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Zimbabwe

Local Currency Evaluation

University of Zimbabwe
Faculty of Agriculture

Part I
Faculty Building

Part II
University Farm

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PREFACE

Since Zimbabwe became independent in 1980, the United States Agency for International Development (USAID) has assisted the Country in the financing of many projects. One of these projects was to support the University of Zimbabwe, Faculty of Agriculture development. A Project Abstract Document published in 1982 (see Part I, Appendix II) budgeted for the spending of Z$8 682 000 under the following headings:-

Capital expenditure on buildings, farm purchase and equipment.
Staff development in the form of overseas travel, feilowships for MSc training in the United States, and thesis support for MSc field work in Zimbabwe.
Technical assistance from expatriate staff.
Faculty development, research and central services funding.
Support staff for the Faculty.
Overhead and running costs.

This report deals with part of the capital expenditure from USAID funds.

Part I covers the building and equipping of the Land Management Building in the Faculty of Agriculture.

Part II covers the purchase and use of Thornpark Estate, the University Farm.

SUMMARY

Findings

Faculty Building:

The project was formulated to enable the Faculty of Agriculture in the University of Zimbabwe to fill the need for trained graduates and to improve research into local agricultural problems. The project fitted in with the National Development Plan for Zimbabwe, which emphasized the need for agricultural production in the country, and with USAID's Country Development Strategy.

There were no changes in the objectives during the implementation of the project. Changes that occurred were in the estimates of the costs and some additions to the building - eg, the construction of the conference room on the flat roof of the large lecture theatre.

The main aim of the project was to allow a 1st year intake of 100 students for the BSc Honours Degree Course by the year 1987. In fact this has been fulfilled in 1986, one year early.

Professor M J Blackie, past Dean of the Faculty, deserves special mention for the part that he played in the design, planning and carrying out of the project. His was a major contribution to all stages of the project and without his drive and enthusiasm it is doubtful if all the objectives could have been achieved.

The general conclusion is that this project is a model of how this type of exercise can be carried out through the ZASA working group. Co-operation was achieved between the donor agency, USAID, the Government of Zimbabwe and the University. The funds allocated to the project were used in full, the objectives were fulfilled and the target date for completion was achieved. The architects have completed the six monthly check of the building and stated that they are completely satisfied with the standard of workmanship.

Errors and delays in the release of funds in turn caused delays in the payment of the contractor. This, at one stage, threatened to bring the entire building programme to a standstill.

There were serious underestimates of the cost of the project. The budget had to be revised a few times. It was fortunate in this case that the donor was agreeable to such revisions. Without that the project would not have been as successful as it turned out to be.

College Farm:

It was found that the acquisition of the University farm was welcomed by all parties concerned. The farm was being utilized commendably for practical training, agricultural demonstration, experimentation, research and production.

Most use of the farm was being made by Part I students during Saturday mornings and by Part II students for their Agricultural Production option.

A good start had been made in experimentation and research with the introduction of eleven hectares of irrigation for CIMMYT (The International Centre for Maize and Wheat Improvement).

Production was noted to be continuing on a sound footing especially with beef and cereal production.

The farm's distance from the campus (15 kilometres), the large number of students involved in practicals, the timing of the academic year and the limited variety of both crops and livestock on the farm are limitations to the farm's ability to act as an effective teaching facility.

Recommendations

Faculty Building:

Greater expertise should be used in the planning stages of the project. Professor Blackie admitted to serious underestimates for the costs of both the purchase of the University Farm and the Land Management Building Project.

If possible, a more streamlined method of payment of funds from the donor to the contractor should be employed. The involvement of two Government Ministries increases the chances of administrative mistakes and poor administrative control.

Before starting a project of this size in future, the contractor must make sure that the materials required are available. In the case of this project, work could only continue at one stage because materials were obtained from a Government building project. The general trend at present is for building materials to become more and more scarce.

The same team of architect and contractor could be used on future projects of a similar size. In the case of the Land Management Building Project, the team worked well together and accomplished the task in the time allowed and to the satisfaction of the clients.

College Farm:

The possibility should be examined of students being on the farm during November to March as this is the busiest period on the farm. This will give the students meaningful hands-on experience. At present the students go on vacation during this period. Also, Saturday practicals should be rescheduled to weekdays.

As wide a variety of livestock and crops as possible should be grown on the farm to ensure broad experience for the students.

PART I

FACULTY BUILDING

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INTRODUCTION

Part I of this report covers the planning, building and utilisation of the Land Management Building in the Faculty of Agriculture, University of Zimbabwe. This project was one part of the assistance programme to the Faculty of Agriculture from USAID.

The objectives of the evaluation were:-

a. To identify the need for the land management building.

b. To decide if the building project was in accordance with the policy of the Zimbabwe Government and the First Five Year National Development Plan.

c. To evaluate the objectives of the project and to see if these have been fulfilled.

d. To evaluate the management of the project and identify any weaknesses in methodology.

METHODOLOGY

The current evaluation was carried out during the period 3rd November and 29th November 1986 by Mr M J Boyd-Clark and Mr P G D Chard of Agriserve (Private) Limited. The evaluation work was greatly facilitated by the willing cooperation of members of the Faculty of Agriculture at the University of Zimbabwe, the architect and members of the building team.

The Report covers the following topics:

Introduction
Methodology
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INFORMATION SOURCES

The following sources of information were used in the study:

The Three volumes of files on USAID/ZASA containing minutes of meetings, reports and correspondence.

Minutes of meetings of the Faculty of Agriculture Buildings Planning Group.

The plans of the building supplied by the architect.

Personal inspections of the building.

Personal interviews with members of the Faculty of Agriculture and the building and design teams.

THE FACULTY OF AGRICULTURE IN THE UNIVERSITY OF ZIMBABWE

Agricultural teaching at the University of Zimbabwe was largely based on the Wye College model introduced when agriculture was part of the Faculty of Science and had its own farm adjoining the Ministry of Agriculture's Henderson Research Station near Mazowe (20 km from Harare). Academic staff were housed on the farm and travelled to the main campus as necessary. However, the farm was sold about 14 yrs ago because of poor management, budgetary problems and the isolation of the staff from the main campus.

Over the 28 year history of the University, the teaching of agriculture has consistently been given a low priority in terms of status within the University structure, quality of physical infrastructure and financial support for staff. The Department of Agriculture in the Faculty of Science was elevated to the status of a School of Agriculture only in 1978 and subsequently to a Faculty of Agriculture in 1979.

With this low priority, it is not surprising that the 1981 undergraduate enrolment of 112 students (4.4 percent) in agriculture was the lowest of the university faculties. Over the past two decades, local employers have strongly preferred agricultural graduates from South African rather than locally trained people. This may be attributed to prejudice, implicit or explicit, in hiring policies, but more importantly, to belief that local graduates were less well trained. In consequence, student enrolments and entry requirements for the BSc degree in Agriculture have been low, thus exacerbating the problem of running a good degree program.

The Course Programmes and Staff List of the Faculty are shown in Appendix I.

STUDENT ENROLMENT IN THE FACULTY OF AGRICULTURE

Although total university enrolment was increased 22 percent from 1981 to 1982 (from 2,525 to 3,091 students), that of the Faculty of Agriculture increased only 16%. This amounted to a decrease from 4,4% to 4,2% of total enrolment.

The 1982 enrolment in the three-year BSc degree program in agriculture was as follows:

First year	=	53
2nd year	=	41
3rd year	=	31
Total	=	125

Table 1

UNIVERSITY OF ZIMBABWE STUDENT ENROLMENT BY FACULTY

Faculty	Enrolment		Percentage of total Enrolment
	1981	1982	1982
Agriculture	112	130	4,2
Arts	405	452	14,6
Commerce and Law	664	791	25,6
Education	172	194	9,5
Engineering	148	186	6,0
Medicine	345	383	12,4
Science	229	271	8,8
Social Studies	450	566	18,3
Veterinary Science	0	18	0,6
TOTAL	2525	3091	100,0

Percentage increase in enrolment 22%

Table 2

ENROLMENTS IN THE FACULTY OF AGRICULTURE

Year	Total Number of Students	1st Year Enrolments
1980	102	57
1981	112	50
1982	130	52
1983	151	57
1984	196	71
1985	229	79
1986	289	109
1987 (proposed)		100

(Source: Figures supplied by the Faculty of Agriculture Administration Department)

THE PROJECT OBJECTIVES

The program proposed in the project abstract (1982) was developed in co-operation with the Dean of the Faculty of Agriculture, Department Chairmen and academic staff in the Department of Crop Science, Animal Science, Land Management, Economics, Botany, Zoology and Geography. In addition, discussions were held with the Dean of the Faculty of Social Studies, the Director of the University Computer Centre, the University Librarians, the Registrar, the Bursar and the Principal.

Discussions were also held with the Secretary of the Ministry of Agriculture and Principals of the Colleges of Agriculture at Chibero and Gwebi. The program comprised six components:

a) academic staff development, including training both within and outside Zimbabwe and provision of opportunities for research and study;
b) capital grants to construct academic buildings;
c) teaching equipment;
d) strengthening the University computer and the main library;
e) strengthening agricultural research by establishing a research program in close co-operation with the Ministry of Agriculture's Department of Research and Specialist services; and
f) technical assistance.

(Source: Project Abstract 1982)

These objectives were formulated in response to constraints and problems facing the Faculty of Agriculture, and which were identified by the USAID project identification team who visited the University in May 1982. These constraints were:

a) Serious constraints on the teaching programme caused by a shortage of senior staff in Soil Science, Biometrics, Horticulture, Agricultural Economics and Animal Science.
b) The lack of practical experience of both students and staff due to their urban backgrounds.
c) The lack of a University Farm since this was given up 14 years ago. This meant that the Faculty could not carry out integrated teaching and research programmes, and it was difficult for staff members to travel to government research stations or undertake on-farm field studies.
d) Inadequate physical plant such as offices and buildings to cope with student enrolment.

The Land Management Building Project was a capital grant to construct offices and buildings to cope with the increase in student enrolment in the Faculty of Agriculture.

The top priority was to construct 2 200 square metre combination classroom office/laboratory block for the Department of Land Management. In addition, the space presently occupied by the Department of Land Management will be remodelled for the Animal Science Department.

Finally, a controlled environment atmosphere greenhouse was planned to support and carry out research and teaching in the plant and soil sciences.

EXPECTED RESULTS

The programme was to enable the univeristy to respond effectively to the needs of Zimbabwe both as a teaching and as a research institution. The undergraduate training programme was to significantly strengthen and improve. Futher, the university would also be able to offer an expanded graduate training programme to improve the trained agricultural manpower of Zimbabwe. A conservative approach to expansion of student numbers was taken in this proposal since the dimensions of the demand for agricultural granduates was not clear and the faculty would prefer to consolidate the extended programme before expanding student enrolment. However, the programme had the flexibility to incorporate increases in student numbers should this become necessary. The faculty might require to seek some additional assistance for staff and teaching equipment depending upon the discipline in which student numbers were to increase.

PROJECT COSTS

The costs of the Land Management Building Project are shown in the table below and in the context of the whole ZASA programme to the Faculty of Agriculture. New estimates were necessary due to underestimation in the Project Abstract and also to allow for increases in building costs during the life of the project.

Table 3

Total cost Z$8 682 000.

	Project Abstract	New Estimates		
	May 1982	Jan 1984	Mar 1985	Jly 1985
University Farm *	-	-	1 300 000	1 300 000
Land Management Building *	1 750 000	2 100 000	3 200 000	3 800 000
Crop Science				
Farm Building *	20 000			
Controlled Environment) Facility *)	250 000	400 000		100 000
Phytotron)			123 000	
Animal Science				
Field Station	510 000			
Teaching Equipment	336 000	600 000		
Office Equipment	16 000			
Phototypesetter	46 000			
Vehicles (3)	30 000	39 000		
16 Microcomputers	96 000	160 000		
Software	60 000			
Research Equipment	120 000			
Research Fund *			40 000	
Scholarships			70 000	50 000
SUBTOTAL	3 234 000	3 299 000	4 733 000	5 250 000
Staff Development	710 000			
Technical Assistance	1 962 000			
Faculty Development *	1 510 000			
Support Staff	670 000			
Overheads	596 000			
TOTAL	8 682 000			

^ See Appendix II for full budget

* These items paid for in Z$ from counterpart funds. Remaining items paid US$.

Office Equipment This item in the original estimate was subsequently included in the costs of the land management building.

University Farm The original estimate for this was $510 000 under Animal Science Field Station, the intention being to purchase Arundel Farm in Mount Pleasant. This proved to be unsuitable, and Thornpark Estate came on the market. This was initially costed at $750 000, and was subsequently purchased for $1 200 000, but this figure was increased to $1 300 000 by transfer and legal charges.

PROJECT TIMESCALE

1979	Faculty of Agriculture formed
1980	Independence of Zimbabwe
1981	
1982 May	Visit by USAID project identification team
	Visit by the faculty review committee
	Project abstract produced
1983	Faculty expansion project approved by MFEDP and included in th of ZASA funded projects
1984 January	New estimate prepared for building work
April	University takes over Thorn Park Estate farm
November	Approval from MFEDP to start building
	Work on the Land Management building begins
1985 March	Estimates of costs reviewed
July	Estimates of costs revised
May	Paper of the proposed Phase II development produced
1986 March	Building completed and handed over to the Faculty

THE LAND MANAGEMENT BUILDING

The building project for the Faculty of Agriculture in the University of Zimbabwe was undertaken for the following reasons:

a) To increase the number of agricultural graduates required to fill research, extension, teaching and management jobs in the agricultural sector. Enrolment of students for Part 1 of the BSc Honours degree in Agriculture to be increased to 100 by 1987.

b) To improve facilities for teaching and research in the Faculty of Agriculture and to expand post graduate training.

c) To provide more office and other accommodation for both staff and students in order to improve the quality of their working conditions.

d) To provide an engineering workshop for teaching and research.

e) To provide a controlled environment faci'ity for plant breeding and disease control.

f) Additional funds were made available for the purchase of a University farm to provide practical training for undergraduate students and research facilities for the Faculty of Agriculture.

The Land Management Building is a major extension to the Faculty of Agriculture and incorporates departments of Animal Science, Agricultural Engineering, Agriculture, Economics and Soil Science. The building belongs to the style of 'Post Modernism' and incorporates two aspects of past styles of architecture; the use of decoration and the colonnaded street.

The building comprises two and a half floors and a central mezzanine conference or lecture centre. It provides staff, students and course participants with over 5 000 sq m of first class work areas which are grouped into offices, laboratories, lecture facilities and storage and service areas, these being isolated by through-ways and courtyards that are typically Zimbabwean.

The main entrance from the north is at a point where the new building joins onto the existing Animal Science block. The north/south colonnade links this with the east/west colonnade. The colonnades are double height with upper galleries leading to offices over the laboratories and teching spaces which open directly off the concouse level. This arrangement creates a gradeur (the classical double order) which a public building in a Univesity should have. The building is raised off the ground to express and emphasise the suspended ground floor slab, the ground beams and the columns running down to the pads underground. The structural frame and supporting elements attached to it are picked out in red paint. The ground beams and all beams above have a red painted ledge which carries the facebrick skin above, and a vertical strip of the concrete inside each column is left uncovered by the brick skin and is also picked out in red. The building is a concrete frame structure with a covering of Willdale

facebricks, and the sun awnings on the outside of the building are painted green. An important aspect of the design and the materials used was to save maintenance costs in the future.

Of the total cost of $3,8 million (Zimbabwe), only $100 000 was spent on imported material. The major items imported were Nigerian timber for the bench tops in the laboratories, and wool which was brought abroad and woven into the carpets for the offices, lecture halls and waiting rooms. All other materials, bricks, cement, timber, etc, were of local origin, and no manufactured materials were imported.

(Sources: The New Land Management Building at UZ, M L Pearce, Zimbabwe Engineer, May 1986. Personal Interviews with Mr M L Pearce, the architect)

Appendix III Building plans and list of rooms.

Appendix IV Illustrations of the building.

MANAGEMENT AND IMPLEMENTATION OF THE PROJECT

The Design and Building Team

ARCHITECTS

Cathcart Fothergill and Pearce, Harare

STRUCTURAL ENGINEERS

Marcusson and Smallwood

MECHANICAL ENGINEERS

Sir Malcolm Macdonald and Partners

QUANTITY SURVEYORS

Hawkins, Leshnick, Pridgeon and Veale

SUBCONTRACTORS

Viking Woodwork (Pvt) Ltd
Frederick Sage & Co

CONTRACTORS

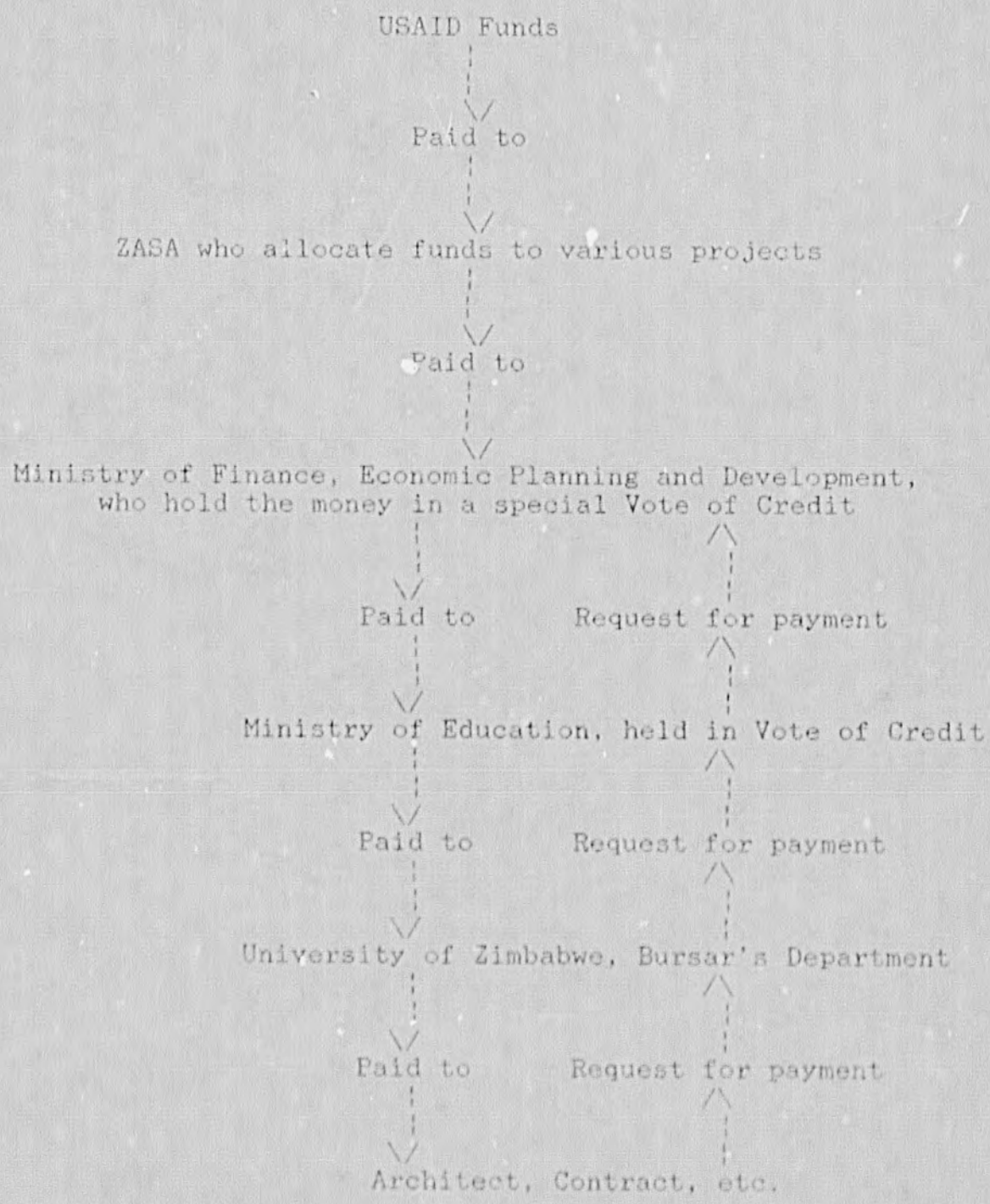
Central African Building Construction Company. Director, Mr Vira.

MEMBERS OF THE FACULTY OF AGRICULTURAL BUILDINGS PLANNING GROUP FOR THE PROJECT

Mr J V Buckley - Director of Works
Professor M J Blackie - Dean of Agriculture
Mr D H Hale - Chariman, Animal Science Department
Dr K W Nyamapfene - Chairman, Land Management Department
Professor M A Schweppenhauser - Chairman, Crop Science Department
Mr C F Chittenden - Lecturer, Land Management Department
Dr P Reynolds - Senior Research Fellow, Animal Science Department
Mr P L Hopkins - Senior Technician, Faculty of Agriculture
Mr R G Jack - Senior Technician, Crop Science Department
Mrs C J Moyo - Secretary

FINANCIAL CONTROL OF THE PROJECT

Finance for the Land Management Building Project was paid out as follows:-



Money held by the Ministry of Finance in their Vote of Credit was released to the Ministry of Education on the authority of a committee which met every three months. Professor Blackie mentioned the fact that money held

by the Ministry of Finance was difficult to obtain and released slowly. Although work on the buildings began in 1984, the first payment of the grant from ZASA of Z$1,1 million was received only in April 1985.

The Land Management Building was due to be finished in March 1986. In October 1985, the University applied to have the remainder of the grant, Z$2,2 million transferred to the Ministry of Education Vote of Credit and then to the University. The Ministry of Finance intended to transfer Z$1 million but owing to a typing error, approval was only given for the transfer of Z$100 000. This mone was paid to the University in January 1986, and the remaining Z$900 000 was paid after the next meeting of the committee in April 1986.

IMPLEMENTATION OF THE PROJECT

The building project was supervised during the planning and building stage by the Faculty of Agriculture Buildings Planning Group and carried out by the Design and Building Team. However, Professor Blackie in his First Interim Report, March 1985, acknowledges major contributions to both the project design and implementation from the Ministry of Agriculture and particularly Mr R Mupawoso, Permanent Secretary, Dr S Muchena and Dr P Chigaru, Director of Research and Specialist Services. The inclusion of two Senior Technicians in the planning team meant that the laboratories and storerooms were built to their specifications. Both made mention of the fact that the architect was always willing to make alterations at their request, and Appendix V gives examples of such alterations. In fact, liaison between the architect and the university was first class throughout the project.

The work of the contractor, Central African Building Construction Co was considered by the architect to be completely sound. Mr Vira is the owner of the firm and also works on site so that control was tight. He appears to have a very good working relationship with his staff, and because this was the only job on hand for the construction company, supervision was careful and continuous. The Land Management Building was completed two months ahead of schedule. Mr Pearce was particularly pleased with the standard of brickwork used as facing on the walls and as flooring in the courtyards.

Mr Alan Ngwenya, the foreman for the contractors, stated that the two main problems encountered on this job were the weather which during the summer season October 1985 to April 1986 was particularly wet including one of the wettest Aprils on record in Harare. The second problem was a shortage of materials, including bricks and cement, during the middle part of the project. This shortage was made good by drawing supplies from a Government building project that was taking place at that time.

Professor Blackie, former Dean of the Faculty of Agriculture, mentioned two problems. Estimates of the cost had to be revised from time to time, and this was due to his own inexperience of this type of work. However, USAID provided the funds required to meet the costs of the revised estimates, and the project was not cut back due to underestimating costs initially. A problem arose between the Ministry of Finance and the University over the procedure for drawing on the funds held by the Ministry, but this problem was resolved by the implementation of better procedures. Apart from these two matters, Professor Blackie considered that the project had been implemented with no serious problems.

Mr P L Hopkins, Senior Technician of the Faculty of Agriculture commented on the readiness of the architect to accept advice on the design of the various laboratories; the placing of fume cupboards, design of workbenches, etc. In his experience this had not happened in the past working with other architects. He also made the point that the building was completed without delays and was handed over to the Faculty two months ahead of schedule and in time for the start of the 1986 academic year.

In general, the project was managed and implemented with skill and goodwill from all the agents concerned.

(SOURCES: First Interim Project Report. M J Blackie. March 1985. Personal Interviews.

EVALUATION

One of the constraints facing the Faculty of Agriculture and identified by the USAID identification team who visited the University in May 1982 was inadequate physical plant such as offices, buildings and laboratories to cope with an increase in student enrolment. In response to the national requirement for more university graduates in agriculture, the Faculty of Agriculture wished to increase first year enrolment to 100 students. Due to the better academic quality of first year students, and in response to the findings of the enquiry into the student failure rate in the Unviersity, the overall failure rate in agriculture is now 3%. This means that as the expanded first year works through the course, the total student undergraduate body will stabilise at a figure of 290-295. In addition, the Faculty wished to increase the number of post graduate students working for higher degrees.

In order to fulfill these needs, one of the original objectives of the project, stated in the project abstrct, 1982, was the provision of capital grants to construct academic buildings. These buildings have now been completed in the form of the Land Management Building and the Engineering Workshop. They provide a conference room, one large (150 seat) and one smaller (60 seat) lecture halls together with offices, student laboratories, research laboratories, a reading room, seminar rooms and storerooms (see Appendix III). These facilities provide the physical accommodation to carry out the teaching and research envisaged by the Faculty of Agriculture. In addition, the engineering workshop and associated facilities will enable the faculty to initiate programmes in the areas of agricultural engineering and irrigation.

One further requirement was that the new buidling should be handed over to the Faculty for use in mid-1986. In fact, the building programme was completed, and the building was handed over in time for the start of the 1986 academic year.

Recurrent costs

The capital costs of the building, equipment and furniture were met in full from USAID funds. The building itself was designed by the architect to keep maintenance costs to a minimum, and this should not be a major item in the future. However, redecoration of the interior, replacement of laboratory equipment, cleaning and refurbishing on a daily basis and, of course, the increase in staff required to handle the expansion in undergraduate and post-graduate student numbers will be costs that will have to be met from the annual budget of the University. The building does provide one source of additional income. The facilities can be used for conferences and seminars during the periods of the student vacations, and a charge can be levied for these services. The facilities have been booked for seven workshops/seminars for 1987 and more are expected. The Land Management Building supported by the sleeping and dining facilities of the student hostels should provide an ideal venue for conferences and the demand for these should increase in the future.

LESSONS

The following lessons can be drawn from the project:

1. Estimates of building and other costs should be more accurate. In the case of this project, estimates had to be revised upwards by fairly large amounts. These increased costs were met in full by the donors, USAID, but future donors may not be so accommodating.

2. Sound precedures are required where money is paid by a donor agency to the Minsitry of Finance, Economic Planning and Development who, in turn pass on this money to the beneficiary. Delays in payment did occur on this project, and these are detailed in the section on Financial Control of the Project. These delays were due to very poor administration and control on the part of the Ministry of Finance.

3. A major building project can be carried out in Zimbabwe using the minimum of imported materials. Only 2,6% of the total cost of the building was spent on imported materials.

4. Given a good working relationship between the donor agency, the client, the design team and the building team, a large project can be carried out that meets the objectives, is completed in the time allowed and that gives satisfaction to all the parties concerned.

ACKNOWLEDGEMENTS

This survey was carried out with the full co-operation of members of the Faculty of Agriculture, University of Zimbabwe, and all requests for assistance were answered readily and quickly. The following deserve special mention:

Dr M Rukuni, Dean of the Faculty of Agriculture for permission to carry out the survey and for providing office accommodation.

Mrs V Winkfield, USAID Administration Assistant for making available the relevant documents.

Professor M J Blackie for his time and trouble in sharing his specialised knowledge of the project.

Mr P L Hopkins, Senior Chief Technician, Faculty of Agriculture for his assistance and knowledge.

Mr R G Jack, Senior Chief Technician, Department of Crop Science for documents and minutes of meetings of the Faculty Buildings Planning Group.

Mr W J Ascough, Senior Lecturer, Department of Land Management for personal interviews.

Mr M L Pearce, Architect and other members of the building team for plans, photographs and interviews.

APPENDICES

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APPENDIX I

FACULTY OF AGRICULTURE

UNDERGRADUATE STUDIES

The Faculty of Agriculture offers programmes leading to the BSc (Agriculture) Honours degree idn the individual fields described below.

BACHELOR OF SCIENCE AGRICULTURE HONOURS DEGREE

Subjects

The degree is offered in four subjects, each of which has a different programme of study to be pursued over a minimum period of three years of full-time study at the University, including three months of approved practical training in agricultural practice at a centre approved by Senate. In addition all Part I students will attend compulsory weekly practical visits to the University Farm or to other approved places.

The subjects are:

Agricultural Economics
Animal Science
Crop Science
Soil Science

The student must elect to follow one of these subjects and the choice is made at the time of initial registration. The range of courses available in the first year curriculum, however, is common to the Animal Science and Crop Science subjects and the student, therefore, may reserve a final decision on which of these two subjects to follow until registration for the second year of the degree programme. It may nevertheless be necessary to limit the number of students accpeted into any particular bias within a subject and the course combination selected by the student in any year, subject to:

a) timetable feasibility and
b) approval of the Chairman of relevant departments and the Dean of Agriculture.

Entry

To qualify for admission to the BSc (Agriculture) Honours degree programme a student must normally satisfy the following requirements in meeting the general entrance requirements of the University.

a) A pass at A Level in at least two of the following subjects:
Biology
b) Chemistry or Physical Science

Physics or Mathematics (or Applied or Pure and Applied Mathematics).

b) A pass at O Level in
Biology
Mathematics
Chemistry (or Physics with Chemistry, or Physical Science)
English Language

c) For the subject "Soil Science" it is compulsory to have a good A level pass in Chemistry.

d) For the subject "Agricultural Economics" an A level pass in Mathematics will normally be required.

e) All A Level passes should normally be attained with a minimum of symbol D.

A person who holds a recognized Diploma in Agriculture or Horticulture may apply for admission to the degree and for exemption from all or part of the entrance requirements. For Diplomas from Gwebi or Chibero College, the Faculty will only accept a First Class grade, and an equivalent level of pass will be required from other institutions.

Possession of the entrance requirements at low grades of pass will not ensure acceptance into the degree programmes.

Programme and Examinations

The degree programme is divided into three Parts and students must satisfy the Examiners at each Part before proceeding to the next Part.

Students who satisfy the Examiners in the practical part of a course and examination, but fail in the theory paper, may be allowed to take a Supplementary examination in that course. A maximum of two supplementary examinations are permitted at any Part, and a maximum of four during the programme.

In special cases, a student who fails one course at Part I or Part II may carry that course. This means that the student must write an examination in that course at the next examination session. Normally, a student will carry only the course he has failed, but in exceptional cases he may be allowed to substitute an appropriate alternative course.

The BSc (Agriculture) Honours degree is awarded in the categories of First Class Honours, Second Class Honours (Upper Division), Second Class Honours (Lower Division), and third Class Honours, and is classified on the basis of the results obtained at both Parts II and III, with Part III.

The following curricula for the respective subjects will normally apply, although all the courses listed may not necessarily be on offer each year. Students will be advised of the combinations available at the time of registration.

Subject: Agricultural Economics

Part I (six courses)

SL101	Introduction to Soil Science
CR101	Crop Science and Genetics
AS101	Animal Science
AGEC101	Economics of Agriculture or EC101 Economic Principles
AGEC106	Agricultural Mathematics and Statistics

and ONE of the following courses:-

CT103	Computing Science
SO101	Introduction to Social Anthropology

Part II (six courses)

CR203	Crop Production
AGEC201	Agricultural Economics
AGEC202	Farm Management
AGEC203	Agricultural Development and Trade
SL204	Land Use and Natural Resource Evaluation

and ONE of the following courses:-

EC201	Macroeconomics
AS301	Animal Production
BS203	Managerial Finance

Part III (five or six courses depending on the course combination)

AGEC301	Agricultural Economics
AGEC302	Applied Agricultural Production Economics

and either FOUR of the following elective courses:-

AGEC303	Natural Resource Economics
AGEC305	Agricultural Price Analysis & Forecasting
AGEC306	Sector Planning & Project Appraisal
AGEC308	Extension and Communication
OR	
AGEC360	Special Study

Any other course with the approval of the Department Chairman and the Dean of Agriculture.

Students choosing to do AGEC360 will only be required to do TWO Elective courses.

Subject: Animal Science

Part I (six courses)

SL101	Introduction to Soil Science
CR101	Crop Science & Genetics
CR104	Agricultural Microbiology & Entomology
AS101	Animal Science
AS102	Agricultural Biochemistry
AGEC101	Economics of Agriculture

Part II (six courses)

CR202	Grassland Science
CR203	Crop Production
AS202	Animal Microbiology

CR206 Biometry
AS203 Nutritional Biochemistry
AS207 Animal Physiology

Part III (six courses)
AS301 Animal Production
AS304 Animal Health
AS305 Livestock Improvement
AGEC202 Farm Management
Plus an approved choice of TWO elective courses from:-
AS302 Principles of Processing Animal Products
*AS303 Animal Metabolism
*AS306 Animal Experimentation
AS307 Animal Production
*AS360 Special Study
CR303 Crop Production
AGEC201 Agricultural Economics
AGEC308 Extension & Communication
AGEC309 Agricultural Mechanisation and Engineering
* Admission to these courses will depend upon performance at Parts I and II.

Subject: Crop Science

Part I (six courses)
SL101 Introduction to Soil Science
CR101 Crop Science & Genetics
CR104 Agricultural Microbiology & Entomology
AS101 Animal Science
AS102 Agricultural Biochemistry
AGEC101 Economics of Agriculture

Part II (six courses)
CR201 Crop Ecology & Physiology
CR203 Crop Production
CR204 Crop Protection
CR206 Biometry
and TWO of the following courses:-
CR202 Grassland Science
CR205 Genetics and Plant Breeding
CR207 Horticulture

Part III (five or six courses depending on course combination)
Production BIAS
CR303 Crop Production
AS301 Animal Production
Plus an approved choice of FOUR elective courses from:-
CR302 Grassland Science
CR307 Horticulture
SL204 Land Use and Natural Resource Evaluation
SL301 Soil Fertility
AGEC202 Farm Management
AGEC308 Extension and Communication
AGEC309 Agricultural Mechanisation and Engineering

RESEARCH BIAS

CR303	Crop Production
CR306	Biometry
CR360	Special Study CR301, or CR302, or CR303, or CR304, or CR305, or CR306 or CR307

Plus either approved choice of TWO elective course from:-

CR301	Crop Ecology
CR304	Crop Protection
CR305	Plant Breeding
CR307	Horticulture

or the following Two courses

CR302	Grassland Science
AS301	Animal Production

Subject: Soil Science

Part I (six courses)

SL101	Introduction to Soil Science
CR101	Crop Science and Genetics
CH101/2/3	Chemistry (two course equivalents)
AS101	Animal Science

and ONE of the following courses:-

CR104	Agricultural Microbiology and Entomology
CT103	Computing Science

Part II (six courses)

SL202	Soil Chemistry
CR203	Crop Production
CH201/2/3	Chemistry (three course equivalents)
CR206	Biometry

Part III (six courses)

SL301	Soil Fertility
SL302	Soil Microbiology
SL303	Clays and Clay Minerals
SL305	Soil Physics
SL306	Pedology

and ONE of the following elective courses:

GL307	Geology
SL360	Special Study
CR207	Horticulture

Any other course with the approval of the Department Chairman and the Dean of Agriculture.

FACULTY OF AGRICULTURE

Members of Staff as at 1 July 1986

Dean	Dr M Rukuni
Secretary	Miss L Zungunde
Assistant Registrar	Mrs M C Swift
Secretary	Miss S Tyrrell
Director Practical Agricultural Experience	Mr G Homewood
Secretary	Miss T Mtungwazi
Faculty Research Fellow	Dr P Reynolds
Snr Chief Technician	Mr P Hopkins
	Miss K Pegley
	Miss C Cabugueira
	Mr A Barnes
	Mr G Nyamatemba
	Mr R Sagwete
	Mrs B Kembo
	Mr Mutangadura
	Mr J Mavurudza
	Mr E Mafunga
	Mr J Mutigwa

Department of Animal Science

Dr N T Ngongoni (Chairman & Deputy Dean of Agriculture)
Miss D Morgan (Secretary)
Miss Z Dube
Mr D H Hale
Mrs M Titterton
Dr R W Erickson (USAID)
Dr H D Ayebo
Dr C Mutisi
Dr J Chesworth
Dr L R Ndlovu
Dr M Gomez
Mr L Makore (Chief Technician)
Mrs F E Brand (Senior Technician)
Mr N Kalimo
Mr L Tsakatsa
Mr H Muzavazi
Mr P Chideme

Department of Crop Science

Prof M A Schweppenhauser (Chairman)
Mrs E Wormald (Secretary)
Mrs E Strong
Miss K Wilsnagh
Mr Tongoona
Sister J Canhao
Dr D L Cole
Mrs B V Maasdorp
Dr D O Giga
Dr S Bose
Dr S M Funnah
Dr A I Robertson
Mr A R Maclaurin
Dr P Northcraft
Mr O A Chivinge
Mr R G Jack (Snr Chief Technician)
Mrs M Cavill
Mrs J Tiffin
Mrs G Moyo
Mr K Nyamarebvu
Ms E Rupango
Mr Sinoia

Department of Soil Science

Mr J Ascough (Chairman)
Mrs P Samuriwo (Secretary)
Mrs J Hussein
Dr M Piha
Dr K Nyamapfene
Dr J Johnson
Mr S Tembo
Mrs G Blanchard (Senior Technician)
Mr D Kennet
Mr P Chimeura
Mr H Mwamuka
Mr S Zimbudzi
Mr M Makoni
Mr A Hungwe (Research Fellow)
Mr C Chiduza (Research Fellow)

Department of Agricultural Economics

- (Chairman)
Mrs B Rusike
(Secretary)
Mrs C Phillips
Dr K Muir-Leresche
Mrs J Stanning
Mr C Mbwanda
Mr G Mudimu
Dr D Neeley (USAID)
Mrs M Ross
Mr L Madziwanzira
Mr M Chiwashira

CIMMYT Staff

Dr A Low
Dr S Waddington
Miss M Murahwa
(Secretary)

UZ(Thornpark Estate)

Dr R Ward (CIMMYT)
Dr Akibo-Betts
(CIMMYT)
Miss S Lone (CIMMYT)
(Secretary)
Miss L Agiotis
(CIMMYT)

USAID Staff

Mrs V Winkfield (Admin
Assistant)
Mrs M Hutchinson
(Secretary)

Food Security Staff

Prof C K Eicher
(USAID)
Miss S Sibanda
(Administrative
Assistant)
Dr S Buccola (USAID)
Mrs N Horn
Mr F Mangwiro
Mr P Ngobese
Mr G Makombe
Mr C Sukume
Dr D Rohrbach

Farming Systems Research

Miss D Chanakira
(Admin Assistant)
Dr M Rukuni (Director)

Resignations

Prof M J Blackie	(former Dean of Agriculture)
Dr K Asumadu	(Soil Science)
Mr C F Chittenden	(Soil Science)
Mrs C Chittenden	(former Assistant Registrar, Agriculture)
Mr B Joqi	

Complete USAID Contracts

Dr R E Herner	(Crop Science)
Dr J Rosenberger	(Agricultural Economics)
Prof K Lawton	(Soil Science)

Appendix II

BUDGET

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Capital					
Land Management building 2200 sqm @ $500/sqm and Alterations to Animal Science Buildings	1 100 000	650 000			
Crop Science farm building	20 000				
Controlled environment facility		$ 250 000			
Animal Science field station	510 000				
Teaching Equipment	112 000	112 000	112 000		
Office Equipment	16 000				
Phototypesetter	46 000				
Vehicle (3 pickups @ $10 000 each)		30 000			
16 Microcomputers @ $3 000 each	48 000	48 000			
Computer centre software		60 000			
Research Equipment	120 000				
CAPITAL SUBTOTAL	$1 852 000	1 270 000	112 000		

Staff Development					
2 international staff travel grants per year	10 000	10 000	10 000	10 000	10 000
4 one year fellowship for MSc training in US	72 000	72 000	72 000	72 000	72 000
Thesis support for MSc field work in Zimbabwe	60 000	60 000	60 000	60 000	60 000
STAFF DEVELOPMENT SUBTOTAL	142 000	142 000	142 000	142 000	142 000
Technical Assistance					
Biometrician	90 000	90 000	90 000	90 000	
Animal Scientist	90 000	90 000	90 000	90 000	
Soil Scientist	90 000	90 000	90 000	90 000	
Horticulturalist		90 000	90 000	90 000	
Ag. Economist		90 000	90 000	90 000	
Small livestock		90 000	90 000	90 000	
Short term visits	18 000	18 000	18 000	18 000	
TECHNICAL ASSISTANCE SUBTOTAL	288 000	558 000	558 000	558 000	
Faculty Development					
Research Foundation			1 000 000		
Publication	32 000	32 000	32 000	32 000	32 000
Field Days Workshop	25 000	25 000	25 000	25 000	25 000
Library Development	25 000	25 000	25 000	25 000	25 000
Central Services	20 000	20 000	20 000	20 000	20 000
FACULTY DEVELOPMENT SUBTOTAL	102 000	102 000	102 000	102 000	102 000

Support Staff					
Special Assistant to Dean	15 000	15 000			
Clerical Assistance	23 000	23 000	23 000	23 000	23 000
Programmer Assistance	18 000	18 000	18 000	18 000	18 000
Technical Assistance	75 000	75 000	75 000	75 000	75 000
Labourers/Cleaner	12 000	12 000	12 000	12 000	12 000
SUPPORT STAFF SUBTOTAL	143 000	143 000	128 000	128 000	128 000
Overhead and Running Costs					
Buildings insurance and maintenance	20 000	20 000	20 000	20 000	20 000
Field station running costs	64 000	64 000	64 000	64 000	64 000
Computer maintenance	4 000	9 600	9 600	9 000	9 600
Software maintenance		7 000	7 000	7 000	7 000
Teaching equipment maintenance	8 000	8 000	8 000	8 000	8 000
Vehicle running and maintenance		22 000	22 000	22 000	22 000
OVERHEAD SUBTOTAL	96 000	125 000	125 000	125 000	125 000
TOTALS	2 623 000	2 340 000	2 167 000	1 055 000	497 000
GRAND TOTAL	$8 682 000				

(SOURCE: Project Abstract 1982)

Appendix III

BUILDING PLANS

LIST OF ROOMS

Conference Hall
Lecture Hall
Lecturer (x 5)
Projection Room (x 2)
Data Processing Room
Student's Common Room
Bullman Room
Post Graduate Reading Room
Reception
Chairman (x 2)
Professor Soil Science
Secretary & Waiting (x 2)
Technical Office
Store (x 7)
Equipment Store
Chemical Store
Instrument Room
Students Lab
Rearch Lab
Chemistry Lab
Chief Technician
Research Fellow (x 2)
Technical Assistants (x 2)
Soil Prep Room
Soil Store
First Aid Room
Tea Kitchen (x 4)
Women's Toilets (x 8)
Covered Verandah (x 2)

Upper Volume to Conference Hall
Small Lecture Theatre
Seminar Room (x 2)
Dark Room
Drawing Office
Staff Reading Room
Under Graduate Reading Room
Post Graduate Students
Office (x 12)
Chairman Soil Science
Professor
Secretary (x 2)
Senior Lecturer
Store (x 3 Gas)
Field Store
Balance Room
Laboratory (x 3)
Preparatory Lab
Pedology Lab
Constant Temperature Room
Minerologist
Research (x 5)
Soil Physics Lab
Plant Room
Main Switch Room
Kitchen
Tea Kitchen & Store (x 2)
Men's Toilets (x 8)
Staff Terrace

LOWER GROUND FLOOR

Student's Common Room
Project Room
Lecturer (x 5) (S19, S20, S21, S22, S23)
Plant Room
Technical Assistants (x 2) (S29, S28)
Equipment Store (S12)
Store (x 8) (1 x LPG Gas, 1 x NO2 - Gas, 1 x H2 4AC - Gas)
Soil Prep Room
CB Kitchen
Women's Toilets (x 2)
Covered Verandah (x 2)

Office
Lecture Hall
Constant Temperature Room (S17)
Chemical Store
First Aid Room (C5)
Tea Kitchen
Men's Toilets (x 2)

GROUND FLOOR

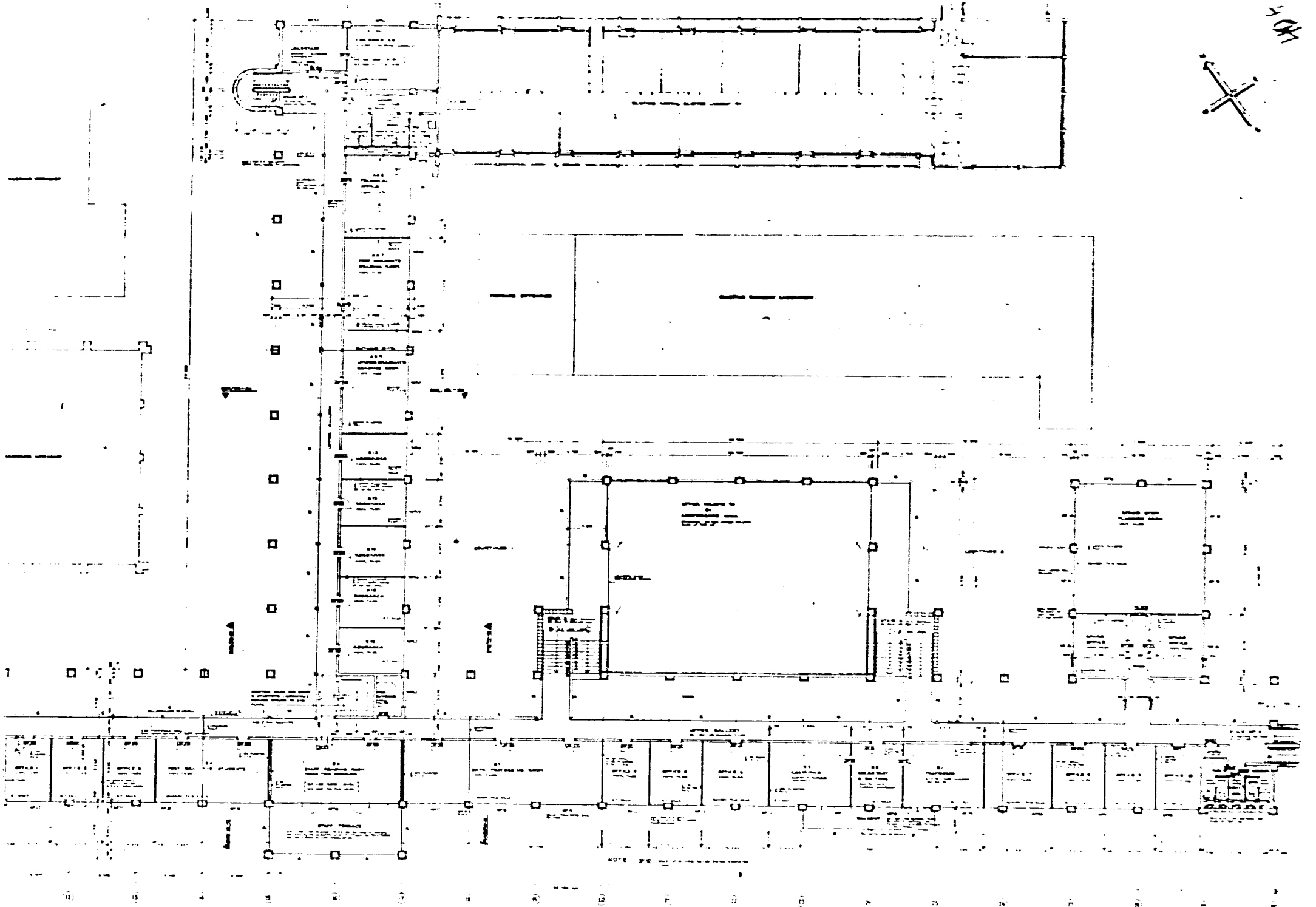
Conference Hall (C1)
Projection Room
Bullman Room
Student's Lab (S14)
Research Lab (AE5)
Pedology Lab (S8)
Soil Store (S5)
Balance Room (S9)
Instrument Room (S10)
Chairman Soil Science (S1)
Professor Soil Science (S1)
Drawing Office (AE6)
Secretary (AE8)
Reception
Main Switch Room
Tea Kitchen (x 2)
Women's Toilets (x 3)

Small Lecture Theatre (AS1D0
Seminar Rooms 1 & 2
Laboratories 1, 2 & 3 (AS1, AS2, AS3)
Preparatory Lab (S16)
Soil Physics Lab (S4)
Chemistry Lab (S10)
Research Fellow (x 2) (S25, S26)
Chief Technician (S15)
Minerologist (S13)
Secretary/Waiting (S3)
Dark Room
Office (AE15)
Senior Lecturer (AE7)
Store
Field Equipment Store (E5)
Tea Kitchen & Store
Men's Toilets (x 3)

FIRST FLOOR

Offices (x 10) (1 to 10)
Secretary & Waiting (E3)
Secretary
Post Graduate Students (E4)
Staff Terrace
Under Graduate Reading Room (AS9)
Post Graduate Reading Room (AS7)
Store
Men's Toilets (x 3)
Tea Kitchen & Store

Chairman (x 2) (E2, AS)
Professor (E1)
Research (x 5) (E16, E15, E14, E13, E12)
Staff Reading Room (E6)
Data Processing Room (E7)
Upper Volume to Conference Hall (C1)
Technical Office (AS6)
Women's Toilets (x 3)
Tea Kitchen



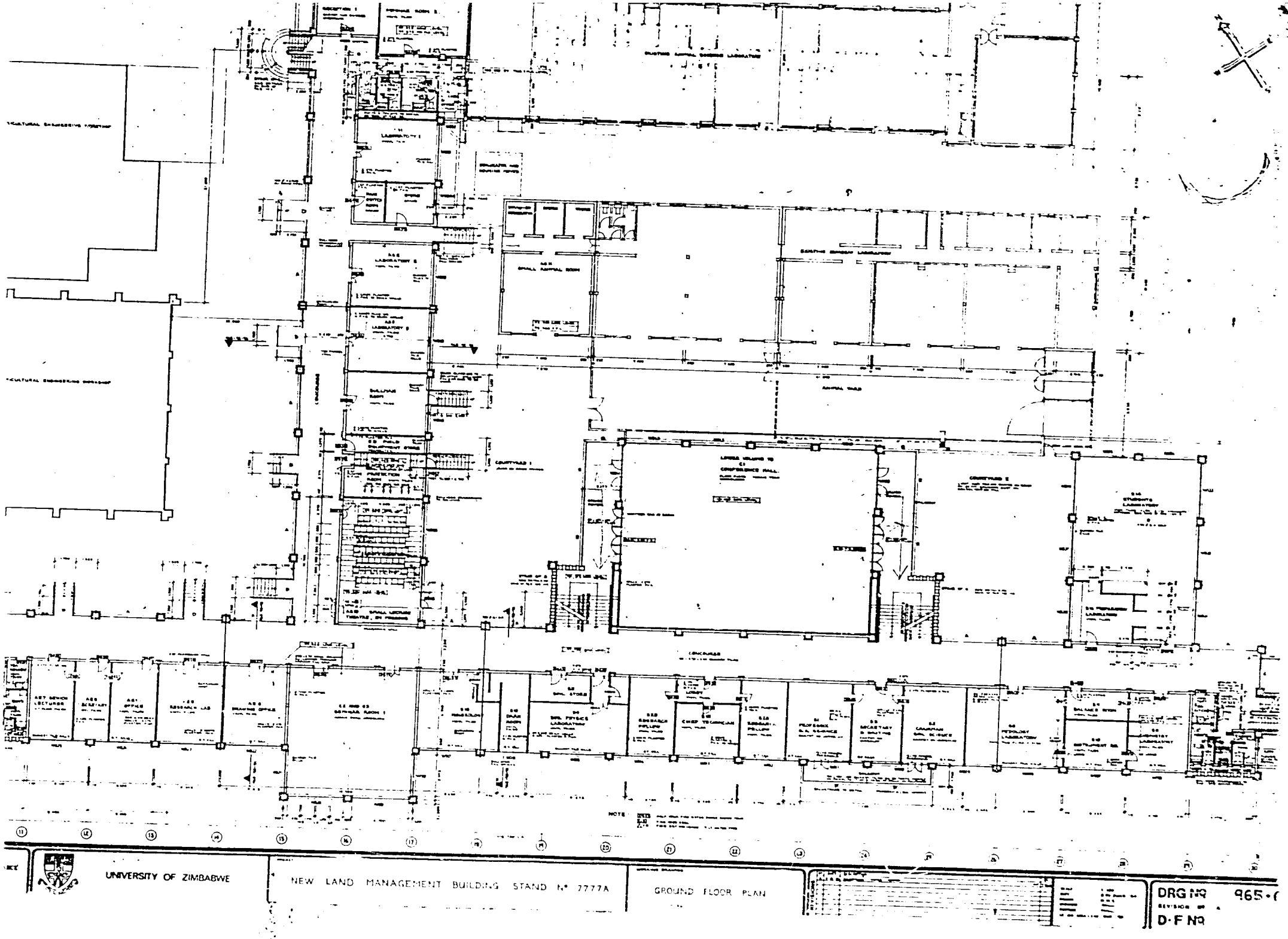
UNIVERSITY OF ZIMBABWE

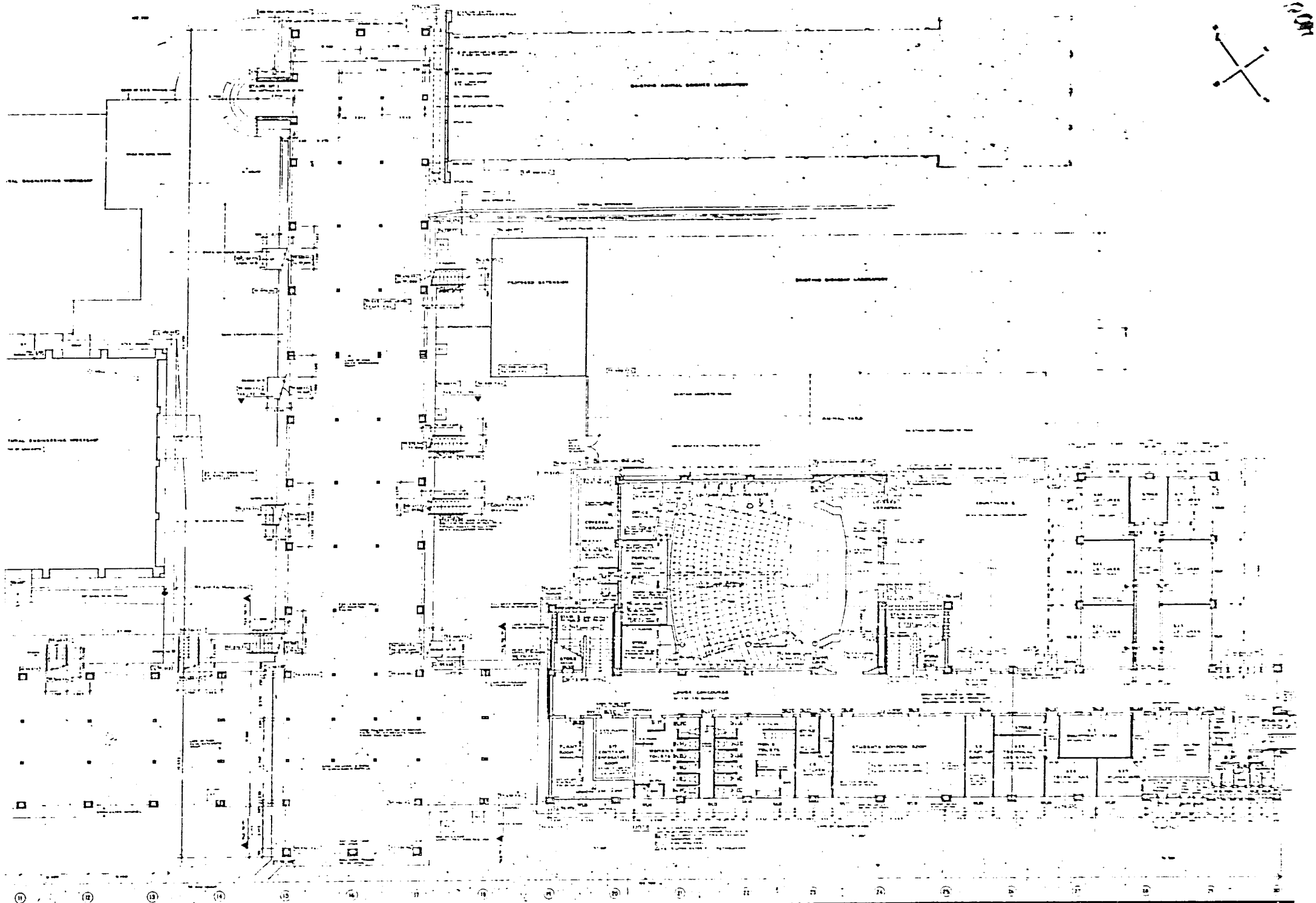
NEW LAND MANAGEMENT BUILDING STAND Nº 7777A

FIRST FLOOR PLAN

DRG Nº 965-0

D·F Nº


UNIVERSITY OF ZIMBABWE
NEW LAND MANAGEMENT BUILDING STAND Nº 7777A
GROUND FLOOR PLAN
DRG Nº
D·F Nº



UNIVERSITY OF ZIMBABWE

NEW LAND MANAGEMENT BUILDING STAND Nº 7777A

LOWER GROUND FLOOR PLAN

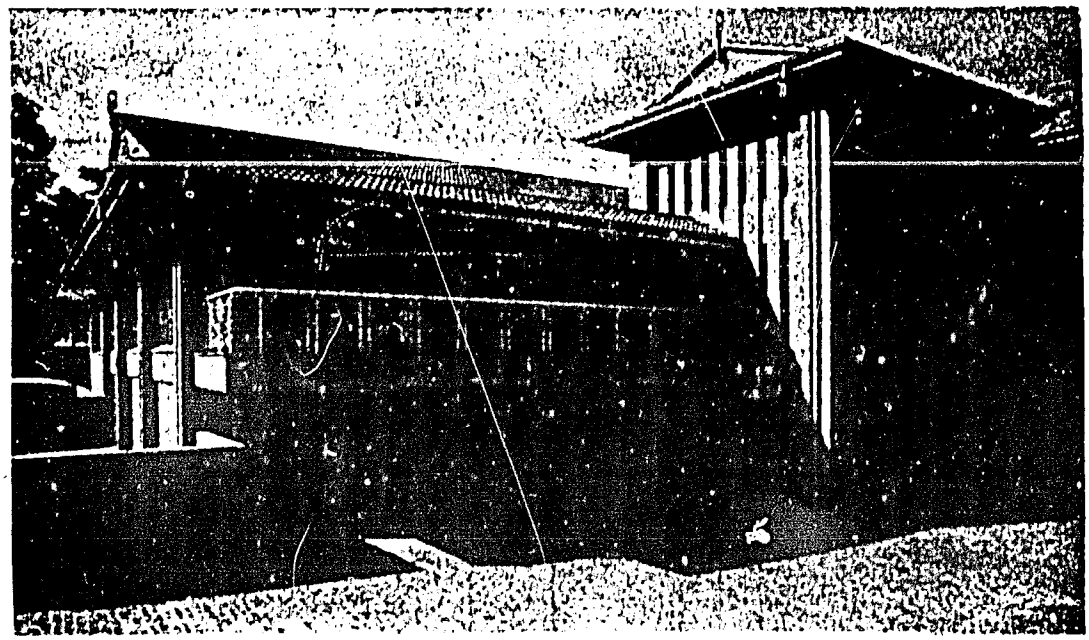
DRG Nº 965

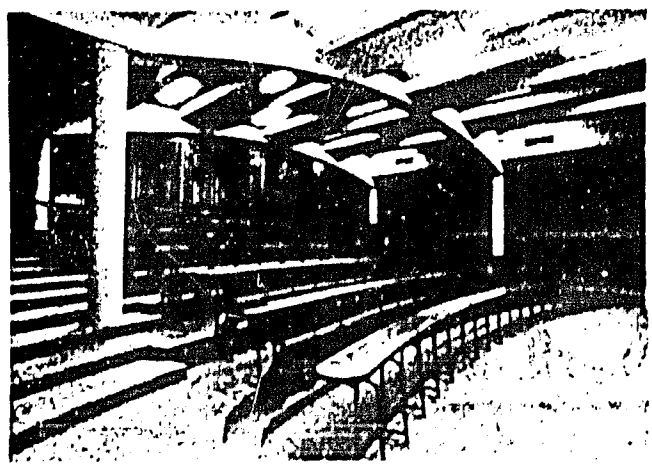
D.F Nº

APPENDIX IV

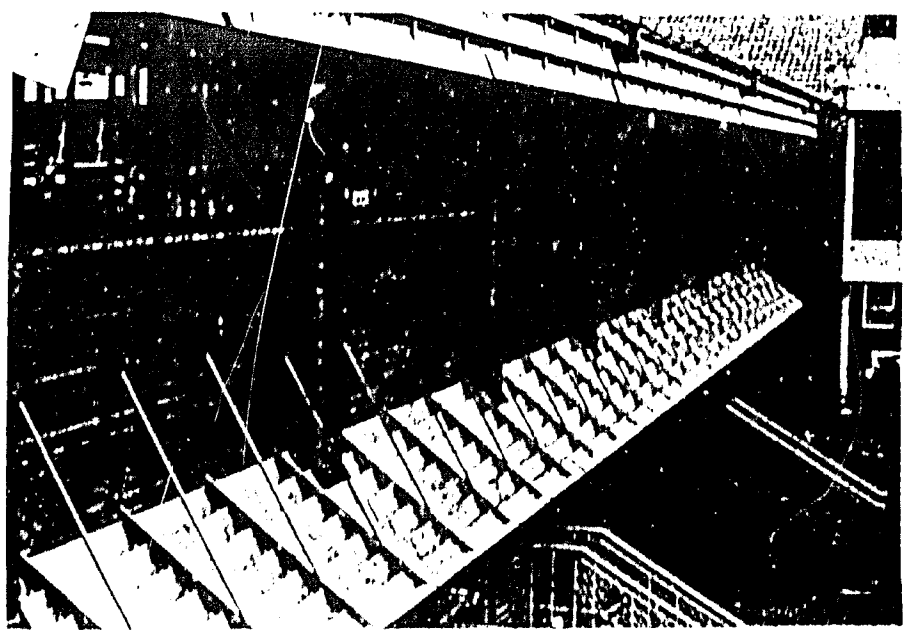
ILLUSTRATIONS

ILLUSTRATIONS OF THE BUILDING

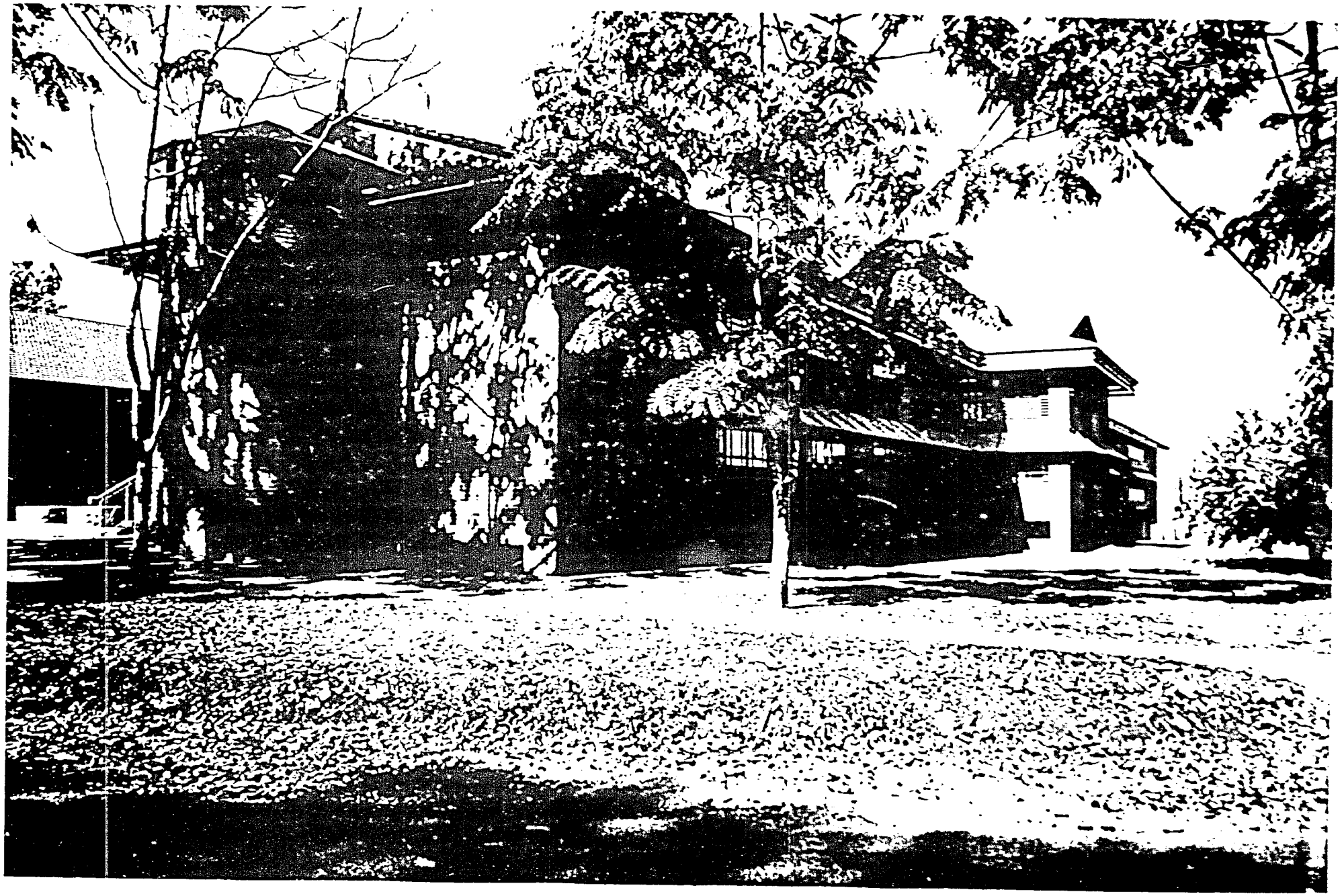




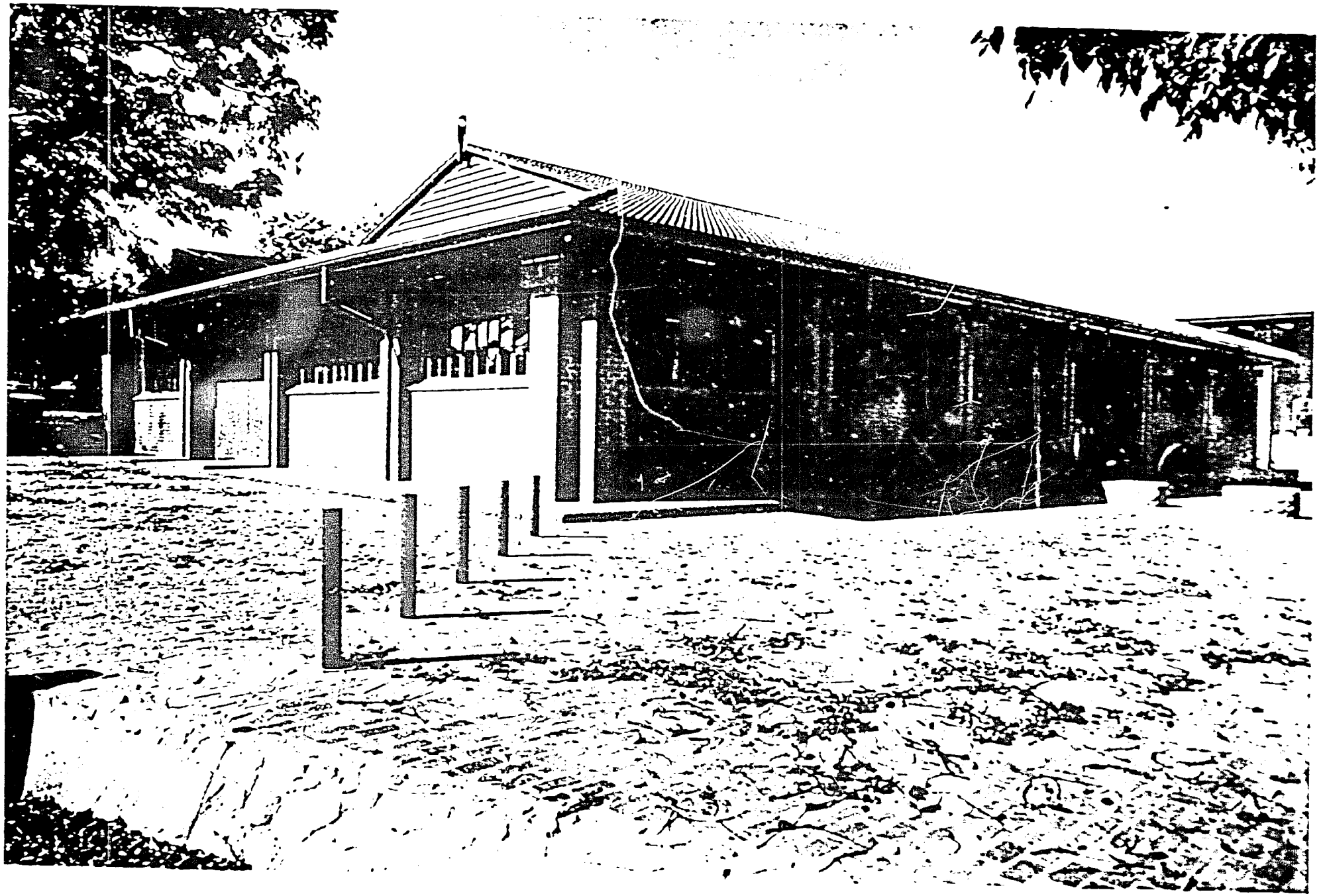
LARGE LECTURE HALL TO SEAT 160



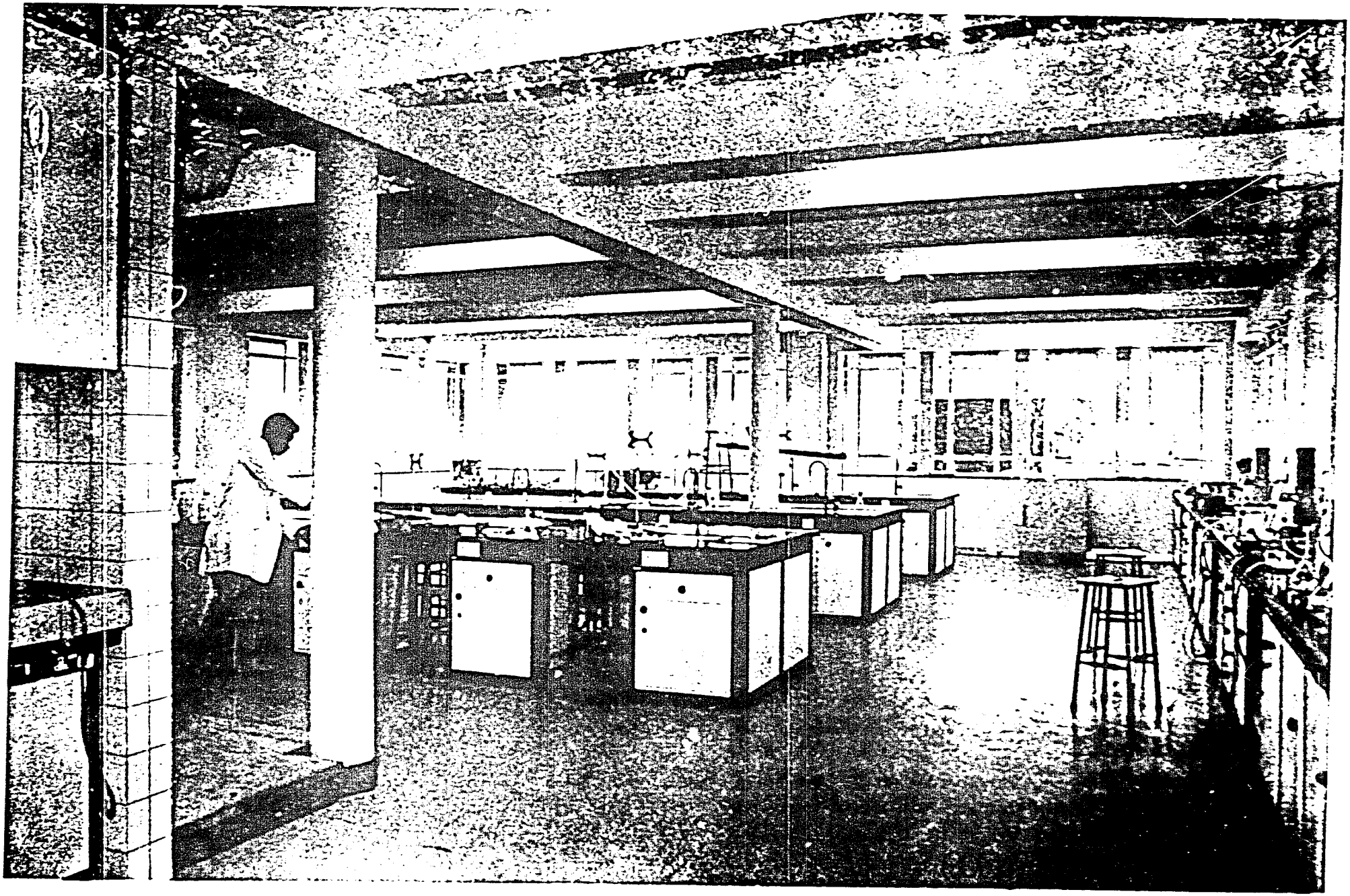
SUN AWNINGS MADE FROM LOCAL MATERIALS



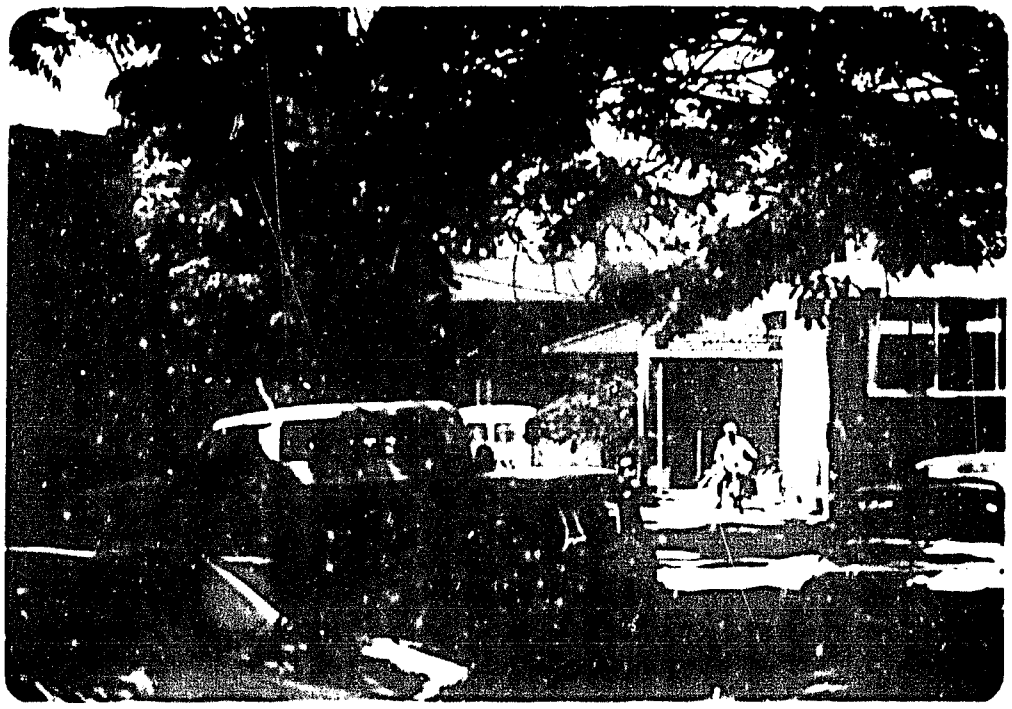
REAR VIEW OF THE NEW BUILDING.



FARM MACHINERY BUILDING



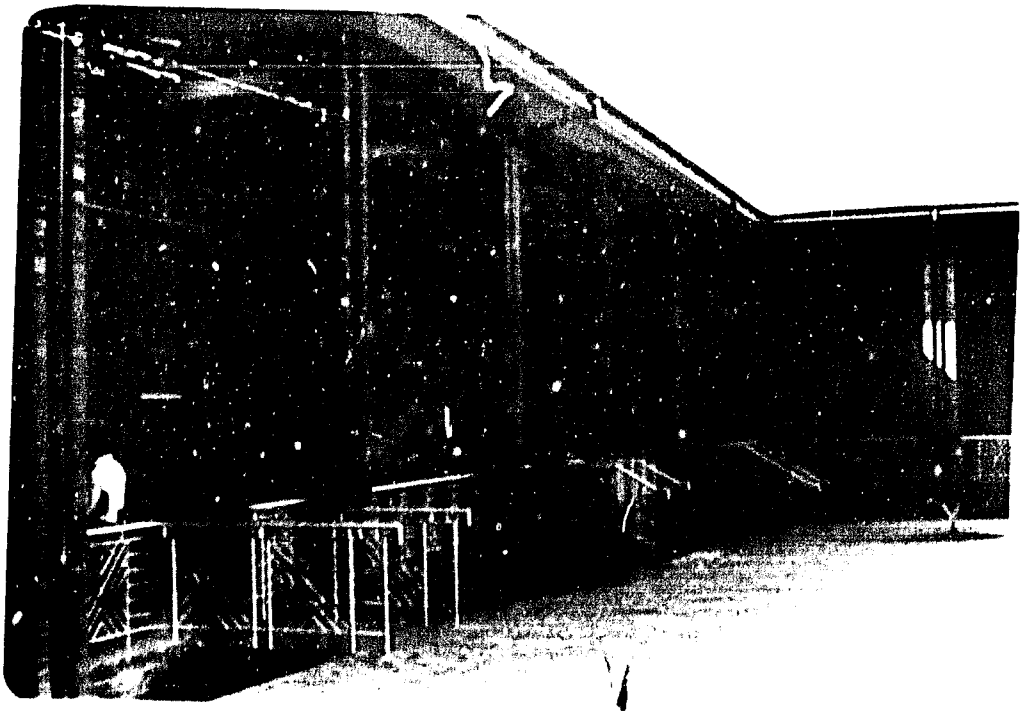
STUDENT LABORATORY



CAR PARK WITH THE EXISTING AGRICULTURAL MECHANISATION BUILDING ON THE RIGHT AND THE NEW LAND MANAGEMENT BUILDING IN THE BACKGROUND

PART OF THE GROUND FLOOR AND FIRST FLOOR OF THE NEW BUILDING

FIRST FLOOR PASSAGEWAY AND GROUND FLOOR CLOISTERS



GROUND FLOOR CLOISTERS OPENING ONTO THE FIRST COURTYARD

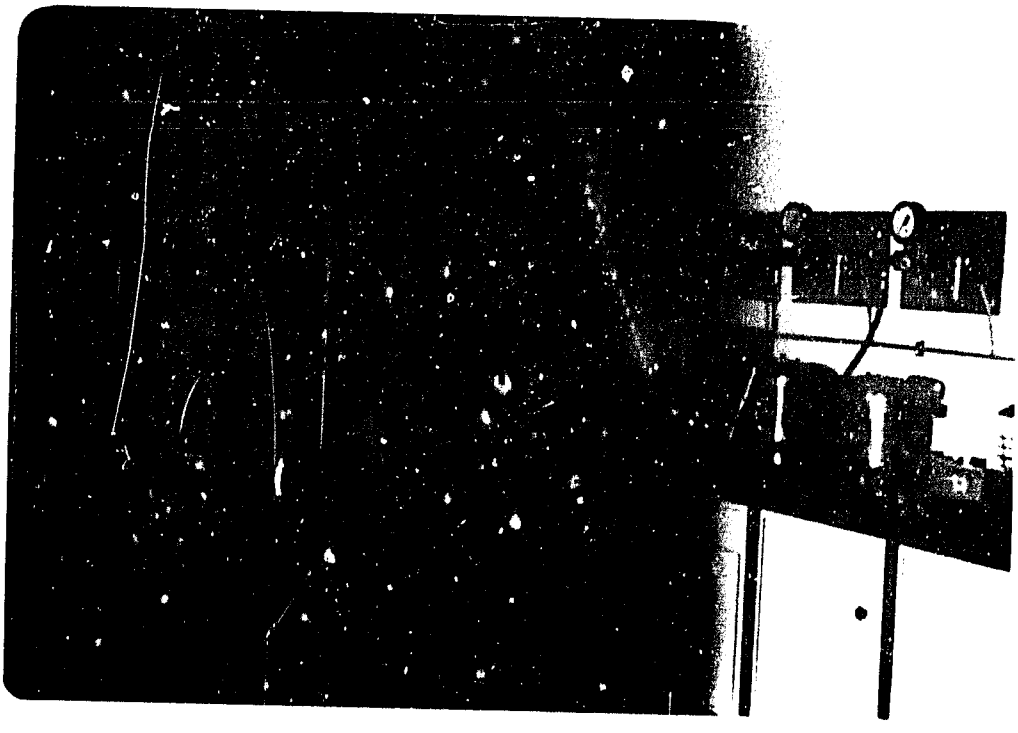
GROUND FLOOR PASSAGEWAY SHOWING DETAILS OF THE BRICKWORK ON THE WALLS AND FLOOR

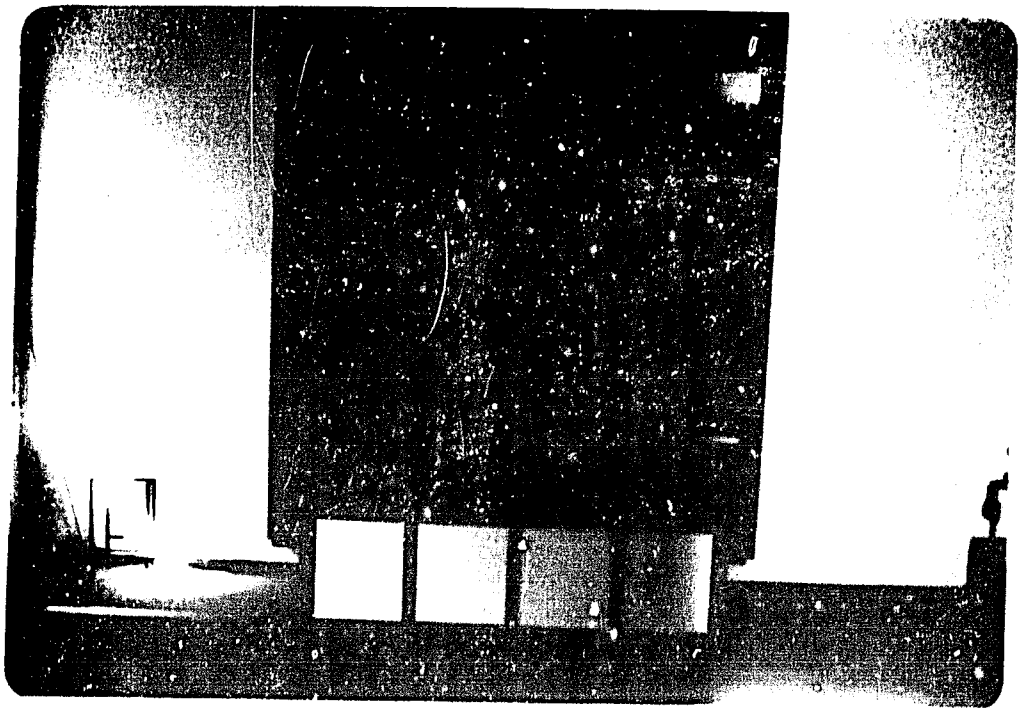
FIRST FLOOR PASSAGEWAY

CONFERENCE HALL WITH STUDENTS TAKING THEIR PLACES TO SIT AN EXAMINATION

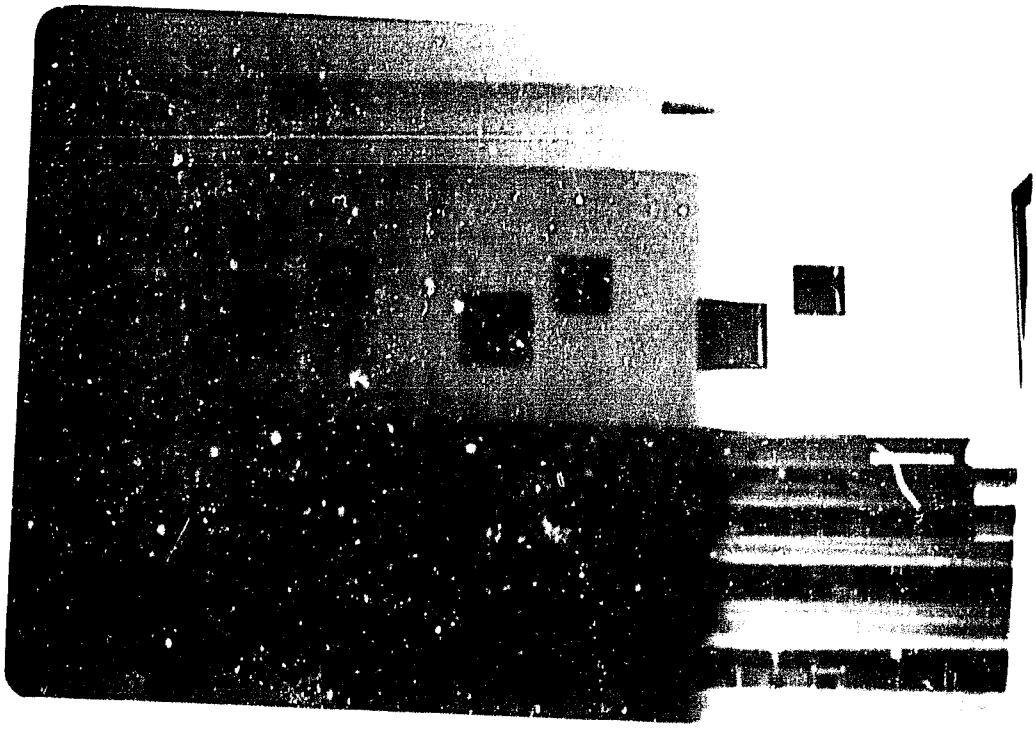
STUDENT LABORATORY

ABOVE AND BELOW: A RESEARCH LABORATORY





SMALL (50 SEAT) LECTURE HALL TAKEN FROM BACK OF THE HALL



SMALL LECTURE HALL TAKEN FROM THE FRONT SHOWING APERTURES FOR FILM PROJECTORS

APPENDIX V

MODIFICATIONS REQUESTED TO THE ORIGINAL PLAN

A meeting was held on Friday 19th October 1984 at 11 am in the Dean's Office. All members of the FABPG had studied the plans prior to the meeting. The following RECOMMENDATIONS were made and are drawn on the plan:-

A) Ref S14

i) Change peninsular benches to island benches.

ii) Remove fume cupboard at the end of each bench.

iii) Extend each bench to where fume cupboards ended.

iv) Place a fume cupboard and 2 (two) fume hoods on the east wall near to the sinks.

v) Place formica top bench with cupboards underneath between the fume hoods.

vi) Remove all sinks shown except the double sink.

vii) Place a sink under fume cupboard and each fume hood.

B) Ref S15

i) Move door-way from Preparation Room to Laboratory, against the side wall. All other facilities to be accommodated as altered on the drawing.

C) Ref S6

i) There should be access from the Chemical Laboratory to the Balance Room.

ii) The access from the Chemical Laboratory to the Instrument Room should be moved, as indicated on the plan.

iii) The internal facilities should be moved to the SW corner.

iv) The "free spaces" should be retained as marked.

v) A continuous sink should be installed at the back of the cupboards and fume hoods in S6 AND S10.

D) Ref S10

i) Instrument Room : move fume hood to SE corner.

ii) Move door in instrument room to Pedology laboratory.

iii) Keep SW side as free space.

iv) Install a continuous sink (see C (v)).

E) Ref S9

i) Remove fume hoods and cupboards.

ii) Install extractor fan in previous position of fume hood.

F) Ref S8

i) Install sink next to fume hood in NW corner.

ii) Remove sink and bench in SW corner to leave free space.

G) Ref S4

i) Remove part of SE bench for free space.

ii) Install peninsular bench with continuous sink, (half way along south wall) as shown on plan.

H) Ref S4A, Ref S5, Ref S13, Ref S18

No modifications.

I) Ref AE5

i) Remove central bench.

ii) Remove benching from east side and install sink as shown.

J) Ref AE7 and Ref AE8

To be made into two offices plus one secretary's room. Access to the store should be from the secretary's room.

K) Ref AS3, Ref AS2, Ref AS1

i) Install double sink and double drainers adjacent to the door.

ii) Remove all fume cupboards.

iii) Put fume hoods in corner adjacent to door.

iv) Put sink in corner diagonally opposite to double sink.

v) Remove all other sinks.

L) STORE ADJACENT TO AS1

i) Install full shelving on all walls.

M) MAIN SWITCH-ROOM

i) Main switch to be removed to Standby Generator Room.

ii) Main switch room to become a Store-room.

N) Ref AS3 only

i) Install continuous sink on island bench.

O) Ref S15

i) Install book shelving on one part of North wall.

GENERAL POINTS:

i) The main access to ALL laboratories should be double doors with a complete swing in and out.

ii) The doors to all seminar rooms, lecture rooms, lecture theatres, laboratories conference facilities must have a glass panel.

iii) No direct sunlight should enter any laboratory. The whole building should be checked and outside blinds, or an alternative shading arrangements, installed.

iv) Book-shelving should be installed on one wall of ALL offices.

G.J.MOYO (MRS)
SECRETARY, FACULTY OF AGRICULTURE BUILDINGS PLANNING GROUP.

PART 2

UNVERSITY FARM

CONTENTS

Introduction
Methodology and Information Sources
Project Description
The Acquisition of the University Farm
Composition of the Faculty of Agriculture Review Committee
Terms of Refernce of the Review Committee
Findings of the Review Committee
Future Employment
The Chibero Year
Rejection of the Chibero Year
The University Farm
Purpose and Objectives of the Farm
Management of the University Farm
Fulfillment of Objectives
Conclusion
References

Appendix I Proposed Practical Programme Syllabus

Appendix II Crop Reports

INTRODUCTION

United States Agency for International Development, USAID, has assisted the Faculty of Agriculture in numerous projects. This section of the report concentrates on the new University farm that was acquired by USAID for the Faculty of Agriculture.

The objectives of the evaluation were:

(a) To identify what prompted the formulation of the project. In this context the term project refers to the acquisition of the University farm.

(b) To identify the projects objectives in line with Zimbabwe Government's policy and First Five Year National Development Plan.

(c) To evaluate how far the objectives had been met especially with reference to meeting the needs of the beneficiaries.

(d) To evaluate management of the project and suggest ways of improvement if any.

METHODOLOGY AND INFORMATION SOURCES

The evaluation was carried out during the period 3rd November to 29th November 1986 by Mr M J Boyd-Clark and Mr L Tendengu of Agriserve (Private) Limited.

The objectives of the evaluation were achieved through the following methodology:

i) Literature review
ii) Visit and tour of the Faculty of Agriculture
iii) Visit and tour of Thornpark Estate the new University farm.
iv) Interviewing some of the Faculty of Agriculture academic staff
v) Interviewing management staff at the farm
vi) Interviewing undergraduate students

The Report covers the following topics:-

Introduction
Methodology and Information Sources
Project Description
The Acquisition of the University Farm
Future Employment
The Chibero Year
The University Farm
Purpose and Objectives of the Farm
Management of the University Farm
Fulfillment of Objectives
Conclusion
References
Appendices I - II

PROJECT DESCRIPTION

THE ACQUISITION OF THE UNIVERSITY FARM

After Independence the University of Zimbabwe underwent tremendous transformation and expansion to meet both quantitative and qualitative demands of the new socio-economic and political order. Since Zimbabwe is an agricultural country, it is not surprising that tremendous pressure for changes was placed on the Faculty of Agriculture. To effect meaningful changes, based on the success of the Universities of the International Community, the University appointed a Faculty of Agriculture Review Committee in October 1982.

COMPOSITION OF THE FACULTY OF AGRICULTURE REVIEW COMMITTEE

The Faculty Review Committee comprised of five members representing five Universities as follows:-

Dean of Agriculture, University of Nairobi - Dr David Ngugi
Dean of International Studies Programme, University of Wisconsin - Professor Peter Donner.
Professor of Agronomy Kansas State University - J A Hobbs.
Professor of International Animal Science at University of Cornell - Robert McDowell.
Formerly Senior Lecturer in Agriculture at the University of Edinburgh - James Harkins.

TERMS OF REFERENCE FOR THE REVIEW COMMITTEE

The following terms of reference for the Faculty Review Committee prompted the formulation of the project, ie, acquisition of the University farm.

1. To define and quantify the main employment prospects for agriculture graduates. This was crucial in that it would enable the Faculty Review Committee to decide whether the Faculty was adequately educating and training the graduates.

2. To evaluate the current and proposed teaching programme of the faculty with respect to meeting the needs defined in (1) above.

3. To examine present resources and their utilization within the Faculty of Agriculture and to recommend deficient or excess areas.

4. To examine the relationships between the Faculty of Agriculture, the agricultural community, and ministries responsible for Land, Agriculture and Rural Resettlement (now combined into one) and to recommend how the relationship can be improved and how the faculty can best train its candidates to serve that community.

5. Study data collected from 1 to 4 to recommend an outline development plan for the Faculty of Agriculture.

FINDINGS OF THE REVIEW COMMITTEE

Of the numerous findings made by the Faculty Review Committee, the following are pertinent in that they prompted the formulation of this project.

Future Employment

It was found that the Faculty of Agriculture had to increase its annual enrolment of undergraduate students from 20 to 100 to meet employment demands. The employment review revealed that both generalists and specialists were required for employment in research, extension, cooperatives, large scale, small scale and communal agriculture. Thus the Faculty had to expand in terms of such structures as lecture theatres, laboratories, offices, study rooms, staff development, equipment and related resources.

Criticism by prospective employers that the University graduates lacked practical knowledge and agricultural skills was taken into account.

Employers tended to prefer people trained at Chibero College of Agriculture. This preference was emphatic to the extent that it was recommended that a fourth year for practical training be added to the Faculty Calender. That year was dubbed the "Chibero Year".

THE CHIBERO YEAR

The following is a quotation from the Faculty Review Committee Report on the Chibero Year,
"The Chibero year has arisen as a result of the desire to improve the practical knowledge and experience for agricultural degree students. It is understood that this desire to strengthen degree training is strongly supported by university staff, students and most outside agencies...." (P24)

It was proposed that additional land, buildings and other training facilities would be availed at Chibero to provide a one year residential course for the first year University undergraduates.

University staff and material resources would be deployed to Chibero where they would be under the jurisdiction of the Chibero principal.

Such an arrangement would have enabled university students to get adequate hands on experience, for example they could wake up at 5.00am and participate at the dairy or work through the night curing tobacco.

Chibero had an added advantage of having both sandy soil and heavy red soils. Thus a wide range of crops could be grown. Equally important was the fact that Chibero was in close juxtaposition with
(i) Large scale commercial farms.
(ii) Small scale commercial plots.
(iii) Communal areas.

Thus the student could learn the three systems without travelling far.

REJECTION OF THE CHIBERO YEAR

The Chibero year was rejected for the following reasons:-

1. University would lose control of personnel and assets at Chibero.
2. Should the Chibero year fail then no immediate alternative use could be made of the assets.
3. University staff would be accountable to both the principal at Chibero and the Vice Chancellor at the University.
4. Higher salaries and better conditions of service of University staff compared to the lower salaries of Chibero staff would be a very destructive or demoralizing factor.
5. The intensive hands on experience at Chibero could be too much for undergradutes intending to excell in such areas as gene transfer or hormonal monitoring etc.
6. Four years could be too long for a degree student, and could have a deleterious effect of either students shunning BSc Agriculture Studies or students being persuaded to abandon University studies in preference for the short two year Chibero Diploma course.
7. There would be friction between the two classes of students with university students being labelled "superior" and Chibero students labelled "inferior".
8. University would have problems in facilitating chemistry lectures and practicals in the first year. Chemistry needs special laboratories and staff. Both are currently availed by the Chemistry Department. Distance from Harare would prevent participation, yet it would be uneconomic to set up a Chemistry unit at Chibero.
9. From the above it became clear that the Chibero year would be fraught with both administrative and accountability problems.

In rejecting the Chibero year the Faculty Review Committee recommended that the University should acquire its own farm withing close proximity to campus.

THE UNIVERSITY FARM

The Faculty Review Committee supported the acquisition of the University Farm on the grounds that if acquired near campus, it would be fully under the control of the University hence the University would be autonomous in its decisions regarding its use. It could also be used by other University departments such as the biological sciences, engineering and institute of mining research.

In 1984 USAID acquired Thornpark Estate for the University by paying the following initial costs:

ITEM	AMOUNT PAID IN Z$
Land	700 000,00
Transfer fees	31 892,00
Implements	51 994,07
Buildings	50 686,48
Plant (mechanical)	50 000,00
Irrigation equipment	50 000,00
Tractors	138 733,86
TOTAL	1 073 556,39

Included in the above costs were the following acquisitions:

1805,8 hectares of land
Eleven tractors comprising:
- One 45 horse power
- Five 60 horse power
- Two 80 horse power
- One 100 horse power
- One 117 horse power
- One 134 horse power

The tractors had and still have the following main implements:-

Four ploughs
Six rollers
Two cultivators
Four planters
Two silage harvestors
One grader
One truck

The farm is located in Harare West Intensive Conservation area fifteen kilometers from the Faculty of Agriculture on the Masowe road.

From an agricultural point of view the estate is on excellant farm land with mainly class I and II red soils. It is traversed by a good tarred road and has adequate power and water supplies for normal development.

It is 1667 metres above sea level on the main watershed receiving about 900mm of rainfall per annum as evidenced by the latest figures below:-

1985 November	40mm
1985 December	213mm
1986 January	345mm
1986 February	198mm
1986 March	124mm

TOTAL	920mm

This is adequate rainfall for dryland farming of most crops in Zimbabwe. But if need be, this can be supplemented by seven boreholes indicated on the map attached. Please refer to Appendix I. At present 83 hectares are under irrigation. Thornpark Estate has a permanent labour force of 67 plus four managers and one mechanic. It also has a beef herd of 900 head.

PURPOSE AND OBJECTIVES OF THE FARM

The farm was acquired to fulful five main objectives:-

1. To provide a facility for agricultural practical training or hands on experience to undergraduates studying agriculture at the University of Zimbabwe.
2. To provide a facility for agricultural demonstrations to the undergraduates.
3. To provide a facility for research by the Faculty of Agriculture and other departments such as the biological sciences, engineering, geography and institute of mining research or such other related bodies.
4. To provide a facility for experimentation by the faculty of Agriculture and other interested parties as mentioned in (3).
5. To provide a facility to be run as a commercial farm for production. The profit from such production would be used to maintain the farm and hopefully sponsor most of the objectives mentioned above.

To achieve the above objectives calls for a unique management/administrative structure geared at meeting both academic and productive needs.

MANAGEMENT OF THE UNIVERSITY FARM

The administration and management of the farm comprises three groups of persons as follows:

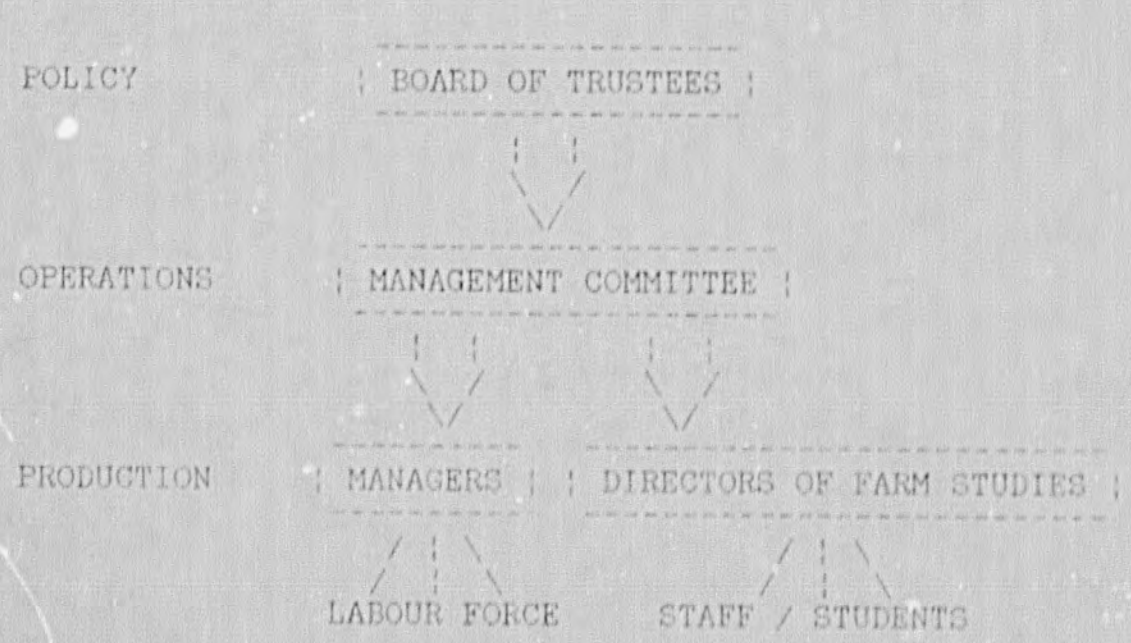
(a) Board of Trustees responsible for policy;
(b) Management Board responsible for operations;
(c) Four farm managers responsible for production;
(d) One director of farm studies responsible for academic activities on the farm.

The Board of Trustees is composed of the following:

Vice Chancellor;
Permanent Secretary in the Ministry of Lands Agriculture and Rural Resettlement;
Director of Research and Specialised Services;
University Bursar;
Dean of Faculty of Agriculture;
President of National Farmers Association of Zimbabwe (Peasants);
Two large scale commercial farmers.

The Management Board is composed of the following:-
Senior Farm Manager;
Director of Farm Studies;
Chairman of Department of Animal Science;
One large scale commercial farmer.

The the structure of the administration can be illustrated diagramatically as follows:-



FULFILMENT OF OBJECTIVES

The fulfilment of objectives has begun on a commendable footing as illustrated by the discussion below:

(a) The provision of facilities for practical agricultural training and demonstrations has made a positive start in that for part one or first year students, Saturday morning practicals have been introduced. Below is an extract of Saturday morning practicals scheduled for 1986:

SATURDAY MORNING PRACTICALS SCHEDULED FOR 1986

DATE	ACTIVITY	NO. OF STUDENTS
22/3	Student orientation and tour of Farm	100
5/4	Population counts on maize and soya	50
5/4	Cattle dipping and routine treatments	50
12/4	Harvesting of soyas, combining etc	100
26/4	Ripping and discing wheat	50
26/4	Sheep dosing/castration A/S	50
3/5	Ripping etc	50
3/5	Sheep dosing/castration	50
10/5	Orientation - farm machinery/working combines etc	100
17/5	Wheat planting	100
	END OF FIRST TERM	
21/6	Commercial maize reaping	100
28/6	Irrigation of wheat	50
28/6	Grading of seed maize	50
5/7	Irrigation of wheat	50
5/7	Grading of seed maize	50
12/7	Metal work	25
12/7	Welding	25
12/7	Machine maintenance	50
19/7	Metal work	25
19/7	Welding	25
19/7	Machine maintenance	50
26/7	Metal work	25
26/7	Welding	25
26/7	Survey/Soil Sampling	50
2/8	Metal work	25
2/8	Welding	50
2/8	Survey/Soil Sampling	50
16/8	Population count on wheat	50
16/8	Cattle dipping and routine treatments	50
	END OF SECOND TERM	

28/9	Fertilisation - calibration	50
28/9	Spraying - calibration	50
4/10	Fertilisation - calibration	50
4/10	Spraying - calibration	50

Below is a specific calendar on handling sheep that is followed by students at Thornpark farm.

CALENDAR

2 Jan	Pulpy kidney vaccine	All animals
	Introduce creep feed	
1 Feb	Rams in	
	Se injection	Pregnant ewes
1 Mar	Rams out	
	Hoggets into breeding flock	Maiden ewes
	Wean	Lambs
	Remove creep feed	
	Lambing starts-tail docking	New lambs
	Ear tagging	
1 Apr	Select rams, start slaughter	Ram lambs
1 May	Pulpy kidney vaccine	New lambs
	Introduce creep feed	
1 Jun	Rams in	
	Remove phosphate lick	
	Se injection	Pregnant ewes
1 Jul	Rams out	
	Hoggets into breeding flock	Maiden ewes
	Wean	Lambs
	Remove creep feed	
	Lambing starts-tail docking	New lambs
	Ear tagging	
1 Aug	Select rams, start slaughter	Ram lambs
1 Sep	Pulpy kidney vaccine	New lambs
	Introduce creep feed	
1 Oct	Rams in	
	Se injection	Pregnant ewes
1 Nov	Rams out	
	Hoggets into breeding flock	Maiden ewes
	Wean	Lambs
	Remove creep feed	
	Lambing starts-tail docking	New lambs
	Ear tagging	
1 Dec	Give phosphate lick	
	Select rams, start slaughter	Ram lambs

Numerous similar such calenders or schedule of practicals are being made by various departments.

After attending one year of Saturday practicals it is believed that the students are at least adequately prepared to proceed to a

commercial farm to spend the remaining three months of the academic year. All the students and staff interviewed were unanimous that the farm was most helpful in that regard.

(b) The availability of the farm has enabled the introduction of a meaningful Agricultural Practice course in Part II or second year of the BSc Agriculture degree course. This entails the study of a specific option by each student. It is run on Saturday morning or during the week when students are not in lectures or laboratory practicals.

The Agricultural Practice Course in each option includes a component of practical farm machinery training. This is deliberately included in compliance with the recommendations of the Faculty Review Committee which observed and noted weakness in the Farm Machinery and Mechanization course in the previous curriculum.

(c) Although there are no farm practicals in the third year, students are required to do a special study, project or on farm research during the long vacation before entering the third year. Again Thornpark Estate is useful in that regard although some students may opt to do a survey in the communal areas.

(d) Use of the farm for experimentation has started well with the Crop Science department growing wheat under irrigation plots. Funds for the irrigation equipment having been provided by USAID.

(e) Use of the farm for research has also made a very encouraging start with the opening of the International Centre for Maize and Wheat Improvement (Centro International de Mejoramrento de Maizy Trigo) (CIMMYT). Already eleven hectares are under irrigation for CIMMYT research. The University has benefitted from the CIMMYT in that high level scientists are now working in Harare and are available to supervise post graduate students in agriculture. This is most useful for the Faculty of Agriculture, whose teaching and research programmes have been fraught with staff shortage problems.

(f) Use of the farm for commercial production purposes has been most encouraging. Extracts of 1985/86 Crop Reports for the seasons 1984/85 and 1985/86 are shown in Appendix III, together with the cropping projection for the 1986/87 season. The whole farm gross margins for the three season as shown below:-

1984/85	$312 600	Crops only
1985/86	$377 587	"
1986/87	$289 560 (projected)	"

Thornpark Estate is a sound, well developed commercial farm with Class I and II soils and situated in one of the best commercial farming areas in Zimbabwe. Under good management, the farm should produce a handsome surplus each year allowing for the repayment of the loan of $400 000 to the University and a re-investment in plant and machinery.

CONCLUSION

From the above presentation it is clear that USAID committed a most worthwhile invaluable investment in compliance with Zimbabwe Government Policy and the first five year National Development Plan which both call for education with production coupled with both quantitative and qualitative expansion in education and manpower skills development.

The project has been most successful in meeting most of its objectives. The change in cropping policy in Zimbabwe will obviously affect profits. This implies that to meet the objective on profitable production some changes will have to be made in the choice of crops. The choice will be difficult as both cotton and flue-cured tobacco, which are Zimbabwes money spinners, cannot be grown due to altitude and soils respectively.

All parties interviewed, including the students, faculty staff, CIMMYT staff and the farm managers, are unanimous that acquisition of the University farm was long overdue and is most welcome. It has made a good start and the momentum should be maintained.

Functions of a University/College Farm

The farm attached to any teaching institution should provide the following:-

a) Up to date information on crops and livestock for the teaching staff.

b) Continuous data for the farm management department.

c) Facilities for staff and student research.

d) Facilities for teaching concepts to students.

e) Facilities for teaching skills to students.

Problems with the University of Zimbabwe Farm

* The distance from the campus which is about 15 km. Students do not have continuous access to the farm.

* The farm is a large scale commercial farm of 2 000 ha which must be run at a profit. This will give rise to conflict between student instruction and profitable farming and can place an unfair burden on both the teaching staff and the farm manager.

* The time available for student visits to the farm - Saturday mornings during the terms.

* The number of students involved in practicals which is 100 First Year students.

* The timing of the academic year. Students are on vacation from December to the following March which covers most of the growing season.

* The difficulty of teaching skills due to: a) the numbers of students involved; and, b) the lack of instructors. The normal ratio of instructor to student for teaching agricultural skills is 1 instructor to 10 students.

* Stocking on the farm is limited to a large commercial beef herd which precludes practical instruction in other types of livestock.

The following recommendations are made in the light of the problems facing the University farm and the five objectives stated in the report:-

1. TIMING OF PRACTICALS

The majority of both staff and students interviewed voiced reservations as regards the suitability of doing practicals on Saturday morning. The main reason was that they were both very busy from Monday to Friday and needed Saturday to do shopping, for writing up assignments and for leisure. It was thus suggested that some of the laboratory practicals could be combined to create room for farm practicals during the week.

2. LIVESTOCK

Although the farm has 900 beef herd, it was noted that it had no dairy, sheep, goats, piggery, poultry, rabbits, apiculture or aquaculture.

This had and will continue to have an effect of narrowing the area of training. It is thus recommended that these be introduced during phase II of the farm development.

3. AGRONOMY

On agronomy it was noted that Zimbabwe was tobacco country yet none was grown on the farm. It is therefore recommended that plots of burley should be grown for demonstration purposes. Also a meaningful start on horticulture and forestry or at least nursery production of forestry seedlings should be started. Ultimately a crop mueum should be developed.

4. CONTENT OF PRACTICALS

Suggestions for a practical training programme are contained in Appendix II. This programme is based on the 'Chibero Year' which was advocated for undergraduate students before the purchase of the University Farm.

5. FIRST YEAR CALENDAR

If the students are to have meaningful hands-on experience then the first year calender may have to be changed so that rather than having students on vacation from November to March, they attend University instead. If they continue following the present calendar it means that between November and March they miss the rainy period and the busiest part of the farming calendar which includes such activities as planting, weed-control, pest control, and crop disease control.

If it is insisted that students must proceed to vacation as per the present calendar then the only other viable solution is the setting up of the "farm pupil scheme". That scheme will be able to absorb the students during the three months of December, January and February. Details of the scheme have been welcomed by all bodies concerned with agricultural training of practitioners.

6. ACCOMMODATION

Some form of overnight accommodation for a specified group of students is going to be required in the near foreseeable future. This will be required for monitoring phenomena over a period of 24 hours as in feeding trials or irrigation for example. Also some students may wish to work and stay on the farm during vacations.

7. STUDENT INVOLVEMENT

Students must be involved with the farm and they must know what is going on, and this can be assisted in the following ways:-

i) Include in the timetable 1 hour period each week for the farm manager/Director of practical training to give the students the latest farm information. This period for all students in 1st, 2nd and 3rd year.

ii) Set up a student information room on campus to include the farm maps, cropping programmes, varieties grown, fertiliser treatements, costs, labour and tractor plans, livestock localities - as much information as possible and all information to be accurate and up to date.

iii) All students to keep a dairy of the farm activities. Third year students would have the benefit of continuity over a three year period. Diaries to be taken in periodically and marked; the marks to be incorporated in the student's final assessment.

iv) Visits to the farm can be related to the farm diaries, information room and weekly briefing by the manager or director of practical.

8. STUDENT PREREQUISITE

All students to complete at least 6 months and preferably 1 year on a small scale or large scale commercial farm or farming cooperative before starting their 1st year on campus. Furthermore, the long vacations should be spent on a farm, and it is here that the skills will be learnt.

9. PRODUCTION FOR PROFIT

The cost of inputs goes up continually. That coupled by the fact that the University farm is going to increasingly share its resources with "non-productive research and student training and interference," calls for very shrewd and diligent management.

It may be recommended that land for research, trials and teaching purposes should be leased out at commercial rates.

Research projects should be large enough and meaningful enough to qualify for assistance from the Public Sector Investment Programme (PSIP). The above two approaches would leave the farm profits intact for farm development.

Comparison of the crops that were traditionally grown at Thornpark Estate indicates that there is an urgent need to change and diversify to more profitable crops like onion, pea bean, groundnut and sunflower. It is a pity that flue-cured tobacco and cotton cannot be grown on the farm due to type of soils and altitude respectively.

10. ACCOUNTABILITY

Accountability must be watched very carefully, and this can be assisted by the computerisation of farm budgets. The running costs of the farm were met in the first year by a loan of Z$400 000 granted by the Burser's Department of the University, and carrying an interest charge of 13% p.a. Every effort should be made to repay this loan as quickly as possible, both in the interests of the University farm and the Burser's Department. Once the loan has been repaid, funds will be available for the further development of the farm. The stated objective of the University is to run the farm as a commercial enterprise and this outlook is commendable and should be maintained. Financial data from the farm should be available, through the farm management department, at all times to both staff and students, and this data should show that comparatively large sums of money can be borrowed and repaid for agricultural purposes.

LIST OF REFERENCES

Blackie, M, 1986, Past Dean, Faculty of Agriculture Personal Communication (Pers Coms)

Berry, R G, 1986 Senior Farm Manager UZ Farm Pers Coms

Bindura, G, 1986, BSc Agric III UZ Pers Comms

Chimvukwa, P, 1986, BSc Agric III UZ Pers Comms

Chapanderma, B, 1986, BSc Agric III UZ Pers Comms

Gonese, H, 1986, BSc Agric III UZ Pers Comms

Hommes, G, 1986, Director of Farm Studies, UZ Pers Comms

Hungwe, S, 1986, Research worker Pers Comms

Karedzera, E, 1986, BSc Agric III UZ Pers Comms

Madombe, S, 1986, BSc Agric III UZ Pers Comms

McLeod, Mrs, 1986, Ex owner of UZ farm Pers Comms

Ngongoni, N, 1986, Chairman Animal Science UZ Pers Comms

Ngwerume, F, 1986, BSc Agric III UZ Pers Comms

Rukuni, M, 1986, Dean Faculty of Agric UZ Pers Comms

Chigaru, P, 1986, Director of R & SS Pers Comms

Chibero College, 1981, Suggested Practicals for UZ Norton

Faculty Reports, 1982-1986, Various, Harare

Appendix I

PROPOSED PRACTICAL PROGRAMME SYLLABUS

Proposed Practical Programme Syllabus for University Students. This is based on the programme developed for the proposed "Chibero Year" of practical training.

1. GENERAL

a) Familiarisation - students are expected to attend and participate, in groups, early morning and evening milking; be actively involved in cleaning of pig pens, poultry houses etc, and feeding of all livestock in the morning or during prescribed times.

b) Vet - Cupboard - utensils, equipment and common remedies or medicines to be kept. Taking temperature of animals.

c) Pastures - types of pastures, management - establishment, fertilizer application, grazing programme, haymaking.

2. BEEF CATTLE

a) Breeds, choice of breed to be discussed at the farm.

b) Production and breeding policies to be discussed at the farm.

c) Dipping - types of dips, types of acaricides, management of dips and precautions when using acaricides, handling facilities.

d) Judging beef cattle to be practised at Thornpark estate.

e) Beef cattle calendar.

i) Calving - paddock selection, inspection of calving herd, weighing of calves, identification (ear notching etc), records to be kept. Calving problems - practical solutions.
Post calving problems - afterbirth retention etc - prophylactic and therapeutic measures.

ii) Routine practices (Calving - 3 months post-partum) on calves. Castration - methods, advantages and disadvantages of methods. Students to castrate using various methods.
Dehorning - methods, advantages and disadvantages of methods. Students to practise dehorning.

iii) Bulling - Pre-bulling period - bull inspection, vaccinations, heifer selection, 'flushing'.

Bulling - Bulling ration, bull allocation, single sire herds and multi-sire herds (advantages and disadvantages). Length of bulling period, mid-bulling weighing and other management aspects.

Post bulling - weighing, pregnancy diagnosis - preparations, uses PD - culling of cows.

iv) Routine practices (3 months - 8 months) - calves. Late dehorning, branding, weaning - methods (advantages and disadvantages), choice of methods. Weighing - weaning weights, 205 day weight.

v) Post - PD - end of summer weighing and dosing.

PD = Pregnancy Diagnosis

vi) Winter Period:
Supplementary feeding - rationale, types of supplementary feeds, choice of feeds, ration computation, preparation of rations from homegrown feeds, pen-fattening 'steaming up'.

vii) End of Winter:
Dosing, weighing.

3. DAIRY CATTLE

a) Breeds, choice of breed (discussion).

b) Production and breeding policies (discussion).

c) Judging dairy cattle.

d) Rearing of dairy animals:

i) Dairy calves - selection dairy replacements.
Feeding - single suckling, multiple suckling.
Bucket feeding, early weaning, weaning at 12 weeks or more, veal production, hygiene in calf house, economics of calf rearing.

ii) Dairy heifer.
Management from weaning to calving - identification, vaccinations, feeding, disease control, age at bulling and calving, economics of rearing dairy heifers.

iii) Dairy cow.
Management - emphasis on feeding, summer feeding, winter feeding; affect of feeding on production, bodymass, reconception and fertility.
Other management requirements of the cow at calving, service and drying off.
Disease control.

iv) Dairy bull.
Rearing of young bull, bull selection, age at first service, feeding and other management aspects.
Artificial Insemination - uses, equipment needed.

v) Machine milking - systems of machine milking, components and functioning of milking machines, dairy buildings and legislation.

vi) Management aspects of mastitis control.

vii) Cooling of milk.

viii) Significance of Methylene blue test and cell counts to the farmer.

ix) Sterlilisation of dairy equipment.

x) Records of importance in the dairy and for milk recording scheme.

xi) Preparations prior to transportation of milk and transportation to Dairy Marketing Board.

4. PIGS

a) Breeds, choice of breed.

b) Production and breeding policies.

c) Housing - choice of site, design of buildings - factors to be considered.

d) Feeds in general - creep, sow and weaner, baconer.

e) Management:

i) Pre-farrowing.
5-6 days post weaning - oestrus and oestrus detection methods, service.
Feeding during gestation.
Pre-farrowing (14 days) practices - disninfection and preparation of pens, dowsing of sow, washing, feeding regimes, checking of aids and equipment required for farrowing - farrowing crates.

ii) Farrowing - signs, supervision.
Farrowing problems - prophylactic and therapeutic measures.

iii) Post-farrowing.
Piglets - identification, disinfection of navels, cutting of eye-teeth, iron injection, detailing, creep feeding, castration, weaning.
Post weaning - feeding to marketing weight (porker or baconer), routine weighing.
Preparations prior marketing, loading and transportation.

5. SHEEP

a) Breeds, choice of breed.

b) Production and breeding policies.

c) Housing and handling facilities.

d) Sheep Calender

i) Pre-lambing period.
Care of pregnant ewes, care of rams and followers.
If spring lambing - shearing sheep.

ii) Lambing - choice of maternity camps and 'mothering up' pens.
Lambing problems - remedies.
Choice of pens and grazing for ewe and lamb.

iii) Post-lambing.
Care of lambs - identification, docking, castration (use of elastrator, knife, burdizzo).
Care of lactating ewes and lambs - feeding.
Weaning - feeding of weaners, vaccinations.
Selection of breeding stock - care of ram and female weaners - feeding and other preparations before tupping.

iv) Pre-tupping, period.
'Flushing', replacement of cull ewes, teazing ewes.

v) Tupping - ewe:ram ratio, duration, use of raddle, other management aspects.

e) Disease control in general.

f) Problems of sheep rearing - on veld, patures, pens etc.

g) Preparation of sheep for sale - lamb, mutton; transportation. NB: Both Autumn and Spring lambing to be practised.

6. GOATS

General rearing - in most respects operations and topics as for sheep, emphasis on aspects different from sheep.

7. POULTRY

a) Breeds - broiler and layers, choice of breeds.

b) Production policies.

c) Housing and equipment, choice of housing system.

d) Rearing.

i) Day old chicks - preparation of brooder house - cleaning, disinfection. Ordering, transportation, management in brooder house, vaccinations, other disease control measures.
Rearing of growers to slaughter mass-feeding, marketing-dressing and disposal of final products.

ii) Rearing of layer pullets - feeding, vaccinations, other disease control measures.
Management prior to point of laying - feeding, etc.

iii) Culling of layers - criteria and practical application.

e) General.

Introduction on rearing of ducks, turkeys and guinea-fowls, in particular aspects different from those of Gallus domesticus.

8. RABBITS

a) Breeds, choice of breeds.

b) Production policies.

c) Housing, choice of housing system.

d) Management.

i) Buck - selection, feeding and housing.

ii) Doe - selection of replacements, care of dry and pregnant do, housing.

iii) Bunnies - from parturition to slaughter, feeding, etc.

iv) Hygiene and disease control in general.

v) Slaughter of rabbits, packing, treatment of pelts.

BUILDING

1. Introduction - to cover materials, tools, machinery and safety precautions.

2. Putting up a farm structure

Stages to include:

a) Site choice, setting out and foundation construction. Emphasis on sound foundation. Concrete ingredients and types. Various types of brick bonds, mortar and plaster.

b) Calculation of quantities of construction materials.

3. Decorating and maintaining farm buildings and structures. Painting. Economic reasons for painting new and old structures.

4. Timber

a) types (hard and soft),
b) sizes,
c) various uses of timber on the farm,
d) sources of timber.

5. Roofing

a) Roof height; parts - span, trusses, fascias and flashings. Types.
b) Common roofs for farm structures.

6. Requirement for Farm Buildings and Structures

Windows, doors, vents, drainage. Ventilation for human and livestock housing. Plumbing and tools.

7. Group Study and Comparison

- of farm structures at Chibero College and at farms visited on education trips.

Surveying

1. Introduction

Uses and types of surveying. Surveying tools: dumpy level, tilting level, staves, chains, boning tods and hand instruments.

2. Levelling and its application, eg,

Drainage and building construction. Use of dumpy level and tilting level. Use of hand instruments, eg, Abney level and compasses. Chain surveying. Plane table surveying.

Water Conservation

1. Introduction Purposes of water conservation.

2. Construction of waterways and drainage channels.

3. Dam and Weir Construction and Maintenance

- Site selection.
- Materials used.
- Construction procedure.
- Maintenance.

4. a) Reservoirs and Troughs

- Quantities estimation.
- Design and construction.

b) Boreholes and Wells

Pump and Pumping

1. Pump Types: Centrifugal.

- Propeller.
- Diaphram.
- Rotary: gear, vane, gerotor.
- Reciprocating.
  - single,
  - double,
  - differential.
- Hydraulic ram.

Deep Well Pumps:

- Turbine.
- Centrifugal Jet.
- Monopumps.

2. Installations

- Head calculations, pump choice, pipes and piping, valves. Friction losses.

Irrigation

1. Types: Furrow, Border strip, Basin Sprinkler and Trickle flow.

2. Devices: for measuring and water flow.

3. a) Land designing and preparation.
   b) Use of irrigation indicator board and Pan 'A' results.
   c) Water application and control.
   d) Frequency of irrigation.

4. Furrow and Canal Maintenance.

Workshop

a) INTRODUCTION to farm workshop.
- Safety in the workshop,
- tools and their uses,
- use of basic metals and how to identify them.

b) ARC WELDING, BRAZING AND SOLDERING.

Transport and Traction

1. The farm TRACTOR.

2. TRACTOR driving lessons.
- good control of tractor,
- reversing with and without implement, eg, two-wheel trailer,
- hitching of implements.

3. TRACTOR ENGINES: S.I. & C.I.
- Parts and their functions.
- The transmission system.
- Hydraulics.
- Fuel and cooling systems.

4. TRACTOR MAINTENANCE
- Daily.
- Weekly.
- Monthly.
- Yearly.

FARM ELECTRICITY

a) Generators and motors.
b) Installations and equiment.
c) Safety.

FARM MACHINERY

OPERATION, SETTING AND MAINTENANCE OF:

a) Soil Working Implements

Rippers, sub-soilers, chisel ploughs. Disc and mouldboard ploughs. Toolbars; Harrows and rotavators, cultivators and gang tillers.

b) Sprayers and Spreaders

Fertilizer spreaders, chemical sprayers, seed drills and seed planters.

c) Harvesting Equipment and Storage

- Hay.
- Silage.
- Seed.

d) Milking Machines, Coolers and Refrigeration

e) Intermediate Technology

- Implements used in communal lands,
- their adjustments and maintenance,
- available power.

CROP SCIENCE PRACTICALS

A. Land Preparation:

i) Tractor driving and hitching ploughs.
ii) Plough setting disc and mould board plough.
iii) Disc harrowing and rolling.
iv) Ripping and chisel ploughing.
v) Ridging and re-ridging and holing out.
vi) Land planing.

B. Fertilizer Application:

i) Application and incorporation of lime and liming materials.
ii) Use of the Fertilizer cup (Hand application).
iii) Top dressing, maize, groundnuts.
iv) Calibrate and use of vicon fertilizer spreader.
v) Methods of application, broadcast, band application, dollop.

C. Weed Control:

i) Cultivation - tyne cultivator.
ii) Rotary hoe.
iii) Gang tiller.
iv) Tractor boom sprayer, calibration and operation.
v) Tailboom and knapsack.
vi) Knapsack and lance.

D. Planting:

i) Maize Planters, calibration and operation.
ii) Hand planting maize:
(a) dry planting,
(b) water planting.
iii) Plant population calculation.
iv) Gum tree planting.
v) Tobacco planting.
vi) Innoculate and dress soyas or groundnuts.
vii) Groundnut planting.
viii) Tobacco seedbeds.

E. Cultural Practices:

i) Tobacco topping.
ii) Tobacco suckering, hand and suckerroids.
iii) Tobacco harvesting Burley and FCT.
iv) Tobacco curing.
v) Tobacco grading.

F. Pest and Disease Control:

i) Nematocide application - EDB.
ii) Stalk Borer control - Maize.
iii) Cotton scouting.
iv) Fungicide application.

G. Harvesting:

i) Mower setting and oporation.
ii) Hay making.
iii) Hay baler setting and operation.
iv) Silage making.
v) Groundnut lifting and curing.
vi) Combine harvesting - wheating.
vii) Maize reaping and shelling.
viii) Cotton reaping.
ix) Felling and treating gum poles.

H. Machinery Maintenance:

i) Tractor servicing.
ii) Tractor maintenance.
iii) Implement maintenance.

I. Miscellaneous

i) Conducting demonstration plots.
ii) Practical experimental procedure.
iii) Organising field days.
iv) Interpretation of scientific research information to the level of the practicing agriculturalist.

As far as is possible, the coverage of these items will be timed in such a way as to coincide with the various stages as they come during the season. Eg, land preparation would be covered and done practically during the period prior to planting in October.

This will help to maximise student involvement in the practical aspects of crop production.

Appendix II

1984/85 AND 1985/86 CROP REPORTS

1986/87 CROP PROJECTIONS

1984/85 & 1985/86 CROP REPORT
* Figures in brackets denote 1984/85

MAIZE

445 (470) Ha were planted and 2990.36 (2673.02) tonnes were sold giving a yield of 6.8 (6.15) tonnes/Ha. Income was $530280 ($499220) at an average of $1192/Ha ($1015). Variable costs were $783/Ha ($553) leaving a Gross Margin of $409/Ha (462).

SOYAS

210 (236) Ha were planted and 508 (298) tonnes were sold giving a yield of 2.42 (1.891) tonnes/Ha. Income was $181923 ($1076581) at an average of $866 ($696) per Ha. Variable costs were $550 ($603) leaving a Gross Margin of $396 ($277)

SORGHUM

50 Ha were planted but, the crop was badly infected with Helminthasporiam Blight. As the crop failed to grow out of the blight due to the incessant wet weather and the grain heads had a poor head set, it was decided that further expenses were not justified. The cost of the crop at that stage was $312/Ha and the crop was used as cattle feed.

SEED MAIZE

50 (50) Ha were planted and 5130 x 50kg (4100) pockets were reaped giving an assessed income of $145000 ($117223) at an average of $2900 ($2344)/Ha. Variable Costs were $1534 (1352)/Ha giving a Gross Margin of $1365 ($992)/Ha.

SEED SOYA

44 Ha were planted and 1889 x 50 kg pockets were reaped giving an assessed income of $53473 at an average of $1215/Ha. Variable costs were $777 giving a Gross Margin of $438.

WHEAT

70 (49) Ha were planted and is in the process of being reaped. The yield has been assessed at 6.29 (6.64) tonnes/Ha and income at $132000 ($92722) giving an average of $1886 ($1893)/Ha. Variable Costs come to $1291 ($1405)/Ha leaving a Gross Margin of $595 ($488)/Ha.

1986/87 Cropping Programme

MAIZE

410 Ha will be grown, some of which is already through the ground as it has had an early irrigation or rain. 33 Ha will be cut as silage so as to ensure a fodder bank of about 1500 tonnes. A further 20 Ha will be kept for high energy feed for the approximately 150 head that must go off this year to enable Thornpark to reduce numbers for next year in line with the expected maize cut. It appears that a rotation of 1 year maize to 2 years soya will have to be practised in future.

SOYA

271 Ha will be grown and approximately 40 Ha have been started under irrigation. A further 70n will be started at the end of November with 80 Ha in mid December and the remainder 2 weeks later. Considerable spacing of the crop is required so as to ensure that the contractor is able to reap the crop in sufficient time to avoid the crop shattering.

SEED MAIZE

44 Ha of 3 way Hybrid ZS215 variety will be planted as soon as the wheat has been reaped. The quota is 4000 x 50 kg pockets.

15 Ha of Single Hybrid ZS233 variety will be planted when land preparation behind the wheat is finished. The quota in this variety is 800 x 50 kg pockets.

SEED SOYA

72 Ha of Duiker seed soya will be grown this year and will be harvested by hand. As there is likely to be an increased demand for seed this year, application has been made to increase the area under seed production.

PEA BEAN

11 Ha will be grown on contract to Olivine Industries as the return of $700/tonne appears attractive even at an average of 1 tonne/Ha. Reaping has to be done by hand and this could be a limiting factor in any expansion.

CROP COMPARISONS FOR 1985 & 1986 & 1987 ON A PER HECTARE BASIS

CROP	INCOME			VARIABLE COSTS			GROSS MARGIN			WINDMILL PROFIT PLANNER
	1984/85	1985/86	PROJECTED 1986/87	1985	1986	PROJECTED 1987	1985	1986	PROJECTED 1987	1986/87 High Yield GM/ha
Wheat	$1 893	$1 886	$1 950	$1 405	$1 291	$1 370	$ 480	$ 595	$ 580	$716
Maize	$1 015	$1 192	$1 130	$ 553	$ 783	$ 900	$ 462	$ 409	$ 230	$503
Soya	$ 696	$ 866	$ 850	$ 603	$ 550	$ 650	$ 277	$ 316	$ 200	$385
Hay Seed Maize	$2 144	$2 900	$2 900	$1 352	$1 534	$1 600	$ 992	$1 366	$1 300	
Single Maize	-	-	$2 200	-	-	$1 150	-	-	$1 050	
Soya	-	$1 215	$1 000	-	$ 777	$ 670	-	$ 438	$ 330	

SUMMARY OF CROP RESULTS FOR 1984/85, 1985/86 AND 1986/87

	Maize	Soya	Wheat	Seed Maize	Seed Soya
Ha planted					
1984/85	470	236	49	50	-
1985/86	445	210	70	50	44
1986/87 *	410	271	70	59	72
Tonnes sold					
1984/85	2 673	298	325	205	-
1985/86	2 990	508	440	256	94
1986/87 *					
Yield/ha (t)					
1984/85	6,15	1,89	6,64	4,1	
1985/86	6,8	2,42	6,29	5,13	2,15
1986/87 *					
Gross Income ($)					
1984/85	499 220	107 658	92 722	117 223	-
1985/86	530 280	181 923	132 000	145 000	53 473
1986/87 *					
Gross Income/ha ($)					
1984/85	1 015	696	1 893	2 344	-
1985/86	1 192	866	1 886	2 900	1 215
1986/87 *	1 130	850	1 950	2 900	1 000
Variable Costs/ha ($)					
1984/85	553	603	1 405	1 352	-
1985/86	783	550	1 291	1 534	777
1986/87 *	900	650	1 370	1 600	670
Gross Margin/ha ($)					
1984/85	462	93	488	992	-
1985/86	409	316	595	1 366	438
1986/87 *	230	200	580	1 300	330
Return per $ of variable costs ($)					
1984/85	1,8	1,1	1,3	1,7	-
1985/86	1,5	1,5	1,4	1,8	1,5
1986/87 *	1,2	1,3	1,4	1,8	1,4

* Projected

WHOLE FARM GROSS MARGIN FOR CROPS ($)

	1984/85	1985/86	1986/87
Maize	217 140	182 005	94 300
Soya	21 948	66 360	54 200
Wheat	23 912	41 650	40 600
Seed Maize	49 600	68 300	76 700
Seed Soya	-	19 272	23 760
Whole Farm Gross Margin	312 600	377 587	289 560