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REPORT ON ANC AGRICULTURAL PROJECT%1"
SWEDISH UNIVERSITY OF AGRICULTURAL SCIENCES
INTERNATIONAL RURAL DEVELOPMENT CENTRE
NOVEMBER-DECEMBER 1986 I

TABLE OF CONTENTS

Page
1. INTRODUCTION 1
2. SUMMARY AND RECOMMENDATIONS 2
2.1 General 2
2.2 Recommendations for Chongela and Alpha 2
2.3 Recommendations for Mazimbu and Dakawa V3 3
3. REPORTS FROM THE PROJECTS 5
3.1 Chongela and Alpha 5
3.2 Mazimbu - 14
3.3 Dakawa 16
4. EXPERIENCE GAINED FROM THE SHORT CRASH COURSE 18
4.1 Preparation 18
4.2 Course duration and implementation 13
4.3 Recruitment of trainers 19 x
4.4 Possible subjects 19
5. PROPOSALS FOR SUPPORT FROM SIDA . 21
5.1 Chongela and Alpha . 21
5.2 Mazimbu and Dakawa ’ 22
5.3 Summary of proposed budget 24
APPENDICES
Farm description, Chongela and Alpha
Farm description, Mazimbu
Crop budgets
Programme for the crash course
Training material, crash course
Terms of reference, consultancy on manpower and
training needs for the
agricultural projects
Terms of reference, consultancy on ihtroducing
agriculture as a subject in
the Solomon Mahlangu Freedom
College
Terms of reference, consultancy on and training
in farm planning and crop
rotation at Chongela and
Alpha farms, Zambia
Appendix
Appendix
Appendix
Appendix
Appendix
Appendix
Appendix
Appendix
mmpr-a

Terms of reference, training in farm machinery
Terms of reference, consultancy on and training in animal production at Chongela and Alpha farrms
Questionnaire on agricultural training
People met for discussions
Programme details
Appendix 9
Appendix 10
Appendix
Appendix
Appendix

1 INTRODUCTION! ’ T

SIDA has supported the agricultural activities of the ANC for many years. The Swedish University of Agricultural Sciences has been involved as an institutional consultant to the agricultural projects.

The projects have grown, both in number and size, and the consultancy service has also expanded.

During November and December, 1986, the University sent two missions to the projects. Mr B Bergstrand and Mr L-G Nilsson conducted a crash course in crop production and farm machinery at Chongela and Alpha from November 1st to December 5th.

Mr J Jonsson and Mr B Sundstedt visited the agricultural projects together with Ms M Husen, desk officer for ANC at SIDA’s headquarters in Stockholm, in connection with the biannual consultations between SIDA and ANC. The objective was to follow-up earlier SIDA assistance for agricultural activities at Mazimbu and Dakawa. Special attention was to be paid to training activities within the sector. Further assistance from SIDA for agricultural activities was to be discussed and priorities suggested.

This report covers both the crash course and the consultancy for the planning of future SIDA assistance for the.projects.

2,1
SUMMARY_AND RECOMMENDATIONS
General
The agricultural activities have grown both in number and size and a fairly high level of technology is being used. Management capacity has, however, not increased accordingly. There is, therefore, a great need to increase management capacity in order to exploit production capacity fully.
Recommendations
1.
Consolidation, rather than expansion, should be emphasized.
2. Training of personnel should be given high priority.
3.
Consultants should be used for certain planning and evaluation functions.
More emphasis should be placed on vegetable and fruit production at the expense of field crop production.
Recommendations for Chongela and Alpha
Efforts should concentrate on already established enterprises while new enterprises, such as wheat productiony should wait until later.
A practical system for record-keeping and evaluation should be put into practice.
A proper crop rotation plan should be worked out.
Soil tests should be made and results used for the planning of crop rotation and fertilization.
Soil erosion control should be applied where necessaryt
The weeding of crop fields should continue in the same way as at present.

7. The thinning of planted maize should continue until a population of 4 - 4.5 plants/metre is attained.
8. No new land should be stumped; instead, existing pasture land should be improved.
9. The workshop should be adequately staffed and equipped.
10. More attention should be paid to the preventive maintenance of machinery and the training of machine operators.
11. Personnel skilled in the maintenance of buildings should be recruited.
12. The cattle herd should be reduced by some 50% and a plan for breeding and culling worked out.
13. New bulls and boars should be bought.
14. The establishment of a large commercial dairy herd should be postponed.
15. New gaskets should be bought for the irrigation scheme.
16. Expansion of vegetable and fruit production should be considered.

2.3 Recommendations for Mazimbu and Dakawe

1. A proper crop rotation plan should be worked out and implemented.
2. Recommended soil conservation measures should be implemented in the coming cropping season.
3. A practical system for record-keeping and evaluation should be put into practice.
4. Extra boxes for pig fatteners should be constructed which match the existing sow unit.

New poultry houses should be constructed et the farm site for 1500 layers and 2000 broilers.
Questions relating to dairy management should be left in the hands of the new dairy manager.
7. Possible overgrazing by goats must be closely monitored.
8. Vegetable and fruit production should be expanded.
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REPORT FROM-THE PROJECTS

3.1 Chongela and Alpha

3.1.1 General

A description of the farms, infrastructure and machinery is attached. (Appendix 1)

The fertility of the soil is generally low but with proper fertilization it can still produce, at least to medium level. Fertilization should be based on soil tests including pH and P and K contents. Soil tests can be made at both Mt Makulu and Kabwe laboratories. Forms and instructions for soil sampling are already available at the farms.

One area in field 26 is subject to erosion and must not be cultivated. This will enable the grass and weeds to reinforce the surface, thereby preventing the formation of a gully.

Rocks are very harmful to implements. Rocky areas should be left for grazing and should not be cultivated.

Due to the sandy character of the soil, soil operations are generally easy and do not require a great deal of experience.

3.1.2 Crop rotation

A certain level of crop rotation is necessary if the fertility of the soil is to be maintained. To accept a monoculture is, in the long run, to accept defeat. According to information received, maize was grown intensively by the former owner.

Crop rotation means that alternation with crops other than maize should take place. Such crops are_soya beans and sunflower. This implies a three year cropping programme every five years. The soil can thus be left to rest for two years and only used for grazing and for keeping troublesome weeds under control.

Recommended croE rotation
Year
One Maize
Two Soya beans
Three Sunflower
Four Faliow
Five Fallow
The arable land should be divided into five units, thus xfacilitating the rotation programme.
At first smaller amounts of soya beans and sunflower should be planted. As experience is gained in the cultivation of these crops, more can be planted. Land not used for the crops should remain fallow until they are grown to full hectarage.
3.1.3 Cropping programme for 1986-87
230 hectares have been winterploughed to allow early planting in October and November.
65 hectares of maize were planted by the first week.in November.
A further 15 hectares were planted by the beginning of December.
Fields 3 and 4 at Alpha are being disced and prepared for further planting. These two fields will add another 55 hectares to the area planted.
This additional planting depends on access to diesel fuel and fertilizer. There is a lack of D comp but X comp is available as a substitute. Seeds are available at Zam Seed. The varieties planted so far are SR 52 and MM 752, two early planting varieties with an ultimate density of 4 plants per metre;
From December onwards varieties such as MM 603 or MM 604 should be used. These varieties allow a denser population, 5 plants per metre.
During the last week in November the crop was threatened by

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drought, but the rains came and conditions for development are good, if the high population density of the plants 6.5 plants per metre, is disregarded.
Application of D comp is generally in excess of 400kg/ha which is slightly more than recommended, but on this type of soil it is acceptable.
The maize plant population must be thinned from the present 6.5 plants/metre to 4-4.5 plants/metre. The variety MM 752 does not allow a higher density.
The calibration of planters and fertilizer applicators must be done in advance. Existing manuals should be used.
Before each cropping season a plan based on the long-term rotation programme should be drawn up. The plan should provide information on how much to plant and"where to plant.
As many factors as possible should be included in the planning:
1. What hectarage should be winter-Eloughed for the early planting of maize.
2. Fields and hectarage.
3. Seeds: variety, seed-rate in kg/ha or seeds/m, totei quantity to be purchased.
4. Fertilizers: type, application rate, total quantity to be be purchased.
5. Chemicals: rates and quantities.
6. Fuels: quantities can be based on the cropping programme.
Consideration of as many factors as possible in advance during the planning stage will greatly facilitate work during the intensive season.

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3.1. 4 Weedkilling_ V

Eliminating weeds is a never ending task for a farmer. A crop without weeds does not have to compete for nutrients and water for its development. Where weedkilling is considered, two options can be considered:

1. Chemical weedkilling

Costs for chemical weedkilling range from K200 to K400 per hectare.This method is therefore uneconomical where maize production is concerned.

2. Manual weeding and cultivation

On account of the access to manual labour, 40-50 people, weeding at Chongela and Alpha must be done manually. Costs are substantially lower than for chemical treatment; It has been estimated that costs for manual weeding work out at approximately K42 per hectare compared to K200 to K400 for chemical treatment. Manual weeding also provides an opportunity for people to earn a living. At present weeding has been carried out well at Chongela and the weeds are under control.

3.1.5 Irrigation

When the main pipe has been completed, an area of 36 hectares can be irrigated At present there is a substantial loss of water and pressure as almost all the joints in the sprinkler system are leaking. The reason for this is that the rubber gaskets in the joints are worn out or missing. New gaskets should be bought as soon as possible.

Vegetable production is low at present. Four hectares of green maize will be ready soon, but the yield will be very low since the space between plants is insufficient. It is probably best if the maize is cut for silage. A few hectares of potatoes and a half hectare of cabbage have just been planted.

_ lrrigatioh scheme at Alpha
A dam at Alpha farm may supply sections of the new farm with water for irrigation during the dry season in the future. The capacity of the dam is not clear at present.
In field no 3 a main supply pipe has been .0 introduced. This pipe supplies 44 hectares.
Since wheat is rather a difficult crop to grow, it is not recommended that it is grown on such a large area initially. It should first be tried on a pilot scale, say two to three hectares. The main problems with growing wheat are the weeding and the need of special machinery both for drilling the seed and for harvesting. The sandy soil at Alpha is not all that suitable for wheat.

3.1.6 Economics of crop and vegetable production

If the crop budgets are examined (Appendix 3),it is evident that production costs for maize and sunflower are unacceptably high at present. It can be argued that if yields are increased, costs will be reduced, but there are some factors which affect this argument, for example, the soil and the level of management. The’soil in particular may be the main limiting factor. However, from the crop budgets it appears that growing vegetables is more profitable than growing crops. Even low yields for most vegetables seem to be more profitable when compared to other crops. If vegetables are grown on a limited area in order to gain experience, subsequent vegetable production could become very profitable in the course of time. Attempts to improve vegetable production are well worth making.

3.1.7 Beef cattle

The beef herd has grown in size during the last year as very little or no culling has taken place. The herd appears to be in-good health and is regularly dipped and dewormed.
The herd now comprises 46 bulls, 739 cows and heifers, 364 steers and 64 calves - a total of 1213 head or 1100-1150 livestock units (LSU).

The grazing area is, at most, about 2400-2450 hectares on the two farms. The general grazing area required for 1 LSU is 4-12 hectares depending on the conditions. The grazing land at Alpha and Chongela is of fair quality and 5 hectares per LSU is a reasonable assumption. The bearing capacity is therefore in the region of 450-500 LSU, compared to the present 1100-1150 LSU.

A serious overgrazing problem will occur at the farms unless some radical measures are taken to change the situation. To purchase supplemantary feeding is very expensive and uneconomical. Therefore 55-60% of the herd must be culled in the next few months if serious overgrazing is to be avoided.

In the first place all cows without calves and steers should be slaughtered, and then those animals judged to be of lesser value from the breeding point of view. This includes the bulls - there are far too many bulls at present. The bulls should also be kept separated from the cows as unwanted mating will take place resulting in the cows giving birth in July and August.

A herd of 250-300 cows and about 60 one to two years old and the same number two to three years old would be more suited to the grazing land available.

The purchase of some new bulls should be considered before inbreeding deteriorates the herd.

3.1.8 Dairy cows

In the last report it was proposed that a few (5-6) dairy cows should be kept at Alpha. No dairy cows have been bought as yet but there are plans to buy about twenty. A herd of that size is not recommended at this stage for several reasons; Feeding twenty dairy cows will be difficult since there is no grazing land or improved pastures. Buying,feedstuff will make the milk production very expensive. Keeping the milk of twenty cows cold will be far more difficult than keeping the milk of five to six cows cold, With a herd of twenty there

will soon be demands for milking machines and other equipment. This is not recommended at this stage.

3.1.9 Sheep and goats

A small herd of sheep and goats is kept, totalling 174 animals (129 goats and 45 sheep).

3.1.10 Pigs

The pigsty is kept clean and tidy and the pigs seemed to be in better condition than they were on the last visit. At present there are 3 boars, 13 sows, 146 gilts/weaners and 52 piglets - a total of 214 animals. The present boars are very heavy and not suitable for mating the young gilts.
The boars should be replaced with new blood as soon as possible.

3.1.11 Poultry

The poultry still seems to be the best run enterprise at Chongela. There are some 1400 layers which produce about 1100 eggs per day at present, a laying percentage of 78%, according to figures received from the farm. The new poultry unit, which was suggested in a previous report, is planned to be built at Alpha. A building contractor will start the construction work in the near future. The building will house 3000 layers. The cost, which includes the construction of a store-house, is estimated at K450 000.

3.1-12 Abattoir

An abattoir is being built by NORAD. The building itself has been erected, but, as yet, no doors or windows etc have been fitted, nor has any equipment been installed. A few alterations must alsoibe made ih"order to meet the requirements of the health authorities where the export of meat is concerned. Among other things the ceiling in the cold storage room has to be raised. This is no simple operation and will take some time. The abattoir is being built to save slaughtering fees which, at present, are K500 per animal.

3.1.13 Construction of roads and bridges

A total of 9.5 km of roads have been constructed between Alpha and Chongela. This includes a new access road to Chongela. For the access road the crossing of the railway line has still to be completed by Zambia Railways. There are still three bridges to be built across some dambo areas and over the spillway near the dam wall. At the moment the road is only passable during the dry season. There are also some more mitre drains to be constructed to divert surface water from the road. The repair of the spillway will be completed when the bridges have been built. So far K119 900 have been disbursed for the road works. A further K20 000 will be paid on completion. The estimated cost of the road crossing is K23 000.

3.1.14 Power line

The power line has been completed and paid for - a total cost of K129 000. However, no transformer has been installed at the sub-station and therefore the problem of mains power remains. A contractor is expected to complete the work in two to three weeks time.

3.1.15 Fencing and bush clearing

The whole farm has been fenced. No bush clearing has started yet. There are plans to start clearing the bush to make more arable land available. In the last report bush clearing was recommended to improve grazing land.

We are still of the opinion that improved grazing should have priority over stumping new land. There is no need for more arable land at present.

3.1.16 Low cost housing

The building of low cost houses has not started yet- However, the matter will be pursued and houses built in due course .

3.1.17 Buildings
As can be seen from the list of buildings in Appendix 1, there is a large number which need repairs and maintenance. A farm unit of this size should be self sufficient where great need to recruit skilled maintenance personnel such as plumbers, carpenters, bricklayers etc. This would also reduce the load on the workshop.
3.1.18 Machinery
short. There is no regular service and maintenance for tractors. Preventive maintenance to take care of radiators and air filters does not take place. The national shortage of oil filters, fuel filters and air filters in Zambia is one reason. Grease is available in abundance but there is a lack of grease-guns. The one greasesgun which is available should be used much more frequently. The maintenance of batteries for tractors as well as other vehicles such as trucks and pick-ups has been neglected for a long time. There is a general tendency to concentrate moreton repairs than on care and preventive maintenance. This situation could be remedied by the training of drivers and supervisory staff.
For the maintenance of technical facilities theworkShOP is essential. However, the present capacity of the workshop does not meet requirements. The following measures are therefore suggested.
1. The workshop must be equipped to a level which corresponds with demands. Equipment such as a welding machine (275A), a compressor, a drilling machine, tools of various kinds, grease-guns and a refilling unit, a battery charger, a high pressure washing aggregate etc should be obtained. An appropriate

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list should be drawn up by a person with experience of agricultural workshops.
2. In special cases, where, for example electrical components and fuel system parts are concerned, items may be taken to a specialist in town or to the ANC workshop.
3. The organisation should be strengthened and more personnel recruited. The workshop manager should be made manager of the unit and not remain the main worker. An additional one or two skilled mechanics are needed. On the job training of drivers and mechanics with.its emphasis on maintenance and preventive care should be carried out. Manuals should be used.
4. A system to record intervals between services of vehicles: should be developed.

3.2 Mazimbu

One day was spent at the Mazimbu farm together with its management. All enterprises were visited and discussed. Details of production volumes etc are listed in Appendix 2.

3.2.1 Crop production

The area under cultivatioh has been increased and, according to the records, production and yields are fair. When even larger areas come under production in the future, there will be a need for increased storage capacity. This has already been ordered. Attention to be paid to questions concerning crop rotation and soil conservation. Recommended soil conservation measures have not yet been fully implemented. There is still an urgent need to intensify efforts in this direction and it is recommended that the visit planned by the soil conservation specialist from Nairobi also includes practical exercises in the fields in making contour ridges and in contour ploughing.

It is recommended that the question of planning proper crop rotation is included in a consultancy on crop production, machinery operation and maintenance. (See terms of reference in Appendix 9.)

3.2.2 Piggery _ 7 I -

The piggery has been extended to the size originally planned and the enterprise is well run. Problems with feedstuff ingredients are causing a prolonged fattening period and more space has therefore been demanded. The construction of extra buildings should be considered as the availability of feedstuff ingredients cannot be guaranteed in the future.

3.2.3 Poultry

In order to ensure a continuous supply of eggs and broilers in the future, it is necessary that this enterprise be re-organized. It is realistic to assume that the ANC must play an active part in obtaining day old chicks in order to guarantee a stable supply of high quality chickens. The local supply is far from reliable and satisfactory. Two options exist. Firstly the possibility of buying day-old chicks in neighbouring countries should be investigated. The secondnaltennative is to import eggs and to install and use the existing incubator at Mazimbu. This alternative will, however, require both additional investment in a building for the incubator and special skills and qualifications in starting up the hatchery, together with all the necessary auxiliary facilities. Regardless of how the day-old chicks are obtained, there is a need for new chicken houses. It is recommended that these are constructed at the farm site.

3.2.4 Dairy

is still to be procured. There are nine cows milking at present and it is recommended that all questions relating to the purchase of dairy equipment are left until the arrival of the dairy manager who is expected to take up his position within the near future. The same applies to questions relating to feeding regimes and dairy management in general.

3.2.5 Beef and goats V
The enterprises seem to be successful and are continuously being expanded with the plan of transferring the beef cattle to Dakawa. With the increasing numbers, especially of goats, it is important to consider the aspect of possible overgrazing. It is recommended that this question is included in the terms of reference for the anticipated visit of the soil conservation specialist.
3.2.6 Vegetable and fruit productiod
Further expansion of these enterprises is recommended and will be possible when the irrigation equipment ordered from SIDA has been received. The staff situation where ANC members are concerned is critical. The post of head of section must be regarded as very important since the enterprise is planned to expand. It is recommended that the staffing of this section is considered and given appropriate attention.
3.2.7 Management
There is an urgent need to strengthen management, especially where planning, budgeting and evaluation are concerned. Training and assistance is also needed in the areas of crop rotation, soil conservation, and the operation and maintenance of existing machinery.
3.3 Dakawa
Dakawa was also visited and discussions were held with members of staff responsible for agriculture. This year’s crop was unsatisfactory (63 bags of sorghum from 31 hectares), due mainly to the following reasons:

It appears that problems experienced earLier stili ekist. These should be solved before any expansion of production takes place. However, new machinery has arrived under a U programme of assistance from UNHCR. This includes two large 4WD tractors (MF 2645). There is an urgent need for trained machine operators to ensure that existing machinery is used properly and efficiently.

4 i EXPERIENCE GAINED FROM THE SHORT CRASH COURSE

At the consultative talks between ANC and SIDA in December, 1986, it was agreed that SIDA should continue to support agricultural training, in line with the experienced gained from the crash course conducted at Chongela in November, 1986. The course focused on the operation, maintenance and repair of farm machinery, and crop production in general. Experience gained from the course is described below.

4.1 Preparation

It is considered necessary to have at least one week at the course centre itself to prepare the course and to adjust to local conditions. There are also some practical arrangements that have to be made which take some of the time allocated to preparation, for example, obtaining course material, books, stationery, tools, and so on. Ample time should be allocated to arrange accomodation for the trainers as well as for the students. It is also essential to make good transport arrangements for the trainers. This will facilitate the smooth running of courses.

The recipient organization should be contacted and informed about the timetable well in advance so that it.has sufficient time to recruit students. Lists of participants should be prepared in good time to allow trainers and students to prepare themselves reasonably well for the intensive programme.

4.2 Course duration and implementation

It was felt that courses of this kind should be limited to three weeks since they are quite demanding, both for trainers and for students. Where practicals and exercises are concerned, the training programme should not be more comprehensive but rather more intensive.

Shorter practicals should also be considered, for example practicals and demonstrations for local employees lasting half a day with some breaks. Suitable subjects for these activities would be the daily maintenance of tractors,

dehorning, castration, and the calibration of fertlizer Spreaders.

There was also a general feeling that social activities such as sports and games should also be included in the programme to allow some relaxation.

of agriculture is concerned. A certain basic knowledge of mathematics and physics is also necessary since the training programme is quite intensive. Students should preferably have a positive attitude towards agriculture and, if possible, they should be given the opportunity to apply knowledge gained from the course soon after its completion.

4.3 Recruitment of trainers

It was felt necessary that prospective trainers should have a sound knowledge of and substantial experience from the country where the course is conducted. As a minimum a few years of field work would be desirable. They should also have experience of training. Experience from a vocational college would be preferable.

The trainers also felt that a team of two is desirable. Two trainers can complement each other. One can work on other farm activities while the other is training students. There is a need for the trainer/student ratio. to be small during practicals. This will enable training to be efficient.

For future programmes it was considered desirable to try to recruit local trainers. This arrangement would have the advantages that such trainers would be very well aware of local conditions and the time required for preparation could be reduced. A local consultant would also be invaluable as an interpreter between expatriate trainers and the students.

4.4 Possible subjects

It was felt strongly that the general maintenance of farm machinery, crop production, and animal production should be

given high priority in the selection of topics for short courses on the agricultural projects. Other subjects such as vegetable production, farm management and irrigation would also be in great demand. It was emphasised by the trainers that the general economic aspects of individual subjects should be a component of the course.

The timing of the courses was discussed. In general there are two main arguments here. One is that courses should be conducted during off-peak periods to allow ample time for students as well as teachers to concentrate on their training activities. On the other hand, during peak periods, there are numerous opportunities to apply knowledge gained immediately in the field. During the planting season, for instance, useful practicals could be conducted by taking students to participate in planting. The choice between the two alternatives should be made depending on the current situation at that particular time.

It was generally felt that a suitable time for short courses in farm machinery and crop production would be between March and May, 1 e avoiding the busiest peak periods. However, the advantages of linking training to ongoing activities in the field was also emphasised.

Where short courses in animal production are concerned, no special preference was expressed since activities are spread fairly evenly over the year.

Short courses in farm management should preferably be conducted during the period between July and August when preparations for the coming season are made. This course would then assist in these preparations.

5 _ , PROPOSALS FOR SUPPORT FROM SIDA ’

As can be seen from the report, the agricultural projects have expanded both in number and in size without a corresponding increase in the availability of competent management. It has therefore been agreed that SIDA’s support should concentrate on training and consultancies, and only limited funds should be used for additional investments.

5.1 Chongela and Alpha

After the,CIash course in the operation and maintenance of farm machinery and crop production, it has been suggested that similar training should be arranged in other subjects as well. Highest priority should be given to planning, budgeting, record keeping and crop rotation. Training and a consultancy in these subjects is proposed, see terms of reference in Appendix 8. Training and a consultancy is also budgeted for in animal production, where culling and breeding practices must be worked out and implemented, see terms of reference in Appendix 10. Specializedscourses are planned for the upgrading of members of staff already involved in the agricultural projects.

5.1.2 Consultancy

It is proposed that a.consultancy.with the aim of drawing up a training plan is carried out as soon as possible.

5.1.3 Possible investments

Ttais ptopdsed.that the limited funds for investments are used for buying new breeding male stock for the beef cattle and the piggery. This should be done in conjunction with the consultancy on the planning of breeding and culling. The new workshop is in urgent need of adequate equipment to meet the increasing demands for maintenance and repairs.

5.1.4 ’ Proposed budget, 1/1-30/6 1987

Prio- rity No	Activity Details		
1.	Training Farm office establishment		
	Crash course Planning, budgeting,	22	SEK
	Practicals record keeping	000	
2.	Training		
	Crash course Animal production	250	
	Culling practice	150	
	Breeding practice	100	
3.	Specialized courses for staff	200	
4.	Consultancy Planning of training programme	90	
5.	Breeding:		
	bulls	30	
	boars	180	
6.	Workshop equipment	1000	
	Total		

5.2 Mazimbu and Dakawa

5.2.1 Training

There is an urgent need for practical-oriented training of staff both at Mazimbu and Dakawa. During discussions with management the following areas were mentioned as being of highest priority:

1. Operation, maintenance and repair of agricultural machinery

2. Maintenance of feed-mixing equipment.
3. Nutritional aspects of feedstuff mixing.
It is recommended that practical-oriented instructor training be arranged at Mazimbu and Dakawa in the above mentioned subjects as well as in crop rotation, planning and soil conservation. This training should be combined with the supply of training material, handbooks and textbooks about tropical agriculture. Draft terms of reference for the training are attaChed (Appendix 9). Specialized courses for staff could be arranged at any suitable institution in Africa or Europe.

5.2.2 Consultancy

The funds below are intended for a consultancy with the objective of including agricultural subjects in the secondary school at Mazimbu. Terms of reference are attached (Appendix 7) It is recommended that this consultancy be combined with a visit to Swedish agricultural schools by the principal at Mazimbu.

5.2.3 PosSible investments

Possible future SIDA support for investments in addition to those already agreed is recommended in the following order of priority:

Priority 1

New poultry houses at the farm site. It is recommended that these are constructed over a period of time in pace with the achievement of efficient production.

Priotity 2

Shed for agricultural machinery

The present shed is too small for the existing agricultural machinery. A simple construction with a gravel floor, a roof and three walls is recommended.

5.2.4
Prio-
rity
No
Total
Tanzania
Zambia
Total
Priority 3
Proposed budget,
Activity
Training
.Crash course
Practicals
Specialized
courses for
staff
Consultancy
Possible
ainvestments
Summary of proposed budget 1/1-30/6 1987
for ANC agricultural projects in SEK 000
Training/Consultancy
600
700
1300
Details
Pig houses
1/1-30/6 1987
Crop production
Soil conservation
Farm machinery
Poultry houses
Machinery shed
Investments
400
300
700
Extension of pig growers’ boxes. At present the growers are overcrowded in their boxes and additional boxes are therefore recommended. These could be somewhat simpler and cheaper than the existing pig houses.
SEK
300
100
200
400
1000
Total
1000
1000
2000

Appendix 1
Farm descriptions, Chbngela and Alpha
Location
Chongela and Alpha farma are situated some 15 km off the Great North Road along the Chisamba Road, 45 km from Lusaka. SIDA purchased Chongela Estate in 1978 and Alpha Farm in 1985 as part of its programmes of development assistance for the ANC. Access to the farms is via two roads. A new road connectina the two farms is under construction. Three bridges will be built where the connecting road crosses the dambos. A dam at Alpha and four boreholes at Chongela supply water for the farms.
In general the land is flat with gentle slopes and a few dambos dividing the area into different sections. Anthills are frequent in the area,
Area under cultivation
Chongela totals 1335 hectares and Alpha 1605 hectares, in all 2940 hectares. Fields available for cultivation are shown in three maps in this appendix (pp 7-9) and are summarized below. The areas which can be cultivated have been calculated on the basis of an aerial photograph and are therefore approximate. In general the figures seem to be correct according to the management of the farms.
Fields indicated with a "P" (paddocks) are considered suitable only for grazing.

Appendix 1 (2)
Field -Estimated area in ha
Chongela East:
2 a 12.5
2 b 22.0
3 47.0
4 8.5
5 37.0
6 34,5 161.5
Chongela West
1 66.5
2 142.0
G 1 (enclosed garden 16.0
G 2 (garden) 20.0 244,5
Alpha farm
1 62.0
2 32.0
3 44.0
4 30.0 168,0
TOTAL 574.0
Soils
The soil at Chongela and Alpha varies from sandy loam soil to a sandy soil.
The pH is not known but is likely to be around 5 or less. The same applies to sources of P (phosphorous) and K (potassium) in the soil.
The frequency of anthills comprises 10-15% of the hectarage, Slopes are gentle and therefore erosion is not a general problem. Rocky patches in some fields are obstacles,it is better to ignore than to struggle with. Field G 1, the enclosed garden and orchard, is one of the more fertile areas on the farm.
The fertility of the soil is generally low but with proper fertilization it can still produce, at least to medium level.

Inventory of-buildings
Appendix 1 (3)
Novelnbe r 1 9 8 6
The buildings are located as shown in the drawings attached.
The present status of these buildings is briefly indicated in the list below:

Building	Remarks
thngela	Built in 1986 but has not been equipped yet. Fencing around the working area is needed. The slope of the roof is such that water seeps through between the roofing-sheets.
New workshop	Erected in 1986. Has not been taken int use yet. Indoor height has been found to be too low and must be altered.
(NORAD)	New, containing approx. 10m3. The roof of the bearing building is not likely to carry a full tank.
Abattoir	A large building with great potential but is in need of internal repairs.
(NORAD)	Old concrete construction. Working, but in need of maintenance.
Water tank	In fair condition. In one of the stores there are two freezers, one of which seems to be in working order.
Farmhouse	In poor condition and will be replaced by a new unit in the workshop. No equipment installed yet.
Water tank Farmhouse	Old and not functioning for their original purpose. Have been replaced by the new workshop. This transfer is taking place at the present time.
Stores	Used for layers only. Also comprises a store for fertilizers. In working condition but access to the store is limited. A new poultry unit will be built at Alpha. A contractor has been engaged.
Milling unit	Shelter for implements and tractors. In working condition but needs repairs.
Old workshOp and stores	Shelter only
Barn	In fair condition. Compartments are built of clay bricks. These need continuous repairs.
Shed	
Goathouse	
Piggery	

Appendix 1 (4)
Feed store piggery Fair, but should be enclosed.
Water reservoir - garden 680m3. In good condition.
(NORAD)
5111312
Farmhouse The dwelling house has been repaired
recently but the painting work has not
yet been completed.
Sub station Recently erected for power supply at
Alpha. Not painted yet. Transformer to
be installed.
Old tobacco barns Not shown on the drawings. The buildings
are in poor condition and are out of
order. Their bricks can be used in the
construction of the planned low cost
houses.
Tractors
J0 3140 4WD 1984 In fair condition. External damage only.
JD 2040 1985 In fair condition
JD 2040 1981 Running, but no starter
SAME 4WD 1980 Running but in poor condition.
MF 2640 4WD 1985 In fair condition but drawbar and hitch
are severely damaged. Consumes a lot of
fuel since few implements are of comp-
arative size.
JD 2040 1980 Out of action.
JD 2030 1980 Out of action
JD 1120 1980 Out of action.
Imglements
Fertilizer spreader
VICON 1983 In working condition.
4-row planter
JD 1985 In good condition.
4-row planter
JUMIL 1983 Out of order.
4-row garden planter
TABATA Out of order.

Combine harvester
JD 942, 3-row maize-head
Maize sheller
LION 1985
Maize trailers (2) 1981
3-ton trailer
Silage cutter 1984
Grass cutter, mower
MF 70 1985
Mower
Deutz Fahr
Disc harrow
BALDAN
Disc harrow
MP 222 1985
Disc harrow X-shape
Disc plough
4 discs 1982
Disc plough
MF 1985
Disc ploughs (4)
Cultivator
KONGSKILDE 1981
Cultivator for maize
with duckfeet
Ridgers home made
Garden tractors (4)
Vehicles
MD truck, 7 ton 1984
Scania Vabis, 10 ton
1985
HINOItruck
Datsun Safari
Station wagon 1984
Toyota 4WD. pick-up
1985
Motorbikes (6)
MORINI (Italy)
Appendix 1 (5)
Working after repairs
Working after minor repairs.
Working
Working.
Fair condition.
Working after repairs.
Working after repairs.
In fair condition
out of order due to a missing bearing.
Working
Working
Out of Order
Out of order
In working condition
Working
Working
Out of order
In working condition
In good condition
Barely working, no starting device.
Working
In fair condition.
4 still packed in crates
2 in working condition.

, Miscellaneous
Chainsaws (5)
Husqvarna
Bush saw
Welding machine,
transformer 150A
Compressor
Atlas Copco
Grease guns
2 big
3 small
Appendix 1 (6)
Out of order.
Working.
Working, working but with low capacity
for course purposes (farm implements).
Working,
Working.
Working.

tAppendiX 1 (7.)

CHONG ELA WEST
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-’ Appendix 1’ (9)
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OLD
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OLD
WORKSho? /
GMDEN
oSmuE
WATEQ -
Ransom He
-DAMT54:

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Appendix 2
Farm desdription, Mazimbu
Location
Mazimbu Farm is located at the SOMAFCO centre some ten kilometres outside Morogoro town, The centre was established by the movement on an old sisal estate which it was given by the Tanzanian government. The few buildings which remain from that time have undergone extensive renovation. The activities at the centre focus on education at primary and secondary levels. There is also a nursery, a hospital and a number of small industries.
Land
The land is situated on the edge of mountainous country and slopes gently eastwards. This makes soil conservation measures essential. Soil tests indicate a pH of around 5.5-6 although this varies from field to field. Farming in the area around the centre focuses on cassava maize, sorghum, vegetables and some fruit trees. Annual rainfall at Mazimbu is normally 800mm, most raining coming during the long rains between February and June. Rainfall during the short rains, December-January, is very unreliable.
Area under cultiVation, enterprises and yields
According to the farm map dated 5/2/1984, there are in all 13 fields ranging from 14.3 ha (no. 8) to 78.3 ha (no.4), with the planned area for cultivation totalling in all 428.3 ha. A total hectarage of 363 ha has been utilized, leaving some 65 ha to be cultivated. The effective utilization of the demarcated area is probably less than 100%.
Areas and yields for field crops for 1983-86 are as follows:
3x7,Enterprise Hectarage Total yield, kg Yield kg/ha
’1983 Grain maize 168 252000 1500
Sunflower 38 22800 600
Beans 40 N/A - N/A
Sorghum 29 40600 1400
Total 273

Appendix 2 (2)
Enterprise Hectarage
Total yield, kg ’ Yield kg/ha
1984 Grain maize 240 N/A N/A
Sunflower 54 " "
Beans 13 " "
Sorghum 72 u "
Total 379
1985 Grain maize N/A 550000 N/A
Sunflower " 6000 "
Beqns " 11500 "
Sorghum 21 50000 2380
Total N/A
1986 Grain maize 216 401000 1856
Sunflower 33 23580 715
Beans 23 5200 226
Sorghum 91 120000 1320
Total 363
Immediate future plans
1987 Grain maize 300
Silage maize NAA
i; sunflowerd ’ 25
’ Beans 50
Sorghum 78
Total 453
Field crops in general
High farming technology is used, including modern machinery, and inputs such as seed, fertilizers and chemicals are mainly purchased. There is a general uncertainty as regards obtaining inputs in sufficient quantities and at the right times. This naturally affects the yields. For harvesting a combination of methods is used and grain is harvested with combines and manual labour. The maize, for example, is choppeddby hand and cobs thrown into the combines for threshing since weak stalks tend to fall to the ground before harvest time.
Some pastures are being established..The quality varies and good grazing areas would probably require reliable irrigation; Silage is cut with a mower and stacks are piled in the fields. It is then taken to the kraal and dairy during feeding time.

ugh. .....
Appendix 2 (3)
Livestock enterprises _
Dairy
At the moment there are 12 cows (9 in milk), 15 heifers (3 in calf), 8 calves and 2 bulls. Average daily production amounts currently to approximately 60-70 kg, 1 e around 7 kg per cow per day. Production is erratic, dependent on the availability of feed, and will increase significantly when the herd is moved to new pastures. Cows are milked by hand although milking equipment for 50 cows will be installed in the future. Most stockfeed is produced on the farm in accordance with recipes worked out in collaboration with Sokoine University, although there are difficulties in obtaining minerals and vitamins.
Beef
At present the total beef herd Comprises 82 head and includes 1 bull, 3O castrates, 37 cows, 7 calves and 7 heifers. The animals circulate within the farm area and are herded to fields where grass is available. The aim is to increase the herd to 500 head and to transfer the herd eventually to Dakawa. The breed is a mixture of indigenous cattle and exotic, such as Guernsey. There are three serving elderly bulls and one young Boran bull.
Piggery
The total number of pigs is some 1300 including 91 sows, 2 large white boars and the remainder being piglets and porkers for fattening. In general the sows farrow twice a year and produce litters of, on average, 8-9 piglets. The piggery also suffers from an erratic supply of stockfeed and, in particular, from a lack of essential ingredients in the mixture, mainly minerals and vitamins but also proteins. Another problem is that imported boars and sows seem to be sensitive to local conditions. It was reported that hooves are injured, mainly through cracking. The animals also suffer from parasites and diseases.
There are separate houses for young and weaning sows, sows and piglets and porkers. Approximately 1000 kg pork is delivered to the kitchen each week, Ideally the result of the slaughter

of 10-12 porkers. However, due to insufficient growth, 16-19 porkers must currently be slaughtered to reach production targets.

Poultry

Currently there are only layers, two pens containing 223 and 214 layers respectively. and some 1000 growers. The present layers arrived on 29th March 1986. One week’s production was reported to be approximately 60 trays x 30 eggs : 1800 eggs. This corresponds to a laying percentage of approximately 59%. New stock is normally’brought in from Kibaha. At present there is an outbreak of fowl typhoid causing higher mortality than usual. The present site, near the industrial area and the river, is not located satisfactorily. There are plans to move the chickens to the farm site.

No broilers are raised at present, mainly due to a lack of day-old chicks. An incubator for 6000 eggs has been purchased.

Goats

At present there are 623 goats which are used for meat production. Inbreeding is common and therefore fresh blood, including a milking breed, is required. 110 have been castrated for slaughter at the age of about 9 months.

Fruit trees

At present there are 1800 trees, including 270 that bear1 fruit. Bananas, various citrus varieties and guavas predominate. During 1986, to the time of this report, 9.3 tonnes have been delivered to the kitchen according to reports. Furrow irrigation does not work satisfactorily due, in the mainly, to the faulty loaction of plants from the beginning.

Vegetables

Approximately 2 hectares of vegetables are grown at Mazimbu. There is a variety of vegetables, for example, Chinese cabbage, egg plant, carrots and onions, This year some 52 tonnes have

Appendix 2 (5)
been delivered tthhe kitchen. The water supply is inadequate due to a scarcity of sprinklers, only 8 in all, and a pump of the high volume type which gives relatively low pressure.

Appendix 3

Crop budgets

It was found necessary to prepare budgets for a few minor crops in order to compare their profitability and the future options between enterprises. The budgets, which were drawn up for maize, sunflower, cabbage and tomatoes, are presented on the following pages.

Gross margins for field crops such as maize and sunflower show negative results, in the range of apprqximately K100 - K900 per hectare. On the other hand the gfbes margins for vegetables vary from K2000 - K6000 per hectare, The growing of vegetables, in preference to field crops, is therefore recommended.

Explanations of the figures used in the calculations:

K : kwacha

1 bag : 90kg and 50kg respectively

Labour cost has been estimated at K4.20 per manday (md)

Transport cost has been estimated at K1.00 per ton per km (/tonkn

Fixed costs have been estimated to be in the range K1500-K2000 per hectare

Fuel price has been estimated at K4.50 per litre

Costs for repair and maintenance have been estimated at K400/year/hectare.

Appendix 3 (2)
Crop budget for maize, 1 hectare

Yield, kg	2000	3000
Income, 22 (33) bags x K78	1716	2574
1 bag : 90 kg		
Variable costs		
Seed		
Fertilizer		
D- compound 300kg x K1.60/kg	480	480
Urea 200kg x K1.30/kg	260	260
Transport	20	20
Fuel and oil, 801 x K4.50/litre	360	360
Maintenance and repairs	400	400
Packing material, 22 bags x K0.50/bag ’ 14’		17
Transport	20	30
Labour		
General, 20md x K4.20/md	84	84
Weeding (twice) 2 x 10md x K4.20/md	84	84
Harvest 15md x K4.20/md	63	63
Total variable costs	1782	1798
Gross margin	66	776
Production cost per bag	81	54

NB. To cover the fixed costs also, an additional 20-25 bags per hectare must be produced. Taking all costs into consideration and assuming a yield of 2000 kg per hectare, the production cost per bag would be in the region of K160. Yields at Chongela have been between 1500 kg and 2000 kg per hectare.

Crop budget for sunflower, 1 hectare
Yield, kg 300
Income, 6(12) bags x K70 420
1 bag : 50kg
Variable costs
Seed, 8kg X K6.00/ha 48
Fertilizer
D-compound 200kg x K1.60/kg 320
Transport
Fuel and oil, 80 litres X K4.50/l 360
Maintenance and repairs 400
Packing material 6(12) bags x K0.SO/bag
0)
Transport 12
Labour
General, 24md x K4.20/md 101.
’ Weeding (twice) 2 x 10nd x K4.20/md 84
Harvest, 10md x K4.20/md 42
Total variable costs 1370
Gross margin -950
Production cost per bag 228
Appendix 3 (3)
600
840
48
320
360
400
24
101’
84
42
1370
-950
115
NB. To cover fixed costs an additional 21-28 bags per hectare must be produecd. Taking all costs into consideration and assuming a yield of 600 kg per hectare, the production cost per bag would be in the region of K260.

Appendix 3 (4)
Crop budget for tomatoes, 1 hectare
Yieldlkg 5000 10000
Income 5000(10000) x K1.50/kg 7500 15000
Variable costs
Seed, 250 g 51 51
Fertilizer
D-compound 500kg x K1.60/kg 800 800
Urea 100kg x K1.30/kg 130 130
Transport 20 20
Fuel and oil, 80 litres x K4.50/l 360 _ 360
Maintenance and repairs 400 400
Packing material 320 640
Transport 200 400
Labour
General, 275md x K4.20/md 1155 1155
Irrigation, 40md x K4.20/md 168 168
Equipment 500 500
Total variable costs 4104 4124
Gress margin . 3396 f0376
Production cost per kg 0.82 0.46
Taking all costs into consideration and
assuming a yield of 5000 kg per hectare, the production cost
per kg would be in the region of K1.20.

1
Appendix 3 (5)7
- _ Crop budget for cabbage, 1 hectare _
Yield, kg 5000 10000
Income, 5000(10000)kg x K1.00/kg 5000 10000
Variable costs
Seed, 0.6kg x K69.00 41 41
Fertilizer
D-compound 300kg x K1.60/kg 480 480
Urea 100kg x K1.30/kg 130 130
Transport 16 16
Fuel and oil, 80.litres x K4.SO/l 360 360
Maintenance and repairs 400 400
Packing material 50 100
Transport 200 400
Labour
General, 150md x K4.20/md 630 630
Irrigation, 40md x K4.20/md 168 168
Equipment 500 ’ 500
L Total variable costs 2975 3225
Gross margin 2025 6775
Production cost per kg 0.60 0.32
. 4.’
Taking all costs into consideration and
assuming a yield of 5000 kg per hectare, the production cost
per 6hg would be in the region of K0.95

Appendix 4
Programme for the crash course, Chongela and Alpha,
November and December, 1986
Preparation: 4/11 - 8/11
- visits to the farms
- preparation of material
- practical arrangements
Programme:
Crash course planned for a group of 10-12 students in Farm Machinery and Crop Production.
Implementation:
Course No. 1 11/11 - 15/11
Duration: One week
No. of students: 6 (4 ANC, 2 SWAPO)
Course No. 2 18/11 - 29/11
Duration: Two weeks
More intensive, also included student-lectures and excursions
No. of students: 7 (3 ANC, 4 SWAPO)
Special input:
On one afternoon tractor drivers and mechanics assembled around a tractor outside the workshop. A full service programme was then implemented using the manual and service_chart. The clerk responsible for recording service intervals was also present.

0800
Lunch
1200-
1300
1630
Material
needed
TRAINING PROGRAMME
TUE 11/11
Farm tractors
Fundamentals of
service
1
2
ummhw
Radiator
Lubric. system
Air cleaner
Tyres
Fuel system
Daily routines
Service prog.
tractors
FOR A ONE WEEK COURSE IN FARM MACHINERY AND CROP PRODUCTION
WED12/11
Planters
Calibration of
1 Seed rates
2 Fertilizer
application
Maintenance of
the implement
planters
sack
2
2 tractors
1
1 scale
1
measuring tape
THUR 13/11
Farm tractors
Cont. of day 1
and
battery service
Adjustment of
1 Clutch
2 Brakes
3 Front wheel
bearings
2 tractors
Grease
Brush
Water
FRI 14/11
Soils
SoilPelements;
Soil structure
Soil erosion
Fertilizers
Plants
Cultivation
mm-bwm-s
Disc ploughs
Disc harrows
Cultivators
2 tractors
SAT 15/11
Spraying and
top-dressing
Calibration and

maintenance
Fieldchecks
Precautions when
spraying
2 tractors
1 sprayer
1 fertilizer spreader
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0800
Lunch
1200-
1300
1600
Materials
needed
TRAINING PROGRAMME FOR A TWO WEEK COURSE IN AGRICULTURE
COMPRISING FARM MACHINERY AND CROP PRODUCTION
TUE 18/11
Introduction
Farm tractor
Fundamentals
of service
Radiator
Lubrication
Air cleaner
Fuel system
1
2
3
4 Tyres
5
6 Daily routines
7
Service
programme
2 tractors
WED 19/11
Farm tractor
(cont.)
THUR 20/11
Soils
Maize planters
Calibration of
seed and fertil.
rates
Maintenance of
the implement
2 tractors
2 planters
scale
tape/ruler
FRI 21/11
Soils
Planters
(cont.)
CHONGELA AND ALPHA FARMS; NOV 86
SAT 22/11 SUN 23/11
Plant nutrients
Fertilizers 1 1%
Crop
calculations
a
w
w
m
a
m
H.
x
A
(E)

needed
MON 24/11
Tractor service
1 Battery
2 Front wheel
bearings
3 Clutch
4 Brakes
5 Lubrication
Daily routines
Materials 4 vehicles
(tractors,
trucks,
pick-ups)
TUE 25/11 WED 26/11
ZAMSEED farm Fertilizer
Excursion spreader/
sprayer
Function
Calibration
Maintenance
Field surveying
1 truck 2 tractors
Sprayer
Spreader
THUR 27/11
Surveyu(c0nt.)
Chongela and
Alpha farms
Truck
FRI 28/11
Maize sheller
Function
Service
Combine
Harvester
Function
Service
Maize sheller
Combine
harvester
SAT 29/11
Final
Evaluation
(v) v XIpuaddv

Appendik 5
TRAINING MATERIALS - CRASH COURSE
Table of contents: Page
Summary of requirements of inputs
Field record (example)
Checklist, daily routines for tractor maintenance
Battery maintenance
Calibration of planters
Calibration of fertilizer application
Calibration of Sprayers
doqmmbww
Safety regulations
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Kg/ha- Kg/ha Kg/ha Kg/ha Tot. Kg/ha Tot.
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Appendix 5 (4)

DAILY ROUTINES BEFORE YOU START YOUR TRACTOR

CHECK

1. Water level in the radiator
- above the cells
2. Oil level in the crankcase
- dipstick, between the indicators
3. Tyres
- inflation
4. Fuel
- either Saugecu’in the tank
5. Air cleaner
- pre cleaner
- filter if needed

LUBRICATE

1. Front axle
2. Front wheel bearings

CLEAN

1. Radiator
- if blocked
- use water or air
2. Hydraulic quick couplers before connecting.

4
Z?!
1.
6.
7..
, BATTERY MAINTENANCE
Clean the battery
- use water and a brush
Remove the clamps from the terminals
- start with the negative
Clean the clamps and terminals
- use water
wirebrush
sandpaper
knife
Lubricate the terminals and clamps
- use ordinary grease
Check the water level in the cells
- fill up with distilled water
(rain water may also be used)
- 10 mm above the cells
Before assembly, clean the battery box
Assemble
- start with the positive terminal
- avoid short circuits
’Appendix 5 (5)

Appendix 5 (6)
CALIBRATION OF PLANTING RATES - SEEDS
Manual:
1. Determine the circumference of the driving wheel
Diameter x’h : circumference
1
1T : 3.14 or 37
2. Determine the number of revolutions to cover 10 metres
19
C
3. Lift the planter
: No of revolutions
4. Place a sack under all units or one seeding unit.
5. Turn the driving wheel the calculated number of revolutions
NB Points 3, 4 and 5 can be substituted by driving the planter on a road for 10 metres.
6. Count the seeds under each unit and divide by 10. This gives you the number of seeds per metre.
Adjust the planterrif necessary and continue testing until a satisfactory rate is achieved.
7. Always check all seeding units
8. The number of seeds pervmetre is dependent on a number of factors, for example,
- variety
- pests
- fertility
- planting time
Normally 4-6 seeds are planted per metre.

Appendix 5 (7)
CALiBRATION OF FERTILiZER APPLICATION -
Manual:
1. Determine the driving wheel circumference
Diameter x U : circumference
11
: 3.14 or 3%
2. Lift the planter and place a sack under each unit
3. Turn the driving wheel the number of revolutions which equals 1/1000 of a hectare
1 ha : 10.000m
10.
1000
If
2
000 : 10m2
the row spacing on the planter is 90cm, the wheel must be turned to correspond to a distance of 11.1 metres
If
If
750m --- 13.3 metres
60cm --- 16.6 metres
4. Weigh the quantity collected, multiply by 1000 and the result is equal to the applied rate in kg/ha.
Field
check of the application rate:
1. Fill the hopper to full level, smoothen the surface!
2. Cover approximately 1/2 hectare or more.
3. Then calculate as follows (the following is an ekample):
a)
b)
C)
d)
e1
f)
g)
Length ofifield, 320m
Operational width of the planter/spreader,
4 rows x 90 cm : 360 cm
Two.times up and down the field, 4 x 320 m : 1280 m
Applied area in total, 6.6 m x 1280 m : 4608 mi
Planned application rate, 300 kg/ha
Formula: A901. are: 303221. rate : applied quantity (kg)
Example 4608 X 300
10.000
After having covered the distance in the example, the fert should be refilled, in this case with 138 kg, almost three bags.
: 138 kg

Appendix 5 (8)
FERTILIZER SPREADER 7
Manual for application rates
1. Read the manual and attach the spreader to the tractor
a) pay attention to height
b) angles
c) shaft attachment
2. Set the application rate in kg/ha
3. Check that the hopper is clean
4. Engage the p.t.o with the empty spreader
5. Fill the hopper with a 50kg bag, after having closed the duct
6. Determine
a) working width
b) speed of tractor, gear to be used
7. Go to the field and
a) engage the p.t.o
b) engage selected gear (5-8 km/h)
0) adjust p.t.o rpm.
d) go forward until the fertilizer is finished
8. Measure the length of the fertilized area
9. Calculations
a) note the working width in m ..... m
b) note the fertilized length in m ..... m
c) note the gear used .....
d) desired application rate in kg/ha ..... kg/ha
Example:
Length (160m) x width (10m) : fertilized area (1600m2)
2
10000m x 50kg2(guantitz aBElied) : kg/ha (application rate)
1600 m (fertilized area)
10. Adjust the spreader if necessary to get the right application rate.
11. Test until a satisfactory rate is achieved.

Appendix 5 (9)

CALIBRATION OF SPRAYER

For accurate performance in the field, the flow rate of sprayer nozzles must be known. The following is a suggestion for calibration.

Fill the tank with water

During this operation

CHECK - That all nozzles are of the same/correct size

With the sprayer stationary - 540 rpm power take off

- start the pump
- open the valve to the boom
- adjust the pressure setting to 3kp/cm

CHECK - leaks

- spray pattern from nozzles
- clogged nozzles

Close valve to boom - lever

Fill up the tank _ lever control

DATA

Rpm .....

2 .....

Pressure, kp/cm

The size of the nozzle tips .....

The volume of the tank (litres) .....

The width of the boom (metres) .....; .....

1

Work out how far you have to drive in order to spray1o of a hectare (1000m2):

1000

The width of the boom in metres : Distance to drive

Select a suitable area and mark the appropriate distance.

Drive the sprayer across the marked distance at operating speed.

Measure the quantity of water (fluid output) which has been sprayed by filling up the tank again. Use a bucket or other measuring vessel.

Litres x 10 : aplication rate L/ha

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Appendix 5 (10)
If the applicatidn rate is not satisfactory, repeat the manoeuvre at a slower or higher operating speed.
Suitable operating rate on a harrowed field, 6-8 km/hour, on a ploughed field 3-4 km/hour.
Consult the tractor manual for the correct gear(s).
When the usprayer has been calibrated, the chemical solution can be used. Remeber : always read the instructions on the container before using the chemical solution.
Note the application rate per hectare and multiply by the number of hectares the spray tank will cover.
For example, if the sprayer is calibrated for a fluid output of 200 litres per hectare and the volume of the spray tank is 600 litres, an area of 3 hectares will be covered.
The volume of the tank in litres
Fluid output in litres/hectare : hectares
The application rate per hectare x hectares : quantity of chemicals per full tank.

Appendix 5 (11)

SAFETY REGULATIONS

Agricultural chemicals can be dangerous. Improper use can cause injury to persons or animals and damage to plants, soil and other property.

Handle and apply with care.

When mixing, calibrating or working in any way with chemicals, use the following equipment and supplies:

- Protective clothing
- Clean water supply
- Detergent

If spray gets on your body, wash IMMEDIATELY with clean water and detergent.

An area must be selected where the sprayer can be safely filled, flushed, calibrated and decontaminated without pesticides escaping in any way to contaminate people, animals, vegetables, or the water supply. Select an area where it is impossible for children to come into contact with the pesticides.

Appendix 6

Tetms of reference for a consultancy on manpower and training needs for the agricultural projects

Background

At the consultative talks between ANC and SIDA in December, 1986, it was agreed that SIDA should continue to support agricultural training. At present, ANC has agricultural projects in Tanzania, Zambia, Zimbabwe and Angola. The projects vary in size and production patterns but the majority operate on a fairly large scale and use high technology in the production process.

The management of these projects requires highly qualified manpower, both in top and middle management, 1 e farm managers, assistant farm managers and section managers. At present there is a shortage, expecially of high level management.

In order to plan for future agricultural activities, it is important that the manpower aspect is considered. It is, therefore, necessary to identify manpower needs and to suggest training activities which would enable personnel to obtain the qualifications and skills required. The need for personnel with different qualifications should be based on current activities at the agricultural projects.

Specific duties

The consultant shall

1. establish manpower needs within different categories for the sucessful management of the agricultural projects,
2. identify the present availability of trained staff at the agricultural projects, and
3, compile information on the future availability of staff at presentiunder training.

0n the basis of 1, 2 and 3 above, the consultant shall

Appendix 6 (2)

4. work out training needs for the different categories,
5. propose a training programme which includes priorities between different activities, and
6. suggest suitable training institutions for the implementation of the training programme.

Qualifications

MSc in Agriculture ahd substantial experience Of training in developing countries.

Suitable period

It is suggested that the consultancy takes place in the first quarter of 1987.

Appendix 7

Terms of reference for aconsultancy on introducing agriculture as a subject at the Solomon Mahlangu Freedom College

Background

The Solomon Mahlangu Freedom College has the objective of producing cadres for the liberation struggle and for a free South Africa. Its curricula objectives emphasise the need for comprehensive, integrated training to link academic and practical training and to bridge the gap between mental and manual labour.

Early in its existence, Somafco attempted to introduce pre-vocational training in various skills, including agriculture, but this proved difficult to sustain because of a lack of instructors and other constraints.

It is the intention of the Department of Education to introduce a well conceived and properly planned pre-vocational course in agriculture at Somafco in order:

1. to create among students a positive attitude towards agriculture, thereby diminishing the negative attitude created by Bantu education,
2. to create in students an appreciation of agriculture and agricultural work (at all levels) in its own right,
3. to create a greater measure of self-sufficiency in agricultural production through the involvement of students in agricultural activity, and
4. to create a manpower resource base from which the future agriculturalists, animal husbandry experts and agronomists can be drawn for training for the agricultural projects of the movement and for a free South Africa.

Tasks of the consultancy

1. To review and evaluate the teaching of agricultural science in the secondary division at Somafco.

Appendix 7 (2)

2; To consider the feasibility of introducing a practical pre-vocational agricultural component for the secondary, primary and adult education divisions at Somafco.

3. To consider the feasibility of establishing links with the agricultural sector at Mazimbu and Dakawa.

4. To recommend a programme of pre-vocational training which will include:

(a) syllabi
(b) methodological objectives
(c) proposals on teaching/learning resources
(d) a list of human resource needs
(e) a proposal on career guidance
(f) a proposal on the duration of such a programme, with a description of its implications for the overall curriculum and time-table of the primary and secondary divisions.

5. To recommend a preparatory programme for the achievement of item 4 above.

Qualifications

MSc in agriculture and substantial experience of training in developing countries.

Suitable period

It is envisaged that the consultancy will take place during the first quarter of 1987, subject to the approval of the Secretary of Education and the Director of Somafco.

Appendix 8

Terms of reference for a consultancy on and training in farm planning and crop rotation at Chongela and Alpha farms, Zambia.

Background

At the consultative talks between ANC and SIDA in December, 1986, it was agreed that SIDA should continue to support agricultural training in line with the experience gained from the crash course conducted at Chongela in November, 1986. The course focused on the operation, maintenance and repair of farm machinery, and crop production in general. A consultancy on and further training in the fields of crop rotation planning, including soil conservation measures, and in planning, budgeting and evaluation is neededa.

Specific duties

In close cooperation with management the consultant shall

1. work out a sound crop rotation plan including aspects of soil conservation,
2. work out a system for the planning, budgeting and evaluation of all enterprises, and
3. train personnel involved in the implementation of the above.

Qualifications

MSc or BSc in agriculture and practical experience in crop production and farm management. Fluent in English.

Suitable time

Two to three months between January and June, 1987.

Appendix 9

Terms of reference for training in farm machinery in Mazimbu, Tanzania.

Background

At the consultative talks between ANC and SIDA in December, 1986, it was agreed that SIDA should continue to support agricultural training.in line with the experience gained from the crash course conducted at Chongela in November, 1986 The crash course focused on the operation, maintenance and repair of farm machinery, and crop production in general. It has been suggested that in-service training at Mazimbu should start at Mazimbu in the first half of 1987. First priority should be given to subjects connected with farm machinery operation, aspects of crop rotation, and farm management in general. The identification and supply of training material/literature is an importnat component of the task.

Specific duties

Plan and implement instructions and in-service training programmes for agricultural staff at Mazimbu and Dakawa in the following subjects:

1. The operation, maintenance and repair of existing machinery, including the feed-mixing equipment.
2. The planning of good crop rotation, including aspects of soil conservation.

Contact should be established with existing activities where the development of vocational training is concerned. It may also be poSsible to cooperate in the development of curricula for such training.

Training should, to the greatest extent possible, be based on existing activities. This will involve instructors in the solution of real problems and in discussion of real plans.

_ Appendix 9 (2)

Qualifications

MSc or BSc in agriculture and practical experience in the operation and maintenance of farm machinery and in crop production.

Suitable time

Three to four weeks between January and April, 1987.

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Appendix 10

Terms of reference for a consultancy on and training in animal production at Chongela and Alpha farms, Zambia

Background

At the consultative talks between ANC and SIDA in December, 1986, it was agreed that SIDA should continue to support agricultural training in line with the experience gained from the crash course conducted at Chongela in November, 1986. The course focused on the operation, maintenance and repair of farm machinery, and crop production in general. Animal production at Chongela and Alpha farms is quite extensive and includes beef, piggery, goats and poultry enterprises. A consultancy on and training in animal production is needed in order to raise productivity, especially in the beef herd.

Specific duties

In close cooperation with management and the staff responsible for the beef herd, the consultant shall

1. work out a culling plan which shall result in a herd size which corresponds to the bearing capacity of the land,
2. work out a long-term breeding programme,
3. identify suitable breeding bulls to be bought in order to improve the genetical standard of the herd,
4. work out a mahagement plan, and
5. introduce an adequate system of record-keeping.

The above applies to the beef herd. Ifutime is available, the consultant should also direct his efforts toward the piggery enterprise.

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Qualifications
Appendix 10 (2)
M80 or B80 in animal husbandry and practical experience in cattle production. Fluent in English.
Suitable time
One month between January and June, 1987.
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Appendix 11

Questionnaire on agricultural training

This questionnaire has been prepared to assist the planning of agricultural training. You are already within the agricultural sector and we would ask you to answer the following questions relaiting to your training. Please answer as carefully as possible using block letters. Thank you.

Surname ..... First names..... .....

1E What is your general educational level:

a) Primary level Place .....

Years .....

b) Secondary level Place .....

Years .....

What vocational training nave you undergone? (SpeCify)

a) Type of training .....

b) Institute .....

c) Period of training .....

d) Trade tests, if any (date, type) .....

e) Diplomas, certificates (or similar) awarded .....

2. What professional training have you undergone? (Specify)

a) BSc/MSc/PhD .....

b) What were the major subjects .....

c) Length and time of training ...., ...

d) Institution .....

Appehdix 11 (2) .
3. Professional experience. List jobs after training in chronological order as regards a)position, b) place, 0) period of service and d) main duties. (Use an extra sheet of paper if necessary.)
I. a) Position..... .....
b) Place..... ....
c) Period.....(..... .....
d) Main duties ....
II. a) Position..... .....
b) Place.... ....
4. a) What is your present post..... ..... ’..
b) Waht is your present duty station.....
c) What are your present duties.....
5. If offered further training, what would you prefer?
Country..... .....
Institution.....
1) Level..... ....
ii) Subjects..... .....
iii) Time ....
6. What type of job/career within the agricultural sector would you be interested in?
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Appendix 12
People met for discussions (Jonsson, Sundstedt)
Tanzania
Development Cooperation Office
Jan Essner, Deputy Head
Bertil Stadell, Senior Programme Officer
Mazimbu
Tim Maseku, Director
Titus Kotsoe, Project Officer
Bikkie Abrahams, Administrative Officer
Mazimbu Farm
Caiphus Mosue, Acting Farm Manager
Mahmood Randee, Agronomist
Ebbe Nordbo, Horticulturist
Dakawa Project
Socks, Commissionar
Jacob Murake, Coordinator
Lefa Phiri, Farm Manager
Gadhaffi, Deputy Farm Manager
Kalevi Repo, ILO Vocational Training Expert
Norwegian Embassy
Daag Mjoeland, 2nd Secretary
Norplan
Arild Brook, Sociologist
ZAMBIA
Development Cooperation Office
Roland Axelsson, Regional Coordinator
Headquarters, Lusaka
Thomas Nkobi. General Treasurer
Jacob Chilwane, Pojects Officer
Mohammed Tikly, Principal, Somafco
Sam Masemola, Manpower Development Officer

_ Appendix 12 (2)
Chongela and Alpha Farms &
Aaron Mafaje, Farm Manager
Sadhan Naidoo, Deputy Farm Manager
George Naicker, Section Manager

Appendix 13
Programme details (Jonsson, Sundstedt)
24/11 Arrival Dar es Salaam
Discussion at DevelOpment Cooperation Office,
Travel to Mazimbu
25/11 Farm visit at Mazimbu
26/11 Farm visit at Dakawa
Meeting with Director at Mazimbu
27/11 Travel to Dar es Salaam
28/11 Meetings with staff ".Norwegian Embassy, Danish Volunteer
Service and Development Cooperation Office
29/11 Departure for Harare
30/11 Travel to Lusaka
1/12 Evaluation of crash course
2/12 Consultative talks at the Swedish Embassy
3/12 Visit to agricultural projects
4/12 lDiscussion.on long-term training
7/12 Drafting of report
8/12 Final discussion
9/12 Editing of report and departure