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AGRICULTURAL RESEARCH RESOURCE ASSESSMENT
IN THE SADCC COUNTRIES

VOLUME II
COUNTRY REPORT: ZIMBABWE

Submitted by

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PREFACE

AGRICULTURAL RESEARCH RESOURCE ASSESSMENT

IN THE SADCC COUNTRIES

This document has been prepared by DEVRES, Inc. in cooperation with the Consultative Technical Committee for Agricultural Research (CTCAR) of the Southern African Development Coordination Conference (SADCC) in accordance with the terms of a contract with the US Agency for International Development.

The national agricultural research resource assessments which provide the necessary background information for this document were conducted by national agricultural research scientists from SADCC countries¹ under the guidance of DEVRES in consultation with the CTCAR. Financial support was provided by the US Agency for International Development (under Contract No. AFR-0435-C-00-2084-00 and Project No. 698-0435 entitled Strengthening African Agricultural Research) on behalf of the member countries of the Cooperation for Development in Africa (CDA).

Discussions concerning this country report were held with the country report authors, responsible officials in the ministries of agriculture, rural development and plan, as well as specialists from international organisations, bilateral donors, and universities. On two occasions, drafts of this final report were examined by SADCC's Consultative Technical Committee for Agricultural Research (CTCAR). Suggestions by its members were incorporated into the report.

The results of the assessment are contained in the following reports:

Volume I - Regional Analysis, Strategy, Programmes and Summaries of Country Reports

Volume II - Country Reports:²

Botswana
Lesotho
Malawi
Mozambique³
Swaziland
Tanzania³
Zambia
Zimbabwe

These reports are available in English and in microfiche or printed form at a cost determined by document size at the address below. The Regional Analysis and Strategy and the Mozambique country report are also available in Portuguese in the same forms.

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¹SADCC member countries are Angola, Botswana, Lesotho, Malawi, Mozambique, Swaziland, Tanzania, Zambia and Zimbabwe. Angola, however, did not participate in this study.

²Each country is printed separately.

³Italy provided technical advisors for the preparation of the Tanzania national report and France provided an advisor to help in the preparation of the Mozambique country report.

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N.R. Mugabe
August, 1984

LIST OF ACRONYMS AND ABBREVIATIONS

AEO	Agricultural Extension Officer
AETC	Agricultural Engineering Training Centre
AFC	Agricultural Finance Corporation
Agritex	Agricultural Technical and Extension Services
AI	Agronomy Institute
AID	Agency for International Development (United States)
ARC	Agricultural Research Council
ARDA	Agricultural Rural Development Authority
ARRA	Agricultural Research Resource Assessment
ART	Agricultural Research Trust
BAE	Branch of Agricultural Education
BSc	Bachelor of Science degree
BVS	Bachelor of Veterinary Science degree
CBI	Crop Breeding Institute
CDA	Cooperation for Development in Africa
CIMMYT	International Maize and Wheat Improvement Centre
CIP	International Potato Centre
Conex	Department of Conservation and Extension Services
CPU	Crop Production Unit
CRI	Cotton Research Institute
CSC	Cold Storage Commission
CSRI	Chemistry and Soil Research Institute
CTCAR	Consultative Technical Committee for Agricultural Research
DANIDA	Danish International Development Agency
DEO	Divisional Extension Officer
DMB	Dairy Marketing Board
DR&SS	Department of Research and Specialist Services
EEC	European Economic Community
FAO	Food and Agriculture Organisation
FSRU	Farming Systems Research Unit
FTE	Full Time Equivalent
GDP	Gross Domestic Product
GMB	Grain Marketing Board
GNP	Gross National Product
GOZ	Government of Zimbabwe

GRS	Grasslands Research Station
GTZ	Agency for Technical Cooperation (Federal Republic of Germany)
HCRI	Horticulture and Coffee Research Institute
HRS	Henderson Research Station
IBRD	International Bank for Reconstruction and Development (World Bank)
ICA	Intensive Conservation Area
ICAO	International Civil Aviation Organisation
IDRC	International Development Research Centre (Canada)
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
IITA	International Institute of Tropical Agriculture
ILO	International Labour Organisation
ILRAD	International Laboratory for Research in Animal Diseases
IMF	International Monetary Fund
IRED	Innovative Research for Development (Switzerland)
LVRs	Lowveld Research Stations
LWF	Lutheran World Federation
MLRRD	Ministry of Lands, Resettlement and Rural Development
MOA	Ministry of Agriculture
MRS	Matopos Research Station
MSc	Master of Science degree
NGO	Non-Governmental Organisation
NIAE	National Institute of Agricultural Engineering
OAU	Organisation of African Unity
ODA	Overseas Development Administration (United Kingdom)
PAEO	Provincial Agricultural and Extension Officer
PhD	Doctor of Philosophy degree
PIB	Pig Industry Board
PPRI	Plant Protection Research Institute
PTA	Preferential Trade Area
RAEO	Regional Agricultural Extension Officer
SACCAR	Southern African Centre for Cooperation in Agricultural Research
SADCC	Southern African Development Coordination Conference
SASA	South Africa Sugar Association
TRB	Tobacco Research Board
TTL	Tribal Trust Land
UANC	United African National Council
UK	United Kingdom
UN	United Nations
UNDP	United Nations Development Programme

UNESCO	United Nations Educational Scientific and Cultural Organisation
UNICEF	United Nations International Children's Emergency Fund
UNIDO	United Nations Industrial Development Organisation
USA	United States of America
USAID	United States Agency for International Development
UZ	University of Zimbabwe
VEA	Veterinary Extension Assistant
VTI	Veterinary Training Institute
WHO	World Health Organisation
WRT	Weed Research Team
Z\$	Zimbabwe dollar
ZANU-PF	Zimbabwe African National Union-Patriotic Front
ZAPU	Zimbabwe African Peoples Union
ZCF	Zimbabwe College of Forestry
ZFC	Zimbabwe Fertiliser Corporation
ZIDS	Zimbabwe Institute of Development Studies
Zimcord	Zimbabwe Conference on Reconstruction and Development
ZIMFEB	Zimbabwe Foundation for Education with Production
ZSA	Zimbabwe Sugar Association
ZSMA	Zimbabwe Seed Maize Association
ZTA	Zimbabwe Tobacco Association

CURRENCY EQUIVALENTS
(December 31, 1983)

Currency unit = Zimbabwe dollar (Z\$)

US\$ 1.00 = Z\$ 1.058

Z\$ 1 = US\$ 0.945

Z\$ 1 = 100 cents

WEIGHTS AND MEASURES

1 hectare (ha) = 10,000 m²
= 2.471 acres

1 acre = 0.405 ha

1 kilogram (kg) = 2.204 pounds

1 metric ton (MT) = 1,000 kg
2,204 pounds

1 kilometer (km) = 0.621 miles

1 square kilometer (km²) = 100 ha

1 mile = 1.609 km

1 liter = 1.066 quarts

1 quart = 0.9464 liters

GOVERNMENT OF ZIMBABWE FISCAL YEAR

July 1 to June 30

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EXECUTIVE SUMMARY

A. Background

1. Country description and economic overview

Zimbabwe, which is situated in south-central Africa, has a total area of 390,245 km². There are five major agro-ecological zones whose productivity varies chiefly according to amount and distribution of rainfall. Thus, Region I is a specialised and diversified farming region which produces beef and dairy products, coffee, tea and orchard crops. Region II is intensively farmed and produces grain, cash and mixed crops such as tobacco, maize and cotton, and beef and dairy products. There is some cash crop production of cotton and maize, and fodder crop production for semi-intensive livestock production in Region III. In Region IV only drought-resistant cash crops can be produced along with some livestock; Region V is suitable only for extensive beef ranching.

Zimbabwe ranks as a middle-income developing country and had a per capita income of US\$ 850 in 1982. Sectoral contributions to GDP were 25 percent from manufacturing, 15 percent from agriculture and forestry and 14.7 percent from services. Between 1979 and 1981 GDP in Zimbabwe rose from US\$ 2,508 million to US\$ 3,918 million at factor cost. Zimbabwe receives aid from both Eastern and West European countries in the form of commercial loans, technical assistance and commercial trade which is usually barter. In 1982, the population was 7.5 million, of which 25 percent lived in urban areas and the rest in the rural areas where they were predominantly employed in agriculture. The animal population growth rate since 1969 has averaged 3.1 percent. Until 1981, Zimbabwe was self-sufficient in food, but since then it has had to import cereals as a result of droughts. It has also received food from donor agencies and foreign governments.

2. Agriculture in Zimbabwe

There are two different agricultural systems in Zimbabwe: the modern commercial sector, run by persons of European descent and communal or subsistence agriculture, where production is by Africans. The communal sector produces most of the food consumed by the rural and urban black population, generally on less favourable soils and with limited inputs. Land is currently owned by the state and privately. In communal areas, farmers are entitled to cropping on the land allocated by their chiefs but they do not have title deeds to it.

The principal crops produced are maize, wheat, cotton, tobacco and sugarcane. Irrigation availability is enabling crop production to be done throughout the year. Major winter crops are wheat, potatoes, seed beans and vegetables. Maize is the staple food; some was exported until the recent drought. Maize is cultivated throughout the

solutions to foreign exchange difficulties until the economic climate improves.

Institutional planning is required to ensure adequate transportation and staff subsistence allowances, both of which are vital for extension work. It is important to develop better communication between researchers and extension workers and between all staff and the farmers. There is also a need to coordinate programmes between the research and extension units so that they can be mutually supportive. Field extension workers require multidisciplinary, in-service training in technical, socioeconomic and communication skills, in order to be more effective.

The important role of women in agriculture must be acknowledged and they must be provided with the appropriate skills, training and facilities to enable them to achieve maximum productivity.

2. Agricultural productivity

Soil reclamation and water conservation are two vital issues that deserve special attention from the appropriate agencies and require solutions that are acceptable to small farmers. In order to deal effectively with weed and pest control problems, it is necessary to expand and decentralise extension services so that they are more effectively rendered to the communal areas.

Removal of the constraints created by labour shortages will require development of appropriate technologies to expedite activities and reduce the need for human labour. An alternative to draught animal power should be sought as well.

Solutions are needed for the economic constraints which will ensure that commodity prices are linked to the costs of production. Marketing infrastructural problems also require solution. The government is taking steps to alleviate the land shortage problem. It is also necessary to reorganise settlements to facilitate crop and livestock improvement programmes. For example, communal grazing must be replaced with fenced pastures to permit improvement in livestock grazing.

multidisciplinary programmes focus on irrigation and farm storage research.

The Department has 1,624 staff members, of whom 128 are professional and 167 are technical. This is the largest number of agricultural research staff of any institution in Zimbabwe; a further increase is anticipated with the expansion of the communal area programme. The greatest professional effort is concentrated on beef cattle research, followed by cotton, maize, pulses and pasture management. Six staff members are in training for their doctoral degrees and 13 for the master's degree. The DR&SS has long-term staff development plans including training 40 people to the doctoral level and 85 to the master's. Plans for improving technicians' skills are based on in-service training to be done at local colleges.

The Department conducts its work at 17 substations, institutes and units. Some of these are based in Harare, but the research is done on farms and stations. The subdivisions include the Matopos Research Station located 35 km south of Bulawayo, the Lowveld Research in the southeastern part of the country, the Agronomy Institute, the Dairy Service and the Seed Services with headquarters in Harare. Most of the divisions are equipped with offices, laboratories, and appropriate research equipment; some also have staff houses and vehicles. The DR&SS has no central library at headquarters, but each research station, institute and unit has its own library, with a department-wide total of 16,785 books and 740 periodical titles.

The Department's total budget for 1983-1984 was US\$ 9.98 million, of which US\$ 9.48 million was for recurrent expenses and US\$ 498,525 for capital expenses. The government provided over US\$ 8.5 million for recurrent expenses and donor agencies such as the World Bank, the IDRC and the ODA made small contributions.

(2) The Department of Agricultural Technical and Extension Services

The primary role of the Department of Agricultural, Technical and Extension Services (Agritex) is its function as the extension department of MOA, but some of its branches, such as the Agricultural Engineering Branch and Management Services Branch, also conduct research. The Agricultural Management Services Branch was formed recently to support the DR&SS's extension work in the communal and resettlement areas by doing social, psychological, cultural and economic research. The Management Services Branch is based at Agritex headquarters in Harare.

The Agricultural Engineering Branch has programmes in five major areas: tillage research; renewable energy technology, including wind energy for water pumping, solar energy and biomass fuels; appropriate technology; testing and development; and soil and water engineering. The Branch collaborates extensively with institutions within Zimbabwe (especially the University of Zimbabwe and the DR&SS) and with

international research agencies. Research is done at an experimental farm near Harare where the Branch has a laboratory and a workshop. Its holdings consist of three trucks and other equipment and a library containing 1,400 books and 35 periodicals.

(3) The Department of Veterinary Services

The MOA's Department of Veterinary Services has two subdivisions: Field Services and Technical Services. Its Research Branch, based at a central laboratory in Harare, does research on animal health as related to tick-borne diseases and tsetse control. Beef cattle research receives the greatest effort, followed by pig and goat research. The Department has six stations around the country which undertake diagnostic work and disease surveys, and conduct experiments with all types of livestock and research on the economics of tick and tsetse control. The library is located in Harare and has 1,500 books and 95 periodicals.

(4) The Department of National Parks and Wildlife

The Department of National Parks and Wildlife falls under the aegis of the Ministry of Natural Resources and Tourism. Its Branches of Terrestrial Ecology and Fisheries conduct research on ecosystems, organisms and fisheries resources with the objective of enhancing their conservation, development and better management. Programmes include studies of various aspects of inland fisheries development; range management and plant ecology; game ranching as a means of better management of large herbivores; wildlife management and conservation; and a multidisciplinary programme for wildlife management and integrated land use planning in the communal areas. Inland fisheries development receives the most attention, followed by wildlife management.

The Department's facilities for research include 13 stations around the country and a library in Harare with 1,804 books and 120 periodical titles. The staff publishes an annual report, as well as papers on various biological/ecological topics. The recurrent budgets of the Terrestrial Ecology and Fisheries Branches amounted to US\$ 419,707 in 1983-84.

b. Statutory bodies

The Tobacco Research Board (TRB) consists of three centres that supplement governmental research. Representatives of the flue-cured tobacco growers, air-cured tobacco growers and tobacco buyers determine the Board's policy. The TRB's research programmes include tobacco agronomy, sucker control, the entomology of the tobacco aphid and the cigarette beetle, communication of research results to growers, nematology, development of disease-resistant varieties and plant pathology. Each of the three research centres has cultivated land and experimental plots. The headquarters at Kutsaga has offices, a lecture theatre, laboratories, specialised equipment

and a library with 10,300 books. The TRB produces annual reports and scientific and topical papers. The total budget in 1983-84 was US\$ 577,925.

Agricultural research at the University of Zimbabwe is conducted by the Faculties of Agriculture and Veterinary Sciences. The Faculty of Agriculture consists of the Departments of Land Management, Crop Science and Animal Science. The Department of Land Management is concerned with soil fertility, conservation and land and agricultural policy. Research programmes include farming systems, studies of dryland agriculture, soil classification, smallholder irrigation development and appropriate technology development. Its facilities include a farm, classrooms, teaching laboratories, a livestock laboratory and field equipment. The Department of Crop Science is engaged in research and teaching on issues related to the production, physiology, breeding and diseases of major crops. Research programmes of the Department of Animal Science include the nutrition, productivity and endocrinology of beef cattle, dairy cattle nutrition and cattle diseases. The three Departments use the University's library; the Faculty of Agriculture as a whole produces an annual report and working papers.

The Faculty of Veterinary Sciences was established in 1982 and is currently focussed on training. Its research programme is being developed.

The Pig Industry Board is concerned with improving pig production through long-term research. Projects include genetic improvement, nutrition, housing, management and reproductive physiology. Its funding is derived from proceeds from the 129 ha research farm. The Board also has one laboratory, a workshop and a small library.

The Forestry Commission differs from other statutory bodies in that it is not a state monopoly and competes with the private sector through commercial activities carried out at two plantations and a sawmill. It is also engaged in non-commercial activities such as forest conservation, research and afforestation. The Research Division aims to increase production from trees for multiple uses. Its major projects include: species introduction in the semiarid areas; breeding of main commercial tree varieties, such as pine and eucalyptus; wood technology development; and agroforestry. The administrative centre for forestry research in Harare has 25 ha for experimental plots and seed multiplication. Its facilities also include greenhouses, laboratories, cold rooms, workshops and a library with 1,000 books. The total budget for 1983-84 was US\$ 546,411.

c. Private research institutions

The Rattray Arnold Research Station was established by the Zimbabwe Seed Maize Association. Its objectives are to supplement government research by testing seed varieties of all major food crops and to enable the Seed Cooperative to carry out plant breeding

programmes. The major effort is in maize research. The station's facilities include a maize work room, a cold room for seed storage, a 330 ha farm, training facilities for day-long courses on the use of improved crop varieties, and a library with 100 books. The budget for 1983-84 was US\$ 247,072.

The Zimbabwe Sugar Association is financed by the sugar industry to study problems associated with irrigated sugarcane production. Projects include testing of a comprehensive range of sugarcane varieties introduced from other countries, conduct of a variety breeding programme, fertiliser and cane physiology studies, and cane disease studies. Its facilities include an experimental farm, two laboratories and a library with 300 books. The budget in 1983-84 was US\$ 485,385.

d. Summary of research efforts

In general, tobacco research receives the greatest attention, followed by beef cattle, sugarcane, irrigation and cotton. Projects of importance to the communal areas such as poultry, goat and pasture management, sorghum and millet, and farm power receive less effort. The demand for technically skilled professionals far exceeds the supply; this is the main reason for staff shortages at the professional and technical levels. However, most government agencies have plans to increase professional staff availability by providing training to the master's and doctoral levels. Staff dissatisfaction with regard to salaries and conditions of service are factors that also need to be addressed.

2. Training

As with research, agricultural training in Zimbabwe is carried out by different types of institutions and in both formal and informal structures. Formal training results in granting of degrees, diplomas and certificates; nonformal training may take the form of in-service training for staff and farmers.

The Branch of Agricultural Education (BAE) of the MOA has two diploma-level colleges and four certificate-level institutes and offers diplomas and certificates in agriculture. It trains students in the theory and practice of crop and animal husbandry, farm management and agricultural engineering. Since Independence, the BAE has shifted its focus to certificate-level training in small-scale agricultural production. Entry requirements for the certificate programme are two years of secondary education. The government provides 90 percent of the funds for student training, which amounts to US\$ 3,780 per annum for the certificate level. The BAE organises a variety of short- and long-term training courses for the staff of various agricultural and educational institutions. Its facilities and equipment are adequate and it has over 6,000 ha of land for student practical training. The BAE's capital expenditure in 1983-84 was US\$ 6.47 million.

The Natural Resources College offers a two-year diploma in wildlife and protected area management. It has a capacity for 35 students; in 1983 it produced its first 18 graduates who found employment with the Department of National Parks and Wildlife, the agency which administers the College. Practical training is emphasised, and students are fully supported by the government. The College also offers short courses on conservation and wildlife ecology for the community. There are only two professionals on the staff. The College has 12,900 ha of land which are maintained as a wildlife sanctuary. The budget for 1983-84 was US\$ 81,270.

Among the training institutions are the University of Zimbabwe's Faculties of Agriculture and Veterinary Sciences and the Zimbabwe College of Forestry. The Faculty of Agriculture provides undergraduate and graduate-level training (BSc, MSc and PhD) through the Departments of Animal Science, Crop Science and Land Management. In 1984, 214 students were enrolled. About 50 percent of the enrolled students graduate. All of the undergraduate and 70 percent of the postgraduate students are sponsored by the government. Most of the lecturers are nationals; some of the teaching staff are currently in training for doctoral and master s degrees as part of a long-term training plan. Student practicals are conducted at the University of Zimbabwe farm. USAID has given the Faculty of Agriculture US\$ 10 million for expansion over a five-year period. The Faculty's total budget for 1983-84 was US\$ 5.81 million.

The Faculty of Veterinary Sciences was recently established and has not yet produced any graduates. It fills a great need in Southern Africa because there is no other such institution in the region except in the Republic of South Africa. There were 23 students enrolled in 1984. Seventy percent of the students are sponsored by the government. Four of nine of the teaching staff are nationals; the rest are expatriates. The building programme scheduled for completion in 1985 will result in 63 offices, four conference rooms, four lecture rooms, six teaching laboratories, a workshop and a hospital.

The Zimbabwe College of Forestry offers a one-year certificate and a two-year diploma in forestry. Student enrollment is low; altogether, 15 diplomates and 115 certificate-holders have been produced since 1980, all of them being employed by the Forestry Commission as Forest Rangers or Officers. No nationals are currently employed as lecturers, although five nationals are employed in a technical capacity. The College has three classrooms, audio-visual teaching equipment and a library with 600 books. The budget for 1983-84 was US\$ 1.05 million.

The Tobacco Training Institute is a private training institution offering a one-year diploma in tobacco culture and short courses to farmers.

Government nonformal training institutes include the Veterinary Training Institute which trains veterinary extension agents for work in the communal areas through nine months of in-service training. The Agritex Training Branch also provides in-service training for field and extension workers and for farmers, 40,000 of whom have been trained under this scheme. An Agricultural Engineering Training Centre is being built to train extension workers in the use of farm machinery. As a part of the government's overall strategy to combine practical and academic training, schools and colleges are being encouraged to develop integrated programmes; some special schools are being built under a scheme known as the Zimbabwe Foundation for Education with Production. The Ministry of Youth, Sport and Culture has 14 training centres aimed at developing a cadre of youth trained to work on cooperative farms.

The Pig Industry Board and the Agricultural Rural Development Authority are examples of parastatals involved in nonformal training for their staff and for farmers. Private organisations involved in nonformal training include the Cotton Training Centre, which trains and gives advisory services to cotton producers through short courses of varying lengths on subjects such as production, pest management and cotton picking. Silveira House is a religious organisation that also provides informal training to communal area farmers. In 1983, 524 farmers were trained at Silveira House.

In general, there is a serious shortage of professionals to provide training in specialised disciplines, but there are plans to train a large number of people to the masters level.

3. Extension

Four government institutions and six parastatal and private organisations are engaged in extension. Agritex, in the Ministry of Agriculture, is the largest extension organisation in Zimbabwe. Its Field Division operates through extension officers, subject matter specialists and teams of fieldworkers at the provincial and regional levels. The focus is to expand extension services to communal area farmers; however, the ratio of one extension worker to 800 farmers is not conducive to this. Agritex's programmes are in crop and animal production, land use planning, conservation and irrigation. Improved maize production receives the greatest attention, followed by cotton, farming systems, land and water conservation, and beef cattle production. The budget for 1983-84 was US\$ 19.67 million, of which US\$ 16.6 million was for recurrent costs and US\$ 3.07 million for capital expenditures.

The Department of Veterinary Services' Field Branch is focussed on its primary functions of animal disease prevention and increased livestock production. Its extension programmes include dipping, vaccinations, livestock post mortems, tsetse eradication and meat inspection. At present, there are not enough veterinarians in Zimbabwe but some are in training. The Department's 1984 budget was

US\$ 15.12 million: the specific allocation for the Field Branch was not available.

The Training Branch of the Department of National Parks and Wildlife regularly does extension work, but all officers of the Department are expected to participate in promoting public awareness of the country's natural resources and wildlife. The major extension programmes are in wildlife management, conservation range management and fisheries. The total budget for extension in 1984 was US\$ 60,258. The Department of Natural Resources does extension work in land conservation. Its land inspectors educate farmers and have the power to prosecute those who do not cooperate in proper conservation measures.

The Tobacco Research Board, the Forestry Commission and the Pig Industry Board are parastatals. Although the Tobacco Research Board has no formal extension service, it is often the sole source of information on tobacco cultivation for small-scale farmers. The other two provide advisory services to farmers as well.

Private institutions engaged in extension include the Zimbabwe Sugar Association. Workers make regular visits to growers and circulate reports and bulletins on new developments in improved sugar production. In addition, a number of agro-chemical and fertiliser companies provide technical advice to commercial farmers as a way of promoting their products.

Nongovernmental organisations such as the Lutheran World Federation provide extension services in the resettlement areas. Silveira House runs joint training and extension programmes in improved production of maize, sorghum, millet, vegetables, groundnuts and cotton.

The three main agricultural extension institutions of Zimbabwe (Agritex, Department of Veterinary Services and the Department of National Parks and Wildlife Management) employ 371 professionals of a total staff of 4,101.

There are fewer vacancies in the extension institutions than in the research and training institutions but, as in the latter two, the largest number of vacancies in extension are in the professional and technical categories. At present, 33 staff members are in diploma training; three are in training for bachelor's degrees and one for the master's degree.

C. Constraints to Agricultural Production and Production Potential

1. Food crops

Crop yields vary greatly between the commercial and communal areas, being much lower and more variable in the latter. This is due to differences in agro-ecological location, level of

mechanisation and management systems. The focus of this section is on the constraints to production in the communal areas as reflected in the results of the ARRA survey.

Rainfall distribution and soil degradation are the most serious physical constraints to increased productivity in all crops. These are particularly significant factors because small-scale farming is primarily done in areas of marginal rainfall and on degraded soils often classified as being unsuitable for production.

Among the biological constraints, weeding is a serious constraint and one which is difficult to overcome, because it is a labour-intensive task and there is often a labour shortage at critical times. Insects and other pests constitute a constraint and, for communal area farmers, their control is difficult; chemical pesticides are unaffordable for smallholders and there are no effective substitutes. The crop varieties used are low-yielding, particularly of sorghum and millet, and the maize varieties are unsuitable for short rainfall periods that occur in the communal areas. Shortage of draught animals and their weak physical condition are also critical factors that cause delays in planting and necessitate the use of lower-yielding varieties of crops.

The economic constraints to increased production include low prices, an ineffective marketing structure in the communal areas, and lack of credit facilities. Population pressure in the communal areas has caused land to be subdivided into holdings of uneconomic size in regions that require extensive rather than intensive cultivation. A lack of education affects farmers' ability to use new technologies and services; the situation is worsened by land mismanagement and, hence, soil degradation. Human labour is used intensively within the five months of the rainy season. This is another constraining factor, because the shortages which arise delay farming operations and adversely affect productivity.

Among the institutional constraints are a research focus more appropriate for the commercial rather than the communal sector and the lack of training for all types of agricultural workers and farmers. Extension services to communal areas are inadequate in quality and focus, and the ratio of extension agents to farmers is unfavourable. As the result of a lack of coordination and planning, there is some duplication of efforts among institutions engaged in rural development, and confusion on the allocation of responsibilities between particular programmes and projects.

2. Livestock and livestock products

A major physical constraint to cattle production is poor annual rainfall. The lack of forage is a constraint to livestock production, but not for poultry; the lack of water supply also is a problem, especially in cattle production. Lack of disease control methods and insects and other pests further limit productivity. The economic constraints in the livestock sector include a lack of

effective demand in local markets and the lack of infrastructure for long-distance marketing. Overstocking is also a problem.

D. Staff Assessment of Institutions

At governmental institutions, low salaries and inadequate benefits were regarded as serious constraints to the recruitment and retention of professional and technical staff, particularly because there are more attractive salaries in the public sector. Lack of uniform promotion structures was an additional cause for dissatisfaction. Retirement benefits were considered unsatisfactory, as were the lack of medical benefits for the junior staff.

Among the physical constraints considered to be hampering work at the agricultural institutions were lack of transport, insufficient or poorly maintained or damaged equipment, and inadequate office and laboratory facilities. Recurrent budgets were reported to be inadequate especially in light of the intended work expansion in the communal areas. Foreign exchange difficulties compounded problems such as vehicle and equipment purchase and repair.

Recurrent expenses were not generally viewed as a problem at private and parastatal institutions; their facilities and equipment are adequate and of high quality except to the extent that they are affected by foreign exchange problems.

E. Conclusions and Recommendations

1. Agricultural institutions

Because successful implementation of development programmes requires so many different agencies, good coordination at the national, provincial, district, and local levels is vital to identify, plan and implement strategies, to monitor and evaluate activities, and to oversee the pace and direction of development. For this purpose, a planning and coordination body is required at the national level which would oversee all rural development programmes of the various agencies.

The planned shift in the national development policy emphasis from commercial to communal area farming has resulted in policy adjustments at the institutional level. However, research activities still benefit the commercial sector and projects designed for the communal areas still need to be expanded further. There thus is a need to reorient research, training and extension work towards the communal areas and to train farmers in these and the resettlement areas.

Flexibility in the administration of the recurrent budget is required to facilitate solutions of ad hoc problems which are often encountered in communal areas. Recurrent budgets should be increased and appropriately adjusted to allow for the proposed expansion of programmes in the communal areas. It is necessary to seek short-term

country, but yields are highest in the high rainfall regions of the north. Other important crops are tea, coffee, citrus, and other fruits, groundnuts and soybeans. Tobacco is the major export earner.

Livestock holdings amount to five million head of beef cattle, for which the government's Cold Storage Commission provides an assured market at fixed seasonal prices. Zimbabwe is virtually self-sufficient in dairy production; it is served by the Dairy Marketing Board which guarantees prices and undertakes distribution and processing. Private entrepreneurs under government regulation carry out commercial fishing in lakes and rivers. There is also a thriving crocodile ranching industry.

Agricultural marketing is highly organised. Handling, processing and delivery of agricultural products are the responsibility of five parastatals and a cooperative. The commercial sector uses large amounts of purchased inputs such as fertilisers and improved seed varieties. Zimbabwe produces its own nitrogen and phosphate fertilisers and seeds, but small farmers' access to these inputs is limited due to lack of transportation and distribution outlets. While credit is available for the commercial sector through a variety of institutions, lack of collateral prevents lending to small farmers.

B. Agricultural Institutions

1. Research

There are a large number of institutions involved in agricultural research in Zimbabwe, including four government research organisations in various ministries, and six statutory bodies and private organisations. There are 222 professionals employed in agricultural research. Total budgetary resources committed in 1983-1984 from national, government and private sources amounted to US\$ 25.5 million and an additional US\$ 8.3 million from donors. Some of these organisations are reviewed below.

a. Government agricultural research institutions

(1) The Department of Research and Specialist Services

The Department of Research and Specialist Services (DR&SS) in the Ministry of Agriculture (MOA) conducts crop, livestock and pasture research. It consists of three research divisions which are further subdivided into institutes and sections or units by functional disciplines. Its emphasis has been on applied and problem-oriented research for the commercial farming sectors but, with recent national policy changes, the Department intends to shift its focus to small farmer needs in the communal areas. The DR&SS's research programmes for 1984 emphasise food crops, such as maize, sorghum/millet, pulses, wheat, vegetables, fruit, cassava and rice, and commercial crops, such as cotton, coffee and livestock. Its

I. INTRODUCTION

A. Background

This Agricultural Research Resource Assessment (ARRA) was conducted from July 1983 through August 1984 in the following countries of the Southern African Development Coordination Conference (SADCC): Botswana, Lesotho, Malawi, Mozambique, Swaziland, Tanzania, Zambia and Zimbabwe. The ARRA was initiated as a result of discussions between the SADCC Consultative Technical Committee for Agricultural Research (CTCAR) and representatives of the Cooperation for Development in Africa (CDA). The CDA is an informal association of donors including Belgium, Canada, France, Italy, West Germany, the United Kingdom and the United States.

The inventory and assessment were carried out within the framework of the high priority accorded by the CDA to developing and strengthening agricultural research capability in Africa. The United States, assisted by other CDA donors, was assigned the specific responsibility for coordinating the development of CDA-supported agricultural research programmes in the Southern African and Sahelian regions. The ARRA inventory reports were financed by the United States Agency for International Development (AID) for CDA, and were carried out with the full collaboration and support of SADCC through the CTCAR. DEVRES, Inc., a U.S. private consulting firm based in Washington, DC, was engaged by AID to implement the ARRA together with senior agricultural research personnel from the SADCC countries and to prepare a SADCC regional report. Two other CDA donor countries, Italy and France, also provided technical experts and other assistance for some of the SADCC countries' reports.

The CDA members recognise that the African nations have established Africa-wide and regional institutions, such as SADCC, and that the heads of African states have given unanimous support to the Organization of African Unity's Lagos Plan of Action which emphasises the development of a strong capability to increase agricultural productivity. The donors have, therefore, joined with the African countries and their regional organisations--SADCC in Southern Africa and the Institut du Sahel in the Sahel--to develop country-specific and regional analyses of existing resources and of the medium- to long-term needs and opportunities in agricultural research that will lead to increased agricultural productivity.

The World Bank, in its 1983 report entitled Sub-Saharan Africa: Progress Report on Development Prospects and Programs, reiterated its emphasis on the high priority which governments and donors should give to agricultural research. More specifically the report noted:

Even within the present state of technical knowledge, improved incentives and marketing arrangements would permit very large increases in agricultural output. However, for the longer term, increased output will depend on the development of effective technical packages, pest and disease control and developments in animal husbandry. . .In a situation of budgetary stringency and of immediate crisis, expenditure on research having a possible, but uncertain, payoff ten years or more in the future is frequently seen as dispensable. This danger is increased when research programmes are manifestly weak and unfocussed. It is, therefore, essential that these programmes be formulated and implemented in ways which will enable them to contribute more effectively to the process of development. . .¹

The ARRA reports, and the recommended research priorities, programmes, and projects within them, are set in a 20 to 25 year time-frame. This long-term perspective permitted the flexibility to make recommendations which are more carefully adapted to the needs of agricultural research. Individual country research staff in charge of country reports, assisted by technical experts provided through the CDA have endeavoured to be sensitive and responsive to the severe budgetary constraints in SADCC countries. The reports confirm that, even when a high priority is given to research, the SADCC country governments initially will not be able to meet all of the recurrent costs of certain research projects. Donors, therefore, will need to provide for some of these costs.

B. Methodology

This study was carried out with the full participation of African professional agricultural researchers and agriculturalists. It was agreed that such participation was of central importance for all phases of the activity--the design of the questionnaires, the data collection process, the analysis, the assessments of research programmes and direction, the actual preparation of the country reports, and the development and review of a regional agricultural research strategy. DEVRES provided a group of technical experts who had wide African and other international experience to assist the country researchers, to contribute to the analysis of the country reports, and to prepare a SADCC regional report. Italy and France also provided technical experts to assist country researchers in Mozambique and Tanzania, respectively.

The ARRA was initiated with a pilot study performed collaboratively with the SADCC member states of Botswana, Malawi and Swaziland. Following review of this pilot report by both SADCC and CDA members, the ARRA was expanded to include additional SADCC countries: Lesotho, Mozambique, Tanzania, Zambia and Zimbabwe. At the time these countries were added, the pilot country reports were updated and a regional analysis was prepared.

Senior researchers from the SADCC countries were designated as National Coordinators. Each Coordinator provided overall direction and support for the ARRA in her/his country. In turn, each Coordinator nominated researchers to be in charge of completing the questionnaires and preparing the national reports for their respective countries. The Country Researchers also used other experienced researchers for short periods to help complete questionnaires on specific subjects. The scope of the questionnaires included not only the research institutions, but also training institutions and extension institutions which provide links between research professionals and the farmers who are intended to utilise research results.

The expanded ARRA was prepared from July to September 1984 by the Country Researchers in cooperation with the DEVRES staff. A regional report, including summaries of the national reports, was prepared by DEVRES in consultation with the CTCAR members and the Country Researchers. The regional report was based on a regionally-oriented analysis of programmes and national reports, on the answers to the questionnaires, on contacts with international research organisations and national and international donors, and on other available information.

During the course of the ARRA, DEVRES provided assistance in the development of a computerised data bank to process ARRA data and to assist the SADCC countries in meeting their future needs for research which, when combined with other available information, can provide a foundation of practical, useful data that can be continuously updated. The data bank can be a valuable tool for use by those designing programmes and projects in agricultural research. It will remain with the Southern African Centre for Cooperation in Agricultural Research (SACCAR) which will update the data bank, as well as ARRA, in the future.

In preparing recommendations for programmes and projects, the National Coordinators, Country Researchers and DEVRES staff took into account research work already proposed or underway. New ideas were also included in this country report and in the regional report as well. One of the principal objectives of the analysis was to build on existing-national research, analyses, conclusions and recommendations in a manner which will strengthen these research activities. A concerted effort was made to place recommendations in a wider context, involving not only the research institutions, but also the training of researchers, the use of research results by the farmers, and the linkages with other SADCC member institutions or other international research institutions.

¹The World Bank, Sub-Saharan Africa: Progress Report on Development Prospects and Programmes (Washington, D.C.: The World Bank, 1983).

II. GENERAL INFORMATION ON ZIMBABWE

A. Description of the Country

1. Geography

Zimbabwe is situated in south-central Africa between the Limpopo and Zambezi rivers. It is bounded by Zambia on the north and northwest, by South Africa on the south, by Mozambique on the east and northeast and by Botswana on the southwest. Zimbabwe lies wholly to the north of the Tropic of Capricorn, between latitudes 15°40' and 22°30' South and longitudes 25°15' and 33°05' East. Its total area is 390,245 km²; the population density is approximately 16/km².

2. Agro-ecological zones

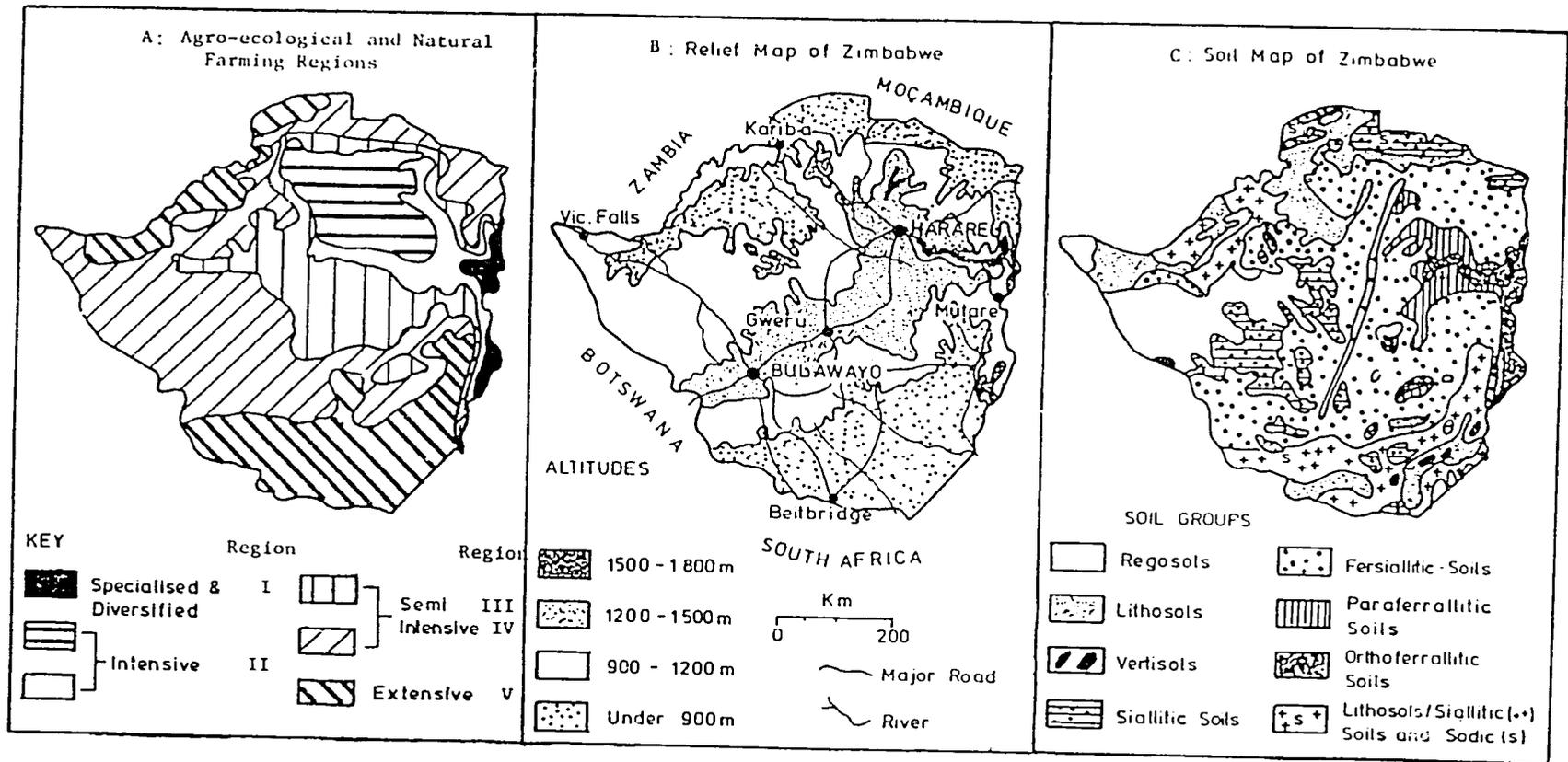
The amount and distribution of rainfall is the most important factor affecting crop and animal production. Based on rainfall, Zimbabwe may be divided into five natural agro-ecological regions. The locations of the agro-ecological zones and the type of farming which characterises each are shown in Figure 1A. The main descriptive features of each of these natural regions, the amount of rainfall, total area and the proportion in communal and large-scale commercial areas, are shown in Table 1.

3. Natural environment

a. Topography

Most of Zimbabwe lies more than 300 m above sea level. Four-fifths of it is above 600 m, but less than one-twentieth is above 1,500 m. (See Figure 1B.) The outstanding feature is the central plateau known as the highveld, which is about 650 km long by 80 km wide, and lies between 1,200 and 1,500 m above sea level. On either side of this is the middleveld, which is between 600 m and 1200 m above sea level. Deep river valleys have split the middleveld areas into great blocks of plateau country. The lowveld, which is below 600 m, is comprised of a narrow strip in the Zambezi Valley and a broader tract between the Limpopo and Sabi Rivers. The lowest point in the country is at the junction of the Sabi and Lundi Rivers, which is about 162 m above sea level.

Massive granite outcrops occur in various parts of Zimbabwe. Along the eastern border is a high mountainous region of great beauty stretching for 350 km. Towards the north of this region, the highest mountain, Inyangani, stands at 2,592 m above sea level.



ZIMBABWE: AGRICULTURAL RESEARCH RESOURCE ASSESSMENT

Figure 1: Physical Characteristics and Land Use

Source: Data collected from the DEVRES/SADCC Agricultural Research Resource Assessment, 1984.

ZIMBABWE: AGRICULTURAL RESEARCH RESOURCE ASSESSMENT

Table 1: Agro-Ecological Regions: Area, Land Distribution and Rainfall

<u>Natural Region</u>	<u>Area^a</u> (ha)	<u>Percentage of Total</u>	<u>Commercial Land</u> (ha)	<u>Percentage of Area</u>	<u>Communal Areas</u> (ha)	<u>Percentage of Area</u>	<u>Rainfall</u>
I	613,233	1.56	440,200	63	128,300	18	1,050mm plus per annum with some precipitation in all months of the year and relatively low temperatures.
II	7,343,059	18.68	4,324,500	74	1,255,100	21	700-1,050mm per annum with rainfall confined to summer. It is divided into two subregions with the second more prone to drought.
III	6,854,958	17.43	3,240,600	44	2,814,700	39	500-700mm per annum with relatively high temperatures and infrequent, heavy rainfalls.
IV	13,010,036	33.03	4,025,800	27	7,307,300	49	450-600mm per annum. and subject to seasonal droughts.
V	10,288,547	26.2	3,648,400	35	4,774,000	46	Less than 500mm per annum. The conditions in this region make it suitable only for extensive cattle ranching.
TOTAL			<u>15,679,500</u>	<u>40^b</u>	<u>16,279,400</u>	<u>42^b</u>	

^aThe remaining 1,220,254 ha (3.1 percent) is unsuitable for any form of agricultural utilisation, being extensively broken country.

^bThe remaining land is either small-scale commercial land (4 percent) or other land.

Sources: Modern Farming Publications, Zimbabwe Agricultural and Economic Review (Harare: Mardon Printers, 1982), p. 37; Transitional National Development Plan 1982/83-1984/85, Vol. I (Harare: Republic of Zimbabwe, 1982), p. 67.

b. Geology and soils

Zimbabwe is made up predominantly of granitic, igneous, and schistose rocks containing greatly varied and rich mineral resources. Zimbabwe's soils are mainly sandy with heavier loamy and clay soils in localised areas. About two-thirds of the country is covered with sandy soils which are derived from coarse-grained granite in most areas, but there are large tracts derived from gneiss in the south and from triassic sands and the so-called Kalahari sands, mainly in the southwest. The coarse-grained soils have very poor physical characteristics such as low moisture-holding capacity and compaction in the sub-soil. The Kalahari sands, on the other hand, have lower chemical fertility since their clay and silt contents are extremely low. Details of the soil groups are given in Figure 1C.

c. Hydrology

In Zimbabwe all surface water, found in streams and rivers, and underground supplies are considered public water and ownership is vested in the State. Its use is regulated under the Water Act of 1976. Rights for agricultural uses are allocated by the Administrative Court presided over by a Judge of the High Court. The allocations specify the period and flow of water which may be abstracted from a river or from the volume stored in private dams. Operation and maintenance of all major storage dams and main delivery systems up to field edge are the responsibility of the Ministry of Water Resources and Development (except in the southeastern lowveld, where the functions have been ceded to the Regional Water Authority).

Approximately 60 percent of Zimbabwe is covered by granite and metamorphic rocks which have low underground water potential with an average borehole yield of 2 m³/hr. The amount of underground water available in Zimbabwe is about 1,000 million m³. Investigations on the Sabi aquifer carried out in 1959 estimated the safe extractable yield to be 2.26 m³/sec, an amount which is considered sufficient to irrigate 2,500 ha. Plans are underway to study the Middle Sabi aquifer's potential to supplement surface water. The Limpopo Valley aquifer could yield 3.0 m³/sec per borehole, compared with 0.2 m³/sec (720 m³/hr) per borehole for the Sabi Valley.

North of Bulawayo, 1,000 ha are under irrigation using boreholes in the Nyamandlovu aquifer. Investigations are also underway to harness the aquifer at Lion's Den for commercial agricultural production. The quality of underground water in the northwest of Zimbabwe on Karoo deposits is poor, being too saline for irrigation or domestic purposes.

4. Climate

Temperatures which might be expected at Zimbabwe's latitude are moderated by its altitude; its inland position keeps humidity low. Days are bright and sunny, and the nights are clear and cool.

Using rainfall distribution as the basis of classification, Zimbabwe has just two seasons: dry and wet. Based on temperature and rainfall, four seasons may be distinguished which include the hot season from September to mid-November, the main rainy season from mid-November to mid-March, the post-rainy season from mid-March to mid-May, and the cold (cool) season from mid-May to August.

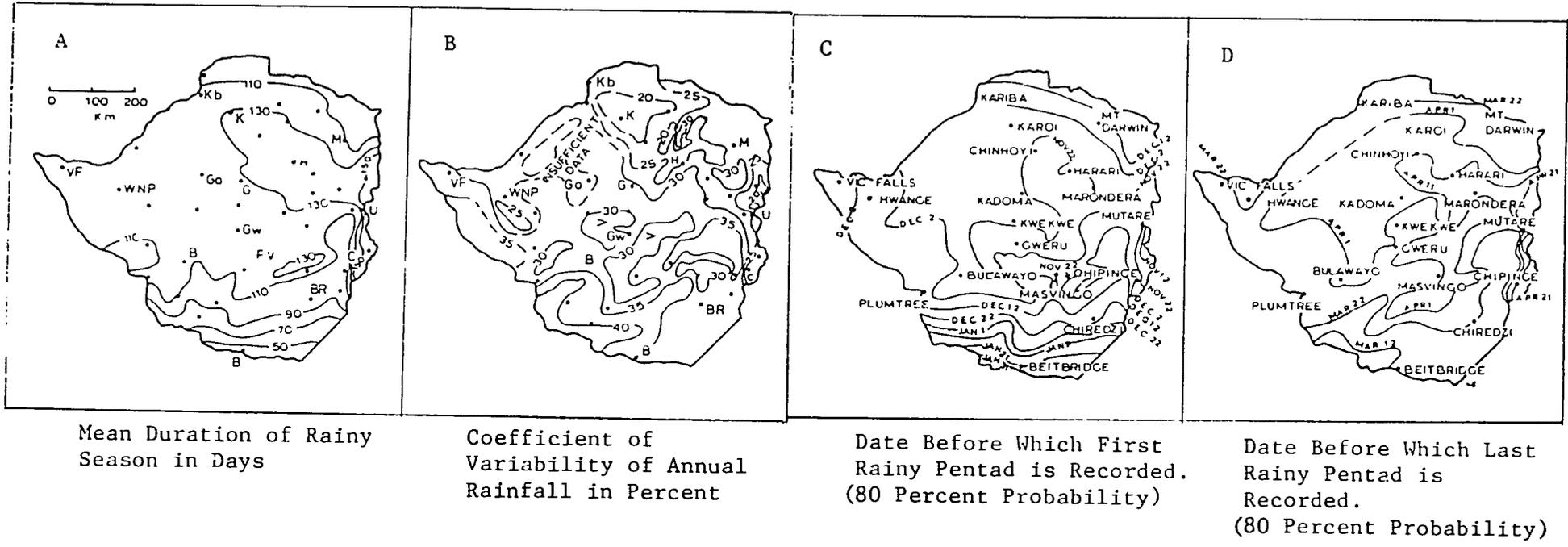
While the main rainy season usually commences in November, it may be delayed until December. The length of the rainy season varies from district to district. (See Figure 2A.) Generally winds are light, although heavy squalls with thunderstorms and hail occur occasionally at the beginning of the season. Figures 2B, C and D show the coefficient of variability of annual rainfall and the dates before the first and last rainy pentads. The post-rainy season is characterised by a steady decrease in rain probability, and after the middle of March rainfall becomes extremely low.

The rainy season in Zimbabwe lasts five months, and there is little or no rain for the rest of the year. Average rainfall for the whole country is about 675 mm, unevenly distributed, with 300 mm in the low-lying Limpopo Valley and 3,000 mm in some mountain areas. Rainfall increases from south to north. Convection currents are the main rain-inducing processes, accounting for about 90 percent of the total rainfall, while orographic rainfall is important in the eastern border mountains. Convergent windflow is often found in the Intertropical Convergence Zone.

The reliability of monthly rainfall is much lower than that of the seasonal total, with the probability decreasing from north to south. At some meteorological stations, a total of less than 25 mm has been recorded at some time or other for each of the wet months. These dry months may occur in otherwise good seasons as well as in poor seasons, and are often called dry spells. They have been known to destroy or drastically reduce crop production, particularly in the marginal areas. In areas where this phenomenon is frequent, farmers tend to stagger planting as an insurance policy. (See Table 2.)

The cold season sets in after the middle of May and lasts up to August; by this time, rainfall is not normal with an occasional exception in the eastern border areas. Weather is usually fine with sunny days and cold nights. Frosts are fairly common, and are more severe in valleys. Occasionally, weather is more severe in the south and east of the country.

Maximum and minimum monthly temperatures for four stations are shown in Table 3. Although Zimbabwe lies within the tropics, only the low-lying Zambezi and Limpopo Valleys experience tropical conditions because four-fifths of the land area is at an altitude of over 600 m above sea level. The effect of altitude is highly significant;



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Figure 2: Rainfall Distribution

Source: Data collected from the DEVRES/SADCC Agricultural Research Resource Assessment, 1984.

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Table 2: Percentage Probability of Drought^a

	<u>October</u>	<u>November</u>	<u>December</u>	<u>January</u>	<u>February</u>	<u>March</u>	<u>April</u>
Harare	55	9	4	4	4	8	35
Bulawayo	41	8	13	11	16	18	51
Mutare	28	9	6	7	4	4	19
Victoria Falls	52	7	4	7	12	24	60

^aThis data shows the higher probability of mid-season droughts in the south which implies a shorter cropping season.

Source: Data collected from the DEVRES/SADCC Agricultural Research Resource Assessment, 1984.

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Table 3: Maximum and Minimum Temperature at Four Stations
(°C)

	<u>Harare (1,472m)</u>		<u>Bulawayo (1,344m)</u>		<u>Buffalo Range (430m)</u>		<u>Mutare (1,113m)</u>	
	<u>Maximum</u>	<u>Minimum</u>	<u>Maximum</u>	<u>Minimum</u>	<u>Maximum</u>	<u>Minimum</u>	<u>Maximum</u>	<u>Minimum</u>
July	21.6	6.5	21.4	6.9	25.5	8.7	21.1	7.6
August	24.1	8.6	24.2	8.9	27.7	10.8	23.0	9.6
September	27.0	11.5	27.5	11.9	30.7	13.6	26.0	11.7
October	29.0	14.6	29.6	15.0	31.8	16.9	27.2	14.5
November	27.3	15.4	28.0	15.7	32.2	18.6	27.0	16.1
December	26.2	15.7	27.2	16.2	32.7	19.8	27.1	17.0
January	26.0	15.7	27.3	16.3	32.9	20.3	27.4	17.6
February	25.8	15.6	26.8	16.0	31.2	19.7	26.4	17.2
March	26.1	14.2	26.6	14.9	30.5	18.5	25.9	16.2
April	25.6	12.5	25.7	12.8	29.0	15.9	24.8	14.1
May	23.7	9.2	23.6	9.4	27.4	11.7	11.2	10.7
June	21.5	6.8	21.1	7.1	25.0	9.2	20.9	8.4
Year ^a	25.3	12.2	25.8	12.6	29.7	15.3	25.0	15.4

^aYearly average

Source: Data collected from the DEVRES/SADCC Agricultural Research Resource Assessment, 1984.

temperatures as high as 43° C have been recorded in the Limpopo Valley at 450 m, while temperatures as low as 15° C have been recorded in the Nyanga mountains which are 1800 m above sea level.

Relative humidities in Zimbabwe are highest along the eastern border mountains and in the southeastern third of the country where humidity remains at over 95 percent for one or two days at a time. Such humidity is rare in the north, even during the rainy season. The driest areas are in the west. Humidity is highest all over Zimbabwe from January to February.

B. The People

1. Population

According to the preliminary assessment of the 1982 population census, the total population of Zimbabwe was 7,546,071 and the rate of growth between 1969 and 1982 was 3.1 percent per annum. (See Table 4.) Over 55 percent of the population were estimated to be under 15 years of age. More than four million people live in the communal areas, as compared to 1.7 million in the commercial areas. Except for some 6,000 farmers and their families, the rest of the population in the commercial areas is comprised of farmworkers and their families. Distribution of population in communal areas is shown by province in Table 5.

2. Occupational patterns

The majority of employed people are Zimbabweans (84 percent). Employed non-Zimbabweans are comprised of two groups: Europeans, who dominate specialised occupations (e.g., accounting, architecture, engineering, electricity, finance, banking, and mining), and immigrant workers from Malawi and Mozambique, who are concentrated in the semi-skilled and unskilled jobs (e.g., agriculture and mining). The lowest incomes are found in agriculture and community services, the highest in finance, insurance and real estate.

Income distribution tends to follow sex and race lines. Thus, in general, males tend to be favoured over females and the Europeans, Asians and Coloureds tend to receive higher incomes than the Africans. Most professional, technical, administrative and managerial workers have certificates, diplomas or degrees. Over one-half of the employees in health, finance, banking, insurance and real estate have four years of secondary education. On the other hand, workers in agriculture, mining, construction and catering tend to possess Grade 7 or Standard 6 qualifications or less. The major staffing shortages are in the following areas: administration and management, agriculture, engineering and medicine.

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Table 4: Population Distribution in Zimbabwe, 1969 and 1982 Censuses

<u>Category</u>	<u>1969</u>		<u>1982</u>	
	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>
District Councils	3,011,530	59.1	4,276,900	56.7
Rural Councils	1,225,590	24.0	1,571,349	20.8
Municipalities ^a	849,050	16.7	1,673,057	22.2
Other areas	13,170	0.2	24,765	0.3
TOTAL	<u>5,099,340</u>	<u>100.0</u>	<u>7,546,071</u>	<u>100.0</u>

^aMunicipalities: Harare, Bulawayo, Chitungwiza, Mutare, Marondera, Chegutu, Chinhoyi, Kadoma, Kariba, Ilwange, Victoria Falls, Gweru, Redcliff, Shurugwi and Masvingo.

Source: Data collected from the DEVRES/SADCC Agricultural Research Resource Assessment, 1984.

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Table 5: Area and Population of Communal Areas, by Province

<u>Province</u>	<u>Area</u> (km ²)	<u>Population</u> (000)	<u>Population density</u> (km ⁻²)
Manicaland	18,982	693	37
Mashonaland North	25,344	421	17
Mashonaland South	14,910	565	38
Matebeleland North	31,045	320	10
Matebeleland South	24,189	357	15
Midlands	27,168	645	24
Victoria	21,156	734	35
TOTAL	<u>162,794</u>	<u>3,735</u>	<u>23</u>

Source: Data collected from the DEVRES/SADCC Agricultural Research Resource Assessment, 1984.

Results of the 1982 census show a relative shift from the communal and commercial farming areas into towns. The percent of the population living in urban areas increased from 18.4 percent in 1969 to 25.7 percent in 1982. However, population density in the communal areas is still high, varying between 10 and 37 people per km².

3. Language and ethnic groups

There are two main traditional languages in Zimbabwe: Shona and Ndebele. The other traditional languages spoken are dialects of the two main languages. English is the official language in schools, industry and commerce. Other groups, such as Europeans and Asians, tend to speak their own languages.

Communal area population can be divided into two broad cultural groupings. The Shona constitute about 80 percent of the black population and occupy the north and east regions of the country, including the capital city of Harare. The Ndebele form about 20 percent of the population and occupy the southwest region, including the city of Bulawayo. The Europeans, Coloureds and Asians are concentrated mainly in towns and on commercial farms. They, together with other smaller groups such as the Tonga, Sena, Hlengwe, Venda and Sotho, constitute the minority groups.

4. Religion

The main religions in Zimbabwe are Christianity and traditional beliefs. However, other religions, such as Islam and Hinduism, are practiced by the Asian community.

5. Educational system

a. Government educational policy

Since Independence the Government has made a firm commitment to the education of the masses. Primary and secondary school education is offered by government, community and private schools. All government schools are divided into Group A and Group B schools. Group A schools are the former European schools and are located mainly in urban areas; Group B schools are the former African schools, and also are located mainly in urban areas. The majority of rural schools are run by religious organisations. Higher education is provided by the University of Zimbabwe.

The Government has also introduced the policy of Education with Production, which aims at integrating skills training with formal academic education. The aim is to offer pupils a wide range of skills, increase their self-confidence and self-reliance, and to lead them to a greater understanding of the environment, hence enabling them to become more useful citizens. At present, eight schools under

the Zimbabwe Foundation for Education with Production operate in the country. A teachers' training school in Belvedere (Harare) has been established to produce teachers capable of implementing this government policy.

b. Primary education

The government, in an effort to implement its policy of educating the masses, abolished tuition fees in all government primary schools. Only boarding and recreational activity fees are paid. A zoning system operates for day scholars attending all government schools. Community and private schools still charge tuition fees. The number of primary school pupils has increased from 818,862 in 1979 to 2,146,696 in 1984, reflecting the government's commitment to primary education for all.

c. Secondary education

Tuition fees are charged in all secondary schools; increases may only be implemented with government approval. Zoning regulations apply as in primary schools. Government has increased the number of secondary schools from 177 before Independence in 1979 to 1,206 in 1984. To maximise present facilities, two groups of pupils use the same classroom, one group attending the morning session, the other the afternoon session. The total number of pupils in secondary schools has increased from 66,215 in 1979 to 419,553 in 1984.

d. Vocational/technical education

Technical training during the pre-Independence period was mainly for personnel in industry and commerce. Skills were acquired through on-the-job training or informal training. Government colleges provided mainly apprenticeship schemes; the majority of trainees were white. Independent colleges offered mainly commercial study courses for those not eligible to enroll at government colleges. The majority of blacks during this period acquired skills through informal training. The post-Independence government has introduced more technical colleges, vocational training centres and training schools. Government technical colleges now not only provide apprenticeship schemes but also a large number of commercial courses. Full-time study schemes have also been introduced for the unemployed. Enrollment for these courses is open to all races.

e. Higher education

The University of Zimbabwe, a statutory body mainly financed by the government, offers degrees in a wide range of disciplines. A number of government financial assistance schemes are available to citizens attending the University. Total enrollment has increased from 1,914 in 1979 to 4,131 in 1984.

f. Adult education

There are 2.5 million illiterate people in Zimbabwe, about one-third of the population. Adult education programmes aimed at eradicating illiteracy were launched in 1983, coordinated by the Ministries of Women's Affairs and Community Development and Education. To date, 25,000 literacy class groups have been established; a complement of 20,000 tutors have been recruited to teach 200,000 adults.

C. Government and Political Framework

1. Structure of government

The Zimbabwe system of government is a multi-party democracy modelled on the British parliamentary system. A non-executive Head of State is the President, and the Prime Minister is the executive Head of Government. The Parliament is made up of two Houses: the Senate and the House of Assembly. The House of Assembly has 100 elected Members of Parliament. The Senate, with 40 members, is the Upper House which reviews bills that pass the House of Assembly before they become law. The political party with the majority of seats in parliament rules the country; its leader heads the Cabinet.

The civil service is divided into ministries which administer specific government functions. Each ministry is headed by a Minister, with a Permanent Secretary who is the chief executive of the ministry, followed by Deputy, Under and Assistant Secretaries. The rest of the civil service consists of executive, professional and technical personnel who perform the various functions of the specific ministry. There are 26 ministries in the civil service structure of the Government of Zimbabwe.

2. Political parties

The first Independent Government was formed by the Zimbabwe African National Union-Patriotic Front (ZANU-PF) which invited the Zimbabwe African Peoples Union (ZAPU) to form a government of national unity on the basis of national reconciliation. In 1984, party representation in the House of Assembly consists of 57 ZANU-PF members, 20 PF-ZAPU members, three for the United African National Council (UNAC) members, and 20 entrenched seats for whites.

3. National budget

The budgetary system in Zimbabwe is an incremental system which increases the previous year's allocation consisting of the recurrent and capital accounts; all accounts are administered by the Ministry of Finance, Economic Planning and Development. Both budgets are presented together, annually, to Parliament by the Minister of

Finance, Economic Planning and Development. Spending is authorised annually by an Appropriation Act. The fiscal year runs from July 1 to June 30.

4. Government policies regarding agriculture

Policies having an impact on agriculture and agricultural research are embodied in the government's National Economic Policy of Growth with Equity. They can be broadly divided into six categories, and generally are aimed at achieving food self-sufficiency and security, producing raw materials for the manufacturing sector, and generating foreign currency through exportable surplus. The policies are as follows: Agricultural Pricing and Subsidy, Agricultural Marketing, Land Redistribution, Agricultural Credit, Inputs, and Minimum Wage Levels and Better Amenities for Agricultural Workers.

5. Membership in international organisations

There are over 100 regional and international organisations in the political, social, economic and cultural spheres in which Zimbabwe enjoys full membership. At the regional level, Zimbabwe is a full member of the OAU, SADCC, and PTA. Zimbabwe is also a full member of the Commonwealth of Nations, the African Caribbean Pacific Group, and international commodity organisations such as the International Coffee and Sugar Organisations. In August 1980, Zimbabwe became a full member of the United Nations General Assembly; it has since been elected a member of the United Nations Security Council. Zimbabwe is also a full member of specialised UN agencies such as WHO, ILO, ICAO, FAO, UNESCO, UNDP, and UNICEF. It is also a member of the World Bank and IMF.

D. Economic Overview

1. General indicators

The Government of Zimbabwe inherited from the previous colonial government a dual economy which was created by a policy of separation and discrimination. Economic dualism is evidenced by the existence of two economic sectors: the modern sector (consisting of commerce, industry, mining and commercial agriculture) and the peasant sector. The modern sector is relatively advanced, dynamic and diversified, while the peasant sector is generally underdeveloped, largely subsistence in character, and poorly served with essential physical, agricultural, social, infrastructural and other resources.

The World Bank ranks Zimbabwe as a middle-income developing country, with a per capita GNP of US\$ 850 in 1982. Table 6 shows the GDP at factor cost by industry of origin over the period from 1979 to 1982. The main contributors to GDP in 1982 were manufacturing at 25

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Table 6: Gross Domestic Product at Factor Cost by Industry of Origin

	Factor Cost			
	(Z\$ million at current prices)			
	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>
Agriculture and forestry	329	462	647	670
Mining and quarrying	226	285	250	243
Manufacturing	623	802	1,016	1,096
Electricity and water	71	70	78	77
Construction	92	87	133	150
Finance and insurance	123	159	185	226
Real estate	44	43	55	51
Distribution, hotels and restaurants	313	425	566	656
Transport and communications	188	211	303	356
Public administration	269	290	307	357
Education	98	169	217	311
Health	63	73	84	109
Domestic services	53	65	72	85
Other services	136	173	213	272
Less imputed banking service charges	-82	-108	-131	-194
Gross Domestic Product	<u>2,546</u>	<u>3,206</u>	<u>3,995</u>	<u>4,465</u>

Source: Data collected from the DEVRES/SADCC Agricultural Research Resource Assessment 1984.

percent, agriculture and forestry at 15 percent, and services, hotels and restaurants at 14.7 percent. These three sectors were primarily responsible for raising the GDP from US\$ 2,546 million in 1979 to US\$ 4,465 million in 1982.

2. International trade

International trade between Zimbabwe and other nations is conducted in a number of ways including trade exhibits, such as the Zimbabwe Trade Fair, trade agreements between governments, and the posting of trade representatives to foreign capitals. At the Zimbabwe International Trade Fair, the scope of commodities covered includes practically every aspect of commercial, industrial and agricultural activity. Tobacco remains Zimbabwe's most important foreign exchange earner. Before the drought, cotton and maize were also important exports.

3. Financial system

The Reserve Bank of Zimbabwe controls the country's currency. There are five commercial banks: Barclays, Standard, Zimbank, Grindlays and the Bank of Credit and Commerce. There also are the Post Office Savings Bank and three merchant banks: Standard Merchant Bank Limited, Ral Merchant Bank and the Syfrets Bank. There are three building societies: Central Africa Building Society, the Beverley Building Society and Founders Building Society. There are also several finance houses, such as United Dominion Corporation, Finance Corporation Ltd. and Scotfin Limited. Many insurance and pension schemes are with insurance companies. These companies include: Old Mutual, Southampton Assurance, Legal and General, and Pearl General Insurance Company.

4. National development plan

Zimbabwe's national development is directed by the post-Independence economic policy of Growth with Equity. The three-year Transitional National Development Plan states sectoral policies and targets, and translates these policies and targets into programmes and activities. The main aims of national development are to:

- o Build a socialist and egalitarian society;
- o Achieve a sustained, high rate of economic growth and speedy development in order to raise incomes and standards of living of all the people and expand productive employment of both rural peasants and urban workers;
- o End "imperialist exploitation" and achieve greater and more equitable degree of ownership of natural resources, including land;
- o Promote participation in and ownership of a significant portion of the economy by nationals and the State;

- o Train, mobilise and utilise fully the country's human resources which are creative and its greatest asset; and
- o Provide, improve and extend the basic economic and social infrastructures so as to serve the whole country.

5. External aid

External aid was initiated by the government through the Zimbabwe Conference on Reconstruction and Development (Zimcord) which was held in March 1981. The aim of Zimcord was to approach the international community for aid for resettlement, reconstruction and rehabilitation programmes. Aid is accepted from both Western and East European countries. The main forms of aid from Eastern countries include commercial loans, technical assistance and commercial trade which is usually in the form of barter trade. The Government receives aid in the form of commodity import programmes (CIPs) whereby donor governments provide requested raw materials which the Zimbabwean government sells to private industries in local currency. The money obtained is then used for development programmes.

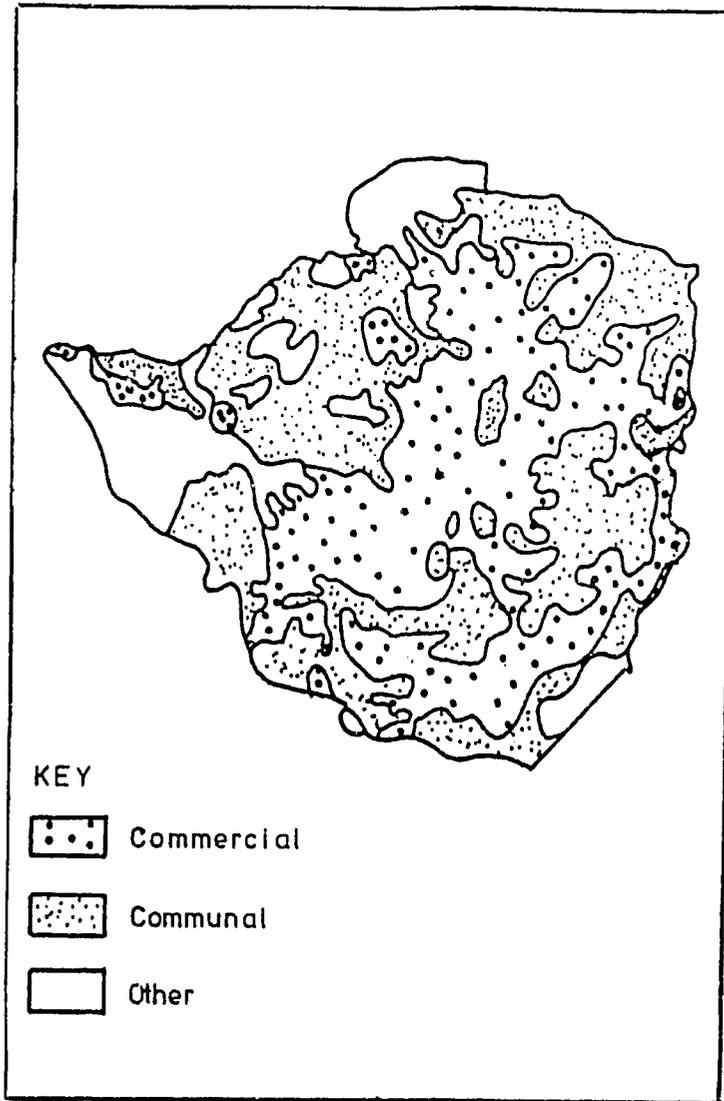
6. Food aid

Zimbabwe was self-sufficient in food and a net exporter of cereals until 1981, when the effects of drought began to be felt. As a result, there is no official policy on food aid.

In 1981, Zimbabwe imported cereals from the USA at a value of US\$ 4 million and vegetable oil from Belgium at about US\$ 2.5 million. The continued drought has made it necessary for Zimbabwe to continue importing food. Donor agencies and foreign governments have been involved in funding various food aid programmes.

E. Agriculture

At Independence Zimbabwe had two separate agricultural systems: the European and the African. Historically, services for the two sectors were provided separately. Zimbabwe is thus characterised by a dualistic agricultural sector where commercial agriculture (mostly white) dominates the cash economy and communal (African) agriculture contributes only 15 percent to the cash economy. However, communal agriculture contributes significantly to the economy because it produces most of the food consumed by the rural and urban black populations. The distribution of commercial and communal farming areas is shown in Figure 3.



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Figure 3: Commercial and Communal Areas

Source: Data collected from the DEVRES/SADCC Agricultural Research Resource Assessment, 1984.

In an attempt to balance agricultural development, the Zimbabwe Government has incorporated into the National Economic Policy of Growth with Equity the following policy goals:

- o An acceptable and fair distribution of land ownership and use;
- o Achievement of a rapid reduction in the levels of absolute poverty in rural areas, together with an accelerated improvement in the standards of living of the rural population;
- o Increased land and labour productivity in all forms of agriculture;
- o Substantial increases in employment for the rapidly growing labour force;
- o Achievement and maintenance of food self-sufficiency and regional food security;
- o Increase in the role of agriculture as a major foreign exchange earner and a source of inputs to local industries;
- o Integration of the two agricultural sectors;
- o Promotion of regional balance in agricultural development; and
- o Development of human resources in the rural areas to their full potential.

It is intended that the Ministry of Agriculture and related ministries, parastatals and private agricultural institutions be guided by these policy objectives.

1. Land use and tenure

About 40 percent of the land area of Zimbabwe is classified as arable land, and 55 percent as suitable for grazing. However, the quality of the land varies. Land in Zimbabwe has been classified into eight classes according to its capability to produce permanently under specific uses and treatments. The classification was based on the most intensive, safe use of the land, while considering soil management requirements and the hazards of indiscriminate use. Table 7 shows a summary of land use properties for each land class arranged in order of decreasing adaptability and freedom of choice of use, with Class I land having few or no limitations.

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Table 7: Land Classes and Land Use Properties

<u>Land Class</u>	<u>Land Use Properties</u>
I ^a	No or few limitations or hazards. Suitable for continued cropping with good management of soil structure and fertility. Soils stable, deep, well structured and drained. Slight slope.
II ^a	Moderate limitations or hazards. Suitable for cropping but may require special management and protective conservation.
III ^a	Subject to severe limitations or risk of damage. Steep slopes and susceptible to erosion. Soil moderately shallow, low water retention and other unfavourable properties. Requires intensive protection and conservation.
IV ^a	Susceptible to very severe, permanent limitations or hazards. Suitable for row cropping only after long fallow rotation. Steep slopes, shallow, low water-retaining soil, highly erodable and with other unfavourable properties.
v ^b	Subject to severe, permanent wetness that precludes cultivation. Cultivated only with very special practices and measures. These are vleis and watercourses.

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Table 7: Land Classes and Land Use Properties (cont.)

<u>Land Class</u>	
VI ^b	Soil unsuitable for cropping but grows perennial vegetation. Steep slopes, shallow soils with rock outcrops. Provides good grazing of hay.
VII ^b	Severe slopes that exclude cultivation. More severe conditions and worse soil characteristics than those of class VI.
VIII ^c	Excessive limitations of soil relief, wetness etc. which is suitable only for wildlife. Steep hills, rocks, sponges, river beds, dam surface area etc.

^aLand classes I to IV are classified as Arable Land.

^bLand classes V to VII are classified as Grazing Land.

^cLand class VIII is designated as being of no agricultural value.

Source: Data collected from the DEVRES/SADCC Agricultural Research Resource Assessment, 1984.

There are three major legislative measures that resulted in the current system of land tenure: the Land Apportionment Act of 1930, the Land Husbandry Act of 1951 and the Land Tenure Act of 1969. The 1930 Land Apportionment Act specifically barred purchases of land by Europeans and Africans in each other's area. Simultaneously, the Act created African Purchase Areas within which African farmers could acquire freehold tenure.

Despite removal of race-based land classification by the Land Tenure Act of 1978, the division between the former Tribal Trust Land (TTLs) and the other land categories (European and state land) remained. In 1979-80, the Government repealed the Land Tenure Act of 1969 and opened land ownership to all races. There now are two types of land: state land and private land. In communal areas, farmers are entitled to cropping on the land allocated to them through the chief but they do not hold title deed to it.

2. Principal agricultural production systems

Agriculture and livestock production systems are determined by the five agro-ecological zones of Zimbabwe. Production encompasses afforestation, livestock and crop production. Table 8 summarises the major products and production systems of these regions. (See Figure 1A).

Traditional production is practiced mainly in the communal areas, two thirds of which is in Natural Regions III and IV. Livestock holdings facilitate crop production by subsistence farmers because cattle provide draughtpower and manure. Cash crops, such as maize and groundnuts, are produced mainly by cattle owners.

a. Principal crops

Major crops produced are maize, wheat, cotton, tobacco and cane sugar, and agricultural diversification has induced an expansion of wheat, cotton and oilseed production. Most crops are raised during the growing period associated with the summer rains. However, the establishment of substantial areas served by irrigation has enabled crop production, especially wheat, to be extended throughout the year. The major winter crops are wheat, potatoes, seed beans and vegetables.

Maize is the principal crop and the staple food for the majority of the country's population. A substantial amount of maize is exported; considerable amounts are also used as stock feeds. Although maize is cultivated throughout the country, it is better suited to the higher rainfall regions in the north where yields are high. However, newer, short-season maize varieties now available have improved production in the drier regions as well.

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Table 8: Farming Production Systems by Region

<u>Region</u>	<u>Production Systems</u>
Natural Region I, specialised and diversified farming region.	Intensive beef and/or dairy production. Plantation and orchard crops specialised production (e.g., coffee and tea).
Natural Region II, intensive farming region.	Intensive grain, cash and mixed crop production (e.g., tobacco, maize and cotton). Intensive beef and/or dairy production.
Natural Region III, semi-intensive farming region.	Semi-intensive livestock production assisted by fodder crop production. Cash crop production (e.g., cotton and maize).
Natural Region IV, semi-extensive region.	Semi-extensive livestock production; some drought resistant cash crop production.
Natural Region V, extensive farming region.	Extensive beef production.

Source: Data collected from the DEVRES/SADCC Agricultural Research Resource Assessment 1984.

Extensive irrigated areas in the lowveld are given to wheat production; as a result, Zimbabwe has been able to achieve a very large measure of self-sufficiency in wheat. Other crops of importance to the country's agricultural development are tea, coffee, citrus and deciduous fruits, groundnuts, and soybeans.

b. Principal livestock and livestock products

Table 9 shows the principal livestock holdings and livestock products. Zimbabwe's beef herd exceeds five million head, more than half of which are owned by blacks. A government commodity board (the Cold Storage Commission) provides an assured market outlet for slaughtered cattle at fixed seasonal prices.

A pig and poultry industry also exists. The national sheep industry, though small, is vigorous. The country is virtually self-sufficient in dairy products: locally-produced cheeses have gained a high reputation beyond the country's borders.

The dairy industry also is served by a commodity board (the Dairy Marketing Board), which guarantees seasonal prices to milk producers and undertakes most of the whole milk distribution and much of the industrial processing.

c. Fisheries

The Department of National Parks and Wildlife Management has three research stations for warm water fish culture at Lakes McIlwaine, Kyle and Matopos and one for cold water fish culture at Nyanga. Apart from conducting research in fish hybridisation, limnology and the determination of the efficacy of a variety of fish feeds, ecologists in these stations also breed fingerlings to supply to fish farmers and give them general advice on fish farming.

All commercial fishing, whether industrial or artisanal, is carried out by private entrepreneurs. Government controls the intensity, extent and form of fishing through the application of regulations defined by the Parks and Wildlife Act of 1975, as amended on 1 July, 1982. Commercial fishing is carried out in Lakes Kariba, Robertson, McIlwaine and Kyle but fish stocks in Zimbabwe's rivers are too small to support a commercially viable fishing enterprise. Two fishing cooperatives are expected to commence fishing in Lake Kariba. Zimbabwe also has a thriving crocodile ranching industry.

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Table 9: Principal Livestock and Their Products

<u>Livestock</u>	<u>Main Products</u>	<u>By-Products</u>
Cattle	Beef and Veal (123,200 tonnes)	Hides (480,000 skins) Tallow (2,300 tonnes) Manure Draught
	Milk (150.0 million litres)	Manure Butterfat (367 tonnes)
Sheep	Mutton (260 tonnes)	Hides
	Lamb (425 tonnes)	
	Wool	
Poultry	Eggs	Manure
	Meat (15,900 tonnes)	
Pigs	Meat (10,200 tonnes)	
Goats	Meat	Hides
Donkeys and Horses	Haulage and Draught	

Source: Data collected from the DEVRES/SADCC Agricultural Research Resource Assessment, 1984.

3. Agricultural marketing and credit

a. Marketing

Unlike many developing countries, the agricultural marketing system in Zimbabwe is highly organised and developed; major products are controlled by statutes, and handling, processing and delivery to final consumers is the responsibility of five parastatals and one co-operative.

The main agricultural marketing parastatals are the Tobacco Marketing Board, the Cotton Marketing Board, the Grain Marketing Board, the Dairy Marketing Board, the Cold Storage Commission, and the Colcom Central Cooperative (which is not a parastatal).

b. Input marketing

Sizeable quantities of purchased inputs are used in agriculture, but smallholders utilise only a very small percentage. In 1979, purchased inputs comprised less than 8 percent of gross output value. Cooperatives provide a main distribution network; however, they do not exist in many smallholder areas and lack adequate depot and distribution centres. They are also constrained by a shortage of capital for operating costs and a lack of trained management.

Zimbabwe manufactures a large proportion of its fertiliser requirements, including 80 percent of its nitrogen and phosphate. However, all potash requirements are met by imports. Seed inputs are produced locally, but research efforts have so far been limited to the provision of quality and improved varieties for Natural Regions I, II and III, mainly to commercial farmers. Commercial contract growers supply seeds through six registered seed certifying agencies, but small farmer access to seeds is limited by the lack of adequate transport and distribution outlets.

c. Credit

Agricultural credit in Zimbabwe is channelled through a variety of institutions which mostly assist the large-scale, commercial sector. These institutions include private commercial banks, farmers' cooperative companies, finance houses, fertiliser companies, the Agricultural Finance Corporation (AFC) and non-governmental organisations (NGOs). The farmers' cooperative companies are mostly owned and operated by large-scale farmers who tend to favour their own members for credit extension; since commercial banks require collateral, small-scale farmers who do not hold title deeds to land have limited access to credit. Some fertiliser companies give in-kind credit to farmers but their repayment terms are often discouraging.

The AFC is the only quasi-governmental institution which gives credit to small-scale producers; the remainder of the available credit for smallholders comes from NGOs, most of which are church organisations. Therefore, lack of agricultural credit for small-scale producers is a serious constraint to increased productivity.

4. Major problems related to the natural resource base

Agricultural production in Zimbabwe is greatly influenced by the natural resource base which is governed by prevailing environmental factors. The country is landlocked and therefore is limited to rail, road and air communication with other countries. Its location, coupled with its high altitude, endows it with a subtropical climate, except in the low-lying areas of the Zambezi and Limpopo Valleys which experience a warm tropical climate.

Agriculture in Zimbabwe is seriously limited by geology, the nature of the soils, and inadequate erratic rainfall. Successful cropping is limited to Natural Regions I and II and, to a lesser extent, Region III. The poor terrain has led to serious land degradation and nutrient wash, leaving deep sandy soils with very low nutrient content that require considerable management.

5. Food security

Maize is the staple grain of Zimbabwe with sorghum and millet playing a minor part. With increased urbanisation, wheat and rice have become important, reflecting changes in food consumption patterns that account for the cereal imports reflected in Table 10. Zimbabwe has suffered three successive years of drought, but in normal seasons it is a net exporter of maize, having exported (mostly to neighbouring countries) 492,000 MT valued at US\$ 57.9 million in 1982-1983. Table 11 indicates the projected grain production and demand for Zimbabwe for the period 1985 to 1994.

6. Ministries responsible for agriculture

Although the Ministry of Agriculture (MOA) is primarily responsible for agriculture, several other ministries, as well as parastatals and NGOs are, to a greater or lesser extent, also involved in agriculture. The Ministry of Lands, Resettlement and Rural Development (MLRRD), for example, is responsible for resettlement programmes and the setting up of agricultural cooperatives. The MOA and the MLRRD work together in cooperative and resettlement schemes. Other ministries linked to the Ministry of Agriculture through some of their activities are:

- o The Ministry of Natural Resources and Tourism, which is involved in the preservation of the natural resource base, including wildlife and fisheries;

ZIMBABWE: AGRICULTURAL RESEARCH RESOURCE ASSESSMENT

Table 10: Import and Export of Cereals, 1975-1981
(1,000 MT)

	<u>Total Imports</u>	<u>Total Exports</u>
1975	67.5	858.3
1976	22.2	371.8
1977	13.5	422.1
1978	5.1	538.0
1979	11.7	252.0
1980	158.3	87.2
1981	23.3	267.8

Source: SADCC Regional Food Reserve Report, January 1984.

ZIMBABWE: AGRICULTURAL RESEARCH RESOURCE ASSESSMENT

Table 11: Projected Total Demand and Production of Cereals, 1985-1994
(1,000 MT)

	<u>Demand</u>	<u>Production</u>
1985	2,716	2,743
1986	2,824	2,830
1987	2,935	2,919
1988	3,048	3,011
1989	3,162	3,106
1990	3,278	3,204
1991	3,396	3,241
1992	3,514	3,279
1993	3,632	3,317
1994	3,750	3,355

Source: SADCC Regional Food Reserve Report, January 1984.

- o The Ministry of Youth, Sports and Culture which provides training for a young farming cadre; and
- o The Ministry of Education, which is dedicated to furthering education with production so that school leavers have a basic knowledge of agriculture and a respect for manual labour.

Several parastatals involved in agriculture report to their respective ministries for policy direction. The Cold Storage Commission and the Tobacco Research Board report to the Ministry of Agriculture. In addition, the Agricultural Rural Development Authority reports to the Ministry of Lands, Resettlement and Rural Development. Government linkages with NGOs and other private organisations involved in agriculture exist but are indirect.

III. AGRICULTURAL RESEARCH INSTITUTIONS

A. Overview of Agricultural Research in Zimbabwe

As shown in Figure 4, the organisational structure of agricultural research in Zimbabwe involves the departments of various government ministries, statutory bodies and private institutions, details of whose locations, funding, staffing and activities are shown in Table 12. Functional linkages between these departments, although improved, are still unsatisfactory in some areas.

B. Government Agricultural Research Institutions

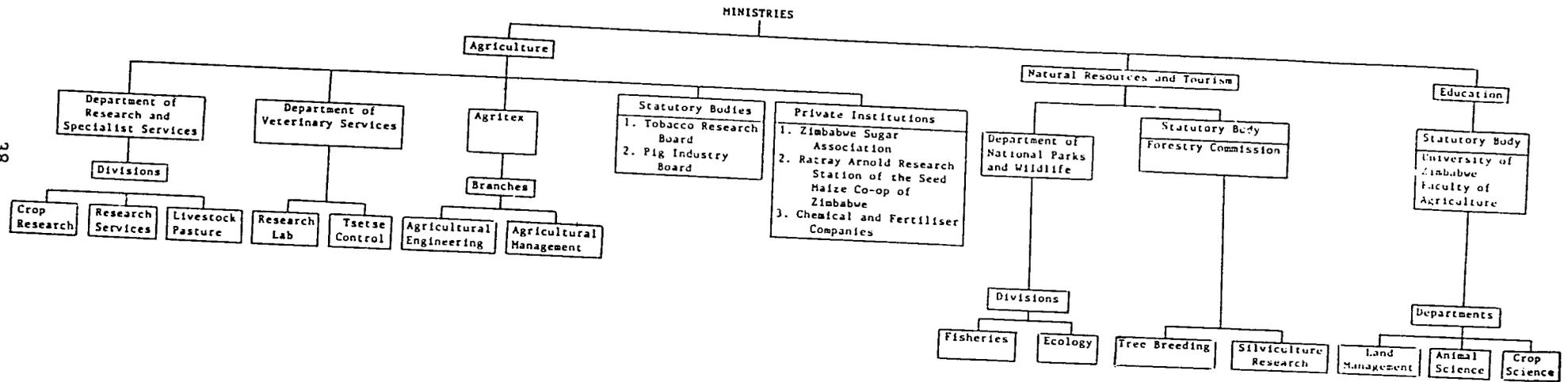
The Department of Research and Specialist Services of the Ministry of Agriculture (MOA) has overall responsibility for conducting crop, livestock and pastures research on a national level. Also involved in research are two other MOA departments, the Department of Agricultural Technical and Extension Services and the Department of Veterinary Services. In addition, the Department of National Parks and Wildlife in the Ministry of Natural Resources and Tourism has a research division.

1. The Department of Research and Specialist Services

a. Organisational structure and purpose

The Department of Research and Specialist Services (DR&SS) consists of three research divisions, each under an Assistant Director who reports to the Director and his Deputy. The divisions are further divided into institutes or stations, sections or units by functional disciplines. Details of the organisational structure of the DR&SS are given in Figure 5. The Department's financial and personnel administration includes the Directorate and the heads of institutes and sections, along with the Principal Executive Officer and his financial and personnel staff. The Agricultural Research Council is a statutory body which works closely with the Department and was set up to advise the Minister of Agriculture on matters of research. Its membership and functions are presently under review.

Established in 1948, the DR&SS is responsible for conducting research in agricultural science, crop and livestock production and for providing advisory and specialist services to the agricultural industry. Its advisory services include crop and livestock production, disease and pest control, identification of plant species and information services. Its regulatory services include: fertilisers, Farm Feeds and Remedies Act, Plant Breeders Rights Act, Seed Act, Phytosanitary control regulations, agricultural pesticide registration, and pest control regulations for cotton and tobacco. Technical and specialist services include: pesticides residue



ZIMBABWE: AGRICULTURAL RESEARCH RESOURCE ASSESSMENT

Figure 4: Organisational Structure for Agricultural Research

Source: Data collected for the DEVRES/SADCC Agricultural Research Resource Assessment, 1984.

ZIMBABWE: AGRICULTURAL RESEARCH RESOURCE ASSESSMENT

Table 12: Agricultural Research Institutions: Funding, Location, Activities and Staff, 1984

Institution	Funding ^a		Location and Major Research Station	Principal Research Activity	Number of Staff				
	Source	Amount ^b (US\$)			Profes- sional	Adminis- trative	Technical ^c	Support Services	Total
Department of Research and Specialist Services	MOA & Private	8,156,570	Harare	Crops, livestock, pastures, soils, information retrieval, Taxonomic ecological, plant pests and plant diseases.	128	39	167	1,290	1,624
Dept. of National Parks & Wildlife	Ministry of Natural Resources & Tourism	419,707	Harare	Research on wild-life, fisheries and ecology.	21	2	6	50	79
Zimbabwe Sugar Assoc. Experiment Station	Private	485,385	Harare (Chiredzi)	Sugar research.	5	3	2	130	140
Forestry Commission	Private	546,411	Harare, John Meikle Forest Research Station (Mutare)	Forestry research.	4	5	5	5	19
Dept. of Veterinary Services	MOA	13,362,521	Harare, Veterinary Research Laboratory	Research on animal diseases.	10	26	14	677	727

ZIMBABWE: AGRICULTURAL RESEARCH RESOURCE ASSESSMENT

Table 12: Agricultural Research Institutions: Funding, Location, Activities and Staff, 1984 (cont.)

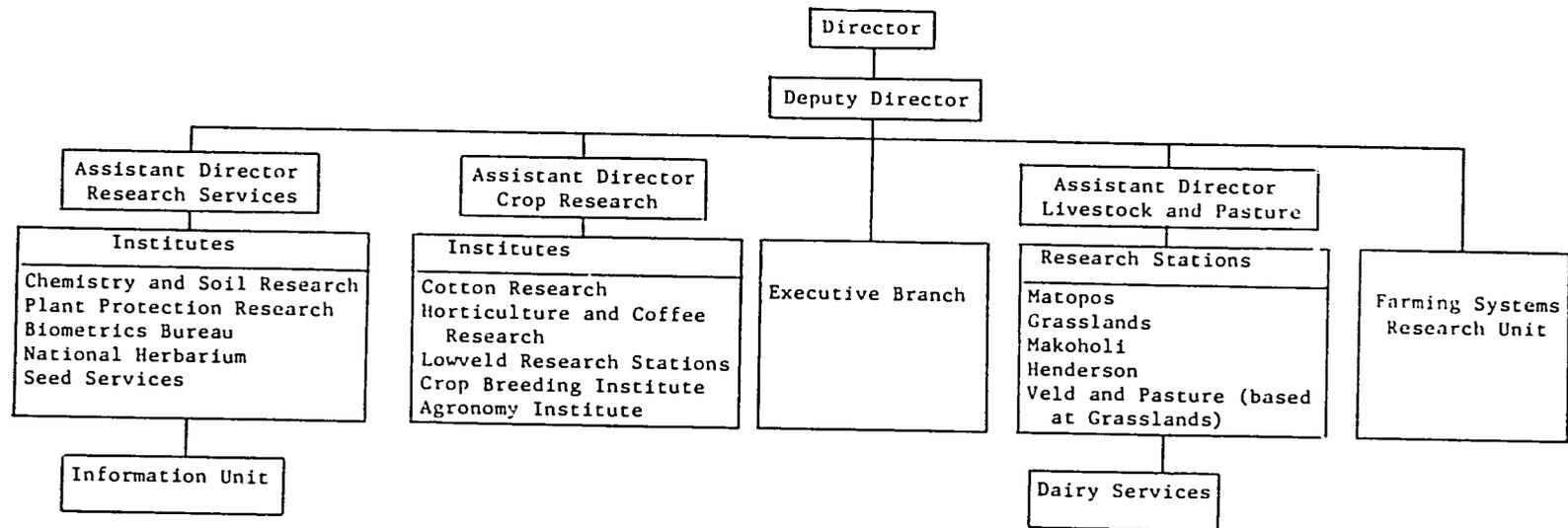
Institution	Funding ^a		Location of Headquarters	Principal Research Activity	Number of Staff				
	Source	Amount ^b (US\$)			Profes- sional	Adminis- trative	Technical ^c	Support Services	Total
Tobacco Research Board	Private	577,295	Harare, Kutsaga Research Station	Tobacco research.	23	5	12	210	250
Pig Industry Board	Private	166,299	Arcturus	Pig research.	2	2	-	4	8
Rattray Arnold Research Station	Private	247,072	Harare (Arcturus)	Maize research.	3	1	9	44	57
Faculty of Agriculture, University of Zimbabwe	GOZ	1,187,850	Harare	Farming systems, crops, livestock.	19	1	9	9	38
Branch of Agricultural Engineering	MOA	327,546	Harare	Agricultural engineering.	7	8	13	43	71
TOTAL		<u>25,476,656</u>			<u>222</u>	<u>92</u>	<u>237</u>	<u>2,462</u>	<u>3,013</u>

^aFunds listed include only those from national government and private sources. Donor funding is listed in Table 17.

^bExchange rate .7919 = 1 US\$.

^cTechnical = diplomate.

Source: Data collected from the DEVRES/SADCC Agricultural Research Resource Assessment, 1984.



ZIMBABWE: AGRICULTURAL RESEARCH RESOURCE ASSESSMENT

Figure 5: Organisational Structure of the Department of Research and Specialist Services

Source: Data collected from the DEVRES/SADCC Agricultural Research Resource Assessment, 1984.

analysis, fertiliser recommendations, milk recording scheme, surveys on crop loss assessment and the manufacture of legume inoculant for legume producers.

The general objective is to generate appropriate agricultural technology and minimise crop loss due to diseases, pests and weeds, so that agricultural productivity can be increased, self-sufficiency can be achieved and a surplus can be created for export. Departmental priorities based on the Growth with Equity policy emphasise small-scale production in communal areas and in the resettlement schemes. Departmental priorities are to:

- o Conduct surveys in communal areas to determine constraints on crop and livestock production;
- o Conduct soil surveys in the communal areas;
- o Carry out farming systems research in order to assess small farmers' constraints and develop solutions for them;
- o Introduce new drought-resistant crops;
- o Conduct performance testing of newly released crop varieties through on-farm trials;
- o Conduct research on livestock, pastures and crops of economic importance in various ecological zones of the country;
- o Train professional and technical personnel in all three Divisions of the Department; and
- o Disseminate research findings through publications, field days and seminars.

b. Research programmes

Research programmes for 1984 include primary food crops such as maize, sorghum/millet, pulses, wheat, vegetables, fruit and the recently introduced cassava and rice programmes. Commercial crops being researched include cotton, coffee, and livestock. Other programmes include research in beef and dairy cattle, sheep, goats, poultry, range and pasture management, as well as a few multidisciplinary programmes in irrigation, vegetation surveys and farm storage research.

The beef cattle projects currently underway include beef physiology, cross-breeding, and beef nutrition. Cotton projects focus on breeding to produce varieties suitable for various elevations, cotton agronomy, pest control, chemical and spraying methods, and cotton pathology. The Crop Breeding Institute has projects on maize breeding for resistance to disease, development of drought-tolerant

varieties and those adapted to lowveld summer conditions. The Agronomy Institute is working on maize agronomy projects to discover the effects of plant population, date of planting, fertilisation, etc., on maize yields. The Plant Protection Research Institute has projects on maize diseases and pests, such as maize streak virus, maize snout beetle, stalk borer, cutworms, etc. The Crop Production Unit of the Agronomy Institute has projects on pulses such as cowpeas, field beans, pigeon peas and mungbeans. Researchers at the Plant Protection Research Institute collaborate with agronomists in studying pulse pest and disease problems. Grasses and legumes projects are in progress, with trials on nitrogen fertilised pastures being carried out, new varieties of legumes being screened, and nurseries established in the various agro-ecological zones.

c. Human resources

(1) Number of staff

Table 12 shows the total number of people employed by each of the agricultural research institutions in Zimbabwe as of 1 July, 1984. Of these, the largest number are employed by the DR&SS, which has 1,624 employees altogether, including 128 professionals and 167 technical staff.

Position vacancies are highest in the professional category. Some areas of technical specialisation such as soil physics, pedology, and biometrics account for a portion of these vacancies because of the shortage of local personnel in these areas. A staff increase is anticipated with the expansion of communal area programmes.

(2) Research effort for various programmes

Beef research accounted for the highest professional effort of 8.90 person years, followed by cotton, maize, pulses and pasture management research, with 7.60, 6.10, 5.13 and 4.40 FTE years respectively. These efforts were equivalent respectively to 17.6, 15.0, 12.1, 10.1 and 8.7 percent of the total departmental research effort. The remainder of the research programmes ranged in effort from 1.00 to 2.61 person years. Except for pulses, the other programmes with a comparatively higher research effort were for commodities that were traditionally given priority based on their export index value.

(3) Staff training

Six staff members are currently in training for the doctorate degree and 13 for the master's degree. The Department has long-term plans for training 40 staff at the doctorate level and 85 at the master's level. Staff training and development are taken seriously beginning with an evaluation exercise followed by examination of recommendations and subsequent implementation. The Department plans to implement its training programme jointly with the

UZ Faculty of Agriculture and the Consortium of American Universities, and also plans to train staff in other parts of the world where appropriate training can be found.

Technician training is planned as in-service training conducted on the job through the local polytechnic and technical colleges. Prospective technicians are required to have basic training in agriculture at the diploma level except where special training in fields such as chemistry, etc., are required. Short courses involving overseas trips for technicians are also planned.

d. Research facilities

The DR&SS has 17 sub-stations, institutes or units, some of which are based in Harare. They are listed below:

- o The Matopos Research Station which is located 35 km south of Bulawayo has research facilities for animal production, staff houses and a laboratory;
- o The Grasslands Research Station which is located 70 km southeast of Harare serves the high rainfall areas. It has livestock facilities, a pasture programme, administrative offices, laboratories, staff houses, a primary school and a clinic;
- o The Horticulture and Coffee Research Institute has sub-stations at Chipinge (coffee) and Nyanga (peaches and apples). Facilities for horticultural research include glasshouses and laboratories. The Institute shares land with the Grasslands Research Station where the administrative offices, staff houses and equipment are located;
- o The Lowveld Research Stations (LVRS) are located in the southeastern part of the country. The headquarters are at Chiredzi Research Station in Chiredzi and the other stations are the Chisumbanje and Sabi Valley Experiment Stations. Facilities exist for irrigated and dryland cropping of horticultural crops such as subtropical fruits, nuts and vegetables. There are also laboratories, field equipment, administrative offices and staff houses;
- o The Cotton Research Institute which is located about 3 km west of Kadoma has offices, laboratories, staff houses and field equipment;
- o The Agronomy Institute has staff offices, grading sheds, field equipment and a physiology laboratory located at the headquarters in Harare. The Agronomy Institute research is conducted on farms and at other research stations;

- o The Crop Breeding Institute is based at the headquarters in Harare. However, research is done on farms and research stations of the DR&SS. All offices, glasshouses, grading sheds, tractors, vehicles, planters and combine harvesters used for the Crop Breeding work are located at headquarters;
- o The Chemistry and Soil Research Institute is based at the headquarters where most offices, laboratories, and vehicles are located. The Soil Productivity Research Laboratory, a section of the Institute, is based at the Grasslands Research Station in Marondera;
- o The Plant Protection Research Institute has its headquarters in Harare which has offices, plant pathology and nematology laboratories and glasshouses. Most of the research work is conducted on other research stations as well as on private and commercial farms;
- o All Seed Services offices and laboratories for seed testing are located at headquarters;
- o The Biometrics Bureau offices and computer are located at headquarters;
- o The Dairy Service has offices, laboratory and vehicles at headquarters;
- o Information Services has a microfiche reader and a photocopying machine at headquarters;
- o The National Herbarium and Botanic Gardens' offices and vehicles are located at headquarters;
- o The Henderson Research Station farm is located about 30 km north of Harare. There are livestock facilities for cattle, poultry and pasture research and the station is also used by the other research institutes, sub-stations or units of the Department, such as the Weed Research Team of the Agronomy Institute. Administrative offices, laboratories and staff houses are located on the farm; and
- o The Farming Systems Research Unit is based at headquarters in Harare. Multidisciplinary research is conducted in the communal areas in crops and livestock and there are plans to add an economist to complete the team.

There is no central library at headquarters but each research station, institute and unit has its own library. The total number of books in the various libraries are 16,785 plus 740 periodicals, and approximately 131 books are added per year. Proposals have been made to centralise the library to improve efficiency and lower costs.

e. Financial resources

The total budget for the DR&SS for the fiscal year 1983/1984 was Z\$ 10.56 million of which Z\$ 10.03 million was for recurrent expenses and Z\$ 527,540 for capital expenses. The Government provided Z\$ 8,954,000 for recurrent expenses and Z\$ 24,000 for capital expenses. Contributions from private sources included traditional contributions from commodity associations (Z\$ 73,240), the ARDA (Z\$ 108,760) and donor agencies. Among the latter, the World Bank made a loan of Z\$ 200,000 for recurrent expenses and IDRC provided Z\$ 424,000 and Z\$ 24,780 for recurrent and capital expenses respectively. The ODA provided Z\$ 370,000 worth of equipment.

2. The Department of Agricultural, Technical and Extension Services

The Department of Agricultural Technical and Extension Services (Agritex) is primarily the extension department of the Ministry of Agriculture but two of its branches also conduct research, namely the Agricultural Engineering and Management Services Branches. The organisational structure of Agritex research is given in Figure 6. Agritex and the DR&SS are also involved in farming systems research and the extension programme.

a. Agricultural Engineering Branch

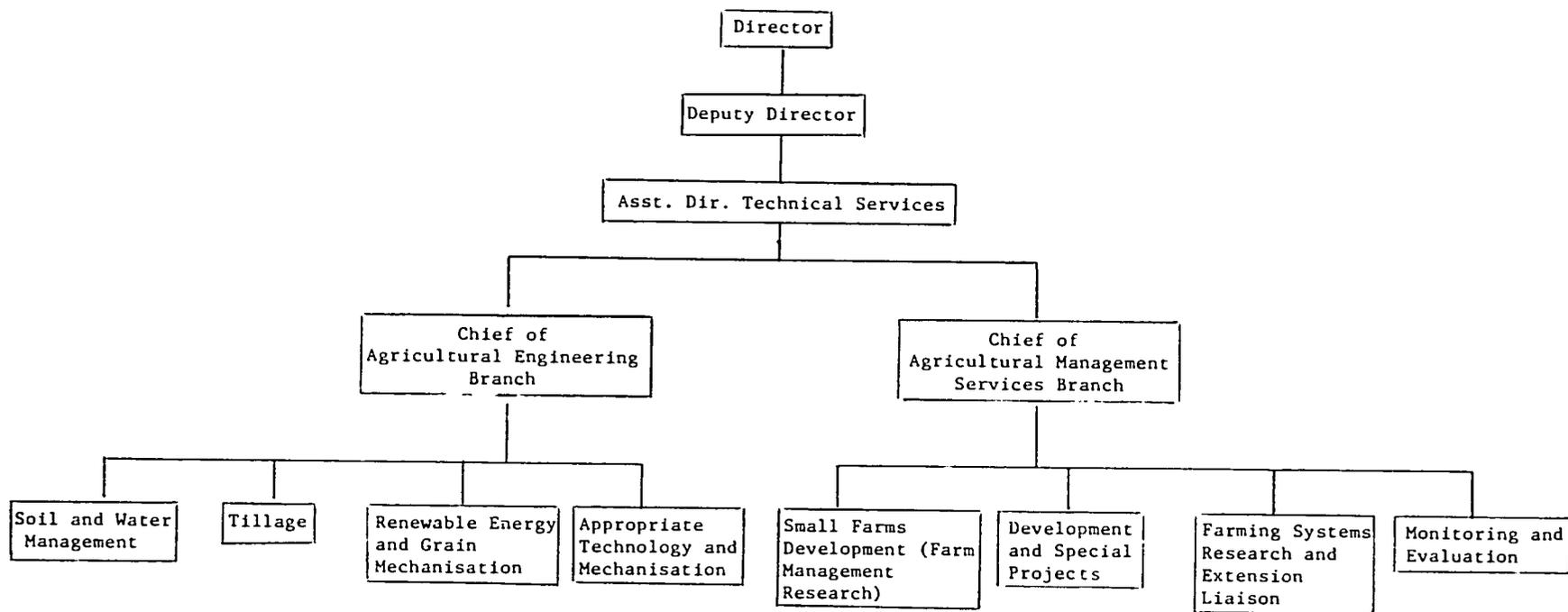
(1) Organisational structure and purpose

The Agricultural Engineering Branch is concerned with research and extension. Its objectives are to help farmers increase productivity by providing them with agricultural engineering information, to support Agritex research efforts, and to relate with farmers' organisations and individual farmers to develop effective communication between research, extension and farmers.

(2) Research programmes

The Branch's five main programmes are the following:

- o The tillage research programme which consists of the following projects: zero tillage--to compare the long-term effects of zero tillage on soils and crops under rainfed conditions; conservation tillage--to test the effect of crop residue mulch; rough tillage--to test the effect of rough tillage and interrow ripping on runoff, soil and crop yield; reduced tillage--to test the effect of tillage treatments and timing of nitrogen application on continuous maize grown in sandy soils; irrigated maize-wheat-soybean rotation--to study suitable methods for growing maize in rotation with winter wheat and soybeans; and maize strip tillage --to investigate the long-term effect of strip tillage in maize using parameters of yield, soil structure and pest levels.



ZIMBABWE: AGRICULTURAL RESEARCH RESOURCE DEVELOPMENT

Figure 6: Organisational Structure of the Agritex Research Branches

Source: Data collected from the DEVRES/SADCC Agricultural Research Resource Assessment, 1984.

Institutions collaborating in this programme include Agritex, the DR&SS, the University of Zimbabwe and the MLRRD internally. Overseas institutions involved include the FAO, Texas A&M University and the National Institute of Agricultural Engineering Silsoe in England;

- o The renewable energy technology programme includes projects in wind energy for water pumping, solar energy for crop drying, human and ox-driven water pumps and biomass fuels. Collaboration on these projects is with the University of Zimbabwe, the Ministry of Water and Energy Resources, the RIIC in Botswana, IT Power Ltd. in the UK and the Beijer Institute in Sweden;
- o The appropriate technology programme which started in 1963 includes four projects: plough and planter development, nut lifter development, and control traffic. Researchers collaborate with the DR&SS, the Federal Republic of Germany (GTZ), FAO, UNIDO, the British Commonwealth and the International Appropriate Technology Institute;
- o The testing and development programme started in 1970 and projects include testing of tractors, ploughs, planters, shellers, ox-drawn equipment and small-scale crop processing equipment. Research collaborators are the University of Zimbabwe, the Agricultural Dealers Association, the Manufacturers Association, the DR&SS, Agritex Field Services Division, the FAO, the NIAE, UNIDO and the Commonwealth Secretariat; and
- o The soil and water engineering programme started in 1956 and focusses on four projects: crop cover measurements in communal areas; soil erosion determination; construction of predictive models for soil loss; and runoff and investigations into granitic sands. The last project is inactive due to lack of staff. There is extensive collaboration with the University of Zimbabwe, MLRRD, the DR&SS, Natural Resources Board and Agritex Field Services Division. There is limited networking with the Australian Department of Primary Industries, Purdue University, and Norwich University.

(3) Human resources

The Branch of Agricultural Engineering has a total staff of 71 persons, including seven professional, eight administrative, 13 technical and 43 support staff. (See Table 12.)

(4) Research facilities

Hatcliffe Estate Experimental Farm is situated 18 km north of Harare, enabling easy access to communications and transport. The Estate has 670 ha of which 400 ha are cultivated and 70 ha are devoted to experimental plots. The Agricultural Engineering Branch has a laboratory and an experimental workshop both of which are in good condition. Equipment used in the research programmes include drawbars, power takeoffs and breakdown dynamometres. The branch has three trucks, a P-2000 computer, two overhead projectors, two slide projectors, one movie projector and two tape recorders. The library contains 1,400 books and receives 35 periodicals, and the rate of book acquisitions is six per year. Inter-library loan facilities provide access to other information sources.

(5) Financial resources

The total budget for the Branch in 1983/1984 was Z\$ 414,615.

b. Agricultural Management Services Branch

The Agricultural Management Services Branch is a recently formed branch whose objectives are to support the Department's extension efforts in the communal and resettlement areas by producing social, psychological, cultural and economic data. The Branch is under the Assistant Director, Technical Services, and is headed by the Chief of Agricultural Management Services. It uses facilities at Agritex headquarters in Harare.

3. The Department of Veterinary Services

a. Organisational structure and purpose

The Department of Veterinary Services of the Ministry of Agriculture is headed by a Director who is assisted by two Deputy Directors. Two Assistant Directors are responsible for the subdivisions of field and technical services. The overall policy, functions, aims and objectives of the Veterinary Services Department are described in the chapter on extension services. The Department's research, extension and advisory services are closely linked. The Research Branch, under the Assistant Director of Veterinary Services (Research), has a central laboratory in Harare which performs research on animal health problems.

b. Research programmes

Two major research programmes related to agriculture are tick and tsetse research.

(1) Tick research

This is a four-year programme started in 1983 with the objective of reducing losses associated with tick-borne diseases, and thereby raising productivity. Research projects include:

- o Study of the economics of tick control which is funded by FAO/DANIDA (80 percent) and the Zimbabwe Government (20 percent);
- o The epidemiology of tick-borne disease, also funded by FAO/DANIDA and the Zimbabwe Government;
- o Study of the efficacy of Heartwater vaccine funded by USAID (80 percent) and by the Government of Zimbabwe (20 percent); and
- o The testing of Theileriosis Vaccine, fully funded by the Government of Zimbabwe.

(2) Tsetse control

This 15-year multidisciplinary programme is aimed at tsetse eradication in Zimbabwe. It is conducted in conjunction with other Branches in the Department of Veterinary Services. Projects include: testing and development of aerial insecticide application, which is fully funded by the Zimbabwe Government; tsetse distribution surveys; and the Regional Tsetse Control project involving Zimbabwe, Zambia, Malawi and Mozambique which is funded equally by the European Economic Community and the national governments.

c. Human resources

Beef cattle research receives the greatest effort with 12.7 FTEs of professional time, which constitutes 82.6 percent of institutional work; sheep research, with 1.2 FTEs, comprises 7.9 percent of the work; pig research, with 0.95 FTEs, comprises 6.2 percent of total effort; and goat research, with 0.3 FTEs, comprises 2 percent of total effort.

d. Research facilities

The Department of Veterinary Services has six stations or units around the country. These are:

- o The Veterinary Investigation Unit in Bulawayo which is involved in diagnostic work and disease surveys for Matebeleland Province and in carrying out livestock experiments;

- o The Veterinary Research Laboratory in Harare which specialises in diagnostic and research work on nutritional and metabolic deficiencies and carries out experiments with beef cattle, sheep, rabbits and poultry;
- o The Veterinary Field Station in Mazowe conducts research on dairy cattle mastitis, rabies and babesiosis. Research is also done on Buffalo embryo transfer, foot and mouth disease, problems of sheep blue tongue and Impala Dictocaulus disease;
- o The Rukomichi Research Station in the Zambezi Valley conducts research on the ecology, behaviour and control of the tsetse flies. Their experimental animals are beef cattle, buffalo, bush-pig, warthog, sheep and goats;
- o The Spelankon Farm is used for research on the economics of tick control among beef cattle in the highveld;
- o The Mbizi Farm in Mwenezi is also used to study the economics of tick control, but under lowveld conditions.

The Department's library is located in Harare and has 1,500 books and 95 periodicals. The rate of book acquisition is 100 per year. Researchers also have access to other local libraries such as the central Library of the Ministry of Agriculture, the University Medical Library, the National Museum Library and the Library of the Department of National Parks and Wildlife. Inter-library loan services provide access to overseas information sources such as the British Library Lending Division in the United Kingdom, and the Veterinary Research Institute Library and the Institute for Medical Research in South Africa.

4. The Department of National Parks and Wildlife

a. Organisational structure and purpose

The Department of National Parks and Wildlife is under the Ministry of Natural Resources and Tourism. Two of its divisions conduct research, the Terrestrial Ecology Branch and the Fisheries Branch. The former does research on terrestrial ecosystems and organisms as a basis for better management and conservation of animals, plants and the ecosystem. The Fisheries Branch is concerned with conservation, research, development and administration of fisheries resources. Research is primarily management-oriented but includes some basic research.

b. Research programmes

The five major research programmes conducted by the Department are the following:

- o The inland fisheries programme studies methods of intensive fish culture; integration of fish rearing and capture into the rural economy; the biology of individual species; aspects of limnology; and gear and technology. It also does surveys and keeps statistics of landings;
- o Range management and plant ecology programme studies the interactions between large wild herbivores and the natural vegetation through conduct of vegetation surveys. The objective is to improve management and conservation of African savanna ecosystems in Natural Regions IV and V. Projects are funded by the Zimbabwe Government and include studies of the influence of artificial water supplies on elephant range use; the influence of buffalo on savanna grasslands; regeneration of the Miombo Woodlands and of elephant-damaged alluvial woodlands; development of techniques for vegetation surveys; primary production on alluvial systems in the Zambezi Valley; and the ecology of Panicum repens and buffalo on the lake shore of Kariba in the Matusadona National Park;
- o Game ranching's purpose is the improved management of large African herbivores and an evaluation of the potential for developing game ranching and safari operations as a form of land use in Natural Regions IV and V. In 1983/1984, the programme was given 4.7 professional FTEs and 1.0 technical FTEs. The programme, which is fully funded by the Government of Zimbabwe, involves an economic survey of the game ranching industry, evaluation of safari operations as a form of land use in the Matetsi area, domestication and management of eland and buffalo, and crocodile farming,
- o The wildlife management and conservation programme studies the numbers, distribution and population ecology of key large animal species in order to improve wildlife management. Indirect benefits are expected for small scale farmers through improved management of communal area wildlife resources. Projects include studies of elephant population ecology and management; census of large mammal population; and population and feeding ecology of buffalo; and
- o The multidisciplinary research programme involves biotelemetry, computer studies and land use planning for communal resource management. The objective is to develop equipment for radio tracking large mammals, to carry out mathematical modelling for management of wildlife and to conduct integrated land use planning for natural resource exploitation in the communal areas. The expected benefits for small-scale farmers are improved management and use of wildlife, forestry and grazing resources in the communal lands. The programme was given a professional effort of 2.1 FTEs in 1983/84.

c. Human resources

The greatest research effort is in the area of inland fisheries with 8.1 professional FTEs, which is equivalent to 30.7 percent of the total effort. Wildlife management follows with 6.1 professional FTEs, equivalent to 25.4 percent of total effort; plant ecology and range management with 4.8 professional FTEs are equivalent to 18.2 percent of the total; game ranching with 4.7 professional FTEs is equivalent to 17.8 percent of the total; and multidisciplinary research with 2.1 professional FTEs is equivalent to 8.0 percent of the total effort.

d. Research facilities

The Department has approximately 13 stations or units around the country. Its library in Harare is used by all four of the department's branches and there are subsidiary libraries at Sengwa and Hwange. The library in Harare has 1,804 books and 120 periodical titles. Books are acquired at the rate of 180 per year. There is also access to the National Free Library in Bulawayo, the Central Library of the Ministry of Agriculture, the National Museum Library in Harare, the British Museum and Natural History Library, the British Library and to periodicals in other Southern African Libraries. Staff publications in 1984 included an annual report, a research monograph on woodland ecology, and 15 papers on a variety of biological/ecological topics.

e. Financial resources

The Terrestrial Ecology and Fisheries Branches had recurrent budgets of Z\$ 530,000 and Z\$ 179,000 for 1983/84 respectively. No figures were available for capital budgets.

C. Statutory Agricultural Research Institutions

1. The Tobacco Research Board

a. Organisational structure and purpose

The Tobacco Research Board (TRB) was reconstituted as a statutory body in 1950 to supplement governmental research. The main research station is at Kutsaga and two others are located at Banket and Masvingo. Research policy is determined by a variety of members representing flue-cured tobacco growers, tobacco buyers, the Ministry of Agriculture and such additional members as the Board may invite. They are then appointed by the Minister of Agriculture to whom the Board is accountable for its activities. Traditionally, the Board has invited a representative of the air-cured growers to act as Chairman.

b. Research programmes

Research programmes include:

- o Tobacco agronomy, concerned with testing herbicides to control annual grasses and nutsedge;
- o Sucker control, concerned with screening new and recommended materials for efficacy in controlling suckers and damage caused to leaves;
- o Entomology, focussed on control of the tobacco aphid using aphicides, studies on the biology of the cigarette beetle, and research on the side effects of fumigation;
- o Liaison, concerned with informing research workers of problems facing growers and their experience with current recommendations, and research on the best ways of communicating research results to growers;
- o Nematology, concerned with performing nematicide trials to establish efficacy on land heavily infested with rootknot nematodes;
- o Plant breeding for resistance to white mould and tobacco mosaic; and
- o Plant pathology, to measure the economic effects of tobacco diseases and devise measures to control angular leaf spot, sore shin, etc.

c. Human resources

The tobacco programme involved 23 professional staff and 12 technical staff in 1984.

d. Research facilities

Facilities include the Oriental Tobacco Station near Masvingo which has 40 ha of land. Of these, 15 ha are cultivated, two used for experimental plots and 12 for grass pasturage. Facilities are provided for short courses for the Agritex staff. The Banket Research Station has 100 ha which are used as experimental plots and 50 ha under grass pasturage. The Kutsaga Research Station, which is situated near Harare, has 951 ha of which 250 ha are cultivated. One hundred ha are used for experimental plots and 150 ha are under grass pasturage.

The headquarters' offices, lecture theatre and boardrooms are in excellent condition. The headquarters at Kutsaga has excellent laboratories and the out stations have greenhouses. Equipment includes five spectrophotometres, a centrifuge, chromatographs, field

equipment tractors and a haler. There are a number of data processing machines (minicomputers and programmable calculators), and overhead and slide projectors.

The headquarters' library has 10,300 books and acquisition is at the rate of 50 per year. The library also has 360 periodical titles. The tobacco researchers have access to other information sources both within and outside the country through inter-library loan facilities. The TRB produces annual station reports, scientific papers and topical papers aimed at growers.

e. Financial resources

The TRB had a total budget of Z\$ 2,542,000 of which Z\$ 2,280,000 was for recurrent costs and Z\$ 262,000 for capital costs during the 1983/84 fiscal year.

2. The University of Zimbabwe

Agricultural research at the University of Zimbabwe is conducted by the Faculties of Agriculture and Veterinary Sciences.

a. The Faculty of Agriculture

The Faculty of Agriculture consists of the Departments of Land Management, Crop Science and Animal Science, each headed by a Chairman who reports to the Dean of the Faculty of Agriculture.

(1) The Department of Land Management

Issues of concern to this Department include soil fertility maintenance, conservation, land and agricultural policy. Research programmes being conducted by the Department are farming systems studies of dryland peasant agriculture, study of cotton production in the Gokwe communal area, soil classification, small-holder irrigation development, and development of appropriate technology suitable for small farmers.

In April 1984, the University bought a farm near Harare for students' practicals. Facilities on the campus at Mount Pleasant include classrooms, teaching laboratories, a greenhouse, a livestock laboratory and field equipment. More equipment is being purchased for laboratories and field work under the USAID expansion project.

(2) The Department of Crop Science

This Department is engaged in research and teaching on the production, physiology, breeding, diseases and pests of all major crops in Zimbabwe. Projects include maize breeding for drought resistance, research on oilseeds disease, a tobacco research programme, and agronomic research on the production of field crops.

(3) The Department of Animal Science

Research programmes in this Department include the nutrition, productivity and endocrinology of beef cattle, the feeding and nutrition of dairy cattle and bovine mastitis and fertility in cows.

All three Departments of the Faculty of Agriculture use the University's library and have access to other libraries in the country. Faculty members also have access to information from international agricultural research centres such as CIMMYT, IFPRI and IITA. The Faculty produces an annual report and working papers.

b. The Faculty of Veterinary Sciences

Since the Faculty of Veterinary Sciences was established relatively recently in 1982, it is currently focussed on training. Its research programmes are still being developed.

3. The Pig Industry Board

The Pig Industry Board focusses on improving all aspects of pig production through long-term research. Projects include genetic improvement, nutrition, housing and management, and reproductive physiology. There are two professional researchers on the staff. Funding is through farmer levies and proceeds from the research farm at Arcturus near Harare. The farm has 129 ha of which 85 ha are under commercial maize production and 44 ha are used as rangeland. The station has a laboratory for artificial insemination and a workshop for maintenance and development. Equipment includes a micro-computer and a slide projector. The library has 50 books and three periodical titles. The station produces an annual report, research project reports and extension publications.

4. The Forestry Commission

a. Organisational structure and purpose

The Forestry Commission is a statutory body which was established in 1954 with headquarters in Harare. It is governed by a Board of eight commissioners. It differs from the other statutory bodies in that it is not a state monopoly and competes with the private sector which owns 60 percent of the plantation area in Zimbabwe. It also undertakes a variety of non-commercial activities such as forest conservation, forestry research, education and, more recently, the Rural Afforestation Project. There are two aspects of the Commission's work: commercial or trading activities which relate to the plantation and sawmills in Manicaland and a plantation near Mvuma; and state activities which include the Rural Afforestation Project.

The Commission's goals are defined by national forest policy which aims at: achieving self-sufficiency in the commercial use of timber, including processing and marketing; meeting fuelwood shortages in the communal areas through the Rural Afforestation Project; conserving and managing the indigenous teak and Mukwa forests in Matabeleland; and providing forestry training and education.

The objectives and functions of the Forestry Commission are:

- o To implement the national tree planting programme and bring the total area planted by the State to 50,000 ha;
- o To continue to provide employment to 1,300 people on eight plantations as well as to 1,000 workers at three logging units and sawmills at Nyanga, Stapleford and the Chimanimani area;
- o To encourage tree planting among the rural population to establish woodlots for fuelwood and construction timber;
- o To promote forest conservation;
- o To implement a pilot agroforestry scheme in the Mafungabusi Forest Area near Gokwe;
- o To encourage establishment of blocks of plantations in Matabeleland for the supply of poles;
- o To continue to operate two nurseries in Gweru and Harare, for the sale of trees and other forest produce to the public; and
- o To implement the Forest Act, particularly as it relates to illegal timber cutting for sale on private land. This work is done in conjunction with ICA Committees and the Inspectorate of the Department of Natural Resources.

b. Research programmes

The Research Division's work is aimed at increasing production of trees for multipurpose uses. Major projects include: species introduction in the semiarid areas; breeding of the main commercial tree varieties such as pine and eucalyptus; wood technology development; and agroforestry. There is extensive collaboration with institutions outside the country, such as the Canadian International Development Research Centre.

c. Human resources

The Commission's forestry and agroforestry programmes receive six and one professional FTEs, respectively. This represents 85.7 and 14.3 percent of the total research effort. There are five professional technical staff, nine assistants and nine forest rangers.

d. Research facilities

The Forest Research Centre in Harare is the administrative centre for forestry research. It has a farm of 25 ha of which 15 ha are under cultivation. Five ha each are used for experimental plots and for seed multiplication. Field stations are the John Meikle Forest Research Station near Mutare, the Muguzo Forest Station in the Chimanimani area, the Gungunyana Forest Research Station near Chipinge, and the Chesa Forest Research Station in Matebeleland.

The Commission has glasshouses and cold rooms used for vegetative propagation and seed storage respectively, and workshop facilities for maintenance. Specialised facilities also exist for seed storage and extraction. Laboratories are equipped with glassware, balances and drying ovens. There is a computer at the Forestry Research Centre. Field equipment includes climbing equipment and refrigerators for pollen storage.

The library in Harare has 1,000 books and 50 periodical titles. Staff also has access to the University of Zimbabwe Library and the Commonwealth Forestry Institute Library at Oxford in the United Kingdom. Publications by the staff include an annual report, research monographs and project reports.

e. Financial resources

The Commission had a total budget of Z\$ 920,000 for 1983/84 of which Z\$ 750,000 was for recurrent costs and Z\$ 170,000 for capital expenses.

D. Private Agricultural Research Institutions

1. The Rattray Arnold Research Station

The Rattray Arnold Research Station was established in 1974 by the Zimbabwe Seed Maize Association. Its objectives are to supplement government research by testing seed varieties of all major food crops and to enable the Seed Cooperative to carry out plant breeding programmes. Rattray Arnold is used as a second testing site along with the Crop Breeding Institute in Harare to conduct preliminary trials with the hybrids developed by the government's maize breeding programme. However, numerous trials originating in other countries are also carried out with wheat, barley, sorghum,

soybeans, groundnuts and sunflowers. Research is also being carried out on agronomic problems specific to the production of seed crops.

The major research effort is in maize, which in 1983/1984 received 4.4 professional and technical FTEs. There are three professional and nine technical staff and one administrator of a total of 57. The majority, 44, are support staff, which includes field workers.

The farm has staff offices which are in fair condition, a maize work room and a cold room for seed storage in good condition, an implement service bay and a crop dryer. There are also an insulated and ventilated seed store and a research workshop for machinery development. The farm has 330 ha of land, 65 ha of which are used for dryland cropping and multiplication. Other uses involve general cropping on 30 ha and grass fallow on 30 ha. The Station offers training facilities to Agritex staff through one day courses on the use of improved crop varieties. The library holds 100 books and ten periodical titles. The Research Station staff published an information manual on crop varieties and an annual report for 1983-84.

The total budget for 1983/84 was Z\$ 497,000 of which Z\$ 312,000 was for recurrent costs and Z\$ 185,000 for capital costs.

2. The Zimbabwe Sugar Association Experiment Station

The Zimbabwe Sugar Association (ZSA) Experiment Station was established in 1966 and financed by the sugar industry to study problems associated with sugarcane production under irrigation. The Experiment Station is centrally situated within the sugar producing area and is situated on soils that are representative of most of the production areas. Administration and policy are controlled by a Management Committee, and research is directed by a Research Committee. The committees include executive and technical representatives from the large sugar estates as well as from private growers.

The Experiment Station is a small research unit that focusses on testing a comprehensive range of varieties introduced from other countries; for example, it conducts a variety breeding programme in cooperation with the South Africa Sugar Association Experiment Station in Natal. It also conducts: research to compare irrigation frequencies at different stages of growth and on different soil types, and to evaluate the effects of pre-harvest drying-off schedules; fertiliser and cane physiology studies; sucrose and maturity studies; and studies on cane sugar smut, leaf scald and ratoon stunting disease. The Station also provides disease inspection, fertiliser advisory and sucrose analysis services.

In 1983/1984, the station had five professional and two technical staff, three administrators and 130 persons employed in support services.

The experimental farm has 160 ha of which 100 ha are under irrigation. There are two laboratories at the farm used for analytical and incubation work respectively. The Station's equipment includes atomic absorption spectrophotometres and microscopes. The library contains 300 books and 50 periodical titles and researchers have access to other libraries both within and outside the country. The staff produce annual reports, project reports, and extension publications on irrigation and disease survey.

The total budget for the Experiment Station for 1983/84 was Z\$ 657,000, of which Z\$ 613,000 was for recurrent expenses and Z\$ 44,600 was for the capital budget.

3. The Agricultural Research Trust

The Agricultural Research Trust (ART) is an independent research, demonstration and training organisation which was established in 1982. It is governed by independent trustees. The Trust has an experimental farm which is being developed to provide facilities for researchers from private, parastatal and governmental research institutions. The ART's objectives are to help develop crop production by supplementing government resources and, through research, to bridge the gap between research station and farmer yields.

4. Chemical and fertiliser companies

There are several chemical and fertiliser companies involved in agricultural research in an effort to promote their products. They include Ciba-Geigy, Shell Developments Chemical Company, Agricura, Windmill, Zimbabwe Fertiliser Corporation, Bayer Zimbabwe (Pvt) Ltd, Hoechst, Technical Services, May & Baker, Spraying Equipment, and Cooper. They generally focus on commodity research related to particular crops and livestock for which they wish to promote their products. Since they are not self-sufficient in staff, nor in laboratory and advisory facilities, they rely on services provided by the DR&SS.

5. Others

The World Lutheran Federation is a church organisation which does socioeconomic research in conjunction with the Zimbabwe Institute of Development Studies (ZIDS).

E. Total Human Resources Available for Research in Zimbabwe

1. Staffing patterns

The total number of authorised posts for the various staff categories in the ten research institutions listed in Table 12 is shown in Table 13. As of 1 July 1984 the percentage of filled posts

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Table 13: Total Agricultural Research Staff, 1984

	<u>Administrative</u>	<u>Professional^a</u>	<u>Technical^b</u>	<u>Support Staff</u>	<u>Total</u>
<u>Total Authorized Posts</u>	95	256	267	2,672	3,290
<u>Positions Vacant</u>	3	31	32	206	272
<u>Nationals (Citizens)</u>					
Staff in training ^c	4	32	9	4	49
Staff on long-term leave	-	-	-	-	-
Number of nationals currently in posts	92	196	234	2,462	2,984
Expressed as a percent of authorized posts	97	77	88	92	91
<u>Expatriates</u>					
Serving in authorized posts ^d	-	25	-	-	25
Expressed as a percent of authorized posts	-	10	-	-	0.7
Not in authorized posts	-	1	3	-	4
Total number of expatriates	-	26	3	-	29
<u>Total Number of Staff</u>	<u>92</u>	<u>222</u>	<u>237</u>	<u>2,462</u>	<u>3,013</u>

^aProfessional = BSc or above.

^bTechnical = diplomate and certificate.

^cLong-term leave is leave of three months or more.

^dIrrespective of source of funds.

Source: Data collected from the DEVRES/SADCC Agricultural research Resource Assessment, 1984.

for the administrative, professional, technical and support staff were 95.5, 79.5, 87.0 and 93.2 respectively. The highest numbers of vacancies were in the professional and technical staff categories, most of them at the government research institutions.

The constraints highlighted by the staff of the institutions provide insight into the high number of vacancies. Some of the constraints cited were low salaries, inadequate promotion schedules, lack of staff incentives, unsatisfactory retirement benefits and lack of training opportunities. The importance of proper recruitment and retention of staff cannot be overemphasised, especially now that implementation of the national development objectives, focussed on small farmers, requires expansion of current staff levels.

There are only 26 expatriates working in professional research positions, or 12 percent of the total, a much lower percentage than in many of the other SADCC countries.

The proportion of women in formal employment as professional and technical agricultural staff for research, extension or training is insignificant even though the role of women in agriculture is well accepted as being vital to production in the communal and purchase areas as well as in the resettlements and cooperatives. The problem has its roots in Zimbabwe's history and social system and is perpetuated through an educational system biased against agricultural training for women. Only recently has the Faculty of Agriculture and one of the colleges started admitting women for agricultural training.

The distribution of professional research effort to various programmes as of 1 July 1984 is shown in Table 14. Tobacco receives the greatest effort followed by beef cattle, maize, sugar cane, irrigation, cotton and wildlife management research. Programmes such as poultry, goat and pasture management receive far less effort than is warranted by their importance in the communal areas. Similarly, sorghum and millet, farm power, rural technology, farm storage, crop processing, land and water conservation and management, and rural institutions deserve more research emphasis. The training of the nationals working in the various programme areas is shown in Table 15.

The areas of specialisation of professional agricultural researchers in Zimbabwe is shown in Table 16. The number of trained persons in each discipline is still very low. The largest number of professionally skilled people (117) are in Plant and Soil Sciences, followed by Animal Science which has 42 professionals. The number of professionals in Crop Science, Agricultural Economics, Animal Pathology, Soil Chemistry, Animal Ecology, Plant Pathology and Agricultural Engineering range from nine to 12. Demand for professionals in all disciplines greatly exceeds available resources and continued training is needed to supply these needs. Professionals trained in Development Studies, Rural Sociology and Agricultural Economics are also required to implement the multidisciplinary approach that has been adopted.

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Table 14: Summary of Professional Staff Effort and Source of Funds by Programme Area of Agricultural Research, 1984^a

<u>Commodity-Related Programme Area</u>	<u>FTE^b</u>	<u>Source of Funds^c</u>	<u>Percentage of National Research Effort</u>
<u>Food Crops</u>			
Maize	11.5	Private	5.2
Sorghum	2.2		1.0
Millet	2.2		1.0
Cassava	1.1		.5
Pulses	6.1		2.7
Wheat	2.6		1.2
Groundnuts	2.0		.9
Undesignated to separate crops	<u>17.8</u>		<u>8.0</u>
Subtotal, Food Crops	<u>45.5</u>		<u>20.4</u>
<u>Commercial Crops</u>			
Cotton	8.6		3.9
Fruit & vegetables	3.0		1.3
Sugar cane	9.0	Private	4.0
Coffee	1.9		.9
Tobacco	23.0	Private	10.3
Rice	.2		-
Undesignated	<u>29.4</u>		<u>13.2</u>
Subtotal, Commercial Crops	<u>75.1</u>		<u>33.7</u>
<u>Livestock</u>			
Beef cattle	20.0		9.1
Sheep	3.4		1.5
Goats	1.4	Private	.6
Swine	3.3	Private	1.5
Poultry	0.8		-
Range management	5.7		2.6
Pasture management	5.4		2.4
Other (animal breeding)	<u>1.6</u>		<u>.7</u>
Subtotal, Livestock	<u>41.6</u>		<u>18.7</u>

ZIMBABWE: AGRICULTURAL RESEARCH RESOURCE ASSESSMENT

Table 14: Summary of Professional Staff Effort and Source of Funds by Programme Area of Agricultural Research, 1984^a (cont.)

<u>Commodity-Related Programme Area</u>	<u>FTE^b</u>	<u>Source of Funds^c</u>	<u>Percentage of National Research Effort</u>
<u>Other Programme Areas</u>			
Irrigation	8.7		3.9
Farm storage	2.0		.9
Vegetation survey, ecology and plant taxonomy	2.0		.9
Dryland crops	1.7		.8
Game ranching	5.7		2.5
Wildlife management	7.7		3.5
Multi-discipline	2.8		1.3
Forestry	7.0		3.1
Agro-forestry	2.0		.8
Barley	1.0		.4
Farming systems	3.1		1.4
Land and water conservation	2.0		.8
Farm power	1.0		.4
Rural technology	1.0		.4
Crop processing	2.0		.8
Rural institutions	3.0		1.3
Agric. engineering	6.0		2.7
Statistics	2.0		.8
Subtotal, Other Programme Areas	<u>60.7</u>		<u>27.2</u>
TOTAL	<u>223</u>		<u>100.0</u>

^aProfessional = BSc degree or above.

^bFTE = Full Time Equivalent.

^cThe Government of Zimbabwe provides funding for all of the programmes except sugar cane research which is wholly funded by private sources.

Source: Data collected from the DEVRES/SADCC Agricultural Research Resource Assessment, 1984.

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Table 15: Disciplines of National Professional Staff Related to Agricultural Research Programme Area, 1984

Programme Area	Discipline Areas	Nationals		
		BSc	MSc	PhD
<u>Food Crops</u>				
Maize	Plant breeding, agronomy, crop science	4	1	-
Sorghum	Plant breeding	-	1	-
Millet	Crop science	1	-	-
Wheat	Crop science	1	-	-
Oilseeds (soybeans, groundnuts)	Crop science	2	1	-
Pulses	Crop science	-	1	-
Subtotal, Food Crops		<u>8</u>	<u>4</u>	<u>-</u>
<u>Commercial Crops</u>				
Tobacco	General agriculture, crop breeding, agronomy, crop physiology, entomology, pathology, soils, nematology	9	10	5
Cotton	Crop science, zoology, entomology, crop physiology	2	3	1
Fruit/Vegetables	Horticulture, crop science, plant science	4	1	-
Coffee	Crop physiology, botany	-	1	1
Sugar cane	Agronomy, crop breeding	<u>3</u>	<u>-</u>	<u>-</u>
Subtotal, Commercial Crops		<u>18</u>	<u>15</u>	<u>7</u>
<u>Livestock</u>				
Cattle, goat, sheep, poultry	Zoology, animal science, dairy science, agriculture (general), animal nutrition, animal breeding, poultry science	16	11	4
Pigs	Animal science	-	-	2
Veterinary	Entomology, animal pathology, biology, zoology	7	5	5
Inland fisheries	Fish biology, limnology, tropical resource ecology, botany (aquatic), zoology	6	5	1
Wildlife and range management, game ranching	Animal and plant ecology, tropical resource ecology, physics, computing, forestry, engineering	10	6	5

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Table 15: Disciplines of National Professional Staff Related to Agricultural Research Programme Area, 1984 (cont.)

Programme Area	Discipline Areas	Nationals		
		BSc	MSc	PhD
<u>Livestock (cont.)</u>				
Pasture and veld management	Pasture science, crop science, crop production, biochemistry, forestry, chemistry	7	2	1
Subtotal, Livestock		<u>46</u>	<u>29</u>	<u>18</u>
<u>Other</u>				
Farming systems	Agronomy, animal science, sociology, agricultural economics	1	1	2
Crop protection	Biological science, pathology, nematology, biology, zoology, agricultural science, crop protection technology	5	8	2
Biometrics	Statistics, computer science, mathematics	4	1	1
Soils and chemistry	Pedology, soil chemistry, analytical chemistry, soil physics, pesticides chemistry, biochemistry, mineralogy, microbiology	13	10	4
Irrigated crops	Crop science, applied entomology, crop physiology, agronomy	2	3	-
Vegetation ecology and taxonomy	Botany, geology, zoology	3	1	-
Seeding testing	Biology, agriculture, plant pathology, geography, chemistry	3	-	1
Dryland crops	Crop physiology, crop science, agricultural botany, agronomy, agriculture	5	5	3
Agricultural engineering	Agricultural engineering	5	3	1
Forestry and agro-forestry	Forestry and agro-forestry	4	2	-
Rural sociology	Sociology	-	-	1
Agricultural economics	Agricultural economics	4	3	1
Subtotal, Other		<u>49</u>	<u>37</u>	<u>16</u>
TOTAL		<u>121</u>	<u>85</u>	<u>41</u>

Source: Data collected from the DEVRES/SADCC Agricultural Research Resource Assessment, 1984.

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Table 16: Summary of Technical Skills of Agricultural Research Professionals by Degree Held, 1984

Discipline Areas	Nationals								Expatriates								Total
	BSc		MSc		PhD		Subtotal		BSc		MSc		PhD		Subtotal		
	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	
<u>Plant/Soil Sciences</u>																	
Crop breeding, general	1	4	1	4	-	1	2	9	-	1	-	-	-	-	-	1	12
Agronomy	1	5	-	3	-	-	1	8	-	-	-	-	-	-	-	-	9
Crop physiology	1	1	-	3	-	2	1	6	-	-	-	-	-	-	-	-	7
Entomology	-	-	1	2	1	2	2	5	-	-	-	1	-	-	-	1	8
Horticulture	-	2	-	1	-	-	-	3	-	-	-	-	-	-	-	-	3
Microbiology	1	1	1	1	1	-	3	2	-	-	-	-	-	-	-	-	5
Nematology	-	-	2	4	-	-	2	4	-	-	-	-	-	-	-	-	6
Pathology	-	-	2	4	-	3	2	7	-	1	-	2	-	1	-	4	13
Range ecology	-	-	1	1	-	-	1	1	-	-	-	-	-	-	-	-	2
Pasture science	-	2	-	1	-	1	-	4	-	-	-	-	-	-	-	-	4
Soil chemistry	-	4	-	3	-	4	-	11	-	-	-	2	-	1	-	3	14
Soil physics	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1
Pedology	-	2	-	1	-	-	-	3	-	2	-	-	-	-	-	2	5
Plant ecology	1	-	-	3	1	1	2	4	-	-	-	-	-	-	-	-	6
Crop science	1	9	1	1	-	-	2	10	-	-	-	-	-	-	-	-	12
Plant breeding	-	1	-	1	-	-	-	2	-	-	-	-	-	-	-	-	4
Crop protection	-	-	1	1	-	-	1	1	-	-	-	-	-	-	-	-	2
Crop production	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1
Agric. science	-	2	-	-	-	-	-	2	-	-	-	-	-	-	-	-	2
Plant physiology	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	1
Subtotal, Plant/Soil Sciences	<u>6</u>	<u>35</u>	<u>10</u>	<u>34</u>	<u>3</u>	<u>16</u>	<u>19</u>	<u>85</u>	<u>-</u>	<u>4</u>	<u>-</u>	<u>5</u>	<u>-</u>	<u>4</u>	<u>-</u>	<u>13</u>	<u>117</u>
<u>Animal Sciences</u>																	
Animal science	2	8	-	2	-	2	2	12	-	-	-	-	-	-	-	-	14
Animal breeding	-	-	-	4	-	-	-	4	-	-	-	-	-	-	-	-	4
Animal nutrition	-	-	-	1	-	1	-	2	-	-	-	-	-	-	-	-	2
Pathology	-	5	-	4	-	2	-	11	-	-	-	-	-	-	-	-	11
Animal ecology	-	5	-	2	1	2	1	9	-	-	-	-	-	-	-	-	10
Poultry science	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	1
Subtotal, Animal Sciences	<u>2</u>	<u>18</u>	<u>-</u>	<u>14</u>	<u>1</u>	<u>7</u>	<u>3</u>	<u>39</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>42</u>

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Table 16: Summary of Technical Skills of Agricultural Research Professionals by Degree Held, 1984 (cont.)

Discipline Areas	Nationals								Expatriates								Total
	BSc		MSc		PhD		Subtotal		BSc		MSc		PhD		Subtotal		
	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	
<u>Other Disciplines/Fields</u>																	
Biochemistry	-	4	-	-	-	-	-	4	-	-	-	-	-	-	-	-	4
Agric. Economics	1	6	2	1	-	2	3	9	-	-	-	-	-	-	-	-	12
Agric. engineering	-	5	-	4	-	1	-	10	-	-	-	1	-	-	-	1	11
Extension specialists	-	2	-	-	-	-	-	2	-	-	-	-	-	-	-	-	2
Food science	1	-	1	1	-	-	2	1	-	-	-	-	-	-	-	-	3
Forestry	-	7	-	2	-	-	-	9	-	1	-	2	-	-	-	3	12
Sociology	-	-	-	-	2	-	2	-	-	-	-	-	-	-	-	-	2
Statistics	-	-	1	-	-	1	1	1	-	-	-	-	-	-	-	-	2
Systems specialist	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1
Biology	3	1	-	-	-	-	3	1	-	-	-	-	-	-	-	-	4
Chemistry	1	2	-	3	-	-	1	5	-	-	-	-	-	-	-	-	6
Environmental chemistry	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	1
Pesticide chemistry	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	1
Botany	2	2	1	2	-	-	3	4	-	-	-	-	-	-	-	-	7
Dairy science	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	1
Computing	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1
Genetics	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	1
Zoology	-	2	-	1	-	4	-	7	-	-	-	-	-	-	-	-	7
Mineralogy	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1
Tropical resources ecology	-	-	-	3	-	-	-	3	-	-	-	-	-	-	-	-	3
Subtotal, Other Disciplines/Fields	<u>8</u>	<u>34</u>	<u>7</u>	<u>19</u>	<u>2</u>	<u>8</u>	<u>17</u>	<u>61</u>	<u>-</u>	<u>1</u>	<u>-</u>	<u>3</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>4</u>	<u>82</u>
TOTAL	<u>22</u>	<u>87</u>	<u>17</u>	<u>67</u>	<u>6</u>	<u>31</u>	<u>39</u>	<u>185</u>	<u>-</u>	<u>5</u>	<u>-</u>	<u>8</u>	<u>-</u>	<u>4</u>	<u>-</u>	<u>17</u>	<u>241</u>

Source: Data collected from the DEVRES/SADCC Agricultural Research Resource Assessment, 1984.

There are 31 nationals with PhDs, a higher number than in most SADCC countries. Twenty percent of them, and the same percent of the nationals with MSc degrees, are women.

2. Staff training

Current and long-term plans for staff training are shown in Table 17. Institutional plans show that most government agencies have started training programmes. The emphasis will be on training to the master's level, followed by doctorate level training and then by bachelor's and diploma level training. The effectiveness of the training plans will depend on the appropriateness of the training for the desired objectives, the timing to meet desired targets, the ability to recruit suitably qualified staff and provision of improved working conditions that will help retain staff by increasing job satisfaction and generating professional interest.

F. Total Financial Resources Available for Research in Zimbabwe

Total funding available to the ten major agricultural research institutions in Zimbabwe from national sources in 1984 amounted to US\$ 25,476,656 as shown in Table 12. About US\$ 3.2 million of this was from private sources. The Department of Veterinary Services with US\$ 13,362,521 received the most funds, followed by the DR&SS with US\$ 8,156,570 and the Faculty of Agriculture at the University of Zimbabwe with US\$ 1,187,850. However, only a small percentage of the Department of Veterinary Services' budget was devoted to agricultural research per se.

Donor funding for agricultural research projects in Zimbabwe amounted to a total of US\$ 8,324,279 in 1984 as shown in Table 18. Thus, about a quarter of the total of nearly US\$ 34 million spent on agricultural research was provided by outside donors.

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Table 17: Training Plans for Staff of Research Institutions, 1984

<u>Level</u>	<u>In Country</u>	<u>Elsewhere in Africa</u>	<u>Outside of Africa</u>	<u>Total</u>
<u>Current Plans</u>				
Doctorate	14	2	1	17
Masters	18	5	-	23
Bachelors	-	-	10	10
Diploma	1	-	-	1
Certificate	3	-	-	3
<u>Future Plans for Training</u>				
Doctorate	33	20	-	53
Masters	53	45	-	98
Bachelors	3	-	-	3
Diploma	6	-	-	6
Certificate	8	-	-	8
TOTAL	<u>139</u>	<u>72</u>	<u>11</u>	<u>222</u>

Source: Data collected from the DEVRES/SADCC Agricultural Research Resource Assessment, 1984.

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Table 18: Donor-Funded Agricultural Research Activities, 1984

<u>Donor</u>	<u>Project</u>	<u>Duration</u>	<u>Expatriate Technical Support (FTE)</u>	<u>Country Contribution (US\$)</u>	<u>Donor Contribution (US\$)</u>
U.S.A. and other countries	Regional sorghum and pearl millet research and training programme.	5 years	34	-	13,300,000
U.S.A.	Faculty of Agriculture extension programme.	5 years	22	-	8,700,000
I.B.R.D.	National agricultural extension and research programme.	5 years	43	-	30,900,000
I.D.R.C.	Sorghum and pearl millet programme.	3 years	-	-	152,045
I.D.R.C.	Animal production systems programme.	2 years	2	33,735	152,837
FAO/DANIDA	Epidemiology of ticks and tick-borne diseases.	27 months	3	79,190	237,570
FAO/DANIDA	Economics of tick control.	2 years	2	79,190	79,190
E.E.C.	Regional foot and mouth control project.	3 years	0.2	791,900	7,919,000
E.E.C.	Foot and mouth research project.	-	0.2	158,380	395,950
			<u>106.4</u>	<u>1,142,395</u>	<u>48,539,592^a</u>

^aDevres' estimate of annualized amount spent in 1984 is US\$ 8,324,279.

Source: Data collected from DEVRES/SADCC Agricultural Research Resource Assessment, 1984.

IV. AGRICULTURAL TRAINING INSTITUTIONS

A. Overview of Agricultural Training in Zimbabwe

Agricultural training in Zimbabwe is carried out by many institutions belonging to different government ministries, by parastatal or statutory bodies, and by private associations of commerce and industry as well as church organisations. The overall organisational structure of agricultural training is shown in Figure 7 and information about degrees offered, staff and students of each of the training institutions is contained in Table 19.

Agricultural training is both formal and nonformal. Formal training includes a system of evaluation with examinations, and issue of certificates, diplomas or degrees indicating proficiency or competence. The qualifications, recognised by the civil service and industry, often meet entry requirements for jobs. Training is carried out over a period of one or more years, instruction being given by qualified staff and examinations by boards which often include external members. There are three levels of formal agricultural training: degree and post graduate levels at the University of Zimbabwe; diploma level at the agricultural colleges; and certificate level at the agricultural institutes. Nonformal training can take the form of in-service training for staff or training of farmers and villagers. The duration of the training can range from one day to a year.

B. Government Training Institutions

Formal training is provided by the Branch of Agricultural Education of the MOA, and by the Zimbabwe College of Forestry and the Natural Resources College, both of which are administered by the Ministry of Natural Resources and Tourism.

1. The Branch of Agricultural Education

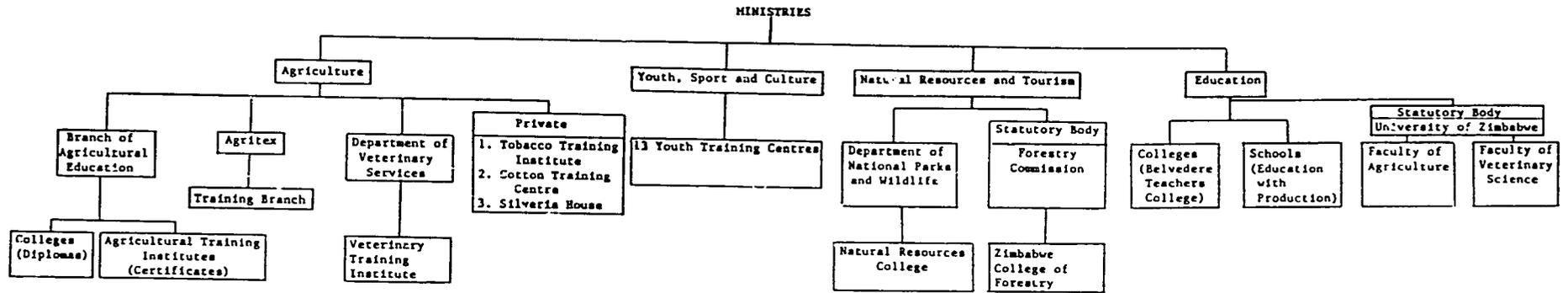
a. Organisational structure and purpose

The Branch of Agricultural Education (BAE) is headed by the Chief of Agricultural Education and has two diploma level colleges and four certificate level institutes, each of which is headed by a principal who is assisted by a deputy principal in some cases.

b. Training programmes

(1) Courses of study

The colleges offer a two-year diploma in Agriculture. They train students in both theory and practice in the disciplines of crop and animal husbandry, farm management and agricultural engineering. Qualified diplomates can be employed as



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Figure 7: Organisational Structure for Agricultural Training

Source: Data collected from the DEVRES/SADCC Agricultural Research Resource Assessment, 1984.

Table 19: Agricultural Training Institutions: Degrees Offered, Number of Staff and Students, 1984

<u>Name of Institution</u>	<u>Degrees, Diplomas, or Certificates Offered</u>	<u>Number of Staff^a</u>	<u>Enrollment</u>		
			<u>F</u>	<u>M</u>	<u>Total</u>
University of Zimbabwe Faculty of Agriculture	BSc in Agriculture	28	27	139	166
	MSc in Ag. Research		2	18	20
	MSc in Food Science		2	8	10
	PhD in Agriculture		14	4	18
Faculty of Veterinary Science	BSc in Veterinary Science	18	4	169	18
MOA					
Branch of Agricultural Education (2 Colleges)	Diploma in Agriculture	29	-	-	80
Branch of Agricultural Education (4 Institutes)	Certificate in Agriculture	52	-	-	610
Veterinary Training Institute	Certificate in Animal Health	4	-	-	24
Tobacco Training Institute	Diploma in Tobacco Culture	11	-	-	32
Natural Resources College	Diploma in Wildlife and Protected Area Management	4	4	29	33
Cotton Training Centre	Certificate of cotton production	7	-	-	671
TOTAL		<u>153</u>	<u> </u>	<u> </u>	<u>1,673</u>

^aIncludes degree, diploma and certificate holders.

Source: Data collected from the DEVRES/SADCC Agricultural Research Resource Assessment, 1984.

research technicians, extension staff, agricultural instructors in agricultural colleges or as farm managers.

Following Independence, Zimbabwe shifted the training emphasis from college-level diploma education to the certificate in agriculture, which is issued at the institute level and is geared to small-scale farming. This was in accord with government priorities, which shifted from commercial farming to resettlement and communal farming. The course was shortened to two years and this increased effective output by 50 percent. Minimum entry qualifications were set at two years post-primary education.

(2) Admissions

The levels of admission and graduation for the various colleges and institutes are shown in Table 20. Until recently, Chibero and Gwebi had a capacity of 40 students each but they are expanding to 120 and 200 students, respectively. While both have had comparatively small numbers of female students, the Chibero expansion will provide facilities for 40 female students. Of a total student enrollment for 1983/84 of 770, 88 percent were from a traditional agricultural background, while 7.0 and 4.5 percent were from commercial agricultural and urban backgrounds respectively. About 0.5 percent were foreign students from Namibia and Zambia.

Entry requirements for the certificate are two years of secondary education, although the majority of entrants have some 'O' level passes. Diploma level entry requirements are five 'O' levels with credits in English, Math and Science, plus at least a season's work on an approved farm.

The Government provides 90 percent of student funds for all forms of agricultural training by the BAE. Ten percent of funds come from private grants. The cost of financing a diploma student is Z \$7,500 per annum, of which Z \$264 per annum is from college fees (which students can receive in grants from the Ministry of Education). A certificate student's training costs Z \$4,000 per annum of which the student is required to pay only Z \$69. The government subsidises the BAE colleges and institutes. On the average, for the period from 1982-84, 75 percent of diploma graduates and 95 percent of certificate graduates found formal employment.

The BAE staff assists in organising a variety of training courses. Staff are encouraged to teach courses in their disciplines for short- and long-term in-service training programmes conducted during block release periods for the staff of various agricultural and educational institutions. In addition, the BAE conducts courses for its own teaching staff to update them in the latest technologies in irrigation, blacksmithing and draught oxen.

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Table 20: Admissions and Graduates for Various Colleges of the Branch of Agricultural Education

<u>College/Institute</u>	<u>Admissions</u>					<u>Graduates</u>		
	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>
Chibero					40			
Gwebi					40			
Mlezu	100	100	100	-	300	4	43	23
Esigodini	20	20	20	-	60	15	18	17
Kushinga ^a					150			
Rio Tinto ^a					100			
Total for Chibero and Gwebi	85	85	86	-	-	75	79	79

^aKushinga and Rio Tinto were not under the Ministry of Agriculture until recently.

Source: Data collected from the DEVRES/SADCC Agricultural Research Resource Assessment, 1984.

c. Human resources

Table 21 shows the number of staff positions in the BAE as of July 1984. In the four training institutions, there are 15 administrators, 15 professionals and 65 technicians. Positions filled were 78.9 percent of the professional staff, 92.9 percent of the technical and 88.3 percent of the administrative staff. The highest number of vacancies were in the professional categories.

d. Training facilities

The BAE has two colleges and four institutes, all of which have adequate administration and meeting rooms, classrooms and teaching laboratories. Facilities at Kushinga and Esigodini Institutes are not quite adequate, but construction is under way at the one and aid has been promised for the other to improve their facilities. There are adequate tractors, ploughs, farm machinery, irrigation equipment and livestock for student practicals on all six campuses. There are library facilities on all six campuses with a total of 6,000 books and ten periodical titles. The rate of book acquisition is about 300 books per year. All the campuses have access to the MOA's Central Library, the National Archives and to various agricultural department libraries and the University of Zimbabwe library.

The BAE has 6,005 ha of land of which 1,011 ha are cultivated as demonstration plots, 3,580 ha are for grazing and 1,261 ha are used for other purposes or are unusable. Total irrigated land is 153 ha. These facilities provide adequate opportunities for the students to gain practical field experience. Students are placed with agribusiness organisations or are given vacation employment on research stations for additional experience.

e. Financial resources

The total recurrent budget for the year ending 30 June, 1984 was Z\$ 2,579,530 of which \$1,303,530 was for salaries and \$1,276,000 was used for other costs. Recurrent costs are funded by the Government of Zimbabwe.

The total capital expenditure budget for 1983/84 was Z\$ 4,270,000. The Chibero expansion budget is Z\$ 2 million, and is being provided by USAID. Esigodini's expansion will cost Z\$ 2.05 million, of which Z\$ 1,494 million is being provided by DANIDA and Z\$ 306,000 by the Zimbabwe Government. Items such as teaching aids, tools and books for institutes have a budget of Z\$ 220,000, provided by DANIDA.

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Table 21: Agricultural Training Staff of the Branch of Agricultural Education, 1984

	<u>Administrative</u>	<u>Professional</u> ^a	<u>Technical</u> ^b	<u>Total</u>
<u>Total Authorized Posts</u>	18	19	90	107
<u>Positions Vacant</u>	3	4	5	12
<u>Nationals (Citizens)</u>				
Staff in training	-	-	-	-
Staff on long-term leave ^c	-	-	-	-
Number of nationals currently in posts	15	14	65	94
Expressed as a percent of authorized posts	83.3	73.7	92.9	87.9
<u>Expatriates</u>				
Serving in authorized posts ^d	-	1	-	1
Expressed as a percent of authorized posts	-	5.3	-	0.9
Not in authorized posts	-	-	-	-
Total number of expatriates	-	1	-	1
<u>Total Number of Staff Serving in Training</u>	<u>15</u>	<u>15</u>	<u>65</u>	<u>95</u>
<u>Expressed as a Percent of Authorized Posts</u>	83.3	78.9	92.9	88.8

^aProfessional = BSc or above.

^bTechnical = diplomate and certificate.

^cLong-Term leave is leave of three months or more.

^dIrrespective of source of funds.

Source: Data collected from the DEVRES/SADCC Agricultural Research Resource Assessment, 1984.

2. The Natural Resources College

a. Organisational structure and purpose

The Branch of Training, Extension and Interpretative Services is responsible for staff training in the Department of National Parks and Wildlife of the Ministry of Natural Resources and Tourism. It is also responsible for the operation of the Natural Resources College. The objective of the Branch is to develop manpower, through formal and in-service training, for the Department of National Parks and Wildlife and related conservation agencies locally and outside Zimbabwe.

b. Training programmes

The Natural Resources College offers a two-year Diploma in Wildlife and Protected Area Management. The College has a capacity of 35 students. In 1982, the College had an enrollment of 18 male and two female students and in 1983 it enrolled 13 male and two female students. In July 1983, the College produced its first graduates (16 males and two females). Students who enroll at the College are required to have at least five Ordinary Level subjects. They are fully supported by the government. Courses include science and technology, management and research, administration, development and maintenance skills.

Students are assigned to the branches of the Department of National Parks for special practical experience such as research with professional ecologists in fisheries and terrestrial research. They are also given opportunities to deliver lectures on conservation to schools and organised groups. Graduating students join the Civil Service and work in the four branches of Department of National Parks and Wildlife.

The College staff offers a variety of short courses: two to three day conservation courses for groups of people from the conservation committees; one to three day wildlife and general ecology courses for groups of about 70 school children; and one week ecology courses to about 15 science teachers.

The College staff is encouraged to participate in research, to give lectures, seminars and organised courses for institutions as part of an extension exercise and to advise the community in matters relating to wildlife conservation. They are also given the opportunity to attend park seminars organised by US Park Service.

c. Human resources

The College consists of a skeleton staff of two professionals, one with a BSc in biological sciences, and the other with a MSc in environmental studies. Other officers in the Department are invited to lecture on particular themes. The Department plans to

train four staff to the Master's level, and two people to the Bachelor's level at the University.

d. Training facilities

College facilities include two administrative blocks, each with three offices, one large classroom and a workshop in which lessons in motor mechanics are conducted. There are plans to build a library but the College currently uses the research library of the Department. It also publishes monthly reports and has one motor mechanics manual. The College has 12,900 ha of land which is forest and a sanctuary for animals.

e. Financial resources

The operating budget for the fiscal year 1983/84 was Z\$ 86,000.

C. Parastatal Training Institutions

Parastatal agricultural training institutions include the University of Zimbabwe's Faculties of Agriculture and Veterinary Sciences which provide graduate level training and the Zimbabwe College of Forestry of the Forestry Commission.

1. The Faculty of Agriculture of the University of Zimbabwe

a. Organisational structure and purpose

The Faculty provides undergraduate and post-graduate level training to the doctoral level with majors in various agricultural disciplines. The Faculty has three teaching departments: Animal Science, Crop Science and Land Management.

b. Training programmes

(1) Course of study

The Department of Crop Science offers courses in plant breeding and genetics, crop protection (pathology and entomology), crop physiology, pasture science, mathematics, and biometry and crop production. The Department of Animal Science offers courses in agricultural entomology and microbiology, animal microbiology, nutritional biochemistry, animal physiology, animal production, food microbiology, animal metabolism, animal health and livestock improvement. The Department of Land Management offers the following courses: agricultural and natural resources, economics, soils and physical land use and agricultural engineering. Ninety-eight percent of graduates are employed by the Ministry of Agriculture and 2 percent by the private sector.

(2) Admissions

In 1984, the Faculty enrolled 62 male and eight female students. Students enrolling for the Bachelor's degree are required to have a minimum of two 'A' level subjects with passes in science subjects. The pattern of admissions has been the following: 12 for 1980, 20 for 1981, 35 for 1982, 56 for 1983 and 70 for 1984. Graduates were 10, 17 and 31 for 1981, 1982 and 1983, respectively. The rate of graduation is about half of that of admissions. Admissions increased greatly in 1984, and with the current expansion numbers are expected to rise even more.

Ninety percent of the students come from rural areas, although some have spent about six years at secondary boarding schools. The remaining 10 percent come from commercial agricultural backgrounds. All undergraduate students and 70 percent of postgraduate students are sponsored by Government through the Ministry of Education. International organisations and grants or scholarships fund the remaining post-graduate students.

c. Human resources

The Faculty has one administrative, 19 professional and eight technical personnel. Most of the lecturing staff are nationals and they constitute 84 percent of the professional staff, while expatriates constitute 16 percent. Some of the teaching staff are currently pursuing training in Zimbabwe; six are studying for Doctorate degrees and one for a Master's Degree.

The Faculty has a five year plan to train ten people per year, mostly at the local University. However, they are expected to spend at least six months overseas attached to various universities for their course work. There is also a University staff development programme in which the Faculty of Agriculture is participating. The University has established an exchange programme with a consortium of American universities to assist in staff development. Under this programme a number of staff will be sent overseas for three to four years for post-graduate study at universities such as Michigan State University, and Pennsylvania State University.

d. Training facilities

The University of Zimbabwe has a 1,700 ha farm near Harare for student practicals. Students and staff use the Main University Library. The Department of Crop Science is in the process of building up its collection of books, monographs, annual reports and periodicals. The Faculty of Agriculture has three lecture rooms in good condition, three teaching laboratories, glasshouses for teaching and research and four vehicles for fieldwork. More laboratory equipment will be bought with USAID funds.

e. Financial resources

USAID has given the Faculty of Agriculture US\$ 10 million to be spent over a five-year period for expansion programmes. The total budget for 1983/84 was Z\$ 6.15 million of which Z\$ 1 million was for recurrent costs and Z\$ 5.15 million for capital expenditure.

2. The Faculty of Veterinary Science of the University of Zimbabwe

a. Organisational structure and purpose

The Faculty of Veterinary Sciences was established only recently and has not as yet produced any graduates. It is expected to meet a growing need in Southern Africa since there is no Veterinary Science Faculty in the English-speaking countries of the SADCC region except in the Republic of South Africa. The Faculty has three teaching departments: Preclinical Veterinary Studies, Paraclinical Veterinary Studies and Clinical Veterinary Studies.

b. Training programmes

(1) Course of study

The Department of Preclinical Veterinary Studies offers courses in biochemistry, anatomy, physiology and animal production; the Department of Paraclinical Veterinary Studies in pathology, microbiology, parasitology, pharmacology and toxicology; and the Department of Clinical Veterinary Studies in medicine, surgery, obstetrics, gynaecology, epidemiology, public health and clinical pathology.

(2) Admissions

The Faculty of Veterinary Sciences enrolled eighteen students (14 male and four female) for the first time in 1982. There are 23 students in 1984. Thirty percent of the students are from a rural background, 9 percent come from commercial agricultural backgrounds, 35 percent from urban areas and 26 percent are from foreign countries.

Seventy-one percent of the undergraduate students are sponsored by the government, through the Ministry of Education, 11 percent by other governments in the SADCC region, 9 percent have either grants or scholarships, and 9 percent get funds from family sources.

It is hoped that when the veterinary graduates complete their degrees in Veterinary Science, most will work in the Department of Veterinary Services as Veterinary Officers in the research, field and tsetse control branches.

c. Human resources

Four out of nine teaching staff are nationals and the rest are expatriates. Half of the authorised positions have not been filled yet. While the Faculty of Veterinary Sciences has no staff in training at the moment, it has a twenty year training plan and it hopes to train three staff to the doctorate level. Two staff members will be going overseas for Doctorate degrees and 15 for Master's degrees.

d. Training facilities

The Faculty of Veterinary Sciences will use the University farm near Harare for students' practicals. When the building programme of the Faculty is completed in 1985, it will have 63 offices, four conference rooms, four lecture rooms, six teaching laboratories, a workshop and a clinical hospital. Laboratory and equipment, field and teaching aids also will be supplied in 1985. Students and staff use the University's Main Library and various libraries in the country and outside.

e. Financial resources

The European Economic Community (EEC) has provided the funds for construction. The total budget for 1983/84 was Z\$ 378,000 of which Z\$ 318,000 was for recurrent costs and Z\$ 60,000 for capital expenditure.

3. The Zimbabwe College of Forestry

a. Organisational structure and purpose

The Zimbabwe College of Forestry (ZCF) is administered by the Training Section of the Forestry Commission, which relates to the Ministry of Natural Resources and Tourism. It offers formal forestry education and issues a one-year certificate and a two-year diploma in Forestry.

b. Training programmes

(1) Course of study

Subjects covered in the Forest Ranger Certificate course include: forest botany, geology and soils, silviculture, forest mensuration, management and administration, forest legislation, forest survey and mapping, forest protection, utilisation, harvesting and marketing, forest engineering, climate and hydrology, and forest extension.

The subjects covered in the two year diploma course are: in the first year--forest botany, protection (fire), forest engineering, forest mensuration, nursery practice, business management,

silviculture I, climate and hydrology, survey and mapping; in the second year--silviculture II, harvesting, utilisation, forest environment, forest extension and forest legislation.

(2) Admissions

The ZCF enrolled 13, 15 and 29 students at certificate level in 1980, 1981 and 1982 respectively, and had produced 48 certificate graduates by 1983. In 1981 and 1982, nine and 11 students, respectively, were enrolled for the Diploma course which resulted in six and nine graduates in 1982 and 1983. In all, the College of Forestry has produced 15 diploma and 115 certificate holders.

Students with rural and urban backgrounds are evenly represented. Those enrolled for the certificate course are required to have a minimum of three subjects (English, math and science) at Junior Certificate level, while those enrolled for the diploma are required to have at least five Ordinary Level subjects with Grade C or better, including mathematics, English and science. All students, both at certificate and diploma level, receive full sponsorship from the government. All graduates are employed by the Forestry Commission as Forest Rangers or Forest Officers.

c. Human resources

There are no nationals currently employed as lecturers but there are five nationals currently employed in a technical capacity. As of 1 July 1984, there were nine nationals studying for Bachelors degrees. The Forestry Commission has the goal of training 65 people: five to the Bachelor's level, 30 to the diploma level and 30 to the certificate level.

d. Training facilities

The College has three classrooms, each with a capacity of 30 students. Imbeza Forest, with 1,000 ha, is used for training. Short courses on nursery management, chainsaw operating, etc. are offered to Forestry Commission staff, the private sector and the Ministry of Education for periods ranging from four days to three weeks.

The College has a library with a total collection of 600 books and two journal titles. The rate of acquisition is 25 books per year. Staff and students have access to the Forestry Research library in Harare.

e. Financial resources

The ZCF had a total budget of Z\$ 1,115,500 (1983/84) of which Z\$ 761,500 was for current operating costs and Z\$ 354,000 was for capital expenditure.

D. Private Training Institution: The Tobacco Training Institute

1. Organisational structure and purpose

The Tobacco Training Institute at Blackfordby Farm is a private training institute offering a one-year diploma in tobacco culture and short courses to farmers and MOA staff.

2. Training programmes

a. Course of study

Subjects of study are tobacco, maize, wheat, groundnuts, coffee, pastures, soil science, plant nutrition, plant physiology, soil conservation, genetics; irrigation, farm management, accounts, records, agricultural engineering and workshop practice, and conversational Shona. Tobacco is covered in great detail and a strong emphasis is placed on practical work, including planting, reaping, grading, ploughing, etc. The Institute also offers courses in all aspects of tobacco production and protection for about 50 communal and small-scale farmers and extension workers at Odar farm near Harare.

b. Admissions

The enrollment figures for 1980, 1981 and 1982 were 36, 32, and 32 respectively. Students attending short courses numbered 1,329 as of 1 July 1984. Minimum entry qualifications are Ordinary Level subjects such as English, math and science. The students must be 20 years or older. Ninety percent of students came from commercial agricultural backgrounds and 6 percent from urban areas. Three percent of the students were from foreign countries. Student financing is wholly by families. Graduates from the Training Institute are usually employed in the private sector (84 percent), by international organisations (10 percent) and in the public sector (6 percent).

3. Human resources

The two administrators, two professionals and two technicians are all nationals. The Institute has a two-year training plan for its staff, and it hopes to train three staff at diploma level in Zimbabwe.

4. Training facilities

The following teaching equipment is available: one overhead projector, one slide projector, one movie projector, one tape recorder, one video and television. The Institute has 20 ha of land, 4 ha of which are used as demonstration plots. The students receive practical work experience at a neighboring tobacco farm. Short-term training facilities also exist for farmers and their staff.

5. Financial resources

The Institute is supported by grants from private sources such as the Zimbabwe Tobacco Association (ZTA), fees from students and profit from the farm. As of 31 December 1983, the Institute had a recurrent budget of Z\$ 194,000 and a capital budget of Z\$ 41,000 amounting to a total of Z\$ 235,000.

E. Nonformal Training Institutions

Nonformal agricultural training is conducted by the Ministries of Agriculture; Education; Natural Resources and Tourism; Youth, Sport and Culture; by parastatal bodies, by private associations of commerce and industry and by church organisations.

1. Government nonformal training institutions

a. The Veterinary Training Institute

The Veterinary Training Institute's (VTI) objective is to train Veterinary Extension Assistants (VEAs) for service in the communal areas. VTI is administered by the Department of Veterinary Services of the MOA. The VEAs receive nine months of in-service training, admission being based on prior receipt of a certificate in Agriculture. Practical work is emphasised and occupies 50 percent of teaching time. Students participate in routine animal husbandry work at the Henderson Research Station for which VTI provides veterinary services, and also do field work at the Mazowe Field Station and on farms in the Chiweshe communal area. Successful graduates receive certificates in Animal Health In-Service Training and training is wholly funded by the Zimbabwe Government. The first two groups are due to complete training in September 1984.

The VTI has two administrators, one professional and two technical staff. The professional is an expatriate who has a Master's degree in veterinary medicine. There are no nationals currently training to become professionals at the Institute and there are no immediate future plans for professional training.

Staff offices, conference and meeting rooms and classrooms are in either adequate or excellent condition. There is a small laboratory with a capacity for eight students, a cold room for storing carcasses, livestock facilities, a slaughter place and a post-mortem room. The library has 50 books and it is expecting a large British Council donation in 1984. It also has access to the Ministry of Agriculture Library, the UZ Library and to publications from FAO. In 1983/84, the VTI produced eight publications on animal diseases, two on animal physiology, one on diagnosis, one on ticks and one on vaccinations.

The total budget for 1983/84 was Z\$ 335,000, of which Z\$ 195,000 was for recurrent expenditures. The Zimbabwe Government provided Z\$ 83,000 for the capital budget and UNDP/FAO contributed Z\$ 54,000.

b. The Agritex Training Branch

The Agritex Training Branch does in-service training for its field officers and extension workers and also for subject matter specialists. Agritex Field and Specialist Branches offer extension services to farmers through extension workers and subject matter specialists. Courses for master farmers and advanced master farmers have been conducted for many years and close to 40,000 farmers have been trained through this scheme.

c. The Agricultural Engineering Training Centre

Construction on a new Agricultural Engineering Training Centre (AETC) near Harare started in June 1984. The AETC is intended to be an integral part of the Institute of Agricultural Engineering and to cooperate with it in research, testing and development.

The AETC is being built with assistance from the Federal Republic of Germany to replace and extend available facilities for training in the use of farm machinery that was provided at the Farm Machinery Training Centre. The new Centre will offer short (one week) courses to Agritex extension workers. Initially, the focus will be on the establishment of the Animal Power and Tractor Power training courses and related extension material. It is also intended that the agricultural engineering training network be extended through the establishment of regional sub-centres and mobile training units.

d. Others

(1) Schools and college

The Ministry of Education, in accordance with the Government National Economic Policy, has developed strategies to implement a practically oriented educational programme for schools and colleges. The objective is to integrate academic knowledge with practical know-how to produce school-leavers who can be self-reliant on the land, irrespective of their level of education, even if they do not obtain formal agricultural employment. Schools are, therefore, required to integrate academic teaching with practical skills training. The Ministry of Education has started schools under a scheme known as the Zimbabwe Foundation for Education with Production (ZIMFEP). Several schools have been built around the country geared to providing integrated education. The Ministry has also started training teachers to implement this scheme. Belvedere Teacher Training College in Harare is the first such institution.

(2) Ministry of Youth, Sport and Culture
Training Centres

There are 13 Training Centres in the Ministry of Youth, Sport and Culture which aim to provide a cadre of trained youth to work on cooperative farms. The training centres offer two-year certificate courses in agricultural and non-agricultural subjects and students are expected to carry out practicals in agricultural subjects such as poultry, piggery, bee-keeping, market gardening, etc. Educational qualifications are not a major criterion for admission to the Centres. Eight farms have been donated to the Ministry by the Department of Cooperatives for the practical training. Graduates from the training centres are expected to work on farms on a cooperative basis, or on their own using the skills gained from the training centres.

2. Parastatal nonformal agricultural training institutions

Several parastatal organisations are involved in various aspects of nonformal agricultural training. They run short and long courses for their staff or farmers in their specialised fields. Some also provide extension training for Agritex staff in their commodity areas. For example, the Pig Industry Board offers short courses and the Agricultural Rural Development Authority (ARDA) offers courses in agriculture for settler farmers and irrigators.

3. Private nonformal agricultural training institutions

Several private, non-governmental organisations (NGOs) are involved in nonformal agricultural training.

Though NGOs are less controlled by the government, they must operate within the framework of official policy and follow official guidelines established by the appropriate Ministries and Departments.

3. Cotton Training Centre

(1) Organisational structure and purpose

Cotton was first grown commercially in Zimbabwe in 1924 but no significant expansion in production occurred until there was a breakthrough in pest control in the 1960s. Since then the cotton industry has achieved an international reputation for producing high quality cotton. The Commercial Cotton Grower's Association built and financed the Cotton Training Centre in Kadoma which plays a significant role in maintaining these high standards.

The Centre was established to train and render advisory services for cotton producers in general, and to ensure delivery of production information to new growers to help them produce an economically viable crop.

(2) Training programme

The Training Centre offers the following courses:

- o Six months' training in regional cotton production (planting, weed control, diseases and pests, etc.);
- o Three weeks' production training for farmers (agronomic and pest management, picking, etc.);
- o Two weeks' production training for extension workers (supervision, extension methods, planning, etc.);
- o Ten-day initial and five-day refresher courses on cotton scouting (pest recognition, scouting, crop growth recording methods);
- o Two-day pest management course (training and choice of chemicals, major insects, economic appraisal of pest management, etc.);
- o Three-day cotton picking courses (techniques of picking, communications, supervision, etc.); and
- o Courses on other commodities during the off season for cotton.

The number of students in each course varies but the Centre can train over 2,000 people annually. Basic literacy is a prerequisite for admission. Extension workers and farmers from both commercial and communal areas attend the courses. Twelve percent of the students are funded by the government. An additional 12 percent are funded by international organisations while commercial farmers sponsor 52 percent of the students and 23 percent are sponsored by private companies.

(3) Human resources

The staff includes three administrators, two professionals and five technicians. There is no plan to train staff.

(4) Training facilities

Ten ha are available for student practicals and three ha are used as demonstration plots. Facilities include six classrooms with a seating capacity of 30, a lecture hall and hostels for residential students.

(5) Financial resources

The total budget for the Centre as of 31 December 1983 was Z\$ 1,382,100, recurrent expenses being Z\$ 501,100 and capital expenses Z\$ 881,000.

b. Religious organisations: Silveira House

Many churches are involved in agriculture and some have buildings and farms where neighbouring communal farmers can come for a range of courses related to agriculture and home economics. Silveira House (by Jesuits), Solusi (by Seventh Day Adventists), Hlekweni and Arcturus (by the World Lutheran Federation) are institutions devoted mainly to training in Agriculture. Only Silveira House will be described in this section.

Silveira House provides informal training to communal area farmers. In 1983, 524 farmers participated in Silveira House farmers' training scheme which includes the following subjects: agricultural awareness, cooperative formation, and bookkeeping for cooperatives. Courses are followed up with field visits and most of the farmer trainers are extension personnel living in the communal areas. Staff also cooperate with other institutions like the Ministry of Lands, Resettlement and Rural Development, Agritex and the Ministry of Agriculture.

Silveira House staff as of 1 July 1984 consisted of two diploma holder trainers and 38 support staff. The training centre has meeting rooms which are in good condition, and three trucks and four motorcycles. The library has 20 books and six periodical titles and adds about three books per annum.

The total budget for training for the fiscal year ending 31 December 1983 was Z\$ 168,796, of which Z\$ 140,796 came from private church organisations and Z\$ 28,000 from Oxfam.

c. Others

The Commercial Oil Seeds Association and the Seed Maize Association are two private associations that occasionally conduct short courses for farmers and their staff. Some agribusiness firms also conduct courses from time to time in their own specialised areas for farmers and other interested parties. In addition, they sponsor students to attend the University of Zimbabwe or other colleges.

At least two commercial colleges offer correspondence courses for two-year certificates in agriculture: the Central African Correspondence College and the Zimbabwe Distance Education College. However, the Ministry of Agriculture does not accept these qualifications primarily because they make no provisions for practical work.

F. Total Human Resources Available for Agricultural Training in Zimbabwe

1. Staffing patterns

Details of the staff situation for the agricultural training institutions listed in Table 19 as of 1 July 1984, are shown in Table 22. There are a number of vacancies, especially in the technical and professional positions. Twenty percent of the professional positions are filled by expatriates. The constraints to full recruitment and retention of national staff are the same as those described in the chapter on research.

Table 23 shows that there are only one or two professionals trained in most of the specialised disciplines. The situation is critical for there are not enough trained professionals to meet current needs and projected expansion plans of the agricultural training institutions. A temporary solution to the problem would be to establish visiting lectureships, but the most practical long-term solution would be to establish well planned staff training and development programmes for individual institutions. There are 14 nationals and seven expatriates with PhDs on the staff of the training institutions; and 11 nationals and four expatriates with MSc degrees. About 30 percent of the professional nationals are female. (See Table 23.)

2. Staff training

Current training plans for staff of the agricultural training institutions are shown in Table 24. A large number of people are scheduled to receive master's degree level training. Diploma qualifications are adequate for trainers who function as laboratory demonstrators.

G. Total Financial Resources Available for Training in Zimbabwe

Table 25 summarises recurrent and capital expenditures of the major government agricultural training institutions for the fiscal year 1983/84. The total amount spent was somewhat over Z\$ 8 million.

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Table 22: Total Agricultural Training Staff, 1984

	<u>Administrative</u>	<u>Professional^a</u>	<u>Technical^b</u>	<u>Total</u>
<u>Total Authorized Posts</u>	32	70	131	233
<u>Positions Vacant</u>	3	15	25	43
<u>Nationals (Citizens)</u>				
Staff in training	-	8	1	9
Staff on long-term leave ^c	-	-	-	-
Number of nationals currently in posts	29	47	105	181
Expressed as a percent of authorized posts	91	67	80	78
<u>Expatriates</u>				
Serving in authorized posts ^d	-	12	-	12
Expressed as a percent of authorized posts	-	17	-	-
Not in authorized posts	-	-	-	-
Total number of expatriates	-	12	-	12
<u>Total Number of Staff</u>	<u>29</u>	<u>59</u>	<u>105</u>	<u>193</u>

^aProfessional = BSc or above.

^bTechnical = diplomate and certificate.

^cLong-term leave is leave of three months or more.

^dIrrespective of source of funds.

Source: Data collected from the DEVRES/SADCC Agricultural Research Resource Assessment, 1984.

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Table 23: Disciplines of Teaching Professionals, 1984

Discipline Areas	Nationals								Expatriates								Total
	BSc		MSc		PhD		Subtotal		BSc		MSc		PhD		Subtotal		
	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	
<u>Plant/Soil Sciences</u>																	
Agronomy	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	1
Crop physiology	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	1
Entomology	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	1
Microbiology	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	1
Range ecology	-	-	1	-	1	-	2	-	-	-	-	-	-	-	-	-	1
Soils	1	1	-	-	-	1	1	2	-	-	-	-	-	-	-	-	2
Other general agric.	4	10	-	-	-	-	4	10	-	1	-	-	-	-	-	-	3
Crop breeding	-	-	-	1	-	-	-	1	-	-	-	-	-	1	-	1	15
	-	-	-	1	-	-	-	1	-	-	-	-	-	1	-	1	2
Subtotal, Plant/Soil Sciences	5	11	1	2	2	3	8	16	-	1	-	-	-	1	-	2	26
<u>Animal Sciences</u>																	
Animal sciences, general	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1
Animal breeding	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	1
Animal nutrition	-	-	-	2	-	1	-	3	-	-	-	-	-	1	-	1	4
Animal pathology	-	-	-	-	1	2	1	2	-	-	1	1	-	2	1	3	7
Animal physiology	-	-	-	1	-	2	-	3	-	-	-	-	-	1	-	1	4
Animal anatomy	-	-	-	-	-	1	-	1	-	-	-	-	-	1	-	1	2
Subtotal, Animal Sciences	-	1	-	4	1	6	1	11	-	-	1	1	-	5	1	6	19

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Table 23: Disciplines of Teaching Professionals, 1984 (cont.)

<u>Discipline Areas</u>	<u>Nationals</u>								<u>Expatriates</u>								<u>Total</u>
	<u>BSc</u>		<u>MSc</u>		<u>PhD</u>		<u>Subtotal</u>		<u>BSc</u>		<u>MSc</u>		<u>PhD</u>		<u>Subtotal</u>		
	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	
<u>Other Disciplines/Fields</u>																	
Agric. economics	-	-	-	1	-	1	-	2	-	-	-	-	-	-	-	-	2
Agric. engineering	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1
Extension specialist	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1
Statistics	-	-	1	-	-	1	1	1	-	-	-	-	-	1	-	1	3
Adult education	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	1	2
Veterinary medicine	-	1	-	-	-	-	-	1	-	-	-	1	-	-	-	1	2
Geography	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1
Biological science	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1
Environmental science	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	1
Subtotal, Other Discipline/Fields	<u>1</u>	<u>4</u>	<u>1</u>	<u>3</u>	<u>-</u>	<u>2</u>	<u>2</u>	<u>9</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>2</u>	<u>-</u>	<u>1</u>	<u>-</u>	<u>3</u>	<u>14</u>
TOTAL	<u>6</u>	<u>16</u>	<u>2</u>	<u>9</u>	<u>3</u>	<u>11</u>	<u>11</u>	<u>36</u>	<u>-</u>	<u>1</u>	<u>1</u>	<u>3</u>	<u>-</u>	<u>7</u>	<u>1</u>	<u>11</u>	<u>59</u>

Source: Data collected from the DEVRES/SADCC Agricultural Research Resource Assessment, 1984.

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Table 24: Training Plans for Staff of the Training Institutions, 1984

<u>Level</u>	<u>In Country</u>	<u>Elsewhere in Africa</u>	<u>Outside of Africa</u>	<u>Total</u>
<u>Current Situation</u>				
Doctorate	6	-	-	6
Masters	1	-	-	1
Bachelors	-	-	9 ^a	9
Diploma	78 ^b	-	-	78
Certificate	41 ^c	-	-	41
<u>Future Plans for Training</u>				
Doctorate	3	-	2	5
Masters	10	-	20 ^d	30
Bachelors	2 ^e	2	5 ^f	9
Diploma	71 ^g	-	6 ^h	77
Certificate	50 ⁱ	2 ^j	5 ^j	57

^aForestry.

^bTwo adult education, 33 protected area management, 43 in forestry.

^c26 forestry.

^dFive wildlife management, remainder unknown.

^eWildlife management.

^fFive forestry.

^gThree agric. ed., 35 wildlife management, 30 forestry, three unknown.

^hSix agric. ed.

ⁱ20 teacher certificates, 30 forestry.

^jSeven wildlife management.

Source: Data collected from the DEVRES/SADCC Agricultural Research Resource Assessment, 1984.

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Table 25: 1983/84 Budgets for Government Agricultural Training Institutions
(Z\$ 000)

<u>Institution</u>	<u>Budget</u>	<u>Colleges^a</u>			<u>Institutes^b</u>					<u>Subtotal</u>	<u>Total</u>
		<u>1</u>	<u>2</u>	<u>3</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>		
Branch of Agricultural Education (BAE), (Ministry of Agriculture)	Recurrent ^c	-	-	-	-	-	-	-	-	\$2.58	
	Capital (Buildings) ^d	\$2.00	-	-	\$2.05	-	-	-	-	4.05	
	(Equipment) ^d	-	-	-	0.22	-	-	-	-	0.22	\$6.85
Department of Veterinary Services (Minis- try of Agriculture)	Recurrent	-	-	-	-	-	-	-	\$0.195	0.195	
	Capital	-	-	-	-	-	-	-	0.14	0.14	0.335
Natural Resources College (Ministry of Natural Re- sources and Tourism)	Recurrent	-	-	\$0.86	-	-	-	-	-	0.86	
	Capital	-	-	-	-	-	-	-	-	-	<u>0.86</u>
											<u>\$8.05</u>
TOTAL											

^aKey to colleges: 1 = Chibero College of Agriculture, 2 = Gwebi College of Agriculture, 3 = Natural Resources College.

^bKey to institutes: 1 = Esigodini Agricultural Institute, 2 = Mlezu Agricultural Institute, 3 = Kushinga Phikilela Agricultural Institute, 4 = Rio Tinto Agricultural Institute, 5 = Veterinary Training Institute.

^cRecurrent budget relates to total for the two colleges and four institutes of the BAE.

^dCapital budget (equipment) relates to total for all four institutes of the BAE.

V. AGRICULTURAL EXTENSION INSTITUTIONS

A. Overview of Agricultural Extension in Zimbabwe

Figure 8 shows institutions which provide agricultural extension services to the farming community in Zimbabwe. A number of government departments, parastatals, private agrochemical and fertiliser companies and non-governmental organisations are involved in agricultural extension. However, by far the largest extension organisation in the country in terms of staff, budget and coverage is Agritex of the MOA (See Table 26.)

B. Government Agricultural Extension Institutions

The following government departments provide agricultural extension services to the country's farmers:

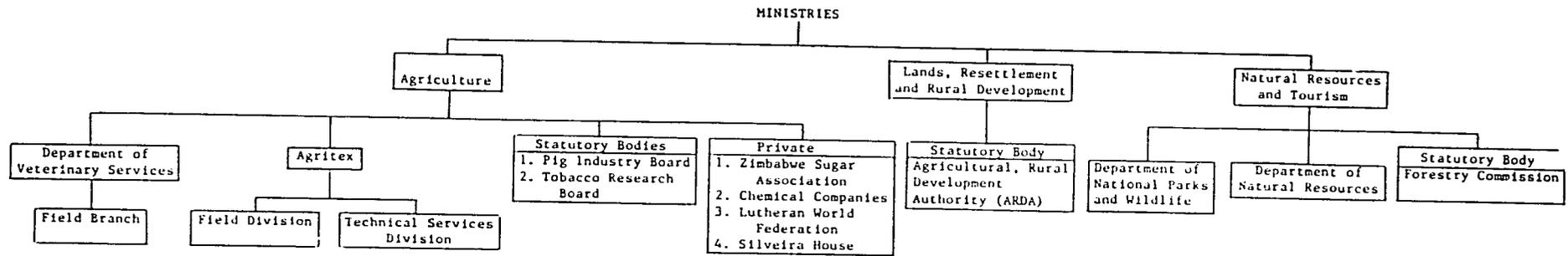
- o Agritex (MOA);
- o The Department of Veterinary Services (MOA);
- o The Department of National Parks and Wildlife (Ministry of Natural Resources and Tourism); and
- o The Department of Natural Resources (Ministry of Natural Resources and Tourism).

1. The Department of Agricultural Technical and Extension Services

a. Organisational structure and purpose

Agritex is organised along functional lines into a Field Division and a Technical Services Division. (See Figure 9.) It is headed by a Director assisted by a Deputy Director and two Assistant Directors who are each in charge of a Division. Its Financial and Personnel administration branch is headed by a Chief Executive Officer. The Field Division is structured at three levels as follows:

- o The National level with the Directorate at the head office in Harare;
- o The Provincial level headed by eight Provincial Agricultural and Extension Officers (PAEOs) each in charge of a province. The PAEOs are assisted by two Assistant PAEOs and subject matter specialists; and



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Figure 8: Organisational Structure for Agricultural Extension

Source: Data collected from the DEVRES/SADCC Agricultural Research Resource Assessment, 1984

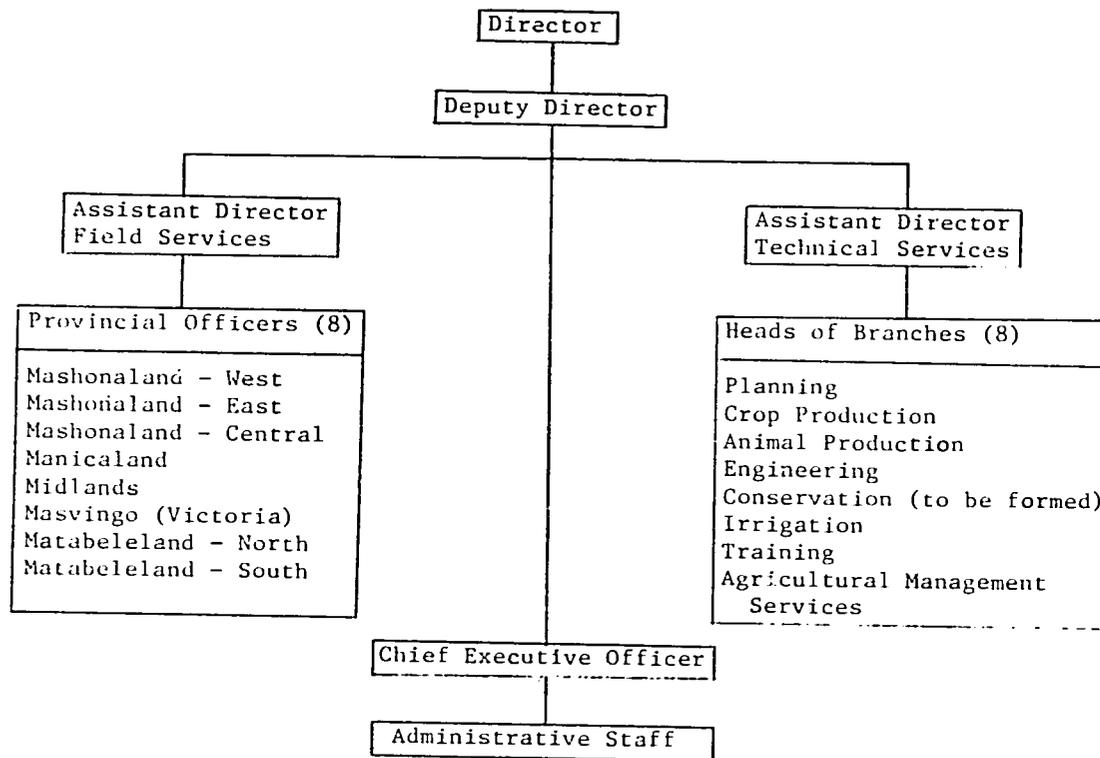
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Table 26: Agricultural Extension Institutions: Locations and Staff, 1984

<u>Name of Institution</u>	<u>Headquarters Location</u>	<u>Field Location</u>	<u>Administrative</u>	<u>Professional</u>	<u>Technical</u>	<u>Support</u>
Agritex, MOA	Harare	Mashonaland Central	7	20	103	
		Mashonaland East	8	31	132	
		Mashonaland West	8	34	116	
		Masvingo	7	32	227	
		Manicaland (Nuteru)	10	37	242	
		Midlands	7	36	242	
		Matebeleland South	7	21	127	
		Matebeleland North	7	17	89	
		Technical Division	67	115	147	
Subtotal, Agritex			<u>128</u>	<u>343</u>	<u>1,425</u>	<u>391</u> ^a
101 Dept. of Veterinary Services, MOA	Harare	Masonaland	7	11	-	
		Matebeleland	5	6	1	
		Victoria	2	3	-	
		Midlands	3	5	-	
		Manicaland	3	3	-	
		Subtotal, Dept. of Veterinary Services			<u>20</u>	<u>26</u>
National Parks Wildlife Management	Harare		48	2		
		Bulawayo	-	-	3	5
		Boulton Atlanta	-	-	1	-
Subtotal, National Parks Wildlife Management			<u>48</u>	<u>2</u>	<u>4</u>	<u>5</u>
TOTAL			<u>196</u>	<u>371</u>	<u>1,480</u>	<u>2,054^a</u>

^aSupport staff includes field extension supervisors and general services support not distributed in table to respective field locations and headquarters.

Source: Data collected from the DEVRES/SADCC Agricultural Research Resource Assessment, 1984.



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Figure 9: Organisational Structure of the Department of Agricultural Technical and Extension Services

Source: Data collected from the DEVRES/SADCC Agricultural Research Resource Assessment, 1984.

- o The Regional level which is headed by Regional Agricultural Extension Officers (RAEOs). The RAEOs lead teams of Agricultural Extension Officers (AEOs) and Divisional Extension Officers (DEOs) and the latter in turn lead a team of field workers.

Subject matter specialists working with Field Officers are drawn from the following branches of the Technical Services Division: Planning, Crop Production, Animal Production, Engineering, Irrigation, Training, Agricultural Management Services and Conservation (to be formed). Administratively, they report to the Assistant Provincial Agricultural Extension Officer (Training) but for technical expertise they report directly to their respective Branch Heads at the head office. There is close cooperation and coordination between the Field and Technical Divisions.

The overall objective of Agritex is to implement the government's agricultural policy as outlined in Growth with Equity. Accordingly, the emphasis of Agritex is to expand extension services to the previously neglected communal areas by working with farmer groups. However, the current ratio of one extension worker to 800 farmers is not favourable. The particular needs of farmers in the communal and resettlement areas are for information in credit management, natural resource conservation and utilisation and proper land use. In addition, Agritex field staff provide crop/area estimates to the Central Statistical Office for central planners to use in critical situations such as in drought years.

In order to fulfill these obligations Agritex has established the following priorities:

- o The provision of all services to communal, resettlement, small-scale commercial and emergent farmers, and only technical, advisory and regulatory services to large-scale commercial farmers;
- o The provision of planning services to resettlement areas;
- o The development and training of the Department's staff in the technical, extension and management aspects of their work; and
- o The provision of conservation services to all agricultural areas.

Specific tasks undertaken by Agritex for farmers and other agricultural agencies include the following:

- o Agricultural extension and advisory services such as crop and livestock production, conservation, irrigation, land use planning, veld and pasture management, farm management, agricultural mechanisation and rural afforestation;

- o Technical and specialist services in land use, catchment, regional, resettlement, conservation and irrigation plans; wetland drainage surveys; dam and fish pond design; agricultural project analysis; beef performance testing; judging shows and competitions and training of master farmers; and
- o Regulatory services including Water Court reports, Agricultural Finance Corporation reports, Natural Resources Board reports, subdivision reports, drought relief and data provision to the Central Statistical Office.

b. Extension programmes

Major extension programmes are in crop and animal production, land use planning, conservation, and irrigation as discussed below.

(1) Crop production extension

This programme was designed to upgrade farmer knowledge of appropriate modern technical methods of crop production to help them increase overall production. Allocation of effort to this programme is the equivalent of 270 professional person years and 910 technical staff years. The programme is conducted in close collaboration with the DR&SS and the TRB who generate the research technologies that are used by Agritex for its extension efforts. Agrochemical companies also cooperate with Agritex in their efforts to sell their products. The programme is fully funded by the government.

(2) Animal production extension

The purpose of this programme is to provide farmers with technical, managerial and research information to help them achieve greater animal production. Expected benefits from the programme are to uplift the standard of living of the farming families through increased draughtpower availability, manure availability, and increased milk production. The programme is long-term and was given 50 professional FTEs and 135 technical FTEs during 1983/84. There is close collaboration with the DR&SS and the Department of Veterinary Services, and to a lesser extent with the Cold Storage Commission and other companies involved in veterinary work. The government funds 95 percent of the programme, the rest of the funding being provided by other agencies.

(3) Land use planning, conservation and irrigation

The purpose of this programme is to provide farmers with information on proper methods of land use for optimal agricultural productivity giving due consideration to the need for conservation. In 1983/84, the programme was given 50 professional

FTEs and 261 technical FTEs. There is close collaboration with the Ministry of Lands, Resettlement and Rural Development and the DR&SS, and to a lesser extent with the Department of Water Development. The government funds 95 percent of the programme, the EEC and the World Bank Fund 2 percent each, and 1 percent is funded by the African Development Bank.

c. Human resources

(1) Staffing patterns

Table 27 shows the Agritex staff situation as of 1 July 1984: 91.4 percent of the administrative positions, 83.8 percent of the professional, and 92.2 percent of the technical positions were filled. The levels of qualification of the professionals are as follows: 95 have Bachelor's degrees; five have Master's degrees and one has a Doctorate degree. There are 187 extension officers with diplomas and 25 officers with certificates in agriculture.

The highest percentage of the extension effort is devoted to maize production (30 percent), followed by cotton which receives half as much effort as maize. Farming systems, land and water conservation and beef cattle together receive approximately a third of the departmental extension effort. Groundnuts, millet, fruit and vegetables, sheep and goats receive one percent of extension effort, while the rest of the effort goes to sorghum, irrigation, poultry, tobacco and forestry.

(2) Staff training

Agritex has an indefinite plan based on in-service training. Part of this training involves overseas study tours for its officers. Some diploma holders have been given permission to study for their first degrees in agriculture on a full-time basis. However, most of them have registered as part-time students with the local University.

d. Extension facilities

Training facilities exist at Domboshawa near Harare for forestry and horticulture. Workshops and testing facilities are available at the Institute of Agricultural Engineering (Hatcliffe Estate) near Harare. Expensive laboratory equipment such as air photo interpretation equipment is available at Agritex and field equipment includes tractors, milling machines, farm implements, etc. Staff at the head office in Harare are linked to the Scientific Computing Centre in the Ministry of Finance, Economic Planning and Development. Audio-visual equipment includes 100 overhead projectors, 38 slide projectors, 15 movie projectors, 20 tape recorders and 20 video replay units.

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Table 27: Agricultural Extension Staff of Agritex, 1984

	<u>Administrative</u>	<u>Professional^a</u>	<u>Technical^b</u>	<u>Total</u>
<u>Total Authorized Posts</u>	140	401	1,545	2,086
<u>Positions Vacant</u>	12	47	120	179
<u>Nationals (Citizens)</u>				
Staff in training	-	-	-	-
Staff on long-term leave ^c	-	11	-	11
Number of nationals currently in posts	128	336	1,425	1,889
Expresses as a percent of authorized posts	91.4	83.8	92.2	90.6
<u>Expatriates</u>				
Serving in authorized posts ^d	-	7	-	7
<u>TOTAL</u>	<u>128</u>	<u>345</u>	<u>1,425</u>	<u>1,896</u>

^aProfessional = BSc or above.

^bTechnical = diplomate and certificate.

^cLong-Term leave is leave of three months or more.

^dIrrespective of source of funds.

Source: Data collected from the DEVRES/SADCC Agricultural Research Resource Assessment, 1984.

Agritex staff also have access to about 10,200 books and 130 periodical titles. About 385 books are acquired every year. Most of the books and journals are housed in the Central Library of the Ministry of Agriculture. Other available libraries and information sources in the country include the National Free Library, the University Library and the Library of Parliament. Material from outside the country can be acquired through interlibrary loan. Agritex published the following documents in 1983: an annual report, 12 issues of the News and Views newsletter and technical monographs on a variety of subjects.

e. Financial resources

The Agritex budget for 1983/84 was Z\$ 20.82 million of which Z\$ 17.57 million was for recurrent costs and Z\$ 3.25 million for capital expenditures. The largest allocation for recurrent expenses came from government sources (Z\$ 17.3 million) while the World Bank and the International Fund for Agricultural Development (IFAD) contributed Z\$ 200,000. The EEC and the Federal Republic of Germany contributed an additional Z\$ 73,000.

A World Bank loan funded capital expenses including construction of extension workers' houses (Z\$ 1.02 million) and the purchase of motorcycles and technical equipment (Z\$ 1.8 million). The Agricultural Engineering Training Centre also received Z\$ 0.43 million from the CDA donor group.

2. The Department of Veterinary Services

a. Organisational structure and purpose

The Field Branch of the Department of Veterinary Services is responsible for animal disease prevention and, with Agritex and DP&SS, for increased livestock production. The Field Branch investigates cattle nutrition, infertility and calving and animal parasites. At the grassroots level a new cadre known as Veterinary Extension Assistants play major role in Veterinary extension. They are stationed in the provinces at growth centres where they take charge of about eight to ten dip tanks. The Veterinary Extension Assistants receive nine months of in-service training after completing a certificate in Agriculture. They are also responsible for conducting post mortems and collecting blood samples. Field officers operate from the five provincial centres in Matabeleland, Mashonaland, Midlands, Masvingo and Manicaland.

b. Extension programmes

The major extension activities of the Department of Veterinary Services relate to rabies, tick and tsetse control. The Field Branch has a professional backing of 32 FTEs of which 26 are nationals and six are expatriates. All livestock health problems in Zimbabwe are tackled by professional officers in the Field Division.

Services provided include dipping in the communal areas; free foot and mouth, rabies and anthrax vaccinations in the communal areas; treatment of trypanosomiasis; livestock post mortems; tsetse fly eradication; and meat inspection at abattoirs. Great strides have been made in the eradication of animal diseases, particularly in controlling the tsetse fly and tick-borne diseases.

c. Human resources

Zimbabwe is not self-sufficient in veterinarians but the first group of veterinarians is currently being trained at the Faculty of Veterinary Sciences. Some of them are expected to join the field force. Two members of the staff are in training at the University of Zimbabwe and one is being trained overseas.

d. Financial resources

The recurrent budget for the entire Department of Veterinary Services for the fiscal year 1983/84 was Z\$ 16,874,000 from Treasury and Z\$ 585,000 from the EEC amounting to a total of Z\$ 17,459,000. The capital budget from national sources amounted to Z\$ 666,000 in the same period. This money was used to buy farm and field equipment and furniture and to provide quarantine and diptank facilities. Budgetary figures were not available for the specific allocation to the Field Branch in 1983/84.

3. The Department of National Parks and Wildlife Management

a. Organisational structure and purpose

The Branch of Training, Extension and Interpretation in the Department of National Parks and Wildlife carries out extension in wildlife management, conservation, fisheries, range management, etc. However, the Department's policy is for every officer in the department to be prepared to provide extension services when called upon to do so. Specialists (ecologists) in the Branches of Terrestrial and Aquatic Ecology provide technical advisory information. The Branch's objective is to promote public awareness of the value of the indigenous flora and fauna and of the parks and wildlife estates.

The Branch has liaison with Agritex in matters such as game ranching. There is also close liaison with the Department of Natural Resources to explain to District Councils the value in wildlife conservation. Working with the Ministry of Education, Extension Officers give lectures on wildlife management to students and teachers in schools and colleges.

b. Extension programmes

The Department of National Parks and Wildlife has four major extension programmes in wildlife management, wildlife conservation, range management and fisheries. Wildlife management

receives the highest professional effort of 3.5 FTEs, and fisheries is next with 2.35 FTEs. Most of the Department's work is restricted to land in Natural Regions IV and V.

c. Human resources

The Extension Unit of the Branch of Training, Extension and Interpretation has a staff of two professionals with Bachelor's degrees and three with Master's degrees. Four technical staff in the Extension Unit have diplomas in Wildlife and Protected Area Management. As of 1 July 1984, the Department's Branch of Training, Extension and Interpretation had 33 staff undergoing training at the diploma level. One member of the staff was studying for a Master's degree.

d. Financial resources

The Extension Unit in the Branch of Training, Extension and Interpretation had a total budget of Z\$ 63,766 for 1983/84. The recurrent budget was Z\$ 63,000 and the capital budget was only Z\$ 766, all funds coming from domestic sources.

4. The Department of Natural Resources

Land inspectors carry out conservation extension throughout the country. They are helped in their task by collaborating with local District Council Committees and Intensive Conservation Area Committees in both the commercial and communal areas. Land inspectors have both an educational role and the power to prosecute farmers who are not carrying out proper land conservation measures such as digging contours and leaving waterways to prevent soil erosion. For its educational functions, the Department works closely with the education committee of the Natural Resources Board. The education committee's purpose is to create awareness about ecology among young people.

The Department of Natural Resources works closely with other departments, for instance, the Department of National Parks and Wildlife Management in wildlife conservation. The Department also has a close working relationship with the DR&SS in implementing the Plant Pests and Diseases and Noxious Weeds Acts.

C. Statutory Bodies Conducting Extension Work in Zimbabwe

1. The Forestry Commission

The Forestry Commission, already described in Chapter III, does not have an extension branch. However, researchers do provide advisory services to farmers who intend to establish their own plantations. Agritex staff members attend the Zimbabwe College of Forestry to train for forestry extension work. The World Bank Rural Afforestation Project relies heavily on Agritex extension workers in motivating rural people to establish nurseries. National Tree

Planting Day, initiated by the Prime Minister, is an important milestone in that it creates an awareness among all people of the need to conserve trees.

2. The Tobacco Research Board

The TRB does not actively involve itself in extension but in recent years has found itself in the position of being the sole source of information for small-scale farmers who grow burley and oriental tobacco. The TRB gives in-service training to Agritex staff so that they can offer sound advice to tobacco growers auctioneers and manufacturers. In Masvingo and Midlands provinces, demonstration plots of oriental tobacco established by the TRB are used as venues for training courses and field days. Visitors to tobacco research stations are given extension advice.

3. The Pig Industry Board

The PIB advisory services are provided by one full-time professional officer assisted by the Director of PIB and the Research and Development Officer who devote about 10 percent of their time to such work. The performance of approximately one-third of the commercial sows in the country is monitored by means of a computerised management scheme. These data are used to provide guidelines for the industry.

D. Private Institutions Conducting Extension Work in Zimbabwe

1. The Zimbabwe Sugar Association

The Zimbabwe Sugar Association Experiment Station research staff give advisory services because there is no other formal extension service for the sugar industry. Contact with growers is maintained by close liaison and regular visits to sugar estates and to private growers when they request advice on particular problems. Reports and information bulletins are circulated to all growers to keep them up to date with research developments and the results of field trials. Technical services provided by the research staff of the Sugar Experiment Station in Chiredzi have been described in the chapter on agricultural research.

2. Agrochemical and fertiliser companies

A number of agrochemical and fertiliser companies provide technical advice to commercial farmers in a bid to promote their products. Technical advisers or agricultural sales representatives visit farmers throughout the country explaining the benefits of using crop chemicals, such as herbicides, pesticides, etc. A few agrochemical companies are now training Agritex staff and small-scale farmers in handling chemicals and in crop spraying techniques. Technical information is disseminated during field days and advisory pamphlets are published in farming magazines for the benefit of farmers.

3. Non-governmental organisations

a. The Lutheran World Federation

The activities of the Lutheran World Federation (LWF) include agricultural extension in the Model B Resettlement areas. The programme is headed by a senior cooperative officer who is an agriculturist by training. A number of field staff, such as the Project Coordinators, Project Assistant Coordinators and Project Advisors provide extension services to farmers in both crop and livestock production and give help with long and short-term planning and project evaluation. The LWF extension staff also offers services to communal area farmers whose land borders that of the cooperatives. The LWF intends to start on another major extension project dealing with the rehabilitation of cattle in the drought-stricken areas of the country.

b. Silveira House

A description of Silveira House has been given in Chapter IV. Extension and training activities are largely tied together as described below for the major programmes.

(1) Maize

The Silveira House maize development programme was started in 1969 with the objective of introducing production techniques to help increase farmer yields. Collaborating on the programme are the Ministries of Lands, Resettlement and Rural Development, Agritex, the Agricultural Finance Corporation, the Zimbabwe Fertilizer Company and Windmill Company in Zimbabwe, the Coady International Institute in Canada and the Innovative Research for Development (IRED) in Switzerland.

Private church organisations fund 95 percent of the programme and 5 percent is funded by the farmers themselves. Funding agencies include Misereor (Germany), Cebemo (Netherlands), Oxfam (U K), CCODP (Canada). Staff involved in Silveira House Extension include two diploma holders and two certificate holders plus several field extension officers who are in-service trained.

The extension budget is tied up with the training budget. (See Chapter IV.) Similarly, facilities for training are the same as those for extension, as Silveira House has no substations. Three trucks and four motorcycles are available for both extension and training trips.

(2) Sorghum programme

The sorghum production techniques programme was started in 1979, its objectives being to introduce drought resistant crops. Collaboration on the programme is with the Department of

Cooperative Development in the Ministry of Lands Resettlement and Rural Development, Agritex and the Agricultural Finance Corporation. There is also limited collaboration with institutions outside the country such as the Coady International Institute in Canada, IRED in Switzerland and IDRC in Canada. IDRC funds 50 percent of the programme, private church organisations fund 45 percent and the rest is paid for by the farmers.

(3) Vegetable programme

This programme was started in 1969, the objective being to introduce various vegetable production techniques in an effort to improve yields and farmers' diets. Collaboration is limited to institutions within the country, namely Agritex, the Department of Cooperative Development and the Agricultural Finance Corporation. Private church organisations which include Misereor, Cebemo and CCODP fund 95 percent of the programme, the remaining 5 percent being funded by the farmers.

(4) Groundnuts programme

The groundnuts production techniques programme was started in 1972, the objective being to increase farmer incomes. There is extensive collaboration with Agritex, the Department of Cooperative Development, the Agricultural Finance Corporation, the Zimbabwe Fertilizer Company and Windmill Company. There is limited collaboration with Coady International Institute.

(5) Cotton programmes

The objective of the cotton programme is to improve production techniques for obtaining greater yields. As cotton is a cash crop it provides a source of income for farmers. The programme started in 1974. Collaboration is with Agritex, the Department of Cooperative Development, the Agricultural Finance Corporation, the Zimbabwe Fertilizer Company and Windmill Company. Misereor, Cebemo and CCODP fund the 95 percent of the programme and the farmers fund 5 percent.

(6) Millet programme

The millet programme was started in 1979 with the objective of introducing improved millet production techniques. Collaboration is with the Department of Cooperative Development, the Agricultural Finance Corporation, Zimbabwe Fertilizer Company and Windmill Company. There is limited collaboration with the Coady International Institute. Misereor, Cebemo and CCODP fund 95 percent of the programme with the remaining 5 percent being provided by the farmers.

E. Total Human Resources Available for Extension in Zimbabwe

1. Staffing patterns

The number of staff positions in the three major governmental (Agritex, Department of Veterinary Services and the Department of National Parks and Wildlife) extension services in Zimbabwe, as of 1 July 1984, is shown in Table 28. The extension service had the lowest percent of vacancies among the three types of institutions (research, training and extension) but, as in the other two, the highest vacancies were in the professional and technical categories.

The number of females in the extension service is virtually insignificant. Studies show that female extension workers could be very effective working in the communal areas where women farmers are in the majority.

Table 29 shows current extension programmes and their respective levels of extension effort. Maize, cotton, farming systems, land and water conservation, beef cattle and sorghum receive 30.1 percent, 17.1 percent, 10 percent, 9 percent, 9.3 percent and 6 percent respectively of the total national extension effort. However, the order is somewhat different when one looks at the research priorities in which tobacco, beef cattle, cotton, maize and pulses get top priority and sorghum and farming systems do not.

2. Staff training

The current training programme includes 33 staff who are undergoing diploma training, three people training for Bachelor's degrees and one person for the Master's degree. (See Table 30.) The extension service in Zimbabwe has no long term plans to provide their staff with formal training. The general philosophy is to provide in-service training. Generally, staff are recruited from the agricultural colleges or the university and are systematically trained in all aspects of extension work including courses related to the staff's specialised extension duties.

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Table 28: Total Agricultural Extension Staff, 1984

	<u>Administrative</u>	<u>Professional^a</u>	<u>Technical^b</u>	<u>Support Staff</u>	<u>Total</u>
<u>Total Authorized Posts</u>	208	431	1,614	2,246	4,499
<u>Positions Vacant</u>	12	61	134	192	429
<u>Nationals (Citizens)</u>					
Staff in training	-	4	-	-	4
Staff on long-term leave ^c	-	11	-	-	11
Number of nationals currently in posts	196	358	1,480	2,054	4,088
Expressed as a percent of authorized posts	94	83	92	91	91
<u>Expatriates</u>					
Serving in authorized posts ^d	-	13	-	-	13
Expressed as a percent of authorized posts	-	3	-	-	0.3
Not in authorized posts	-	-	-	-	-
Total number of expatriates	-	13	-	-	13
<u>Total Number of Staff</u>	<u>196</u>	<u>371</u>	<u>1,480</u>	<u>2,054</u>	<u>4,101</u>

^aProfessional = BSc or above.

^bTechnical = diplomate and certificate.

^cLong-term leave is leave of three months or more.

^dIrrespective of source of funds.

Source: Data collected from the DEVRES/SADCC Agricultural Research Resource Assessment, 1984.

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Table 29: Summary of Extension Staff Effort and Source of Funds Related to Programme Area, 1984

<u>Programme Area</u>	<u>Funding Source</u>	<u>FTE</u> ^a	<u>Percentage of Total Staff Time</u>
<u>Food Crops</u>			
Maize	MOA	600	30.1
Sorghum	MOA	120	6.0
Groundnuts	MOA	20	1.0
Millet	MOA	20	1.0
Fruit/Vegetables	MOA	<u>20</u>	<u>1.0</u>
Subtotal, Food Crops		<u>780</u>	<u>39.2</u>
<u>Commercial Crops</u>			
Cotton	MOA	340	17.1
Tobacco	MOA	<u>50</u>	<u>2.5</u>
Subtotal, Commercial Crops		<u>390</u>	<u>19.6</u>
<u>Livestock</u>			
Cattle (beef)	MOA	180	9.0
Poultry	MOA	60	3.0
Sheep	MOA	20	1.0
Pigs	PIB ^a	1	-
Goats	MOA	20	1.0
Veterinary	MOA	26	1.3
Wildlife management	MNR&T ^b	3	.2
Fisheries	MNR&T	<u>2</u>	<u>.1</u>
Subtotal, Livestock		<u>312</u>	<u>15.7</u>

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Table 29: Summary of Extension Staff Effort and Source of Funds Related to Programme Area, 1984 (cont.)

<u>Programme Area</u>	<u>Funding Source</u>	<u>FTE^a</u>	<u>Percentage of Total Staff Time</u>
<u>Multidisciplinary</u>			
Farming systems	MOA	200	10.0
Land and water conservation	MOA	200	10.0
Irrigation	MOA	60	3.0
Forestry	MOA	<u>50</u>	<u>2.5</u>
Subtotal, Multidisciplinary		<u>510</u>	<u>25.5</u>
TOTAL		<u>1,992</u>	<u>100.0</u>

^aFTE = Full Time Equivalent

^bPig Industry Board.

^cMinistry of Natural Resource & Tourism.

Source: Data collected from the DEVRES/SADCC Agricultural Research Resource Assessment, 1984.

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Table 30: Training Plans for Staff of Extension Institutions, 1984^a

<u>Level</u>	<u>In Country</u>	<u>Elsewhere in Africa</u>	<u>Outside of Africa</u>	<u>Total</u>
<u>Current Situation</u>				
Doctorate	-	-	-	-
Masters	-	1 ^b	-	1
Bachelors	2 ^c	-	1 ^c	3
Diplomate	33 ^d	-	-	33

^a Agritex reported that almost all training of extension accomplished through in-service training.

^b Wildlife management.

^c Bachelor of Veterinary Science.

^d Wildlife management.

Source: Data collected from the DEVRES/SADCC Agricultural Research Resource Assessment, 1984.

VI. CONSTRAINTS TO AND THE POTENTIAL FOR INCREASED PRODUCTIVITY

A. Major Crops

1. Current and potential yields

Crop yields in Zimbabwe vary greatly between communal area farms and the commercial sector. Commercial farmers consistently obtain high yields while communal farmer yields are low and vary considerably from year to year, primarily due to unpredictable rainfall. Also, the commercial and communal farming areas are located in different agro-ecological regions, and the commercial sector is characterised by a highly developed and mechanised agricultural system, while the communal areas are characterised by low input and low management systems. Estimated production statistics for some of the major crops for 1980/81 are shown in Table 31.

Since farming conditions are so different in the two sectors, the constraints to increased productivity are also different. Given below are the results of a survey designed to assess the constraints to increased productivity in the communal areas. Tables 32 and 33 summarise the findings of the survey for the crop and livestock sectors respectively.

2. Physical and biological constraints

Rainfall distribution and soil degradation were considered the most serious physical constraints to increased productivity in almost all crops.

a. Rainfall

Rainfall is a most significant factor affecting both crop and animal production in Zimbabwe, particularly for small-scale producers who farm in areas of marginal rainfall. These areas experience scanty and unpredictable rainfall, and often have mid-season dry spells that are harmful to crops. Rainfall distribution is, therefore, considered a very serious constraint to increased productivity.

b. Soils

Soil degradation is another physical constraint to crop production in Zimbabwe. Soils are severely degraded in the communal areas which are located in Natural Regions IV and V and in Land Capability Classes VI, VII and VIII. The extent of soil degradation was one of the factors used to develop the land classification system which forms the basis for land use planning. The majority of small-scale producers farm in the areas classified as having the most serious soil degradation problems. Some of these areas have been designated as not suitable for cropping. (See Chapter II.)

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Table 31: Area Planted and Yields of Major Crops

<u>Crop</u>	<u>Estimated Area of Production (ha)</u>	<u>National Average Yields (kg/ha)</u>	<u>Total Production (MT)</u>	<u>Estimated Yield by Sector</u>	
				<u>Commercial Sector (kg/ha)</u>	<u>Communal Sector (kg/ha)</u>
Cotton	220,000	1,250	250,000	1,800	850
Flue and Tobacco	50,000	2,340	± 11,000	2,300	2,000
Pearl Millet	± 200,000	500	± 100,000	NA ^a	500
Maize	355,274	5,095	1,810,075	-	-
Sorghum	9,290	2,705	25,131	-	-

^aNA = Not Available

Source: Data collected from the DEVRES/SADCC Agricultural Research Resource Assessment, 1984.

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Table 32: Perceptions of Severity of Constraints to Achieving Higher Crop Yields ^a

Constraints	Maize	Sorghum	Vege- tables	Cotton	Ground- nuts	Tobacco	Millet	Average
<u>Physical/Biological</u>								
Climate	3.2	3.5	2.3	2.1	3.2	3.3	4.5	3.2
Annual rainfall	2.8	3.2	3.3	2.5	3.6	3.1	4.0	3.3
Rain distribution	4.0	4.2	2.6	2.5	4.2	4.5	4.5	3.8
Soil suitability	2.7	3.0	2.0	3.5	3.8	4.2	3.2	3.3
Soil degradation	3.5	4.0	1.0	3.5	4.0	3.9	3.7	3.4
Soil topography	3.0	3.2	1.6	2.1	2.6	4.0	2.0	2.7
Weeds	3.5	4.2	2.0	4.4	3.7	4.2	3.5	3.7
Plant diseases	2.8	3.5	5.0	2.7	3.5	3.5	3.5	3.6
Pests/Insects	4.0	3.7	5.0	4.8	3.7	3.6	4.0	4.2
Predators	2.8	3.5	3.3	2.2	2.7	2.3	3.5	3.0
Varieties/Species	4.3	4.7	3.6	2.5	4.2	3.1	4.2	3.9
Human power	3.6	4.2	3.0	4.5	4.1	4.1	4.7	4.1
Animal power	4.8	4.2	1.3	4.5	4.3	3.9	4.2	3.9
<u>Economic/Policy</u>								
Prices	4.5	4.5	4.0	3.8	4.3	4.0	3.3	4.1
Marketing	4.6	4.0	5.0	3.4	3.5	3.6	2.6	3.9
Short-Term credit	4.5	4.5	4.3	3.4	4.6	4.1	3.6	4.2
Long-Term credit	3.8	3.7	3.6	3.1	3.6	4.0	4.6	3.8
Government subsidy	1.7	1.2	1.0	1.8	2.2	2.3	2.5	1.9
Import policies	2.1	2.0	3.3	2.5	3.1	1.6	2.5	2.5
<u>Traditional</u>								
Land tenure	1.8	1.7	1.6	3.0	2.3	3.0	4.0	2.5
Farm size	4.1	3.5	3.0	3.0	4.0	3.5	4.2	3.7
Education	4.3	4.0	4.6	4.7	4.3	3.7	3.5	4.2
Role of women	4.2	3.0	4.0	4.2	4.0	3.8	4.5	4.0
<u>Institutional</u>								
Research	4.6	4.5	4.6	3.8	4.2	3.6	4.7	4.3
Training	4.6	4.7	4.3	4.2	4.7	4.4	5.0	4.6
Extension	4.7	4.7	5.0	4.7	4.6	4.7	5.0	4.8
Overall Average:	3.7	3.7	3.3	3.4	3.8	3.7	3.9	3.7

^a Weighted average of respondent rankings: 1 = Not serious, 5 = Very serious. Number of respondents varied by crop from 3 to 10.

Source: Data collected from the DEVRES/SADCC Agricultural Research Resource Assessment, 1984.

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 Table 33: Perceptions of Severity of Constraints to Achieving Higher Livestock Productivity ^a

Constraints	Beef Cattle	Goats	Pigs	Poultry	Average
<u>Physical/Biological</u>					
Climate	2.7	2.0	1.0	2.1	2.0
Annual rainfall	3.6	2.8	2.0	1.5	2.5
Rain distribution	3.4	2.6	2.0	1.6	2.5
Soil suitability	2.1	1.5	2.0	1.4	1.8
Soil degradation	3.0	3.0	2.0	1.5	2.4
Soil topography	1.7	2.0	2.0	1.6	1.9
Natural forage supply	4.8	4.5	2.0	1.8	3.3
Fodder supply	4.2	4.2	3.0	3.0	3.7
Other fodder supply	3.8	3.6	4.0	2.8	3.6
Water supply	4.0	3.6	2.0	2.5	3.1
Water access	4.1	3.0	2.0	2.3	2.9
Disease prevention	4.1	3.5	5.0	4.7	4.4
Curative problems	4.5	3.5	5.0	4.7	4.5
Pests/Insects	4.5	3.6	4.0	3.4	3.9
Predators	2.6	3.3	2.0	3.2	2.8
Species/Breeds	3.6	4.7	5.0	4.6	4.5
<u>Economic/Policy</u>					
Input prices	4.2	2.5	5.0	4.5	4.1
Animal prices	3.6	3.1	5.0	4.7	4.2
Marketing	4.2	4.1	5.0	4.7	4.6
Short-Term credit	4.0	3.0	5.0	4.4	4.2
Long-Term credit	4.2	2.1	4.0	3.4	3.5
Government subsidy	1.8	1.0	1.0	1.1	1.3
Import policy	1.8	1.1	1.0	1.8	1.5
<u>Traditional</u>					
Land tenure	3.6	3.0	1.5	1.2	2.4
Farm size	3.6	2.3	1.5	1.4	2.3
Farm labor	3.3	2.1	1.5	2.5	2.4
Education	3.8	3.5	4.5	4.0	4.0
Role of women	3.2	2.8	3.0	3.4	3.2
<u>Management Factors</u>					
Herd management	4.8	4.7	5.0	3.3	4.5
Range management	4.5	4.7	4.0	2.2	3.9
Health management	4.6	4.2	5.0	4.3	4.6
Overall Average	3.7	3.1	3.2	2.9	3.2

^a Weighted average of respondent rankings: 1 = Not serious, 5 = Very serious. Number of respondents varied by livestock from 2 to 9.

Source: Data collected from the DEVRES/SADCC Agricultural Research Resource Assessment.

c. Weeds

Weeds are a serious production problem where hand and hoe weeding are still the main weed control methods, which is the case among the small farmers of Zimbabwe. Farmers still rely on hoe weeding using family labour. Difficulties arise when the labour supply is reduced by children's school attendance or because of male urban migration which leaves the women solely responsible. Some of the main crops grown in Zimbabwe, such as maize, are highly susceptible to weed competition in the early stages of their growth so that timing of weeding is a critical factor in production. A maize crop heavily infested with weeds in the early growing stage stands virtually no chance of survival.

d. Insects and other pests

Insects and other pests are known to be a serious problem in crop production. The cotton industry in Zimbabwe was greatly impeded until a breakthrough was made in pest control during the 1960s. Other crops such as maize, sorghum and millet, groundnuts and vegetables are also seriously affected by insects and other pests. For communal area farmers, there are no cheap alternatives to chemical pest control which is largely beyond their means.

e. Crop varieties

Most of the available varieties of maize were developed for the high rainfall areas of Natural Regions I, II and III and are not suitable for the short rainfall periods, moisture stresses and mid-season droughts of the communal areas. Their storage properties in the communal areas are also not good. Sorghum and millet varieties are late maturing, low yielding and present processing problems which also affect their general acceptability. Groundnut varieties are limited in number and availability, and farmers expressed that they would like to try improved varieties if they were available.

f. Animal power

Small-scale farmers depend mainly on oxen for ploughing, but very few people own their animals and must hire draught animals or make arrangements with family members. The shortage of animal power has been accentuated by the drought that has reduced the number of cattle. Since ploughing is concentrated in a short period, some farmers are unable to get draughtpower while others plough too late to obtain optimum yields.

The lack of availability of fodder during the dry season when natural grass is almost non-existent is a factor that affects use of draught animals for they are too weak to plough. Farmers are then obliged to delay cultivation until after the first rains when the cattle have grass to renew their physical condition. This causes

delays in the planting of certain varieties that may be suitable and high yielding. Thus, the availability of draughtpower is a serious constraint to improved production.

3. Economic constraints

Prices, marketing and credit facilities were identified as serious constraints to the production of most crops. Cotton and millet, however, were not affected by these constraints.

a. Pricing

One of the problems inherited from the colonial government was unfair pricing for the commodities grown by African farmers. The Government has endeavored to correct some of these irregularities. However, there are still some commodities whose prices constitute a constraint to small farmer production. Farmers surveyed felt that prices were not high enough to cover production costs.

b. Marketing

Another economic constraint affecting small farmer production is the poorly developed marketing system for the communal areas. Farmers surveyed identified serious weaknesses in the marketing structure and administration that impeded the transfer of surplus output from farm to market place. Problems included lack of roads, trucks, spare parts, fuel, maintenance, bridges, market places, stores, processing plants, wholesale and retail arrangements, etc. It was expressed that the ineffectiveness of the delivery channels caused delays and frustration for the farmers. Further, the farmers did not have the resources to attempt to solve these infrastructural problems by themselves.

c. Credit

Lack of credit availability was identified as a serious constraint. As described in Chapter II, credit facilities are almost non-existent for the majority of communal area farmers. Only one quasi-governmental institution, the AFC, gives credit to the communal farmers. Comparatively few farmers are able to get credit at any time. Chemical and fertiliser companies give input credits but repayment terms are very unsatisfactory for communal farmers, who farm in regions where yield predictions are difficult to make. Some communal farmers have been known to lose their cattle and other assets in order to repay loans. In general, credit facilities are inadequate, and when available, the interest rates are too high.

4. Constraints related to rural traditions

a. Farm size

Uneconomic farm size is also a significant constraint to increased agricultural production. Population pressure in communal areas has resulted in subdivision of landholdings into small unproductive units. Even if other production constraints, such as labour and draughtpower, are removed, land scarcity continues to be a problem particularly because environmental constraints necessitate extensive rather than intensive cultivation.

b. Farmer education

Lack of formal education among communal farmers is a serious constraint to increased productivity. Lack of training in proper farming methods and the economics of production reduces the ability of farmers to utilise available technologies and services and to participate in the activities of researchers and extension workers. It has also been one of the main causes of land mismanagement and the resultant soil degradation.

c. Role of women

Women, who constitute the majority of the population over 15 years old in the rural areas, have been the main communal area farmers since the 1930s, when men shifted into the formal labour market. The role of women in agriculture is therefore very important. Women are a critical factor in activities such as hand planting, weeding, cotton picking and grading and processing. With reference to the cotton crop, for example, respondents said that no cotton would be grown at all without women. Cooperatives having a majority of women members have successfully implemented progressive ideas because women were receptive to new ideas and were willing to experiment.

d. Human labour

Small-scale producers depend on both human and animal power. Human labour is provided mostly by the family. Farming activities under rainfed agriculture in Zimbabwe are concentrated within the five months of the rainy season. They include land preparation, fertilisation and planting, weeding and further fertilisation, bird scaring and harvesting. Harvesting is done at the end of the rainy season and yet there is still a sense of urgency in completing the task. Climatic factors such as rainfall, relative humidity and temperatures affect various aspects of crop development so that timing is a very critical issue. For example, some maize varieties will not mature if sown after certain dates. In light of these factors, shortage of farm labour becomes a constraint at critical points in the cycle which, in turn, affects productivity.

5. Institutional constraints

a. Research

The survey showed that adequate and appropriate research was considered very important to increased productivity in the communal areas. Research priorities so far have been heavily in favour of the commercial sector. Except for maize and cotton, other crops (excluding tobacco) do not receive research attention in proportion to their importance in communal area production.

b. Training

The survey identified the need for appropriate training of all types of agricultural workers. Farmer training was also considered a serious constraint to production in almost all assessed crops. Lack of proper crop and livestock management also was a cause of low levels of productivity which results from lack of adequate education.

c. Extension

Extension services were considered inadequate for the extent of services required in the communal areas. Extension workers are needed to help develop farmer skills and training. The current ratio of one extension staff to 800 farmers is too low to provide effective service. The quality and appropriateness of extension worker skills were questionable and some extension workers in the field were servicing white commercial farmers, rather than communal area farmers. The communication skills and technology required by commercial and communal area farmers are quite different, as are their constraints, which implies that extension workers must receive particular training if they are to be effective in assisting communal farmers.

d. Planning and coordination of rural agricultural development programmes

During discussions with officials involved in various rural agricultural development programmes, serious constraints involving planning and coordination of rural development programmes were identified. As a result of the priority given to rural development following Independence, ministries, departments, parastatals and non-governmental organisations initiated development programmes. As there was no national rural development coordinating body, the programmes were carried out independently and organisations requested coordination assistance only as it became necessary. Some donor-funded and NGO programmes were also conducted independently. As a result, duplication exists in the functions of several institutions, and allocation of responsibility for some programmes and projects between particular ministries and departments is unclear. Examples of such projects are: the Model C resettlement scheme which involves

specialised agricultural projects such as tea, coffee, tobacco, sugar etc.; horticultural projects in communal areas; and grazing schemes.

Officials pointed out that rural development programmes invariably involve many ministries, departments, parastatals and non-governmental organisations. Furthermore, various programmes are at different stages and are interlinked to a greater or lesser extent with several others. Typical examples cited were resettlement exercises which involve several ministries, a minimum of nine departments, a number of parastatals and non-governmental organisations. The various organs are required to provide their inputs to the resettlement exercise in a timed and well-coordinated manner. Some of the stages involved in the exercise are as follows:

- o Acquisition of funds for purchase of land;
- o Identification of land in blocks large enough to justify provision of social, physical infrastructural and other basic amenities;
- o Accomplishment of the complex procedures for land purchase;
- o Identification of settlement sites on the basis of availability of basic amenities such as water;
- o Conduct of feasibility studies involving inputs from various government institutions such as Agritex, the Department of Veterinary Services, the Department of Physical Planning, the Water Development Authority, etc.;
- o Appraisal of the feasibility document; and
- o The processes of settling farmer families and initiating agricultural programmes.

In addition, the resettlement process requires planning and coordination from the national through the provincial, district and local levels. The current situation is one that lacks coordination, and results in fragmentation of responsibilities between various rural development authorities, in duplication of functions, in neglect of some important aspects of rural development and in programmes that are not well-linked to any government authority. In some programmes that are linked to the government, lack of proper coordination has often resulted in a failure to systematically develop additional linkages to the variety of institutions from which inputs are needed. This results in delays and dislocations at critical stages of programme development.

B. Major Animal Production Systems

1. Physical and biological constraints

Climate, rainfall patterns and soil characteristics were considered unimportant to most animal production with the exception of cattle production which was believed to be affected by annual rainfall.

All forms of forage supply were considered a serious constraint to increased animal production except for poultry production. Without adequate forage, cattle and goat production are seriously constrained. Water supply was a significant consideration, especially for cattle production. Lack of disease prevention and curative methods were considered serious constraints to all types of animal production. Insects and other pests were considered most serious for cattle and less serious for goats. Availability of improved breeds appropriate to communal area production was considered very important to increase poultry and goat production but less significant for cattle production.

2. Economic constraints

Marketing problems are a most serious constraint in all types of animal production. Cattle, goats and poultry need special facilities for distant markets. These facilities are not available for communal area farmers. These farmers depend on local markets where demand is inadequate for further expansion. Input prices and credit facilities were considered important for cattle and poultry but not for goats. Prices for poultry feeds have risen considerably which is making production less profitable.

3. Constraints related to rural traditions

Land tenure and farm sizes are constraints to increased cattle production. There are overstocking problems in the communal areas which will become complicated by increased production.

In general, the low level of education in rural areas was considered a serious constraint to increased production of all livestock types.

4. Management constraints

Management factors were also considered a serious constraint to all types of livestock production. Herd and range management limitations were serious for all but poultry, while health management was considered a serious constraint for all.

VII. STAFF ASSESSMENT OF INSTITUTIONS

This assessment was based mainly on interviews with staff of government institutions and the Faculty of Agriculture. Staff at private institutions and parastatals were reluctant to give candid opinions, especially on matters related to conditions of service. Generally, private institutions do not have funding problems and are adequately provided with facilities and high-quality equipment. However, they have been somewhat affected by foreign exchange shortages.

This exercise was aimed at eliciting staff responses to what they considered to be important factors affecting the optimum performance of their institutions. The results were obtained from questionnaires, additional narratives made by some respondents and views gathered in the discussions held during the presentation of questionnaires. The number of respondents from each of the three types of institutions is as follows:

<u>Institution type</u>	<u>Institution</u>	<u>Respondents</u>
Research	DR&SS	20
	Dept. of Veterinary Services	8
	National Parks & Wildlife	5
	Faculty of Agriculture	4
	Other respondents	3
Training	Branch of Agricultural Education	4
	Faculty of Agriculture	4
	University of Zimbabwe	5
	Other respondents	2
Extension	Agritex	14
	Dept. of Veterinary Services	3
	Dept. of National Parks & Wildlife	8
	Other respondents	4

The results of the survey are shown in Table 34. Constraints will be discussed collectively for all government institutions.

A. Government Institutions

1. Budget

The recurrent budget was inadequate especially for the intended expansion of programmes into the rural areas. This constraint was regarded as one of the most significant in determining the success or failure of small-scale agricultural programmes. The recurrent budget supports all important aspects of rural programmes such as transportation costs, subsistence allowances, repair and maintenance expenses and the general administrative expenses. This

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Table 34: Staff Assessment of Research, Training and Extension Institutions^a

Problems/Criteria	Research	Training	Extension	Overall Average	Number of Respondents		
					Research	Training	Extension
Budget:							
Consistency of support	3.6	3.1	4.1	3.6	40	15	27
Level of funding	4.2	3.1	4.0	3.8	40	15	28
Release of funds	3.3	2.9	3.2	3.1	40	15	26
Foreign Exchange Difficulties:							
For purchase of parts	3.8	4.2	3.4	3.8	39	15	26
For purchase of equipment	4.4	4.3	3.8	4.2	40	15	26
For purchase of books/journals	3.4	3.3	2.9	3.2	41	16	27
For purchase of special supplies	3.6	3.5	3.3	3.5	40	14	27
Senior Staff:							
Lack of training opportunities	2.9	3.1	3.8	3.3	41	14	29
Lack of interest in further training	1.6	2.5	2.6	2.2	40	14	29
Lack of experience/background	3.2	3.4	3.9	3.5	40	14	28
Lack of motivation	2.4	2.7	3.1	2.7	39	14	29
Lack of leadership	2.5	2.7	2.9	2.7	40	14	29
Junior Staff:							
Lack of training opportunities	3.1	3.4	3.7	3.4	40	16	29
Lack of interest in further training	1.8	2.6	2.4	2.3	40	14	29
Lack of experience	3.0	3.0	3.3	3.1	41	15	29
Lack of motivation	2.4	3.4	2.7	2.8	41	15	29
Support Staff:							
Lack of training opportunities	2.8	2.5	3.4	2.9	41	14	29
Lack of interest in further training	2.0	3.2	2.2	2.5	41	13	28
Lack of experience	2.8	3.3	3.5	3.2	40	14	26
Lack of motivation	2.3	2.7	2.6	2.5	39	13	29
Conference/Meeting Rooms:							
Number of conference rooms	2.4	2.5	2.7	2.5	38	12	28
Capacity of conference rooms	2.2	2.2	2.9	2.4	38	12	28
Adequacy of conference rooms	2.4	2.1	2.9	2.5	38	13	27
Classrooms:							
Number of classrooms	NA ^b	2.7	NA	2.7	NA	13	NA
Capacity of classrooms	NA	2.6	NA	2.6	NA	13	NA
Adequacy of classrooms	NA	2.5	NA	2.6	NA	12	NA
Laboratories:							
Number of laboratories	2.5	3.2	NA	2.9	38	13	NA
Capacity of laboratories	2.8	3.5	NA	3.2	39	13	NA
Adequacy of laboratories	2.4	3.8	NA	3.1	39	13	NA

ZIMBABWE: AGRICULTURAL RESEARCH RESOURCE ASSESSMENT

Table 34: Staff Assessment of Research, Training, and Extension Institutions^d(cont.)

Problems/Criteria	Research	Training	Extension	Overall Average	Number of Respondents		
					Research	Training	Extension
Offices:							
Number	2.7	3.8	3.2	3.2	39	15	29
Capacity	2.2	3.4	2.9	2.8	40	14	29
Adequacy	2.0	3.1	3.1	2.7	40	14	29
Equipment:							
Insufficient number/Obsolescence	3.6	4.2	3.5	3.8	39	14	28
Lack of repair/maintenance	3.5	4.8	3.4	3.9	40	14	29
Funds for essential equipment	4.1	4.9	4.0	4.3	40	15	28
Transportation:							
Budget for operations	3.3	4.0	4.1	3.8	41	14	28
Availability/Access	2.7	4.5	3.9	3.7	39	15	28
Adequacy of allocation		4.4	4.2	4.3	-	-	29
Maintenance/Care	3.0	4.1	3.2	3.4	39	13	28
Number of vehicles/bicycles	3.1	4.9	4.4	4.1	40	14	28
Staff Housing:							
Number of houses	3.2	3.2	4.0	3.5	37	15	28
Adequacy of staff housing	2.9	2.9	3.8	3.2	36	15	29
Salary Scales/Levels:							
Not sufficient to hold staff	4.6	4.6	3.9	4.4	41	15	28
No differentiation for remote posts	-	-	4.5	4.5	-	-	29
Competition from the government sector	3.0	3.0	3.6	3.2	40	15	28
Competition from private sector	4.7	4.7	3.3	4.2	41	15	29
Promotion System:							
Promotion schedule	3.6	3.6	4.5	3.9	40	15	29
Rewards for superior service	3.8	3.8	3.7	3.8	40	15	29
Without higher training certificate	-	-	3.8	3.8	-	-	29
Staff evaluation procedure	3.2	3.2	3.3	3.2	38	15	29
Tenure System:							
Tenure security rules	2.4	2.4	3.2	2.7	38	15	29
Tenure for superior young staff	2.4	2.4	2.4	2.4	38	15	25
Other Benefits:							
Leaves of absence schedule	1.9	1.9	2.9	2.2	39	15	26
Health benefits	2.7	2.7	1.9	2.4	38	15	28
Retirement benefits	3.4	3.4	3.2	3.3	39	15	28

^a Key to seriousness of problems/criteria: 1 = Not serious, 5 = Very serious.

^b NA = Not Available, Not Applicable, or No Answer.

Source: Data Collected from the DEVRES/SADCC Agricultural Research Resource Assessment, 1984.

aspect of the budget was considered inadequate, inflexible and inconsistent, making impractical an effective shift of emphasis to rural areas.

Foreign exchange difficulties were regarded as serious setbacks to the implementation of small-scale agricultural programmes when special purchases such as equipment, spare parts, and vehicles from abroad were needed for successful implementation.

2. Facilities and equipment

Some government institutions were lacking equipment or could not replace or repair obsolete equipment. This was caused by lack of funding and foreign exchange. Lack of maintenance and repair skills were additional factors affecting availability of equipment. Some equipment was permanently damaged, and enormous funds were spent on repairing damages that could have been avoided.

Conference rooms, offices and laboratories were not adequate in some government institutions. Some of the available facilities were not adequately furnished or equipped and some badly needed maintenance and repair. Other government institutions have enough facilities of good quality.

3. Transportation

Lack of transport facilities was an important issue identified by most institutions. There were serious shortages of vehicles to execute important duties. When available, the vehicles were either in disrepair or operating funds were not available. Vehicles were difficult to acquire, maintain and repair due to interrelated constraints such as general funding problems, foreign exchange constraints, etc. This often resulted in failure to implement programmes or caused delays. The DR&SS, the DVS and the government extension services are most seriously affected by the transportation problem.

4. Terms of service and benefits

Salaries and benefits were considered serious constraints to recruitment and retention of professional and technical staff, particularly in government institutions, since private sector salaries and benefits were more attractive. Lack of uniform promotion structures was an additional cause for dissatisfaction in government institutions as were lack of rewards for exceptionally good work, lack of differentiation of performances under different work loads and unsatisfactory evaluation procedures. Retirement benefits were unsatisfactory since they were unadjusted for inflation. This generated a sense of insecurity. Although there is a public service medical aid scheme, it does not cover all categories of staff, particularly those at junior levels.

Government institutions were regarded as being insensitive to staff problems. Benefits such as loans were not easily available and neither was housing for junior staff.

B. Parastatals and Private Institutions

Funding constraints for parastatals and private organisations were different from those of government institutions. Private organisations and parastatals were constrained by foreign exchange shortages, but recurrent expenses were not a problem. Their facilities and equipment were adequate and of high quality except where lack of foreign exchange prevented purchase of special equipment or spare parts.

VIII. CONCLUSIONS AND RECOMMENDATIONS

A number of constraints to higher productivity in the communal areas were identified through the questionnaires, through additional narratives and through discussions held with respondents. They ranged from those requiring solutions at the national level to those that could be tackled at departmental and institutional levels. Constraints to increased productivity in crops and livestock among communal farmers were also identified. These constraints were discussed in the previous Chapter; some recommendations to deal with these constraints will be discussed in this Chapter.

A. Strengthening Zimbabwe's Agricultural Institutions

1. Planning and coordination of rural development programmes

Each of the research, training and extension institutions are involved in the overall rural development process and each programme involves many ministries, departments, parastatals, NGOs and other private sector institutions. Consequently, successful implementation requires good coordination at the national, provincial, district and local levels. The focus of development programmes in Zimbabwe is on small-scale production in the communal and resettlement areas where the main constraints to implementation also are the lack of proper planning and coordination. Coordination is vital to identify, plan and implement development strategies, to monitor and evaluate activities and to oversee the pace and direction of development. A rural development planning and coordination body is required at the national level. All rural programmes designed by the different ministries, departments and other organisations would be channeled through the coordinating body which could be made up of representatives of the ministries involved in rural development.

Extension has a vital role in the resettlement schemes, both in planning and the initiation of activities related to livestock and crop production. Research could help identify and develop appropriate crops and livestock technology and pasture research relevant to the area. Research could also be undertaken on the economics of small-scale farming and on the socioeconomic aspects of production.

2. Emphasis on communal area (small-scale farmer) development

The shift in national development policy emphasis from the commercial to communal areas has been appreciated by many institutions which have made appropriate adjustments in their own policies and objectives. Research activities are still beneficial to the commercial sector. Projects designed for the communal areas still need to be expanded further. Research, extension and training must be reoriented such that they reflect government priorities in the communal areas. Staff must be trained to execute communal area programmes, and to be able to provide appropriate in-service training

to communal area farmers so that an educated farming cadre can be developed for the resettlement, cooperative and communal areas.

3. Budget priorities

Flexibility in the administration of the recurrent budget is required to facilitate solutions of ad hoc problems which are often encountered in the communal areas. Recurrent expenses should be appropriately planned to adjust for the proposed expansion of programmes for the communal areas.

4. Funding and foreign exchange

Foreign exchange and budgetary constraints are really a function of the economic situation prevailing in the country which has been greatly affected by the three years of drought coupled with the world economic climate. It is necessary to seek short-term solutions as a temporary measure until the economic climate improves.

Respondents identified constraints common to all government agricultural institutions related to the coordination, planning and implementation of programmes. These included budgets and staffing problems. Special or sometimes interrelated constraints were identified for some institutions as being a legacy of the colonial system.

5. Transport facilities

Institutional planning is required to ensure adequate transportation and subsistence allowances which are vital to enable agricultural workers to visit farmers. The provision of transport is going to be one of the decisive factors in the success of communal area programmes.

6. Staff problems

The administration should be more sensitive to staff problems as these have a strong bearing on overall institutional performance. They are duty-bound to reflect the true feelings of their staff and adequately represent them where their work-related interests are decided. Efforts should be made to find satisfactory promotion systems, and good work and deserving staff should be rewarded appropriately.

7. Inter-departmental liaison

The communication between researcher and extension worker, and between them and the farmers is not yet well developed. As shown by the amount of professional effort given to particular commodities, the research emphasis was on beef and maize production while extension work was focussed on crop production. Meanwhile, farming systems

research showed that beef production in the communal area ranked very low in the farmers' scale of priorities.

The following are some suggested strategies to deal with this constraint:

- o Liaison between research and extension should be strengthened and both should communicate directly to farmers without conveying contradictory messages;
- o Livestock and crop production researchers should fully understand current production systems and take cognisance of the target farmers' objectives and priorities; and
- o An approach should be developed to research in the communal areas which will include researchers, extension workers, sociologists and farmers to assess the constraints and to develop appropriate and acceptable solutions.

8. Extension service reorganisation

Field extension workers should be mobilised for development work in the communal areas. In order to be most effective, they will need multidisciplinary in-service training in technical, socioeconomic and communication skills. Some back-up service could be provided through trained farmers assisting extension workers in a manner similar to the system of village health workers in Zimbabwe.

9. Women in communal area agriculture

Women in Zimbabwe play a vital role in agricultural production. It is in the national interest to mobilise this force in the following ways:

- o Train more women in agriculture and allow them to participate fully in the activities of agricultural development in research, extension and training; and
- o Provide women farmers with the necessary skills and facilities to enable them to achieve optimum productivity and to remove those social and traditional constraints that work against them and restrict their performance.

10. Role of politicians in rural agricultural development

Politicians play vital roles in the development of their nations. If properly used, their role of educating and bringing awareness to the people could greatly facilitate agricultural development. The Prime Minister's role in promoting afforestation by motivating rural people is a practical example of how politicians can effectively participate in and lead national development. The fight against soil degradation and the need to conserve and efficiently use

water are but a few areas in which politicians could effectively educate the people. Agricultural workers, therefore, need to consider this method of disseminating information and mass education.

B. Dealing with Constraints Affecting Crop and Livestock Production

1. Physical and biological constraints

Soil and water conservation are crucial issues in Zimbabwe. Land conservation activities were long appreciated by the colonial administrators. However, the methods used to mobilise the communal area people were unacceptable to the latter and therefore the exercise became counter-productive. It is therefore necessary to seek solutions to this urgent problem, bearing in mind the effects of the previous government's methods. All departments involved in rural development should work together in this reclamation effort. The Departments of Natural Resources and National Parks and Wildlife should adjust their efforts in research, extension and training to realign their activities with the magnitude and urgency of this problem.

Research on weeds, pests and diseases was previously directed to the commercial sector and communal area problems were left to chemical companies whose main interest lay in promoting their products. Plant protection services were centralised at headquarters in Harare. In order to reach the remote communal areas, it is necessary to expand and decentralise these services.

Since labour is a serious constraint to agricultural production, it is necessary to develop appropriate technologies which will expedite activities and reduce the need for human labour in planting, weeding, harvesting and processing. There is and will be a real problem caused by lack of draughtpower following these years of drought. An alternative to oxen power should be urgently sought.

2. Prices and policy

The Government is aware of the inherited problem of unfair pricing for the communal farmers' commodities and has been taking steps to correct the situation. It is now necessary to assess the true costs of crop and livestock production systems in the communal areas. Commodity prices should be linked to the costs of production. There is a need in vegetable marketing, for example, to fix prices to benefit both the buyer and seller and avoid exploitation by private transport owners.

Marketing problems due to lack of infrastructure such as roads, transport, depots, storage facilities, and lack of proper administration causes losses for farmers. Infrastructural problems such as these require attention in order for marketing to improve. Special consideration should be given to marketing perishable commodities.

3. Tradition

The problem of land shortage is acute in some communal areas but the government is taking steps to alleviate it. In the old communal areas there is a need to reorganise settlements to facilitate crop and livestock improvement programmes. Pasture improvements also are not possible under the present system of communal grazing, and settlement reorganisation, as well as fencing and paddocking of pasture land, are necessary for these improvements to occur.