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Zimbabwe

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**UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT**

**LOCAL CURRENCY PROGRAMME**

**EVALUATION**

**OF THE**

**CHIBERO COLLEGE OF AGRICULTURE**

**JULY 1987**

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## **INTRODUCTION**

Chibero College of Agriculture is one of a number of agricultural training institutions that are part of the function of the Ministry of Lands, Agriculture and Rural Resettlement. The College takes students with passes in five subjects, including English, Mathematics and a science at 'O' Level (11 years schooling).

USAID has supported Chibero with three projects, that have in total amounted to \$2 234 000. The grants were made from 613-K-601/602, 613-K-605 and 613-K-604 commodity aid programmes.

## **MAJOR FINDINGS**

### **Achievements**

As planned, and as the result of the grant made to it, the College has increased its annual intake of students from forty to sixty. At the same time, and also as planned, the College now has forty female students.

### **Graduate Demand**

Despite the difficult employment climate in Zimbabwe, all graduates from the College have readily found careers, although the opportunities open to women may be less challenging than those available to men. Information on where Chibero graduates are and what they are doing is not readily available.

### **Management**

Expenditure was \$800 000 below allocation. Other small projects have been proposed to utilise this surplus with ZASA approval.

## **RECOMMENDATIONS**

### **Graduate and Employer Survey**

A survey of the graduates from Chibero and a survey of the needs of employers of the graduates is recommended as this would be of great value in the continuing development of the curriculum, and future development of the College.

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## EXECUTIVE SUMMARY

### Findings

This has been a straightforward project aimed at expanding the boarding and teaching facilities at the college.

The project met its objectives, namely the increase in student enrolment and the recruitment of women for the agricultural diploma offered by Chibero. All course graduates have found employment in the different sectors of the Zimbabwe economy or are pursuing further studies in the agricultural field.

As a result of the project, learning and living facilities at Chibero have been greatly enhanced. Staff and students interviewed at the college gave testimony to this.

A problem that has been experienced in many of the projects reviewed under this evaluation is the delays in the flow of funds. No such problems were reported in the Chibero project. This may be attributable to the frequent dialogue between the two implementing ministries, namely, the Ministry of Lands, Agriculture and Rural Resettlement and the Ministry of Public Construction and National Housing. The two were also in close consultation with and submitted necessary reports to the Ministry of Finance, Economic Planning and Development. The enthusiasm of the Principal of Chibero College and his staff contributed to the success of the project.

The minor problems encountered during the implementation of the project centred on differing views of the project administrators. These were resolved and need no further comment. They had no material effect on the smooth running of the project.

\$2 million (1) was allocated to the main component of the project, namely construction. \$1,17 million was spent on all the buildings specified in the original project document. It is proposed to spend approximately 0,35 million on the expansion of teaching facilities sanctioned by ZASA.

### Recommendation

An important part of the study should have been discussions with Chibero graduates and their employers to obtain their views on courses offered by the institute. This, obviously, is an enormous task as the ex-students work throughout the country and no known record exists to trace them. However, in order to get an accurate assessment of the impact of Chibero College of Agriculture we recommend that such a study be carried out. It is possible that once that data has been collected and interpreted, a syllabus evaluation might be indicated, leading to syllabus change.

(1) All financial figures appearing in this report are stated in Zimbabwe Dollars.

## INTRODUCTION

Agriculture is the backbone of the Zimbabwean economy. (1) Over 70 per cent of the population lives in rural areas and their main source of livelihood is farming. "In addition, the growth of the economy is largely conditioned by the performance of the agricultural sector which, in addition to providing more than 90 per cent of the food requirements of our society, accounts for 41 per cent of total merchandise exports. Therefore, meaningful development must place the agricultural sector in the centre of the development strategy." (1)

The United States Agency for International Development (USAID) recognises this fact. For this reason one of USAID's goals in Zimbabwe is to assist the Government in raising the living standards of its people by expanding agricultural output, as well as by other means. To this end the Country Development Strategy Statement FY 1987 says, "The specific program areas to which resources will be directed are: .... Training: Support for basic education programs that prepare new labour entrants for modern sector jobs and training for farmers, extension agents, researchers, farm managers, etc, will be continued. The focus will be on strengthening and reinforcing the already established Zimbabwean training institutions through ongoing assistance in the education sector and agriculture sector programs." (2)

The above underlines the importance that both the Government of Zimbabwe and USAID attach to the agricultural sector in the country in general and agricultural training in particular. The formulation of the Chibero College Expansion project is a result of this.

(1) Republic of Zimbabwe, First Five-Year National Development Plan, 1986-1990, Volume 1, April, 1986, page 25.

(2) Country Development Strategy Statement FY 1987, Zimbabwe, February 1985, Agency for International Development, Washington, DC 20523, pages 48-49.

**METHODOLOGY**

This report is based on interviews conducted with Ministry of Finance, Economic Planning and Development, Ministry of Lands, Agriculture and Rural Resettlement and Ministry of Public Construction and National Housing officials and Chibero staff and students (Appendix 1). Financial data was obtained from a collection of documents held by the above ministries.

The Chibero Expansion project was subdivided into three sub-projects as follows:

**Table 1**

**CHIBERO EXPANSION PROJECT : SUB-DIVISIONS**

<u>Project Name</u>	<u>Implementing Agency</u>	<u>Amount</u>
Chibero College Expansion	MPCNH	\$2 000 000
Chibero Equipment	MLARR	169 000
Chibero Irrigation	MLARR	65 000
		-----
TOTAL		\$2 234 000
		=====

All of the above funds were provided by USAID.

The report is divided into the above three divisions. In each division, where applicable, we examine:

- Factors leading to the formulation of the project
- Project aims and objectives
- Project management
- Project implementation, and
- The impact of the project on beneficiaries.

With the exception of one day site visit to Chibero, no field work outside Harare was carried out.

**BACKGROUND**

Chibero College of Agriculture was founded in 1961 and continues to be one of the two public Colleges of Agriculture offering a National Diploma in Agriculture. It falls under the Zimbabwe Ministry of Lands, Agriculture and Rural Resettlement. Chibero offers a one year on-farm placement followed by two residential years at College.

The course is intended for those wishing to follow a career in farming, as farmers or farm managers, in farm extension or in the ancillary trade connected with agriculture.

The aims of the course are:

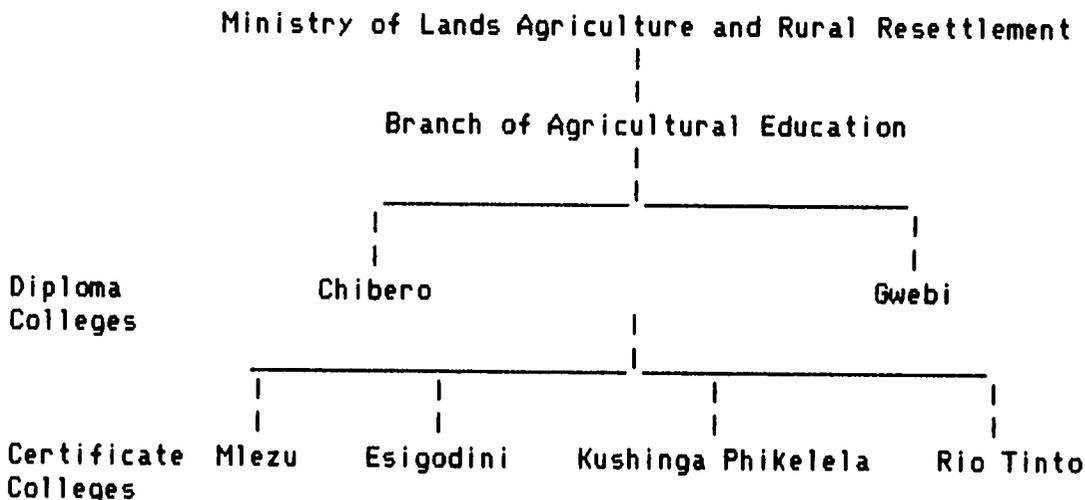
- 1) To give the student a knowledge and understanding of the theory and practice of agriculture in Zimbabwe.
- 2) To enable him/her to take correct decisions and display sound judgement in practical farming situations.
- 3) To consider farming problems from the viewpoint of the entrepreneur, farmer or farm manager.
- 4) To work effectively and responsibly with other people.
- 5) To form considered opinions on agricultural matters.

The course is completed in one on-farm year plus two years of full-time study, and the diploma is awarded to those who satisfy the examiners at the end of the second study year. A student will gain entrance to the second year by examination at the completion of the first year of residential study. All students are expected to take the full diploma course and no specialization is permitted. The course consists of formal lectures, laboratory practicals, farm practicals, case studies, projects, seminars, group discussions, specialist courses given by visiting lecturers, farm and other visits.

Much emphasis is placed on practical work and students spend almost half their time at work on the farm.

Table 2

**Position of Chibero College in the Hierarchical Structure**



### Geographical Location

The College is situated 27 kilometres south of Norton and 69 kilometres south west of Harare by road, at an altitude of 1305 metres in a 750mm summer rainfall area. It is in natural region 2 in Mashonaland West Province. It borders Mhondoro Communal Land.

### The College Farm

The College farm is 1 100 hectares comprising sandy soils derived from granite and heavy red soils derived from dolomite.

The granite is the dwala type while the dolomite is of dyke origin.

The combination of sandy soils and heavy clayey soils makes the College uniquely suitable for flue cured tobacco, burley tobacco, cotton, maize, soyabean, wheat, barley, groundnuts, sunflower and sorghum.

Both fruit and vegetable production are key functions in the programme. A World Bank rural reforestation programme has been established with the planting of both exotic and indigenous trees.

Before 1980, Chibero College of Agriculture had a total enrolment capacity of 80 adult students. Because of the nature of the hostels, only males could be enrolled. Also since its inception in 1961, except for maintenance money, no worthwhile capital investment was injected in the College.

On attainment of independence, the Government of Zimbabwe gave priority to agriculture as the nation's mainstay. Consequently vocational agricultural education at tertiary level was given equal emphasis. To that end Chibero was given Ministerial directives to ensure the following:

- 1) Increased enrolment.
- 2) Introduction of female students.
- 3) Raising the standard of the diploma to a national diploma.

To comply with the above directives meant that funding would be needed for the following:

- a) Increasing and improving accommodation and training facilities.
- b) Building special accommodation for women.
- c) Additional equipment and related resources.
- d) Additional staff.
- e) Staff development.

The first project formulated to achieve the above was contained in the 'Bunting Report'. Prof A H Bunting came out to Zimbabwe in 1981 to study the Faculty of Agriculture at the University. At that time the University of Zimbabwe had no farm of its own. The resultant

## Page 6 - Chibero College of Agriculture

report suggested that since Chibero College of Agriculture already owned a farm, degree students spend a year at Chibero in order to improve their practical knowledge and experience.

This necessitated a further upgrade of Chibero College to cater for the 'Chibero Year'. The Overseas Development Authority (ODA) in conjunction with USAID expressed their interest in funding the project.

Subsequently, a Faculty of Agriculture Review Committee headed by Dr David Ngugi of the University of Nairobi was appointed in October 1982 to carry out a similar study. In its report the committee said that the University needed its own farm. On 26th November 1982 the University abandoned the Bunting recommendation. As a result the ODA also pulled out of the Chibero project.

Following these developments a project was formulated based on Chibero College of Agriculture's own requirements only. Finance was to be provided by USAID.

### APPLICANTS SEEKING PLACES AT CHIBERO

Accurate data are not available, but clearly thousands of applications are made yearly for enrolment by eligible people.

Admission requirements include gaining 5 O-level passes at one sitting, including distinctions in English, Maths and Science. Admission to study years is by recommendation by a farmer with whom the student has worked for a minimum of ten months. Despite these stringent selection criteria, ample properly qualified people come forward each year.

Thousands of school leavers enter the job market each year knowing that there is little likelihood of finding work. It is natural, therefore, that such people should seek further education and training rather than remaining idle. However, in the past, when there was no problem over employment for whites, the then whites only college, Gwebi, was always over subscribed. We expect therefore that Chibero will continue to attract well qualified and well motivated students, women as well as men.

### GRADUATE DEMAND

The demand for diplomates is limited by the depressed state of the economy. The private sector provides some openings for farm managers, and sales representatives. The public sector, after expanding during the years following independence, has to a certain extent stabilised. Enquiry reveals that Agritex employs some 170 diploma holders, but has an annual turnover of about three. Arda presently employs some 30 diploma holders but is said to lose staff infrequently - ten new posts will be created for this year (1987/8), but this seems to be exceptional. One employment agency reported occasional demand for diploma holders saying that for certain occupations, diploma holders were preferred to degreed people because of their practical approach to farming. The college principal asserts that there is no limit to the demand for graduates and produced evidence in the form of correspondence, mainly from government sources, but with some applications from commercial employers. A spot check of final year students showed that, by June some 28 had already been offered employment - some more than one job - and of these, eight were women.

It would be unreasonable to judge the potential demand from the current labour market. It is clear that to service the needs of the agricultural growth sector, the communal land and resettlement area farmers, government will increase the establishment of extension workers. Parallel to this we would expect a natural development of appropriate technology, produced in the private sector and supported by advisors and demonstrators who might well be Chibero diploma holders.

An interesting development has been the employment of diploma holders as untrained teachers. Some thirty are currently in post and the Ministry of Education plans to offer such teachers a year's unpaid leave to 'top up' on education methods to become properly qualified teachers. The official at the Ministry of Education was enthusiastic about Chibero students, their expertise and attitudes.

## PUBLIC AND PRIVATE SECTOR EMPLOYMENT

Training at Chibero has a commercial bias. It prepares students for work on privately owned farms, for work on estates like those run by ARDA, and for work on cooperatives. A certain number of graduates are now running their own farms - ten have been identified including three women.

We noted above that both public and private sector employment opportunities would improve with an improved economic climate. Together with this, the future will provide private sector employment as non-government organizations such as Redd Barna and Zimbabwe Trust show an increasing interest in productive agriculture.

## CHIBERO COLLEGE EXPANSION

The project was formulated by the then Ministry of Agriculture. The Ministry of Construction estimated the cost of the project at \$2 000 000. Copies of the final project document were sent to the Ministry of Finance, Economic Planning and Development and USAID on 18th January 1983.

The objectives of the project were:

- i) to increase the output of trained diploma agriculturalists at Chibero to  $\pm$  60 per annum; and,
- ii) to create a facility for women students to study at Chibero.

For a detailed list of works carried out to cater for this expansion please refer to Appendix 2.

## Project Management

The Ministry of Public Construction and National Housing in Zimbabwe is responsible for the construction of all Government buildings. As such, it is termed a 'service ministry'. In addition, all Government buildings are the property of this Ministry and it is accountable for their maintenance.

Therefore, once the project was approved the construction of buildings specified in Appendix 2 became the responsibility of Ministry of Public Construction and National Housing.

Construction commenced in March 1984 and was completed by the end of 1985. However, as the original project was completed below budget additional training facilities have been approved by ZASA.

**Project Finance**

Funding for the project was provided by USAID; \$1 500 000 being sourced from the Zimbabwe Agricultural Sector Assistance (ZASA) fund 613-K-604 and \$500 000 from the Commodity Import Programme (CIP) 613-K-603. Both are assistance programmes whereby Zimbabwean companies and the public sector can import goods from the USA but pay for them in local currency to the Government. The local currency so generated is utilized for the financing of projects in the country. The main difference between CIP and ZASA sector programmes is that ZASA was established specifically for agriculture.

Although the total cost of the project was estimated initially at \$2 000 000 only \$1 171 807 was spent initially as follows:

Table 3

Women's Hostel	\$ 264 374
Library	62 602
Dining/Kitchen block and lecture theatre	92 346
Other buildings	350 000
Unspecified work	50 000
Electrical installations	113 840
Ministry of Public Construction and National Housing Contribution	238 645
	-----
Total actual cost	\$1 171 807
	=====

The Ministry of Public Construction and National Housing contribution was in the form of labour, transport and materials deployed to the project. This was charged out to the project.

More works are planned, ie, the dairy parlour, the grain dryer, entrance archway and the providing of water piping to staff housing. The estimated cost of these works is \$350 000. ZASA has agreed to finance this from savings made on the original project.

The dairy parlour is the main component and will be used for educating students in milking procedures and other topics related to dairy farming. Its construction has already been put out to tender.

**CHIBERO COLLEGE IRRIGATION SCHEME**

In order to cope with the expansion at the college, the Ministry of Water Resources and Development constructed a pipeline from the Mhondoro Dam to the college administrative centre. A night storage dam and water treatment works were also constructed.

With the above infrastructure in place the college, in order to train students in irrigation technology decided to buy irrigation equipment. For details on the project see the project document in Appendix 3. As the responsibility of the Ministry of Water Resources and Development stops at the storage dam the college had to provide the funds. On 9th July 1983 USAID approved an allocation of \$65 000 for the project. This amount was sourced from the ZASA 613-K-604 programme.

The irrigation equipment was supplied by Wright Rain at a total cost of \$47 360.

During the site visit we watched the equipment being used to irrigate the maize crop on the college farm. Without it this crop would have wilted as a result of the current drought in Zimbabwe.

**CHIBERO COLLEGE EQUIPMENT**

Additional equipment was required by the college to cater for the increased student intake. These were:

Table 4

Fort concrete demonstration/office block	\$ 40 000
Tobacco bulk curer	40 000
Burley barn	2 000
Paddocking	20 000
Calf rearing system	2 000
Welding bay additions	15 000
Bee husbandry house	3 000
Sheep handling facilities	2 000
Poultry battery system	3 000
Grain handling shed with dryer	15 000
Additional pig accommodation	2 000
Silage bunkers	1 000
Beef feeding pens	4 000
10 Married workers houses	20 000
TOTAL	----- \$169 000 =====

USAID approved an allocation of \$68 200 under the commodity aid grant 613-K-601 and \$100 800 from ZASA on the 29th December 1983 to finance the project. Responsibility for the implementation of the project was that of Ministry of Lands, Agriculture and Rural Resettlement.

The schedule of items to be procured under the project (Table 4) was flexible. Project administrators were free to substitute items on the list by others where they felt it necessary.

\$161 935 has been spent on equipment to date. The Ministry of Lands, Agriculture and Rural Resettlement has approached the Treasury to release the remainder, ie, \$7 065 for the purchase of some small items.

### THE EXPANDED CHIBERO COLLEGE

Before the upgrade the college turned out less than 40 graduates annually. Now the figure has risen to ±60; women make up one third of this number. (1) As far as expansion is concerned, the project achieved its objectives.

A comprehensive syllabus (Appendix 5) is taught at the college thus producing graduates with a high demand in the Zimbabwean agricultural sector. The pre-college one year spent on commercial farms is a special feature of the Chibero curriculum which involves the private sector in the training of its future managers. In addition, according to the principal, some countries in the region have made enquiries as to the possibility of Chibero becoming the in-service training centre for their people.

Consideration is being given to the possibility of introducing fish farming and duck production.

Chibero graduates are employed by many different organisation in a variety of capacities. We have learned, however, that women still do not enjoy the range of job opportunities that are open to men.

Appendix 6 gives a list of employers of Chibero graduates. It was not possible for us to obtain figures as to the number that each of the organisations employs.

(1) See Appendix 4 for detail.

**CONCLUSION**

The Chibero College of Agriculture Expansion Project met its objectives: it has:

- i. increased enrolment by 50%
- ii. provided for the enrolment of women students
- iii. raised the standard of the diploma to national level.

This meets the criteria set for the project and has been accomplished within the financial limits set.

The total budget and actual cost of the project was:

**Table 5**

<b>Component</b> -----	<b>Budget</b> -----	<b>Actual</b> -----
Construction	\$2 000 000	\$1 171 807
Irrigation	65 000	47 360
Equipment	169 000	161 935
	-----	-----
Total project	\$2 234 000	\$1 381 102
	=====	=====

As noted above, ZASA has approved the use of some of the considerable savings made in expanding the training facilities.

To conclude, we list the physical improvements that have resulted from USAID funded projects at Chibero.

New hostel accommodation of 40 bed-room/studies with common room, TV room, gum-boot room and ablution block have been built.

Extensions have been completed to:

- i. Kitchen
- ii. dining hall
- iii. laundry
- iv. college clinic
- v. library

A welding-bay has been provided.

A staff-room has been converted into a lecture theatre for 65 students.

**A demonstration block has been constructed.**

**A large hall has been constructed.**

**Nine offices have been constructed.**

**Nineteen staff houses have been constructed, 15 for staff and 4 for management.**

**A piggery and a poultry unit have been constructed.**

**A grain drier, a tobacco curer and grader have been installed.**

**Irrigation for 80 hectares has been provided.**

**Renovations and extensions include:**

- i. electrification of the old compound**
- ii. resurfacing internal roads**
- iii. repainting certain buildings.**

**Acquisitions include:**

- i. trailed combine**
- ii. sheller**
- iii. silage chopper**
- iv. bailer**
- v. laundry equipment**
- vi. Kitchen equipment**
- vii. furniture and curtaining for new buildings.**

Appendix 1

ACKNOWLEDGEMENTS

This report is the result of a three week study carried out in February/March 1987 by Mike Boyd-Clark and Celestine Gadzikwa of Agriserve (Private) Limited, Harare.

The site visit to Chibero College of Agriculture was paid on 18th February 1987.

The following organisations and people assisted with the provision of information contained in the report. We are grateful for their help.

Ministry of Finance, Economic  
Planning and Development:

Mr J Bote  
Mr P Chingombe  
Mr W Moyo

Ministry of Lands, Agriculture  
and Rural Resettlement:

Mr J Dickens

Ministry of Public Construction  
and National Housing:

Mr A Binga  
Mr S Naggo  
Mr T Ritzau

United States Agency for  
International Development:

Mr J Mushauri

Chibero College of Agriculture:

Mr A Chinyati  
Mr L Tendengu

The following publications were reviewed:

Ministry of Lands, Agriculture and Rural Resettlement, Ministry of Public Construction and National Housing and Chibero files  
USAID files  
University of Zimbabwe, Report of the Faculty of Agriculture Review Committee, October 1982  
Republic of Zimbabwe, First Five-Year National Development Plan 1986-1990, Volume I, April 1986  
Country Development Strategy Statement, FY 1987, Zimbabwe, February 1985, Agency for International Development, Washington, DC 20523

Appendix2

PROJECT ABSTRACT

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1. Identification

Recipient

ZIMBABWE  
MINISTRY OF AGRICULTURE

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Title of Project

Chibero College Expansion

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Economic Sector

Agriculture

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Total Cost

Two million dollars. \$2 000 000

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Contribution

USAID

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Mode of Finance

Grant

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2. Project Summary

The plan is to increase the size of the College from 80 to 120 beds. This will also entail building extra teaching and administration facilities and renovating other existing buildings.

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3. Background

The plan to expand Chibero was drafted after recommendations by Prof. A H Bunting from the University of Reading together with local officials (19 August - 4 September 1981).

The original plan was to expand the facilities for the Diploma students to cater for an extra 40 and to set up facilities for 80 university students who would spend one of their academic years at Chibero doing practical work. The idea was the ODA would pay for the University expansion aspect and that USAID would back the Ministry of Agriculture Diploma student expansion.

However, University of Zimbabwe has now shelved its plans for a "Chibero Year".

The Ministry of Agriculture expansion can now proceed as Ministry of Construction no longer view this as a joint exercise.

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4. Objectives	<ol style="list-style-type: none"><li>1. To increase the output of trained diploma agriculturalists at Chibero from <u>±40</u> per annum to <u>±60</u> per annum (ie, increase the college capacity from 80 to 120 students).</li><li>2. To create a facility for women students to study at Chibero. (The new hostel will cater for 40 female students.)</li></ol>
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5. Project Details	<p>The architect's plans for the buildings have already been drafted by Ministry of Construction. The Ministry of Water Resources has increased the water availability at Chibero to cater for the additional students and for an enlarged irrigation scheme.</p> <p>Details of buildings are:</p> <ol style="list-style-type: none"><li>a) 40 bedroomed female hostel</li><li>b) TV and indoor games room</li><li>c) Dining room, kitchen and laundry</li><li>d) Multipurpose hall</li><li>e) 4 Admin Offices</li><li>f) 4 Senior Officers houses into a lecture theatre</li><li>g) Convert existing assembly hall into lecture theatre</li><li>h) Expand library</li><li>i) 15 junior employees houses</li><li>j) Demonstration office block</li></ol>
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6. Costs	\$2 000 000
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7. Financing	USAID Grant
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8. Expected Results	<ol style="list-style-type: none"><li>1. Increase in the number of diploma qualified agriculturalists in the country.</li><li>2. Better quality learning facilities at Chibero.</li></ol>
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9. Justification	<p>Agriculture is a productive sector in Zimbabwe. Qualified agriculturalists will produce more agricultural products and advise and teach peasant farmers and hence increase productivity further.</p>
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10. Time Table	<p>As soon as possible. It is now possible for Ministry of Construction to start these additions this year as building is at an advanced stage.</p>
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Appendix 3

PROJECT ABSTRACT

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1. Identification	Recipient	ZIMBABWE MOA (Chibero College)
	Title of Project	Chibero College Irrigation Scheme
	Economic Sector	Agriculture
	Total Cost (First Estimate)	\$65 000
	Contribution	USAID Ag Sector Project
	Mode of Finance	Grant

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2. Project Summary	In order to cope with an expansion in student numbers and to teach modern farming more effectively, it is proposed to have an irrigation scheme to increase the area of crops for learning purposes and to teach the correct uses of irrigation. The idea is to have winter crops, summer crops and irrigated pastures.
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3. Background	As a result of the intention to expand the number of student places at the college, the Ministry of Water Resources and Development has constructed a pipeline from Mhondoro Dam to the administrative centre at the College. There they have also established a night storage dam and a water treatment works to cope with an increase in student numbers. However their responsibility stops at the storage dam. If Chibero wish to irrigate they have to provide the pumps, pipes and other equipment.
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4. Objectives

1. To train students in the use and technology of irrigation.
  2. To grow irrigated winter crops (eg, barley, wheat) in order to train students in this aspect of crops.
  3. To grow early planted tobacco and extra irrigated maize to teach the expanded number of students and to use the maize for feeding the increased livestock herd. (The increased herd will be necessary to cope with enlarged student intake.)
  4. To grow smaller specialised crops under irrigation to be used as demonstrations for student learning purposes.
  5. To grow irrigated pastures to teach students this aspect of farming and to graze the increased livestock herd on the pastures.
  6. To be in a position to cope with future expansion of the college.
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5. Project Details

The system will cater for 70 hectares command area of summer crops and 27 hectares in winter. This includes 8 hectares of irrigated pastures.

The project details have been compiled by the Chief Irrigation Officer of Agritex in the Ministry of Agriculture. All relevant papers are attached as appendices to this project abstract, ie:

- 1) Water availability, Total Delivery from dam, domestic use, available for irrigation, draw off, etc.
- 2) Cropping programme.
- 3) Block No, spacings, cycle, precipitation, application pressure, flow etc table.
- 4) Map showing blocks, crops etc.
- 5) Comparison in terms of data at Appendix 2 for 3 tenders (Tinto Ind, Wright Rain, Dore & Pitt).
- 6) Tenders with details (sketch plan, materials costings notes, etc) from three tenderers (Tinto Industries, Wright Rain, Dore & Pitt).

The tenders range in price from \$56 378 to \$62 403,19.

The tenders were submitted in July and August 1982 and costs have probably escalated, hence a bid of \$65 000 is considered appropriate.

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Appendix 4

CHIBERO COLLEGE STATISTICS

**Student capacity**

70 on commercial farms doing pre-college agricultural training for ten months.

60 in first year of residence.

60 in second year of residence.

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190 Total

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Ratio of women to men = 1:2

Ratio of teaching staff:student = 1:9

but ratio of instructor:student = 1:17

and ratio of lecturer:student = 1:17

Total Number of Posts

Title of Posts

1	Principal
1	Vice Principal
7	Lecturers
8	Instructors
1	Executive Officer
1	Clerk (EG I)
1	Typist/Stenographer (EG I)
1	Clerical Assistant
1	Library Assistant
1	Warden Grade I (Chibero)
1	Matron (EG IC)
1	Cook Class I (EG IIA)
2	Driver I (EG IID)
2	Driver III (EG IIID)
2	Kitchen Hand (EG IIIA)
2	Watchmen II (EG IIIB)
3	Equipment Assistant (EG IID)
1	Agricultural Assistant
2	Telephone Attendant (EG IIIC)
1	Sewing Assistant (EG IIIC)
13	Senior Hands (EG IIIC)
51	General Hands (EG IIIA)
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104	TOTAL
===	

**Vehicles**

2 buses  
2 pick-ups  
2 trucks  
2 cars  
2 motor bikes  
7 tractors and implements  
25 bicycles

**Livestock in round figures**

70 dairy cows  
260 beef cattle  
120 sheep  
150 pigs  
80 goats  
70 rabbits  
750 birds (poultry)

**Mode of Operation**

1. Lectures from 7.30 up to 12:00 noon.
2. Practicals in the afternoon from 1:30 to 4:30 pm.
3. Projects (completed in students' time)
4. Visits to farms, agro industry factories, and field days.
5. Assignments.
6. Essays.
7. Seminars.
8. Tests.
9. Term exams.
10. Final exams.

Appendix 5

COLLEGE SYLLABUS

SYLLABUS

ANIMAL HUSBANDRY

First Year

ANATOMY AND PHYSIOLOGY

Introduction. Digestion, dentition, digestive tracts and related organs. Circulatory and respiratory systems. Excretory and nervous systems. Reproductive system. Endocrine system. Bones and muscles. Growth and development.

ANIMAL NUTRITION

The digestion, absorption and transport of food nutrients in ruminants and non-ruminants. Classification and evaluation of feeding-stuffs. The preparation of rations for maintenance and production for various classes of livestock.

ZOOLOGY

Classification of the animal kingdom. Agriculturally important members of the phyla Protozoa, Platyhelminths, Aschelminthes, Arthropoda and Chordata are dealt with in detail.

PIG HUSBANDRY

Important breeds. Selection and management of breeding and young stock. Management of pigs for pork and bacon production. Housing. Marketing and economics.

POULTRY HUSBANDRY

Origin, classes and breeds of poultry. Incubation, brooding and rearing of chickens. Feeding and management of layers and broilers. Housing. Management of turkeys and waterfowl. Diseases of poultry and their control. Economics.

GENERAL

Apiculture, fish culture and rabbit production.

**Second Year**

**BEEF HUSBANDRY**

History of beef breeds. Selection of breeding stock. Management of pedigree herds and their economics. Management of the commercial breeding herd. Production systems. Marketing and economics. Essential records.

**DAIRY HUSBANDRY**

Breeds and history. Rearing of calves and heifers. Dairy cow and bull management. Milk composition, secretion and yield. Machine milking. Dairy hygiene. Marketing. Records and economics.

**SHEEP HUSBANDRY**

Breeds and history. Selection and management of the breeding flock. Fat lamb production. Wool. Marketing. Records and economics.

**VELD AND PASTURE MANAGEMENT**

Veld and pasture management in Zimbabwe. Basis and principles of veld management. Systems. Veld condition assessment. Ranch planning. Pasture evaluation, establishment and maintenance. Irrigated pastures. Veld and pasture legumes. Economics.

**ANIMAL BREEDING**

Breeding terminology. Selection - basis and methods. Breeding systems, pure and cross-breeding. Objectives of breeding and livestock improvement. Developments in breeding.

**ANIMAL HEALTH**

Introduction of disease causing micro-organisms. Infection. Immunity. Farm first aid. Major diseases of cattle, calves, sheep, goats, and pigs; their causes, symptoms, treatment and eradication. Ectoparasites with emphasis on ticks. Round-worms. Veld poisoning.

## FIELD HUSBANDRY

### First Year

#### BASIC SCIENCE

Matter. Gases and solutions. Elements and compounds. Organic chemistry. Carbohydrates, proteins, fats and oils, minerals and vitamins.

#### SOIL SCIENCE AND PLANT NUTRITION

Soil and soil types. Inorganic fraction and soil texture. Soil colloids and base exchange. Organic fraction of the soil, soil micro-organisms and structure. Soil air, water and temperature. Formation and classification of soils. Brak soils.

Liming. Major, minor and trace elements. Organic manures. Fertilizers. Soil sampling and analysis.

#### CROP HUSBANDRY 1

General aspects. Crop classification. Land selection and preparation. Planting and populations. Weeds and their control. Principles and examples of rotations. Forestry.

Crop production. Production of the following crops dealt with in detail: sorghum, millets, rice, sugar-cane, sunflowers, coffee and tea.

#### BOTANY

Introduction to the subject. Plant anatomy covering cytology, roots, stems, leaves, flowers and seeds.

Plant physiology covering photosynthesis, respiration, osmosis, dialysis, transpiration, translocation. Deficiencies and toxicities. Growth regulators.

Economic botany covering the economically important families and the economic crops they contain. A study of the structure of the major crop plants.

Microflora. Bacteria, fungi, viruses, yeasts and their relationships with other living organisms.

#### GENETICS

The genetic mechanism. Chromosomes, genes. Mitosis and meiosis. Linkage. Mutation. Character determination. Dominance. Phenotype and genotype. Mendelian ratios. Breeding and new varieties. Seed production and testing.

## FIELD HUSBANDRY

### Second Year

#### CROP HUSBANDRY 2

Introduction. Crop production in the world and in Zimbabwe. Climate and crop production. Timeliness of operations.

Production of individual crops. Various aspects of the production of different crops are dealt with under some or all of the following headings: climatic and soil requirements, land preparation, varieties and improvements thereof, seed-beds, manuring and fertilizing, planting, cultivation, weed control, irrigation, special practices, harvesting, processing, storage, important pests and diseases and their control, labour and machinery requirements, special rotation practices, marketing and economics.

The following crops are dealt with at present:

- (i) Grain crops. Maize, wheat, oats, barley, triticale.
- (ii) Legume crops. Introduction to legumes and Rhizobial inoculation. Ground-nuts, soya-beans, lucerne, field beans and peas.
- (iii) Fibre crops. Cotton, sisal.
- (iv) Stimulants. Tobacco, both flue-cured and burley.
- (v) Horticultural crops. The common vegetables and deciduous and citrus fruits.

The amount of time spent on each crop depends largely on its present or potential importance in farming in Zimbabwe.

#### ADVANCED CROP HUSBANDRY

In this part of the course hay and silage making, crop diseases and pests, crop costs, meteorology and research methods and future developments in crop production are handled.

#### ECOLOGY

Ecological terminology and concepts, energy relationships, plant associations and successions, applied ecology and pollution.

## AGRICULTURAL ENGINEERING

### First Year

#### MECHANICAL AND ELECTRICAL ENGINEERING

Energy, force and work. Introduction to formal mechanics. Vectors and weights transfer. Levers and leverage.

Power including indicated, brake and drawbar horse-power. Power and torque curves. Pulleys.

Fluid flow and basic hydraulics; hydro-mechanical systems; tractor hydraulics. Pumps, piston, centrifugal and vane types and their applications; hydraulic motors.

Nature of electricity: sources and methods of generation and transmission. Circuits. Laws. AC current. Electric motors and starters. Rural electrification and overhead lines. General wiring practice.

#### GENERAL ENGINEERING

Workshop practice; tools and their use.

Gas- and arc-welding, brazing, soldering. Commonly used workshop materials.

Fuels and lubricants; types, their characteristics and uses.

Boilers, heat exchangers and stokers; their operation, maintenance and safety precautions.

Refrigeration; types of systems, refrigerants. Milk-coolers and storage-tanks; refrigerators; control and maintenance.

Introduction to petrol engines: the four-stroke cycle and structure of the engine. Basic operational principles.

Farm safety.

#### CIVIL ENGINEERING (BUILDING)

Introduction. Concrete, brickwork and bonds, foundations, plastering, roofs and roofing, timber, ventilation, insulation and heating.

Construction, site selection and setting out, bills of quality, erection of normal buildings.

Maintenance, paints and finishes.

Material and labour costs.

## FIELD ENGINEERING I

Surveying: value of surveying on farms. Levels.

The dumpy level, setting up, use and care. Survey staves. Accuracy. Different uses of surveying on farms.

Water conservation. The hydrological cycle. Run-off. Site selection laying out and construction of small earth dams. Reservoir design and construction. Legislation.

## AGRICULTURAL ENGINEERING

### Second Year

#### AUTOMOTIVE ENGINEERING

The petrol engine and its ancillary systems. Diesel engines and their fuel systems.

Vehicle systems. Cooling, steering, braking, transmissions. Fault tracing. Hubs, ball- and roller-bearings.

Tractor systems. Hydraulics, PTC systems. Weight transfer.

#### FARM MACHINERY

Individual machines are dealt with under the headings of layout, function, operation, maintenance, and output. The following types of machine are covered:-

Ploughs - disc and mould-board, reversible, chisel

Harrows and cultivators of different types.

Rippers, rollers, ridgers and tool-bars.

Planters, drills and distributors for seed and fertilizer.

Sprayers - tractor, knapsack and aerial.

Hay and silage equipment - mowers, rakes, conditioners, balers. Forage harvesters and chopper-blowers.

Harvesting equipment - shellers, combines, pickers, spinners.

Processing and storage - silos, augers, elevators, milling and mixing, driers, grain cleaning, grading and treating equipment.

General equipment - trailers, water-pumps, fire-fighting.

Dairy equipment - milking-machines and milk-handling systems.

## FIELD ENGINEERING 2

Irrigation. Introduction, soil-water-plant relationships. Water measurement, reservoirs, canals.

Irrigation methods and systems, scheduling for different crops and at different stages of growth.

Land levelling and drainage.

Costs and economics.

## FARM MANAGEMENT AND LAND USE PLANNING

### First Year

#### FARM MANAGEMENT 1

Objectives of business.

Marketing and economics. Determination of price; supply and demand; equilibrium price; elasticity of supply and demand and effect on farm produce. Law of diminishing returns and marginal analysis.

World marketing of agricultural produce. Fluctuations in supply and demand. Government interference with market forces; production controls; quotas; support prices; subsidies and deficiency payments. Problems associated with agricultural marketing. Functions of the middleman.

Marketing of agricultural produce in Zimbabwe. Controlled and uncontrolled systems. Free, cooperative and statutory marketing. AMA and the marketing boards; advantages and disadvantages. Study of the marketing of the major crops and livestock products; CSC; cattle finance and residual buying schemes.

Financial records and their analysis. Financial records required on the farm. Construction and analysis of the profit and loss account and balance-sheet. Livestock trading account; depreciation; income tax; private drawings; capital expenditure. Use of tax accounts for farm planning.

Capital. Measurement of capital in the farm business. Landlord's and tenant's capital. Functions of the balance-sheet. Net worth; liquidity; equity; management and investment income. Returns on capital. Sources and costs of capital for the farmer. Rules of borrowing. Repayments of capital and interest.

## LAND USE PLANNING 1

Introduction to the subject. Aerial photography, and its use in planning. Extraction of physical data from photography. Dam site selection using aerial photography. Planning soil conservation layouts using aerial photography. Soil mapping. The preparation of soil, vegetation, conservation and present land use maps from aerial photography.

## EXTENSION METHODS

Introduction. Rural sociology and the factors within societies to be considered when seeking to introduce change.

Factors in adult learning. Communication and motivation. Methods to communicate and motivate in practice. Visits, lessons, demonstrations and discussions. Planning, organization and control. Principles and practices of community development in Zimbabwe. Role of agricultural extension worker.

## Second Year

### FARM MANAGEMENT 2

Gross margin analysis. Variable and fixed costs; groww output; net farm profit; depreciation; interest and redemption on loans. Livestock trading account. Return on capital.

Cash flow budgets. Advantages. Layout. Calculation of interest on bank overdraft. Reconciliation of cash flow and gross margin budgets.

Partial budgets. Advantages. Uses - layout. Break-even budgets.

Total farm budget. Uses of the whole-farm budget. Gross margin planning procedue. Allocation of resources. Alternative methods of improving profitability. Limitations of budgeting. Planning to the most limiting factor. Full farm plan.

Records. Physical and financial records required for farm planning. Livestock pedigree records.

Labour, tractor and equipment planning. Advantages. Methods of preparing labour, tractor and equipment plans and their use in farm planning.

Factors affecting the profitability of the major crops and livestock enterprises. Milk production. Beef breeding herd. Intensive and pen fattened beef. Grass fed beef. Weaner pig production. Bacon and pork production. Sheep, fat lamb production. Poultry, egg and broiler production. Cereal enterprises. Potatoes. Control of the factors affecting profitability by the farmer. Margin per head and margin per hectare.

Management of the farm business. Tasks of management. Management by objectives; need for leadership and leadership characteristics. Problem identification, and solving. Labour requirements; labour situation in Zimbabwe; treatment of African labour; training of labour; factors affecting productivity of labour. Service agreements. Farm leases.

Investment appraisal. Discounted cash flows. Methods and uses in the farm business.

Income tax. Rates of tax. Abatements; PAYE; special deductions and allowances for the farm. Drought relief. Depreciation; scrapping allowance. Fixed standard values.

## LAND USE PLANNING 2

Types of plans – national, regional and farm plans. Fact collection and assessment. Data sources. Factors affecting production – natural including climate, soil, topography, vegetation, water supplies; artificial restrictions such as farm history and erosion.

Aerial photo interpretation and mapping. Soil coding.

Land capability classification. Intensity of land use and crop planning. Limitations of cropping. Vegetation coding and livestock planning; ranch planning and production policies. Rotational grazing systems and veld management. Investigation of economic planning into land use planning.

## SOIL CONSERVATION

Introduction. Environmental science. Types of erosion and their causes. Control of erosion by biological and mechanical means. Types of mechanical protection used in Zimbabwe including storm-drains, contour ridges, waterways, terraces, grass strips. Layout of conservation measures and construction. Land preparation on conserved lands.

Appendix 6

**MAIN AREAS OF EMPLOYMENT**

1. Agricultural Extension officers.
2. Agricultural resettlement officers.
3. Land use planning officers.
4. Research Technicians in the Department of Research and Specialist Services.
5. Veterinary technicians in the Department of Veterinary Services.
6. Officers in the Forestry Commission.
7. Managers in the Agricultural and Rural Development Authority.
8. Managers in the Cold Storage Commission.
9. Officers in:
  - Cotton Marketing Board
  - Grain Marketing Board
  - Dairy Marketing Board
  - Agricultural Finance Corporation
  - Pig Industry Board.
10. Farm Managers.
11. Estate Managers in Multinational estates such as the Anglo-American Mazowe Estates.
12. Rangers in the Department of Parks and Wildlife (now trained at MushandiKe).
13. Agricultural officers in the army.
14. Salesman of agri-products.
15. Agricultural Consultants.
16. Agricultural Instructors.
17. Agricultural Science teachers.
18. Land Inspectors.
19. Rural development officers with non-governmental organisations.
20. Admission to University for BSc Agriculture degree.