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

Summary Report and Recommendations of a CTA Study Visit

Zimbabwe, 15—26 February 1999

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Technical Centre for Agricultural and Rural Cooperation (CTA) was established in 1963 under the Lomé Convention between the African, Caribbean and Pacific (ACP) States and the European Union Member States.

CTA's tasks are to develop and provide services that will improve access to information for agricultural and rural development, and to strengthen the capacity of ACP countries to produce, acquire, exchange and utilise information in these areas. CTA's programmes are organised around three principal themes: strengthening ACP information capabilities, promoting contact and exchange of information among partner organisations and providing information on demand.

Acknowledgements

Mr Josiah Wobil, International Seed Consultant, Accra, Ghana, prepared this report. He was head of Ghana's national seed programme from 1975 until 1988 when he joined FAO and served as Chief Technical Advisor or Consultant on seed multiplication projects in Swaziland, Trinidad & Tobago and Rome. **He** has also undertaken several seed consultancies for FAO, AfDB, IsDB and ECOWAS in several parts of Africa, the Caribbean and Asia. He was responsible for the technical and scientific conduct of the study visit.

The organisers of the study visit wish to express their gratitude to the Ministry of Lands and Agriculture of Zimbabwe and in particular, DR&SS and Agritex, and through them all farmers and national and international experts met during field visits. The assistance provided by the two national consultants, Dr N.R. Gata, Director of DR&SS, Zimbabwe and Mr Marcus Hakutangwi, Head of Training, Agritex, Zimbabwe is also highly appreciated. During the study tour, each participant had his/her day as rapporteur and assisted in recording the events of the study visit, and their contribution to this report is acknowledged. Commendation is also extended to all others who in various ways assisted during the study visit, including the various host organisations and departments in Zimbabwe.

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Table of Contents

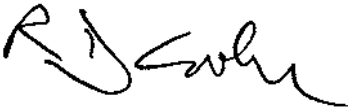
Foreword

Agriculture dominates the economies and livelihood of ACP countries, and therefore any factor which has a positive impact on ACP agriculture has the potential to improve the socio-economic well being of the people. Of all farm inputs, high-quality and adapted seeds and planting materials exert the most profound influence on agricultural productivity. The recognition of this fact has led to numerous national and international efforts in ACP and other developing countries to develop national seed production and supply systems.

These efforts have created a very high degree of seed awareness among all categories of farmers, and have made great contributions to overall national food security efforts. Indeed, seed security has become synonymous with food security. But in spite of the advances made, many small-scale farmers have not adequately benefited from the successes of modern crop improvement, and continue to face productivity uncertainties associated with the use of unsuitable seeds. This is largely due to over-concentration of national and international efforts on the formal seed sector and on the needs of commercial or large-scale farmers, involving a narrow range of crops – there is a tendency to ignore the informal seed sector which caters for indigenous or traditional crops, which are important in marginal areas where the majority of smallholder farmers reside.

In recognition of the special needs and circumstances of smallholder farmers, CTA, in collaboration with the Ministry of Lands and Agriculture of Zimbabwe and in particular the DR&SS, organised a study visit on the role of smallholder farmers in seed-production systems in Zimbabwe from **15** to **26** February **1999.** The aim was to expose the participants (selected from national seed programmes of eight eastern and southern African countries) to efforts being made in Zimbabwe to assist smallholder farmers to improve their seed production and utilisation practices, and to integrate their efforts into the formal seed system so as to enhance the effectiveness and coverage of an integrated national seed-production system. The study visit attracted a high degree of interest, and participants not only seized the opportunity of studying Zimbabwe's situation but, through interaction among themselves and with their hosts, contributed to disseminating a considerable wealth of knowledge to be shared with colleagues on their return home.

It is our hope that the information gathered and the lessons learned during this study visit will provide an opportunity for seedsmen, policy-makers, NGOs, donors and stakeholders to better promote seed security for smallholder farmers. CTA wishes to express its gratitude to the host country and institutions, the national consultants, and all the participants for their contribution to the success of this meeting. We sincerely thank Mr Josiah Wobil who prepared this report and was the scientific coordinator of the study visit.



Dr R.D. Cooke
Director, CTA

1 INTRODUCTION

1.1 Background and Context

Sub-Saharan Africa continues to suffer from food deficits and poverty despite an abundance of natural resources, including large tracts of arable land, plentiful water and a large pool of human resources. Nearly 70% of the population of sub-Saharan Africa live in the rural areas and are engaged in agriculture. Therefore it is on the agricultural front that efforts to attain food security and poverty alleviation must be concentrated.

It has been widely recognised that, more than any other input, improved seeds hold the key to enhanced farm productivity and increased income generation. However, despite decades of efforts by governments, the private sector and donors in the development of national seed programmes, the seed situation in sub-Saharan Africa remains dismal. The formal seed sector, as 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, soya bean and sunflower. But a myriad of seeds of small-grain and other indigenous crops grown by smallholder farmers have been neglected, largely due to 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 suggests that the attainment of food security will remain a faint and unattainable goal.

In eastern and southern Africa, there has emerged an awareness that smallholder seed producers need assistance to play an enhanced, productive and constructive role in national seed systems, and to establish adequate linkages with the formal or commercial seed sector, in order to ensure strong, all-embracing national seed systems which are able to contribute effectively towards the attainment of food security at all levels. In this context, Zimbabwe is a good representative of the countries of eastern and southern Africa, which have achieved very advanced formal seed sectors but which have also recently taken steps, with the assistance of private seed companies, NGOs and donors, to assist the efforts and outputs of smallholder seed producers in order to address the seed constraints facing small-scale farmers. Thus Zimbabwe stood out as a good venue for a study visit aimed at exposing problems, possible solutions and practical curative action programmes in the context of advancing the role of smallholder seed producers.

The study visit was organised by CTA within its mandate of enhancing the flow of information with potential benefits of strengthening the agriculture of ACP coun-

tries, and in recognition of the urgent need to address seed security issues, especially as they affect smallholder farmers in eastern and southern Africa.

1.2 Objectives of the Study Visit

The overall objective of the study visit was to expose seed experts and experienced smallholder seed growers from eastern and southern Africa to an all-encompassing seed-production system such as that in Zimbabwe and, through sharing of experiences, to assist in broadening participants' perspectives in order to formulate strategies likely to make a positive impact on their particular national seed systems. The specific objectives were as follows.

- To assess the development status of the seed industry of Zimbabwe, 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 their optimum integration into the formal or commercial sector.
- To enhance the expertise of participants in developing appropriate technology packages and guidelines likely to make a positive impact on smallholder seed production, especially of 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 concrete recommendations for greater recognition of the selected priority information themes in seed programme strategies at national and regional levels.
- To enhance information-exchange mechanisms among the main stakeholders in national seed industries.

1.3 Planning and Participation

1.3.1 Preparatory activities

The planning process of the study visit commenced with the visit to Zimbabwe of the CTA Deputy Head, Seminars and Studies Department, from 16 to 20 March 1998. During that visit, hosting arrangements were concluded with the Department of Research and Specialist Services, tentative sites to be visited discussed, and options for logistical support, including the appointment of a local conference and tour operator, explored. Additionally, two national consultants, Dr N.R. Gata, Director, DR&SS, and Mr M. Hakutangwi, Head of Training, Agritex, were recruited to assist with the implementation of all local preparatory arrangements.

Following that, an international seed consultant, Mr Josiah Wobil from Accra, Ghana, was recruited and charged with responsibility for the technical and scientific plan-

ning, preparation and conduct of the study visit. Mr Wobil's work started with his participation in a preparatory meeting which was held at CTA Headquarters in Wageningen on 29 July, 1998. The objective of this meeting was to discuss a proposed preparatory mission by the consultant to Zimbabwe as well as the preparation of the various study visit documents which would be used to announce the study visit, invite participants and provide the technical and scientific basis for the study visit.

The International Seed Consultant visited Zimbabwe from 16 to 30 August 1998 on the preparatory mission with the objectives of

- identifying and selecting different sites and projects to be visited
- preparing background material on selected sites
- preparing the overall programme for the study visit
- preparing the study visit itinerary, including detailed timing for each site visit
- collecting information on accommodation facilities in different sites.

The consultant was assisted in this work by the two national consultants. The consultant subsequently prepared and sent to CTA following papers:

- background information for the study visit
- guidelines for preparing national reports by participants
- descriptive papers on the projects and sites selected
- evaluation form of the study visit for use by participants.

Invitations were sent to prospective participants in October. Confirmed participants subsequently prepared country seed position papers according to the prescribed guidelines, and these were synthesised into a unified seed position paper generally covering the countries of eastern and southern Africa. The synthesis paper was to be used as background material for the study visit.

1.3.2 Participants

Seventeen national seed experts variously drawn from the public and private sectors, NGOs and smallholder farmers in eastern and southern African countries accepted invitations from CTA to participate in the study visit. The countries involved were: Ethiopia, Malawi, Mozambique, South Africa, Tanzania, Uganda, Zambia and Zimbabwe. Additionally, representatives of some host institutions in Zimbabwe joined the group on field visits at various stages.

1.3.3 Study visit programme

The programme for the study visit began with the Opening Ceremony on the morning of 15 February, 1999, with statements from the Honourable Minister of Land and Agriculture and from CTA. Participants then took turns to present their prepared country papers, which were thoroughly discussed and the interactions recorded by a rapporteur.

From 16 to 25 February participants travelled extensively around the country to visit sites which had been carefully selected to enhance participants' appreciation of the issues to be addressed in Zimbabwe's seed-production system, especially as they related to the role of smallholder farmers. Each day ended with discussions on the sites visited and the appropriate lessons learned, duly recorded by the rapporteur of the day.

On the morning of the last day, 26 February, participants discussed their findings, drew conclusions and adopted recommendations of the study visit, especially stressing the lessons learned. Additionally, and of particular importance, each participant elaborated a particular activity, to be led by him/her, based on a relevant lesson learned during the study visit. The proposed activity was required to help in rapidly disseminating the benefits of the study visit in the participant's home country, and also to be likely to make an impact on an area of weakness in the participant's national seed programme.

The recommendations session was followed immediately by an evaluation of the study visit by the participants. The study tour ended in the afternoon with a closing statements by CTA, DR&SS, and a participant speaking on behalf of his colleagues.

2 ANALYSIS OF THE GENERAL SEED SITUATION IN THE PARTICIPATING COUNTRIES

2.1 Introduction

The following analysis emanates from a synthesis of the seed position papers prepared and presented by the study-visit participants, and offers a summary of the general seed situation in eastern and southern Africa as a whole, which is well represented by the participating countries.

2.2 Basic Agricultural Information

The countries of and eastern and southern Africa are basically agricultural, although natural resources, especially minerals, are of immense economic importance in a few, especially South Africa, Namibia, Zambia and Botswana.

2.2.1 Population: rural/urban ratio

Population size varies among the eight countries participating in the study visit, from Ethiopia's 50 million to Malawi's 11 million. Around 70% of the population reside in the rural areas, often on marginal lands, and are often very disadvantaged. The problem of rural–urban drift in search of elusive better conditions of living is a common phenomenon in all eight countries surveyed. The problem is starkly displayed by Zambia which has 50% of its population living in the urban areas, giving the country an unenviable rural/urban ratio of 1:I.

2.2.2 Climate

Climatic conditions among the 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 bimodal) but with more than 85% of food production being attributable to the main season during June to September. Mean annual rainfall is closely linked to the different agro-ecologies of which each country represented has several, based on altitude, with the low altitudes receiving less rain than the higher areas. Agriculture in the area under study is mainly rainfed, so rainfall is the main determinant of performance. The crops that can be grown in an agro-ecology are dictated by rainfall levels and often, in the very low altitude agro-ecologies, rainfall is so sparse that only pastoral activities and cultivation of arid crops can be undertaken. Mean annual rainfall also shows very wide swings, and in recent years the area under survey has undergone extreme droughts alternating, in some years, with sporadic flooding in some countries.

2.2.3 Farm sizes

Farm sizes are largely grouped into two broad categories: the large-scale commercial and the small-scale or communal. The former category is comprised of large hold-

ings, mainly freehold, in productive ecologies, highly mechanised and held by a small minority of farmers, mainly families of former settlers as well as a few urban businessmen. The communal or small-scale farmers are located in the less favourable agro-ecologies, with farm sizes ranging from 1 to 3 ha per farm family and having a large subsistence component, of which mixed farming is a common feature.

2.2.4 Farming systems

Farming systems are diverse and are based on the farming sector, agro-ecology and farm sizes. A wide range of crops are grown reflecting the wide diversity in growing conditions across the countries. The main crops are maize, wheat, barley, rice, sorghum, millet, tef, beans, groundnuts, soya beans, sunflower, tobacco, cassava and pigeon peas, although smaller quantities of many other cereals, legumes, pulses, oil, horticultural, herbal and forest crops are cultivated. Livestock and fisheries are also important in the agriculture of the area. Cereals dominate the crops and, except in Ethiopia, maize is the predominant cereal, often occupying as much as 70% or more of the total arable land, and being forcibly cultivated even in agro-ecologies which can better support production of small grains.

2.2.5 Food security status

Food security is an important issue as the whole of eastern and southern Africa is extremely prone to drought and crop failures. Many of the countries produce less than they consume, thus being in an almost permanent state of food insecurity. Drought, declining soil fertility and poor-quality seeds are often cited as some of the root causes, but lack of political direction and inadequate agricultural and population policies also play a role. Apart from Zimbabwe and South Africa, there are no comprehensive and permanent food security arrangements in the countries studied, although a few *ad hoc* donor-sponsored food security projects in a few countries are now being initiated. Therefore the entire area of eastern and southern Africa is becoming a net importer of food from external sources, often with donor assistance and acutely so during emergencies which have become more and more rampant in recent years.

2.3 Variety Adoption Trends

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 the countries. Since small-scale 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 from the late 1940s onwards has led to high rates of improved seed adoption among all categories of farmers, often reaching 60–80%. This is especially so in the countries where commercial farming is well established and where the hybrid culture has had a long history, as in Zimbabwe, South Africa and Zambia. Improved seed use is also high for cash crops and high-value crops because of quality requirements dictated by marketing and utilisation.

2.4 Seed Sources

Each of the eight countries has a formal seed sector comprising public and private sectors, producing improved seed and exhibiting most of the conventional characteristics of a modern seed programme. In this respect Zimbabwe and South Africa have private-sector seed entities which are a good match for any in the developed countries. In other countries such as Tanzania and Mozambique, the private sector is relatively small and exerts only a very limited role, having a small market share and limited spatial coverage even for the few crops which are within their mandates. In others, a sophisticated seed programme exists for export crops, while seeds of food crops, except hybrid maize, are almost totally ignored by the private seed companies, as is the case in Malawi. The net result is that while the formal seed sector is the prime source of hybrid maize seeds as well as other seeds required for commercial farming, the informal seed sector provides between 90 and 100% of the seeds of traditional crops.

Another neglected area is the vegetable seed programme. In all the countries studied, the most visible activity in this programme is the massive importation and distribution by the private sector of vegetable seeds imported from overseas, whereas there is a huge opportunity to exploit the region's potential to produce a wide array of vegetable seeds, especially tomatoes, cucumber, muskmelon, watermelon, pepper, sweet pepper, onion, spinach, amaranthus, okra, kale, eggplant, aubergine, squash, pumpkin, etc. This neglected area is begging for intervention by small-scale entrepreneurs, but so far the governmental support needed to accelerate this process has been lacking.

2.5 The Formal Seed Sector

2.5.1 Status of seedpolicy and legislation

The region of eastern and southern Africa region has some of the more developed seed programmes in Africa, as typified by Zimbabwe and South Africa. The other six countries in the study visit group also display the main features of a comprehensive seed programme to varying degrees. While plant breeders' rights legislation is in place only in South Africa and Zimbabwe, all the countries have seed policies and seed laws at various stages of development and implementation. While some have in place a single well defined and comprehensive seed-policy document, others have seed-policy statements incorporated into various official documents, particularly the agricultural policy. Generally, all the countries recognise the importance of a seed policy and seed-related legislation including plant breeders' rights legislation, and the majority of them are taking steps to address policy lapses which have existed in the past.

2.5.2 Participating agencies

Arrangements to oversee seed production, such as National Seed Committees or their equivalent, Variety Release Committees and Seed Quality Control and Certification are in place to a limited or advanced extent in all the eight countries.

Research is largely public, although private research is well developed or in the ascendancy in Zambia, Zimbabwe and South Africa. Other participating seed industry agencies are seed multiplication agencies, seed marketing agencies, agricultural extension, donors and NGOs.

As mentioned above, the role of the private sector is pronounced only in the advanced seed programmes. Thus in Ethiopia, Mozambique, Uganda and Tanzania the role of the private sector is minimal, while in Zambia, Zimbabwe and South Africa it is dominant for maize and other high-value cereals, soya beans, wheat, sunflower and cash crops. Malawi, with an otherwise small formal sector, has a developed seed programme for tobacco, tea and sugarcane because of the importance of these three export crops to the national economy.

The problem of general seed unavailability in the area under study has attracted donors and NGOs into various seed projects, especially as the problem can eventually lead to hunger and starvation in rural communities.

2.5.3 Strategies of the formal seed sector

Research and variety development is largely *a* public function. In Zimbabwe and South Africa, and slowly emerging in Zambia, the private sector is important especially for crops in which the private seed sector is active. An important feature of public research in the eight countries studied 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 sole source of new varieties and other required supportive technologies.

Supply of breeder and foundation seed is properly organised in the formal or commercial 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 other crops of commercial importance, but is grossly insufficient for indigenous and subsistence crops. Where breeder seed of such crops is provided, the supply is spasmodic, *ad hoc* and selective *as* to beneficiaries. Often it is really not breeder seed at all, but harvests from on-farm trials and demonstration plots. Additionally, outside the formal commercial sector there are insufficient foundation seed production and supply arrangements, and seed multiplication goes 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, in both public and private seed sectors, the most visible of the seed industry products. Certified seed is produced on large-scale seed multiplication farms in both public and private sectors. In Zimbabwe, South Africa and Zambia this is a highly commercial activity for the main crops. In Mozambique it is also a private sector function, although the coverage is presently small. For the other countries it is either a parastatal or public function, as in Ethiopia, Uganda, Malawi and Tanzania. Even in the latter group a private sector is emerging, concentrating on selected crops, especially hybrid maize, vegetable seeds and other high-value seeds.

Seed processing and storage strategies depend on the status of the seed industry. Thus for the commercialised seed programmes, seed processing is highly mechanised and storage facilities are elaborate and widespread in their location. In some of the countries, the public sector has a modern seed infrastructure similar to that found in the private sector and in some cases even more elaborate, but inadequate management has allowed these facilities to fall into serious disrepair and/or under-utilisation, as can be found in Tanzania. Strategies adopted by Mozambique and Zambia in moving their public seed facilities into the private sector have ensured that such facilities are still fully utilised. At the stockist level there seems 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 generally high for long periods, and this usually reduces the shelf life of the seed. Generally, the storage facility at the stockist level would not have been designed for seed storage and may be storing many other commodities, including fertilisers and chemicals, with attendant deleterious effects on seed viability.

Seed marketing and pricing – marketing is satisfactorily organised mainly through country-wide stockists and seed outlets for the 'profitable' crops handled by the private seed sector. The situation with the less popular seeds, especially in the public sector, is dismally inadequate due to poor distribution networks, inadequacy of seed stocks, inefficiency in planning and management, lack of adequate seed promotion, low commercial crop price, etc. 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 as well as information leaflets. Seed promotion is supposed to be a major mandate of extension but, for most part, the myriad logistical and manpower constraints facing extension hinder their ability to play this role adequately.

Credit – inadequate credit for the seed industry has been cited as a major hindrance to the growth and development of the seed industry. For most of the countries studied, particularly where the private sector is absent, there are virtually no arrangements for credit from formal banking sources whose conditionalities and high interest rates prohibit availability of credit to seed farmers and dealers. Even for the private sector, which has access to bank finance, the high rate of interest has begun to seriously affect operations as evidenced by the situations in Zimbabwe and South Africa. Generally, the recovery of farm credit, where it has been available, has been extremely poor. Small-scale farmers especially have shown a general unwillingness to pay back loans and it is presumed that a system of offering credit to farmers via a government programme is likely to fail due to this poor record of credit recovery. In Zambia, a rural finance programme is being established with UNDP assistance to extend credit to smallholder farmers in the form of input supplies instead of physical cash.

Training – Africa generally lacks good arrangements for high-level training in seed industry subjects, and the eight countries studied here are no exception. Donors have played and continue to play a leading role in offering such training to leaders in the seed industry. Where the private sector is active, such training has been complemented in recent years with well organised corporate in-house training which has produced top calibre seedsmen. But training is now most urgently required among small-scale seed operators who have little access to fellowships and corporate training. Training for such operators would be best organised by the national seed service. This is being done in Zambia where the Seed Control and Certification Institute has established a section to handle training in seeds with a view to broadening the understanding of the extension service, seed companies, NGOs, seed stockists, farmers and other seed industry collaborators in quality seed enhancement and appreciation. However, in many countries the national seed service is proving increasingly ineffective as a result of inadequate resources and may not be able to take on the additional role in their present situation. Extension could also play a role, especially in the training of farmers in on-farm seed multiplication techniques and seed utilisation, but extension itself needs to receive adequate training in seed matters in order to play this role adequately.

2.6 The Informal Seed Sector

The informal seed sector is made up of unregulated and uncontrolled seed operations and is largely represented by on-farm seed selection and multiplication efforts by farmers themselves, seed exchanges among farmers, and the use of planting material saved from previous crop harvests and set aside as seed to be sown during the following cropping cycle. The sector is characterised by an absence of official interventions and oversight, is divorced from research and seed quality control, is confined to seeds of crops which the formal sector largely does not consider profitable, and is dependent on mostly indigenous cultivars and devoid of any sophisticated infrastructure. For decades, the sector was neglected by national seed programmes despite its record of providing nearly 90% of the total seed requirement in Africa as a whole. Along with recent recognition of the potential of this sector in enhancing seed delivery have come wide-ranging efforts (national, international and with the collaboration of NGOs) to strengthen the sector.

2.6.1 Relevant government policy

In Zimbabwe, the Seed Act and its enabling regulations do not recognise the informal sector, and so this very important group operates outside the limits of the law. However, the official system seems to condone the operations of the informal sector in view of its all-embracing importance in smallholder farming. The same can be said of South Africa. In Zambia there is official recognition of the role of the informal sector, but the necessary amendments to the legislation protocols are yet to be effected to provide the needed legal backing. In Mozambique, government policy stresses the

promotion of on-farm seed production as well as the dissemination of seed storage techniques for seed conservation among smallholder farmers. A similar situation prevails in Ethiopia. The most dynamic step in this context has been taken by Malawi. The Seed Act of Malawi has been amended, allowing smallholder farmers to multiply and trade in all seeds. As a result, improved seeds of crops hitherto neglected by seed companies can now reach all farmers at affordable prices.

2.6.2 Current activities

Community initiatives – in Malawi, Zambia, Zimbabwe and Tanzania, NGOs and a few donor-assisted projects have been very active in the informal seed sector, training farmers in simple, improved, on-farm seed multiplication techniques, and the new element of linkage to research and quality control is being gradually introduced with extension support. Other activities are community-based seed-production systems, village seed stores and seed banks, assistance in enhancing crop utilisation, enhanced storage practices, and education on simple methods of ensuring and monitoring seed quality.

Individual farm practices

- *Farmer-saved seeds* – individual farmer practices mainly take the form of on-farm seed multiplication, by which the farmer saves some of his harvest, prepares it, and stores it as farmer-saved seed for planting the succeeding crop or for exchange with neighbours. In all the countries studied this is by far the most important source of seeds in the informal sector.
- *Smallholder commercial activities* – a recently emerged feature in the informal sector is the development of smallholder commercial seed farmers, who carry out on-farm seed multiplication, have acquired good linkages to research, quality control, extension, etc., and have built up a good level of credibility enabling 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 and, although presently a very small group, it can be considered an important transitional pathway towards ushering in the good attributes of modem crop improvement practices to smallholder seed farmers. In Zimbabwe, many smallholder seed producers are emerging as contract seed growers, producing seeds of indigenous crops for further processing and marketing by seed companies. Many such contract seed producers have the potential to develop into smallholder commercial seed farmers. However, many smallholder seed operations currently thrive mainly as a result of NGO and donor support. There is a need to enhance capacity building to enable such operations to continue to thrive when external assistance ends.

2.6.3 Sources of varieties in the informal sector

The main source of varieties in the informal sector are farmers or their neighbours. For generations, farmers have selected the best-adapted cultivars in the context of suitability to their particular growing circumstances, palatability, and cooking and

other end-use qualities. Thus farmers possess landraces and cultivars with attributes they consider more important than those selected by the research station. These form the stock which is multiplied to obtain seed for the next planting.

2.6.4 Advances/constraints in the informal sector

Variety development, release and utilisation – a major feature of the informal sector is the absence of formal links to research, and although some progress has been made in some countries, such as Zambia, generally this constraint may continue as a hindrance for a long time to come. It is presumed that advances made in the smallholder commercial sector have the potential to minimise this constraint. At any rate, the acid test is whether or not research will be able to develop and release farmer-preferred varieties. Until then, utilisation of research-generated varieties by smallholder farmers will continue to be low, and this is demonstrated by the low adoption rate of many improved varieties as compared to the large number of new varieties being generated by research. This low adoption rate is largely due to varieties being inappropriate from the point of view of the farmer, the price of the improved variety, inadequate stocks and poor distribution. Therefore, in the informal sector the only credible mode of variety development will, for the time being, remain on-farm cultivar selection by farmers themselves, imperfect as the methodology may be in the context of modern science.

Seed production – except in the cases of community seed farms and smallholder seed enterprises, seed multiplication in the informal sector differs very little from regular crop production. Basically, it takes the form of normal crop production, with a greater degree of attention being paid to the starter seed as well as to the location to be harvested for seed. The quantity of material harvested per farmer is very small since the main aim is self-sufficiency.

Seed processing – since orthodox seed processing involves capital-intensive equipment and large seed volumes, it has had very little impact on the informal sector, a major characteristic of which is still manual cleaning involving traditional threshing/shelling, winnowing, picking and dusting of seeds. With the onset of the smallholder commercial sector, a few low-capacity seed cleaners and treaters are being introduced.

Seed storage at the on-farm level continues to be improved. Considerable advances have been made due to the impact of several on-farm storage improvement programmes and projects which have imparted very effective storage technologies to farmers. The emergence of village seed banks with supportive storage structures has also assisted in boosting seed-storage techniques in the rural communities. However, seed storage still needs to be improved through better pest control, minimising mechanical admixtures and monitoring seed quality. Additionally, in times of drought and food shortages seeds tend to be consumed as food, and this is a serious constraint which needs to be tackled with innovative actions.

Seed marketing – seed quantities produced at the small-scale farmer level are often small and are mainly tailored to fit the farmer's own requirements. Therefore there is

very little market constraint. Most seeds are bartered for other seeds or grain. The growth of the smallholder commercial seed sector and community seed initiatives in some countries are bringing to the fore some seed marketing problems in the informal sector. For example, in Malawi 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 fully appreciate and deal with market dynamics. At present, NGOs buy most of the seeds produced by seed growers in Malawi. This is not considered sustainable, and there is a need to strengthen farmers' associations in order to cooperate with traders in developing market strategies.

Seed quality control – the informal seed sector is largely cut off from formal seed quality control arrangements as a result of the requirements of the seed laws. Nevertheless, through the activities of smallholder seed projects and NGOs, seed quality in the informal sector continues to improve. Much more needs to be done. For example, timing and selection criteria in cultivar improvement, isolation and rogueing, improved stacking in seed stores, and quality control monitoring of seeds in storage need to be improved through training and cooperation with relevant agencies, to enable the informal seed sector to benefit from basic modern crop improvement practices.

Extension and seed promotion – with the informal seed sector so cut off from the organised formal seed sector, the onus falls on extension to provide the needed guidance and support to farmers. Extension has displayed a level of cooperation and support to the informal seed sector which it has not accorded the formal sector. This may be because the practices involved in the informal seed sector are close to the normal crop husbandry technologies which extension serves. NGOs and donor-assisted projects have exerted a similar impact. On the issue of promotion, there has been little to promote since, as has already been pointed out, there is very little to market and seed trade is largely on barter basis. Perhaps the need for promotion will begin to be seriously felt as the small-scale commercial sector becomes more significant.

2.7 Future Trends and Needs of Smallholder Seed Production

All eight participating countries recognise that smallholder seed production has been important in their national agriculture, and with proper guidance and a proper policy framework will exert an even greater positive influence on crop production. The recognition by Zimbabwe of the need to re-align the Seed Act to cater for the needs of smallholder seed production, and the imminent elevated role of the informal sector once the Bipartite and Tripartite are terminated, constitute important examples of the future trend to recognise the informal seed sector. It is expected that the informal seed sector will continue to exhibit most of the characteristics which make it attractive to farmers and which have allowed it to survive, almost unchanged, for countless generations. Positive changes likely to occur are stronger linkages to research and quality control, and a slightly more commercial dimension.

Additionally, there is a need for a strong policy backing from government, including arrangements to enhance access to credit, especially among smallholder commercial seed producers; good producer prices for grain to enhance seed usage; and the timely provision **of** fertilisers and other farm chemicals to enhance productivity.

The impact of village and community seed banks has been very positive and there is a need to expand their coverage with a view to enhancing the injection of improved practices into the informal seed sector.

3 SUMMARY OF FINDINGS OF SITE VISITS

Participants were taken through a step-wise progression in a tour of the seed industry system, starting from germplasm management, seed quality control, variety development, production, processing/storage and marketing to seed utilisation, crop production and processing, training and extension, etc. in the public, private and informal contexts. In the context of the five priority information themes (as identified during the **CTA** seminar on information themes relating to agriculture in **ACP** countries, held in Wageningen in 1996) the 19 selected sites can be categorised as in Table 1.

Table 1 Categories of sites visited

Theme	Site visited	Elements supporting the theme
Conquering markets	Seed Services, Harare	• Seed testing and inspection for certification and phytosanitary purposes • Registration of new varieties of plants • Conservation of plant genetic resources, mainly land races • Licensing and monitoring of seed-processing facilities and private seed-testing facilities • Training of seed producers
	Seed processing plant of Agriseed and Services, Mt Hampden, Harare	• Seed conditioning and storage • Quality monitoring • Seed treatment where necessary • Development of regional linkages
	Seed Co., Harare	• Seed conditioning • Seed storage • Seed certification • Marketing and distribution • Research and variety development
	Farm and City (seed outlet)	• Sale to farmers of high-quality farm inputs • One-stop and convenience purchasing by carrying a wide array of goods
Production optimisation and intensification	Research plots of DR&SS, Harare	• Breeding for superior plant attributes, e.g. high yield and pest resistance • Production of breeder seed of new varieties for seed producers • Training and provision of advisory services to rural farmers • Conduct of a large number of multi-location variety trials annually to establish adaptability to differing agro-ecological zones

	Stapleford Farm (seed grower), Harare	• Large contract seed production
	Rattary Arnold Research Station, Harare Matopos Research Station	• Development and evaluation of superior varieties • Advisory and training services • Variety development • Development of production management recommendations • On-farm trials • Animal and range management research • Forage production
	Smallholder seed producers, Tsolotsho	• Seed multiplication at on-farm smallholder level • Training of smallholder farmers in seed production techniques • Community cooperation • Ensuring the availability of good seeds in good time to small-scale farmers • Ensuring income generation and poverty alleviation in rural areas
	Smallholder seed producers, Chivi African Centre for Fertilizer and Development	• Smallholder seed production • Mass seed-production training at community level • Linkages with market systems, training and advisory service • Development of crop varieties and production technology • Improvement of soil fertility • Training and advice on soil management • Linking with communities for training on all aspects of fertiliser use
Environmental protection and the improvement of natural resource management	ICRAF Agro-Forestry Project	• Development of indigenous fruit trees • Development of woodlots • Supplementing fertiliser use with plant residues and nitrogen fixation • Establishment of community nurseries • Training, research collaboration and networking
Strengthening national agricultural systems	SADC/ICRISAT	• Enhancing farmers' adoption of improved technologies to improve crop husbandry • Broadening public- and private-sector partnership and developing networking • Development of marketing systems linking producers and industry/consumers

		• Injecting superior breeding materials into national breeding programmes
	CIMMYT	• Exchange of germplasm with national programmes • Contributing advanced lines into national programmes • Development of technological packages and training national experts on their proper use • Ensuring the development of superior varieties able to support food-security goals and income generation
	Agritex Farm, Domboshava	• Strengthening linkages with research • Development of good agronomic packages • Mobilisation of farmers • Enhancing the utilisation of crops to improve marketing
Mobilisation of civil society	Community Seed Bank, UMP	• Organisation of smallholder seed production • Community management of **ex *situ*** biodiversity • Community seed security through farmer training and mobilisation • Conduct of demonstration trials to enhance technology transfer
	Smallholder contract seed producer, Gutu	• Mass mobilisation of farmers • Intensive continuous training of farmers • Organisation of community marketing • Creation of rural job opportunities • Development of partnership between research extensions and farmers
	Mtekedza Community Agricultural Projects	• Community mobilisation • Food security programmes • Genetic conservation and utilisation

3.1 Analysis of the Seed Situation in Zimbabwe

Participants recognised that the formal/commercial seed sector is very developed and competitive and is operating in an extremely liberalised market. The formal sector is making a tremendous contribution to the Zimbabwe economy by ensuring seed security for the major commercial crops, maize, soya bean, wheat, etc., which are suited to high-potential agro-ecological areas, and is assisting many neighbouring countries with seed exports. However, large areas of Zimbabwe, where communal farmers are located, experience marginal rainfall, have poor soils and limited farm sizes, and are not suited to the crops catered for by the formal seed sector. While acknowledging that a large proportion of hybrid maize seeds are sold to communal farmers, it would appear that seeds of small-grain crops such as millets, sorghum, cowpeas and open-pollinated varieties of maize would be more supportive of household food security in many of the communal areas. Since the seeds of 'minor' or indigenous crops have so far been mostly neglected by the formal sector, the tried and trusted source of seeds for the smallholder farmer has been the informal sector, which in Zimbabwe supplies as much as 90% or more of seeds of the indigenous crops.

With the assistance mainly of NGOs and donors, as well as the active participation of extension and research, the age-old practice of farmer-saved seeds is gradually giving way to a better organised production and supply of such seeds through the farmers' own efforts. The participants agreed that if the informal seed sector were sufficiently well resourced to generate the high-quality seeds demanded by the nearly 90% of farmers who presently rely on that source, not only in Zimbabwe but in the other participating countries, it would exert a huge impact on national food stocks and make the urgent goal of food security much more attainable.

3.2 Constraints to be Addressed in the Informal Seed Sector

The participants recognised that many constraints need to be addressed in order to adequately develop and harness the potential of smallholder farmers in seed production in eastern and southern Africa.

- *Policy constraints:* need to review existing legislation and policies to empower and nurture the participation of smallholder farmers in seed production and to enhance collaboration and linkages necessary to develop the informal sector.
- *Technical constraints:* need to develop adequate and appropriate methodologies for on-farm seed multiplication and handling as well as training of farmers in their use.
- *Marketing constraints:* need to assist marketing arrangements for both seed and commercial crops to ensure sustained patronage of seed, and to enhance income generation among rural dwellers.

- *Utilisation:* need to enhance utilisation of minor crops in order to improve their demand for both domestic and commercial purposes, thereby enhancing the sustainability of seed demand.

Community mobilisation with respect to on-farm seed multiplication, which is assisted by NGOs and donors, has contributed to a rapid awareness of the impact of good quality seeds and has improved the availability and utilisation of such seeds by communal farmers. However, the sustainability of some of these activities is yet to be properly developed to enable such efforts to be continued following the withdrawal of external support.

4 LESSONS LEARNED DURING SITE VISITS

Specific lessons learned during visits to the various sites are summarised under six groups, by mandates, as follows.

4.1 Germplasm Conservation and Seed Certification

(National Gene Bank, Seed Services)

- Licensing of trained private seed inspectors to carry out some seed certification functions minimises the burden on the public service.
- Seed Act presently hinders development of the informal sector.

4.2 Researh

(DR&SS, CIMMYT, ICRAF, SADC/ICRISAT Sorghum and Millet Improvement Programme, ACFD, Rattray Arnold Research Station)

- Over-concentration of research suited for commercial farming compared to communal farmer needs.
- International research has unearthed a wealth of technologies which are not being fully utilised by national programmes.
- Of particular note are soil nutrient opportunities in agroforestry, use of open-pollinated maize varieties, etc.

4.3 Commercial Seed Activities

[Seed Company Plant, Stapleford Farm (large-scale contract seed grower) and Farm and City (seed outlet)]

- Commercial seed activities are highly efficient and competitive and contribute to national food security, but their role in household food security is minimised by their neglect of seeds of indigenous crops.
- Isolation of seed farms slowly becoming a problem for some seed growers.
- Commercial seed outlets are playing a useful role in seed distribution but need support in adhering to quality standards as per seed law provisions.

4.4 Community Seed Activities and Smallholder Seed Producers

(UMP, Tsholotsho, Chivi)

- Inadequate collaboration among NGOs, extension and some donors has led to transfer of conflicting messages to the farmer.
- Arrangements for renewing starter seed stocks were found inadequate.
- Strong need was felt for massive seed training programmes for farmers, extension workers and NGO staff.
- Community efforts at initiating seed-bank activities are a crucial step in genetic resources conservation at grassroots level as well as in seed security.
- Community and smallholder seed schemes need to incorporate capacity building aimed at long-term sustainability.

4.5 Community Agricultural Projects

(Mutekedza)

A holistic approach in rural development is important in effectively alleviating hunger and poverty.

4.6 Development of Smallholder Seed Business

(Agriseeds, Gutu smallholder seed producers)

- **A** contractual arrangement between smallholder seed farmers and the seed companies is a good start towards enhancing entrepreneurship among smallholder seed producers.
- There is need for some amendments in the seed law to enable smallholder seed growers to develop.
- Government assistance will be needed in exploring further marketing opportunities.
- Training of extension staff by DR&SS is necessary to ensure seed farmers adequately understand the technical basis of their work.
- It is important for assistance groups such as NGOs and extensionists to consider the cost/benefit implications of activities aimed at assisting farmers.
- Groups of progressive smallholder seed producers should be encouraged to ac-

quire simple resources to be able to form complete seed entities in order to ensure sustainability.

- The arrangements under which several hundred tons of good quality seed are being produced by smallholder farmers, as the basis for a viable export seed business by Agriseeds, is a testimony that smallholder farmers not only can produce seeds but can do so profitably and for crops which large-scale commercial farmers have ignored.

5 SUMMARY OF STUDY VISIT RECOMMENDATIONS

In the light of the lessons learned, the participants adopted study visit recommendations as follows.

5.1 National Seed Programmes

- 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 concrete efforts must be made to enhance the incorporation of more minor crops in the formal seed sector.
- National seed policies should recognise the role of smallholder seed producers and the informal seed sector as a whole. In this respect, legislations and practices that hinder the development of the sector should be reviewed with the aim of removing the hindrances and replacing them with enabling policies and strategies. Additionally, linkages and collaboration among stakeholders need strengthening to foster rapid, orderly and effective growth.
- National seed programmes should seriously support community participation in biodiversity conservation, particularly as engendered by community seed farms and seed banks as they ensure germplasm conservation while assisting in seed security efforts.
- National seed programmes are also urged to view plant breeders' rights legislation not only as necessary to encourage private research and growth in the formal sector, but also as an opportunity to ensure that commercial use of publicly bred varieties generates a fair contribution, under suitable arrangements, which could be used to support smallholder farming, especially informal seed-sector activities.
- National seed programmes should initiate technical expert consultations in their activities to develop and disseminate workable methodologies for the conduct of the various aspects of on-farm seed multiplication suitable for particular crops, specific areas and among participating farmers. Considerable quantities of material, especially technical guidelines, have been generated in recent times by seed experts in SADC and could be of help in this context. The need for adequate seed training of extension and NGO staff is crucial in ensuring that farmers receive adequate guidance in seed work.
- The potential of open-pollinated maize varieties for some marginal areas needs to receive the attention of national programmes, as they have been found suited to some agro-ecological areas and for some socio-cultural circumstances.
- As soon as farmers are adequately trained in good seed-production practices, they should be assisted to establish linkages in effective seed marketing ar-

rangements to ensure sustainability. In this respect, governments will need to assist in such support areas as improved marketing and utilisation, fair agricultural produce pricing, and availability and reasonable pricing of farm inputs, especially fertilisers and chemicals.

5.2 Regional and International Efforts

Participants recognised the impact which has been made by the CTA publication *Seed Programmes and Projects in ACP Countries,* and therefore recommended the donor funding of a new edition incorporating a more comprehensive analysis of information on the informal seed sector at regional and/or international level.

6 IMPACT ACTIVITIES TO BE IMPLEMENTED BY PARTICIPANTS

Participants agreed to undertake study visit impact activities on return home, in order to broaden the impact of the study visit on national seed programmes, especially as they relate to smallholder farmers. In line with this, they agreed on the following categories of activity.

6.1 Mini-Seminars and Field Days in National Programmes

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

6.2 Application of Lessons Learned to Selected Activities

- Revisions in strategies/policies.
- Technical revisions.

6.3 Enhancement of Existing Activities

Proposals on the following activities under existing projects were prepared by the participants to be implemented by them on return home, based on the lessons learned during the study visit.

- Workshop for key seed stakeholders to review the Zimbabwe 1999 seed study tour resolutions (Zambia).
- Strengthening smallholder seed production (Malawi).
- Smallholder seed production (Tanzania).
- Production of seed of maize, sorghum and indigenous grains (South Africa).
- Zunde ra Mambo in Chief Mutekedza Area, Chikomba District (Zimbabwe).
- Review of seed legislation and Plant Breeders' Rights Act (Zimbabwe).
- Towards greater involvement of more smallholder farmers in quality seed production. (Ethiopia).

- Strengthening the marketing aspect of farmer-based seed production and marketing scheme (Ethiopia).
- Sustainable smallholder seed production and supply (Uganda).
- Home-saved seed production and quality improvement (Uganda).
- Strengthening seed production at farmer level in Nampula Province – pilot project for two districts (Mozambique).