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The International Livestock Centre for Africa



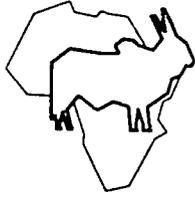
ILCA

P.O. Box 5589, Addis Ababa, Ethiopia

ILCA AND THE CGIAR

The funding for ILCA's work is coordinated by the Consultative Group on International Agricultural Research (CGIAR). The CGIAR Secretariat is in Washington DC, USA. Other CGIAR-supported centres are located in Peru, Colombia, Mexico, USA, Nigeria, Liberia, Kenya, the Netherlands, Italy, Syria, India and the Philippines.

ILCA is one of two of these centres focusing specifically on livestock production and its improvement – the other centre is the International Laboratory for Research on Animal Diseases (ILRAD), which is based in Nairobi (Kenya).



THE INTERNATIONAL LIVESTOCK CENTRE FOR AFRICA

INTRODUCTION

ILCA, the International Livestock Centre for Africa, is one of a group of 13 international centres for agricultural research whose funding is coordinated by the Consultative Group on International Agricultural Research (CGIAR). ILCA was established in 1974.

ILCA's aim is to improve livestock and food production in sub-Saharan Africa. Its activities centre on research, training and information services.

ILCA's headquarters are in Addis Ababa, Ethiopia, and there are regional offices in Nairobi (Kenya), in Gaborone (Botswana), in Kaduna and Ibadan (Nigeria), in Bamako (Mali), Niamey (Niger) and Banjul (Gambia).

ILCA'S DONORS

Currently ILCA receives funding from the following countries and donor agencies:

Australia
Belgium
Canada
China
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Finland
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France
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Centre (IDRC)
International Fund for Agricultural
Development (IFAD)
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United States of America

ILCA'S ADDRESSES

*Headquarters/Central Research/
Training/Library/Information*
P.O.Box 5689, Addis Ababa, Ethiopia.
Telex: 21207 . Tel.: 18-32-15/19,
18-32-22, 18-24-55

Highlands Programme
P.O.Box 5689, Addis Ababa, Ethiopia.
Telex: 21207 . Tel.: 18-32-15

Humid Zone Programme
P.O.Box 5320, Ibadan, Nigeria.
Telex 31417 . Tel.: 41-34-40

Subhumid Zone Programme
P.O.Box 2248, Kaduna, Nigeria.
Telex: 71384

*Arid and Semi-arid Zones Programme
(West Africa)*
P.O.Box 60, Bamako, Mali.
Telex: 459 . Tel.: 22-21-77

P.O.Box 12404, Niamey, Niger.

Ethiopian Rangelands Programme
P.O.Box 5689, Addis Ababa, Ethiopia.
Telex: 21207 . Tel.: 18-32-15

*Kenyan Rangelands Programme/Livestock
Productivity and Trypanotolerance Group*
P.O.Box 46847, Nairobi, Kenya.
Telex: 22040 . Tel.: 59-20-66

Botswana Rangelands Programme
P.O.Box 20604, Gaborone, Botswana.
Telex: 2412 . Tel.: 51697, 51177 Ext. 72

International Trypanotolerance Centre
P.O.Box 2571, Serrekunda, Gambia.

ORGANISATION

ILCA's Directorate and Administration and Finance departments are at headquarters in Addis Ababa. ILCA's research work is complemented by that of the Training, International Liaison and Information departments which are also based at headquarters.

ILCA's research centres around seven field programmes. Two of these, the Highlands Programme and the Ethiopian Rangelands Programme, operate from headquarters. The Kenyan Rangelands Programme and the Botswana Rangelands Programme are based in Nairobi and Gaborone respectively. The remaining field programmes are in West Africa: the Humid Zone Programme in Ibadan, Nigeria; the Subhumid Zone Programme in Kaduna, Nigeria; the Arid and Semi-arid Zones Programme in Mali and Niger; and the joint ITC programme in Gambia.

Research in ILCA's field programmes is supported and complemented by that of the central research units, most of which are based at headquarters. The exception is the Livestock Productivity and Trypano-tolerance Group in Nairobi, Kenya. Central research units based at headquarters in Addis Ababa are:

- the Livestock Economics Unit
- the Forage Legume Agronomy Group
- the Nutrition Unit
- the Small Ruminant and Camel Group

- the Range Research Unit
- the Systems Research Unit
- the Resource Survey Unit
- the Computer Unit

RESEARCH APPROACH

ILCA bases its research on a multi-disciplinary systems approach. Research activities require a clear understanding of the functioning of farming systems in the different agroclimatic zones of sub-Saharan Africa. Such an understanding is developed through detailed literature studies and initial surveys of existing farming systems. ILCA's

research teams employ satellite imagery, aerial surveys and ground surveys backed by agronomic and livestock research to study existing farming systems in detail and diagnose the constraints to increased production.

Improvements are then sought to overcome key constraints, and these are tested on research stations, then on farmers' land and in pastoralists' herds.

ILCA's research seeks to complement and strengthen national research efforts. The Centre is actively sponsoring networks of national research efforts in specialized fields.

ILCA's headquarters site near Addis Ababa.



BOARD OF TRUSTEES

ILCA's work is guided by a Board of Trustees. The Board includes representatives of countries in sub-Saharan Africa and of donor countries. Board members meet regularly to assess and review ILCA's progress and to oversee the funding of the different research projects. Members also serve on the Executive, Programme and Finance Committees.

DIRECTORATE

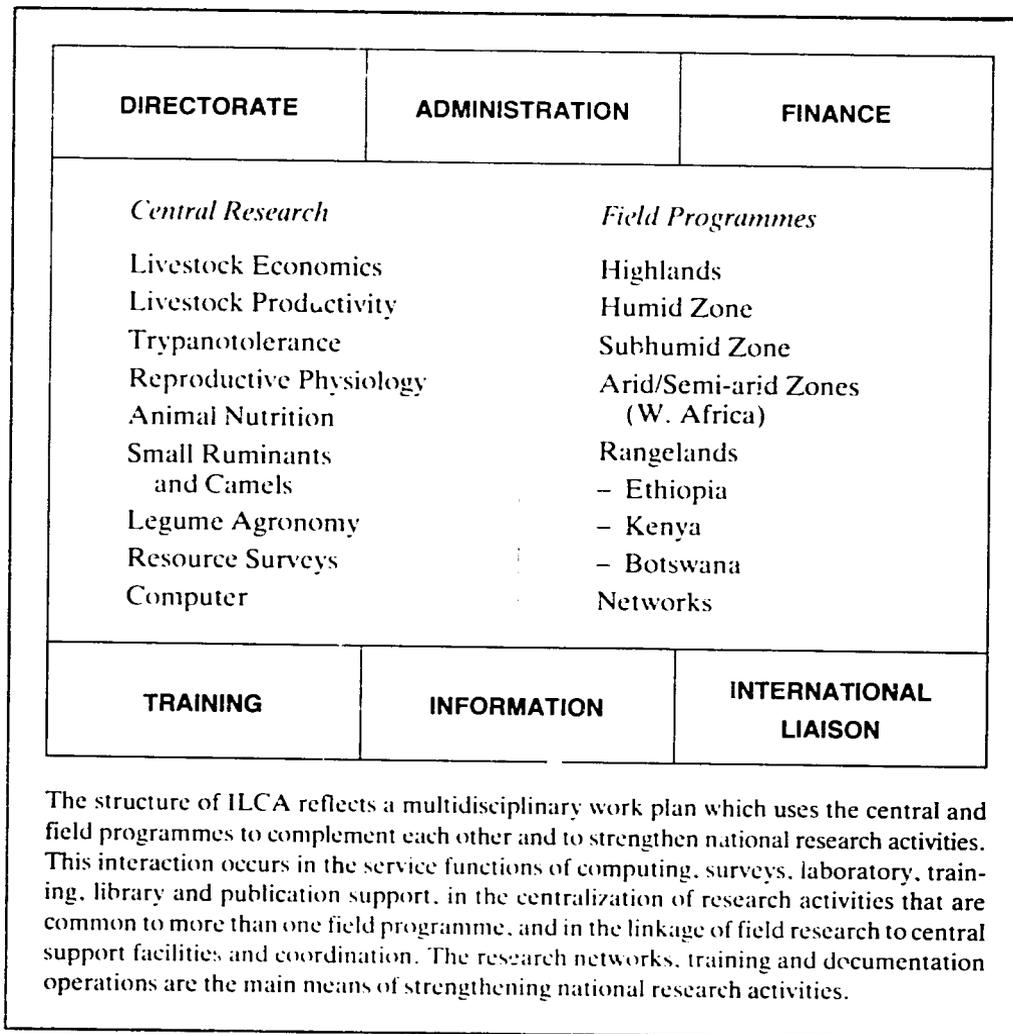
In addition to the Director General's Office ILCA has Directors of Research, Information, Training, International Liaison and Operations.

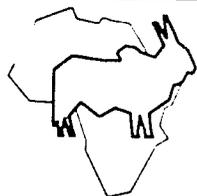
ADMINISTRATION

ILCA's Administration Department includes the Personnel, General Services and Maintenance sections and the Warden's office. ILCA's hostel facilities provide accommodation for up to 50 visitors.

FINANCE

The Finance Department is responsible for internal accounting procedures and for ILCA's budget. The Department is located at headquarters, but interacts closely with all units and field programmes.





THE HIGHLANDS PROGRAMME

ILCA's Highlands Programme has two principal research sites at different altitudes in the Ethiopian highlands. These sites, at Debre Berhan (2850 m a.s.l.) and Debre Zeit (1800 m a.s.l.), are located in areas which have been surveyed in detail by the Programme.

The Programme's research is aimed at increasing overall farm production in the mixed crop and livestock smallholder farming systems in the African highlands. Improvements in livestock production are used as the catalyst in the process.

Component research focuses on key elements of the traditional system, including soil fertility, forage production, draught animal use, sheep production, small-scale dairy-processing technology and water harvesting. The highlands team has introduced a combination of improvements,

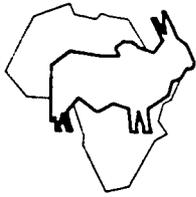
including better seed, fertilizer, forage crops and crossbred cows.

Forage crop trials have demonstrated striking responses of native Ethiopian clovers to small applications of phosphorus when the crops are grown on the heavy black clay vertisols common in the highlands. The highlands team has also adapted the traditional *maresha* plough normally pulled by two oxen. The modified plough can now be drawn by a single ox, enabling many more smallholder farmers to be self-sufficient

in land preparation, and demonstrating that there are opportunities to develop minimum draught cultivation systems even in traditional farming areas. The team is also investigating the possibility of introducing non-conventional uses of draught animals for the construction of dams and surface ponds. If successful, such developments will increase the contribution of animals to the farming system and allow major improvements to food production.

Excavating a surface pond at Debre Berhan.





THE HUMID ZONE PROGRAMME

ILCA's Humid Zone Programme, based in Ibadan, Nigeria, focuses on the dominant farming systems of the humid zone of West Africa, where livestock play a subsidiary role to food crops. To date the Programme has sought to increase the productivity of village sheep and goat flocks through the development of links with crop production. Increased attention is now being given to milk production and to draught animals in this difficult environment.

The team has used vaccination and monthly dipping to combat the two main diseases in the area, and is continuing to assess diseases in different management situations. Outstanding lines of browse legume species are evaluated by the Programme for their palatability, their yield at critical times of the year and their persistence under cutting and browsing regimes.

The team has adapted the 'alley cropping' system which was originally developed by the International Institute of Tropical Agriculture (IITA). In this system food crops are grown in alleys separated by lines of leguminous browse trees. Foliage from the trees may be used as mulch on the cropped area, and browsed by sheep or cows, and carried to sheep and goats.

Intensive 'feed gardens' have also been established in areas where land is in short supply. These feed gardens depend on intensive nutrient cycling through the

frequent application of manure, mulch and fertilizer to maximise feed production from a limited area.

The humid zone is infested by the tsetse fly, which carries the animal disease trypanosomiasis. The Programme traps tsetse flies to relate the incidence of disease to tsetse challenge. This work is an important part of the trypanotolerance network coordinated by ILCA's Livestock Productivity and Trypanotolerance Group based in Nairobi.

A poster on alley farming prepared by the Humid Zone Programme.





THE SUBHUMID ZONE PROGRAMME

The Subhumid Zone Programme is based in Kaduna in northern Nigeria. The diagnostic studies of the team focus on three study areas. Each area is about 2500 km² and contains arable farmers and Fulani agropastoralists. The importance of crop residues in the dry-season diet of cattle and the widespread use of animal manure in cropping have led the team to focus their research on the interactions between crop and livestock production and to use legumes as the key linkage between increased crop and livestock production.

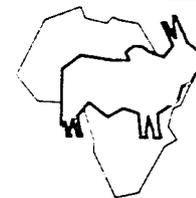
ILCA's team has developed fodder banks of *Stylosanthes* spp. which provide high-protein feed for cattle during the dry season. This has resulted in improved animal nutrition, and the Fulani agropastoralists are now growing their own fodder banks. The banks require minimal cultivation and the legume pasture adds nitrogen to the soil. The team is exploring

the potential for sequential crop – forage rotations within fodder banks.

By growing sorghum and *Stylosanthes guianensis* on alternate ridges and by planting the sorghum in two stands per hill rather than one, sorghum grain yields equivalent to those from sole cropping have been obtained, while the *Stylosanthes* yields up to 2000 kg of high-protein forage as a bonus.

ILCA's team in the subhumid zone is also studying animal health, crop residue improvements, cropping potentials and the development of smallholder dairying.

Stylosanthes growing in a fodder bank in the subhumid zone of Nigeria.



THE ARID AND SEMI-ARID ZONES PROGRAMME

ILCA's Arid and Semi-arid Zones Programme in West Africa is based at Bamako in central Mali. Work is also carried out in Niger in close collaboration with the Sahelian Centre of the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), a sister institute of ILCA within the CGIAR.

In the design and testing stages of research, the team's work is now focused on agronomic trials, the nutrition of work oxen, animal health problems and improvements in pasture management.

Agronomic trials are being carried out on the improvement of floodplain pastures and links between the growth of millet and cowpea. Intercropping of millet and cowpea has produced increases in both the quality and the quantity of animal fodder. The introduction of cowpea into the cropping cycle has resulted in large increases in millet grain yields following cowpea.

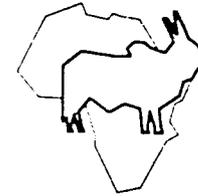


Cowpea cultivation in the semi-arid zone of Mali.

Various feeding regimes have been tested on work oxen in the agropastoral system, including the feeding of legume hay and cottonseed cake. This testing is carried out in collaboration with local farmers using their own oxen in their own fields, and is evaluated by measurement of crop yields.

The disease status and the reproductive performance of small ruminants in the agropastoral system are being monitored by epidemiological surveys, field examinations and slaughterhouse studies. In the testing of veterinary packages, the best results have been obtained by vaccinating small ruminants against pasteurellosis.

A simple improvement scheme for small ruminant production in the agropastoral system has been designed, based on exploiting genetic variability among individual animals and on improved management. Through questionnaire surveys and by studying selected flocks, the team is determining those management techniques leading to improved output. Grazing trials have shown large increases in forage production with rotational grazing compared with traditional grazing.



THE ETHIOPIAN RANGELANDS PROGRAMME

The Ethiopian Rangelands Programme is based at ILCA's headquarters, and its research is focused on the southern rangelands of the country.

The Borana plateau of the southern rangelands covers an area of 95 000 km². The pastoral system is based on permanent wells and a dry-season grazing area defined by water availability. The work in the southern rangelands is carried out as a joint project between ILCA's team and the Rangelands Development Project of the Ethiopian Ministry of Agriculture.

The research includes studies of well and pond use, animal production and the introduction of food crops and forage legumes into the area.

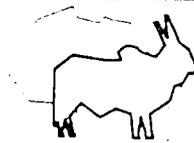
Sealing the watering troughs around wells in the southern rangelands has resulted in increased water and labour efficiencies. Various materials for making buckets for drawing water from the wells are also being



ILCA enumerator interviews a Borana pastoralist

tested. Desilting surface ponds using ox-drawn metal scoops is proving successful.

Studies of management strategies have shown that milk is the major production objective and that competition between human and calf needs for this milk is a major constraint to animal performance. Milk offtake for human consumption follows a bimodal curve corresponding to the different rainy seasons, to increased plant growth and to the total amount of milk produced. Lactations starting in March/April provide about 30% more milk than those starting in October/November. Alternative means of supporting better calf growth are being sought.



THE KENYAN RANGELANDS PROGRAMME

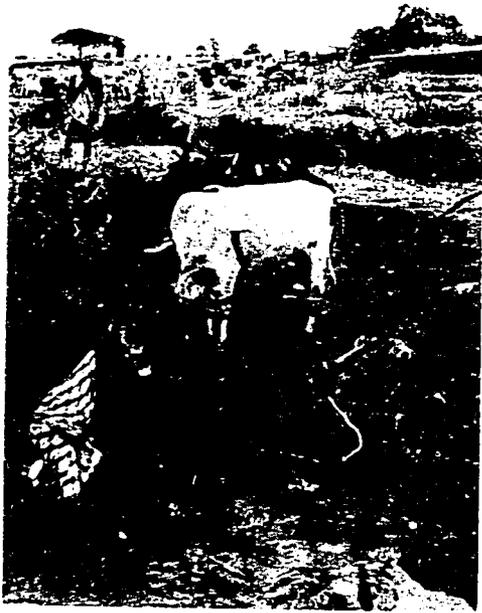
ILCA's research on the range livestock systems of Kenya is carried out among the Maasai pastoralists. The team is based

Discussion with Maasai elders in a group ranch in Kenya.



in Nairobi and the research programme focuses on an area of about 1700 km² in Kajiado District, southeast of Nairobi. Three group ranches in this area have been studied in detail.

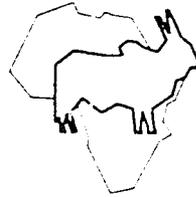
ILCA's team aims to clarify the causal relations in the production systems, to identify the constraints to production and to design and test improvements. The team has developed integrated techniques for evaluating rangeland resources, combining satellite imagery, aerial surveys and ground studies. The ground studies include the time allocation technique used to study labour



Maasai herders watering their cattle.

patterns, and a technique for the rapid assessment of wealth status, which is itself related to herd and flock productivity.

Detailed human nutrition studies have revealed clear seasonal patterns in food consumption, variations in nutritional status with age and sex, and for children a marked relationship between work activity and nutritional status.



THE BOTSWANA RANGELANDS PROGRAMME

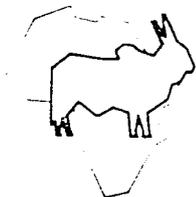
ILCA's work in Botswana is concerned with evaluating government policies for the eastern communal grazing areas, where people form associations for the management of animals, land and water. The work aims to monitor the seasonal distribution of livestock in two study areas, to measure home ranges and small-scale movements of selected herds, and to explain animal distributions in terms of the quality and quantity of range resources. The Programme also aims to demonstrate and adapt cost-effective and rapid survey methods so that approaches found useful in the two study areas can be used elsewhere in the communal areas.

The northern study area is within the project area of the recently established Agricultural Technology Improvement Project of the Botswana Government. The southern area is under the government's Integrated Farming Pilot Project. In the

northern area ILCA's work contributes information to the descriptive phase of the government's project and helps the Ministry of Agriculture identify groups of people, herds and areas of land where extension efforts should be focused during the implementation of a new policy for cattle development and range management. In the southern area ILCA's work provides a technical and biological basis for government proposals for communal range management.

Satellite image of Africa taken by the NOAA-7 satellite in July 1984. Satellite images are being used increasingly by ILCA scientists to complement aerial surveys and ground recording.





SUPPORT UNITS

The Livestock Economics Unit

ILCA's Livestock Economics Unit was established at headquarters during 1983. Its role is to highlight the importance of policy issues in livestock development, to carry out research on selected policy issues, and to bring such results to the attention of those who make policies for the livestock sectors of African countries.

Studies undertaken so far include the financing of livestock services in Africa, the identification of those factors which determine why the livestock sectors of some countries perform better than others, and the economic and social effects of the imports of dairy commodities into Africa.

The Livestock Productivity and Trypanotolerance Group

The Livestock Productivity and Trypanotolerance Group is based in Nairobi, Kenya, where ILCA's team works closely with staff of the International Laboratory for Research on Animal Diseases (ILRAD).

The work of the Group focuses on the biological and economic aspects of livestock productivity, with a strong emphasis on trypanotolerant livestock. The Group has established a network of national research and epidemiological studies to investigate the performance of trypanotolerant livestock over a range of locations. Studies in nine countries in West and central Africa are evaluating the productivity of trypanotolerant breeds of domestic

The N'Dama: an important trypanotolerant breed of West Africa.



ruminants living under different measured levels of tsetse-trypanosomiasis risk.

The Group is involved also in comparative breed studies in cooperation with national organisations and private producers. This work is building up comparative production information on important livestock groups in Africa. A new unit of the Group is being established with EEC support in Gambia in 1985.

The Forage Legume Agronomy Group

The Forage Legume Agronomy Group was established at ILCA's headquarters during 1982, incorporating the plant collection work started earlier by the Highlands Programme. The long-term objectives of the Group are to investigate, evaluate and promote better forage production and utilisation in African livestock production systems of all types.

The main headquarters activity so far established is the collection and screening of legume lines at a range of sites. This work provides forage germplasm for ILCA's field programmes and for national research and development organisations throughout sub-Saharan Africa. The Group also works in close collaboration with ILCA's field agronomists on legume establishment and ecology, legume productivity in pastures and different cropping systems, nitrogen fixation, soil fertility and improved crop yields.



Planting Trifolium seeds for forage germplasm screening.

The Group plays a key role in training and communications among forage researchers throughout Africa.

The Nutrition Unit

ILCA's Nutrition Unit is based at headquarters and includes laboratory and animal barn facilities. The Unit provides a laboratory analysis service for ILCA's field programmes and for other African institutions. It also carries out original research in the development of improved feed and nutrition for African livestock and is particularly concerned with improving the utilisation of forage-based feeds.

Two animal barns and about 220 animals at headquarters enable the Unit to carry out detailed nutrition, digestibility and reproductive studies. Some of the animals are also used for animal traction work with the Highlands Programme.

The Unit is well equipped for nutritional analyses and can determine a large range of both macro and micro elements: a laboratory has also been established for soil analysis.

Browse intake and digestibility studies include work on tannins which lower protein digestibility, inhibit microbial activity and reduce palatability. Nitrogen metabolism in

Analysis of macro and micro nutrients using an atomic absorption spectrophotometer.



the rumen is a particular interest of the Unit.

Interactions in the improvement of the nutritive value of crop residues by the inclusion of legumes, and the nutrition of work oxen and donkeys, are also studied.

The Range Research Unit

The Range Research Unit was formed at ILCA's headquarters during 1984. The Unit coordinates aspects of research common to ILCA's three East African rangeland field programmes and to the Arid and Semi-arid Zones Programme in West Africa. It provides a modelling capability based on field data and collates information on rangelands not covered by ILCA's field programmes.

The Systems Research Unit

The Systems Research Unit was established at headquarters during 1984. The Unit undertakes a support and advisory service for ILCA's field programmes, especially in micro-economics, and is developing analytical techniques, in particular systems modelling. It forms a key element of ILCA's economic work.



Routine investigations into Maasai flock productivity in progress at an ILCA field site.

The Small Ruminant and Camel Group

The Small Ruminant and Camel Group was established at ILCA's headquarters during 1983. The Group provides a network for national research on these species.

Goats and sheep account for 28% of African meat production although their total liveweight is equivalent to only 17% of the domestic herbivore biomass in the continent. Camels are the main source

of subsistence for many people living on the margins of the deserts of Africa and at the very edge of survival.

The Group analyses data on small ruminants and camels, and summarises existing national, regional and international research for African research workers. The Group attempts to link research groups more effectively to each other and to research and development needs.

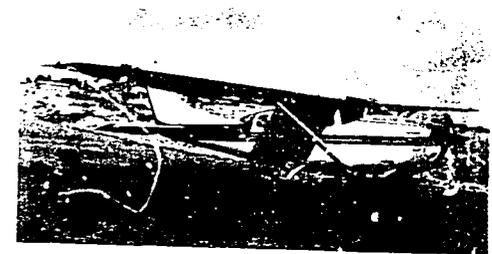
The Resource Survey Unit

The Resource Survey Unit assists ILCA's field programmes in the survey of livestock numbers and movements, human populations and feed resources. It complements the ground survey work carried out by the programmes themselves.

Satellite imagery is being used as a source of information on feed resources, particularly in pastoral areas, and for determining the length of the growing period in different areas. Extensive use is made of the computer in the analysis of these data, and suitable hardware and software are being acquired for use with satellite imagery and in mapping.

ILCA owns two planes used in the aerial survey work. One is based in West Africa and the other in East Africa. The Unit is working towards an integrated system of resource assessment, employing satellite imagery, aerial surveys and ground studies.

ILCA's new Cessna 206 ... used for aerial surveys in East Africa.



The Computer Unit

The Computer Unit at headquarters provides ILCA scientists with statistical analysis of their research results as well as with advice on experimental design and data collection methods. It also provides



Data analysis in the Computer Unit.

computing services for the Finance and Documentation sections and, where appropriate, assists national authorities with their computing requirements.

The Unit has two Hewlett Packard HP 3000 mini-computers, and about 25 HP 125 and HP 150 microcomputers. The computer software includes statistical packages, administrative and financial

packages, documentation programmes, word processing and graphics.

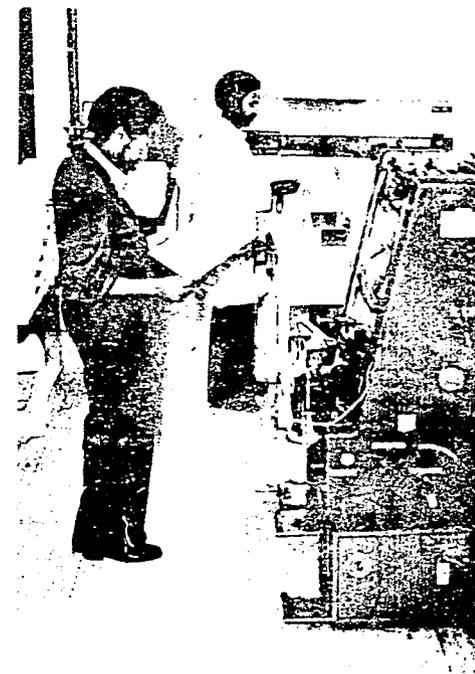
Information Services

ILCA's information services include the Library and Documentation Section, the Publications Section, and the Audio-Visuals and Mapping Section.

The library houses over 15 000 books and subscribes to 940 journals. The microfiche collection totals about 25 000 fiches and the map and slide collection about 10 000 items. The Library and Documentation Section provides a selective dissemination of information (SDI) service for African research workers. This service is based on the monthly computer analysis of abstracts from the Commonwealth Agricultural Bureaux in England and from FAO's AGRIS system in Rome.

The Section also runs a project for the collection of 'non-conventional' literature on livestock research and development from African countries. The project involves visiting African national institutions to locate and microfiche valuable but unpublished reports and documents. This information is stored at headquarters, providing a unique collection of information which is available to research workers throughout the continent.

The Publications Section is responsible for producing a range of publications on



Another research report off the press in ILCA's busy print-shop.

ILCA's work in both French and English. These include the *Annual Report*, research reports, the *ILCA Newsletter*, the *ILCA Bulletin*, conference proceedings, manuals and information brochures.

The Audio-Visuals and Mapping Section produces tape/slide presentations on ILCA's work and other visual aids for use by

ILCA staff in meetings and conferences. The Section also provides cartographic support to ILCA's research programmes and units.

The Training Section

The Training Section based at headquarters organises a series of group training courses, conferences and workshops aimed principally at young African research scientists. Regular courses on key subjects for livestock research and development in sub-Saharan Africa are organised each year. Such courses focus on topics such as the economics of animal health and

disease control, the design and analysis of livestock development projects, and animal nutrition and forage evaluation techniques.

The Section also organises individual training for junior African scientists. Under the Visiting Scientist scheme, senior scientists from national institutes conduct research at ILCA's headquarters for periods of up to 12 months. A graduate training programme was established in 1985.

International Liaison

The International Liaison Section is responsible for ILCA's close links with African countries. Close relations are maintained

with the Organisation for African Unity (OAU) and the United Nations Economic Commission for Africa (ECA) in Addis Ababa. Agreements of cooperation have been signed with Gambia, Niger, Rwanda, Benin and Malawi and negotiations are progressing with Cameroon, Senegal and Zimbabwe.

The Liaison Section is also responsible for meeting visitors to headquarters, for arranging travel for ILCA staff and for assisting international staff in housing and services in Addis Ababa.

Networks

ILCA's international activities in research and information are further supported by a series of networks. The Trypanotolerance Network coordinates research and data collection in 10 countries in West and central Africa. ARNAB, the African Research Network on Agricultural Byproducts, is run by the Nutrition Unit and links scientists throughout sub-Saharan Africa. ILCA also coordinates research networks on livestock policy, small ruminants and camels, animal traction and forage germplasm.

The Library and Documentation Section at headquarters coordinates a major information network for African scientists through its computerised information services.

ILCA workshop participants in the field.

