rattray Arnold Research Station	5
–Matopos Research Station	5
–Smallholder seed producer 1, Tsholotsho	4
–Smallholder seed producer 2, Magama	4
–Smallholder seed producers, Chivi	5
–African Centre for Fertiliser and Development	4
Theme 3: *Protecting the environment and managing natural resources*	
–ICRAF agroforestry project	5
Theme 4: *Strengthening national agricultural systems*	
–SADC/ICRISAT SMIP	5
–CIMMYT	5
–Agritex Farm, Domboshava	4
Theme 5: *Mobilising the civil society*	
–Community seed bank	5
–Contract seed growers, Gutu	5
–Mtekedza agricultural projects	4

Mean rating: 1 = very insufficient; 2 = insufficient; 3 = average; 4 = good; 5 = very good

		RESPONSES
3.2	Which theme did you find most interesting? (in ascending order of interest)	
	1.	Very varied
	Why?	
	2.	
	Why?	
	3.	
	Why?	
3.3	Which themes would you have liked given more emphasis?	Very varied
3.4	Which theme do you think was given too much emphasis?	None

4. EVALUATION OF THE IMPACT OF THE VISIT	RESPONSES
4.1 On the whole, did the lessons learnt meet your expectations? If not, why?	Yes (all participants)
4.2 Will the lessons of the visit be useful in accomplishing your present tasks?	Yes (all participants)
4.3 Following the visit, which activities do you consider appropriate and useful to your country situation?	
Smallholder seed multiplication	
Seed marketing	
Contract seed production	
Community seed bank	
4.4 Would you be able to disseminate the information acquired in the course of the visit?	
Target group: Smallholder seed multiplication	
When? Soon after return	
How? Community and smallholder participation	
4.5 Would it be convenient for you to send a report to CTA on the outcome of the visit?	Yes (all participants)
4.6 Would you like to maintain regular contact with other participants?	Yes (all participants)
If yes, why? To continue exchange of experiences	
If no, why?	

5. APPRECIATION OF ACTIVITIES OF CTA	RESPONSES
5.1 Did you know CTA before the organisation of the visit?	Yes (all participants)
If yes, how? Through its publications	
5.2 Do you received the publication titled "Spore"?	Varied

6. ANY OTHER COMMENTS

Commended CTA for a good job done and recommended more of such study visits on a regular basis

Acronyms

ACFD	Agricultural Centre for Fertiliser and Development, Zimbabwe
ACP	African, Caribbean and Pacific States
ADB	African Development Bank
CFU	Commercial Farmers Union, Zimbabwe
CGIAR	Consultative Group on International Agricultural Research
CIMMYT	Centro Internacional de Mejoramiento de Maíz y Trigo (International Maize and Wheat Improvement Centre)
Commutech	Community Technology Association
CTA	Technical Centre for Agricultural and Rural Cooperation
DR&SS	Department of Research and Specialist Services, Zimbabwe
ECOWAS	Economic Community of West African States
ESE	Ethiopian Seed Enterprise
EU	European Union
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit, Germany
ICRAF	International Centre for Research in Agroforestry
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IFAD	International Fund for Agricultural Development
ITDG	Intermediate Technology Development Group
KARI	Kwanda Agricultural Research Institute, Uganda
NARO	National Agricultural Research Organisation
NARS	national agricultural research systems
NGO	non-governmental organisation
NSIA	National Seed Industry Agency, Ethiopia
PBR	plant breeders' rights
SADC	Southern African Development Community
SAFGRAD	Semi-Arid Food Grain Research and Development
SCCI	Seed Control and Certification Institute, Zambia
SMIP	Sorghum and Millet Improvement Program (SADC/ICRISAT)
UNDP	United Nations Development Programme
WVI	World Vision International
ZFU	Zimbabwe Farmers Union