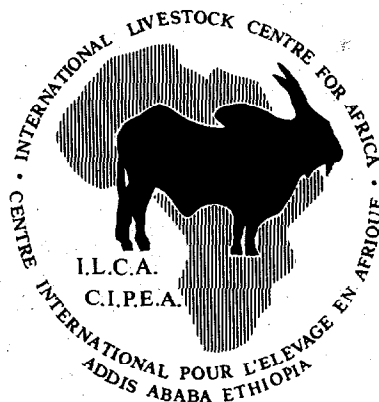


the consultative group on international agricultural research
technical advisory committee

report of
the tac quinquennial review mission
to the
international livestock centre for africa
(ilca)



tac secretariat
FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

THE CONSULTATIVE GROUP ON INTERNATIONAL AGRICULTURAL RESEARCH

TECHNICAL ADVISORY COMMITTEE

REPORT OF THE
TAC QUINQUENNIAL REVIEW OF THE
INTERNATIONAL LIVESTOCK CENTRE FOR AFRICA
(ILCA)

Panel Chairman: Sir John Crawford

Panel Members: Prof. Thadis Box
Prof. Jean Gallais
Dr. H.H. Messerschmidt
Dr. P.M. Touade
Dr. J. Vercoe

Secretary: Mr. S.A. Risopoulos

Observer: Dr. D. Plucknett

TAC SECRETARIAT
FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
March 1982



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30th March 1982

Dr Ralph W. Cummings,
812 Rosemont Avenue,
Raleigh, N.C. 27607
U.S.A.

Dear Dr Cummings,

I had the pleasure to lead the Quinquennial Review Panel which was commissioned by TAC to review the first quinquennium of ILCA. The Panel was composed of:

Professor Thadis Box,
Dean, College of Natural Resources,
Utah State University, USA

Professor Jean Gallais,
University of Rouen, France

Dr H.H. Messerschmidt,
former Director-General,
National Association of Animal Production Organisations,
Federal Republic of Germany

Dr P.M. Touade,
Senior Regional Officer,
Animal Health and Production,
FAO Regional Office, Accra, Ghana

Dr John Vercoe,
Senior Principal Research Scientist,
CSIRO Tropical Cattle Research Division, Australia

Dr D. Plucknett,
Scientific Adviser - Observer on behalf of the CGIAR
Secretariat

Mr S.A. Risopoulos,
TAC Deputy Executive Secretary - acted as Panel Secretary.

I am proud to have led such a distinguished body of scientists who all worked quite hard and with an open mind to come to an agreed diagnosis of the present state of progress of ILCA and to a unanimous set of recommendations for its future. The business

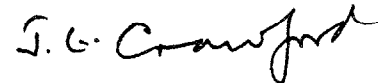
of the Panel was a harrowing one, as ILCA is a Centre admittedly difficult to assess, due to its geographical spread and the complexity of its mandate. However, the Panel had the impression that its exertions were of value due to the potential role ILCA can and should play in Africa. Indeed from the long debates on the review report in which I participated with TAC during one open session of its 27th meeting at Los Banos, Philippines, I retain the impression that the audience was fully sharing the concern expressed by the Panel about the food prospects of Africa, and the need for an institution like ILCA. It was also realised, it seems, by all that ILCA was designed very differently from Crop Research Institutes of the CGIAR system - the mandate precludes its work to be located at one Centre. ILCA has, thus, to invest in four or five countries at least if it is to meet its mandate and yet unite all these activities effectively as integral parts of one research institute.

The Panel has made several recommendations which would increase ILCA's efficiency through restructuring and concentration of efforts. The first process, restructuring, will likely require sometime to be fully effected due to written agreements with Governments and contractual obligations. The increase of the scientific capacity of ILCA, however, is urgently called for. Thus the Panel had felt that six senior scientists should be added with due speed to the Central Research Unit. Not only would they assist the Director-General to effect restructuring (with all the implied hard personnel and technical decisions), but they would improve the capacity of ILCA in research and training activities. It is possibly the latter role which has the greater multiplier effect, because of the relative weakness of national services in livestock research. Thus the correction of this weakness would further develop the relationship between African Governments and ILCA and the mutual benefits which would accrue to both parties.

While it has not been possible for me to make a detailed examination of the resources available and the budget plans of ILCA, I am satisfied that it is too much to expect ILCA to proceed to appoint six scientists wholly from savings to be affected by elimination of a good deal of the present programme. I do understand the caution of donors in recent years in supporting ILCA, but I believe the stage has been set by my panel and the willingness of the Board to accept our report for a more confident support of ILCA by donors. To make the appointment of the scientists depend on an equivalent immediate reduction in the already too limited budget is, I believe, unreasonable and I would wish to say this at the meeting in Paris. I suspect that ILCA should be able to make early savings which would support two new appointments, but I believe it reasonable to ask the donors to provide the additional funds necessary in respect of three or four.

With the above comments, I submit herewith to you and TAC the Report of the Quinquennial Review of ILCA.

Yours sincerely,

A handwritten signature in dark ink, appearing to read "J.G. Crawford". The signature is written in a cursive, slightly slanted style.

(J.G. Crawford)

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OVERVIEW AND SUMMARY OF RECOMMENDATIONS

(1) The terms of reference given to the Panel were most comprehensive and very detailed. They are set out in Chapter 1. The Report does not try to answer them seriatim but as explained in that Chapter, the Panel believes they have been answered; for the Report is structured in a manner designed to meet the general purposes of Review Missions as accepted both by the Directors of the Institutes and by the CGIAR. This purpose is:

"On behalf of the Consultative Group, to assess the content, quality, impact and value of the overall programme of IARCs and to examine whether the operations being funded are being carried out in line with declared policies and to acceptable standards of excellence."

(2) On the same general statement there is a sentence reading: "it is hoped that the review will inter alia assist the International Centre under review in planning its programmes and ensuring the validity of the research priorities recognized by the Board of the Centre". This is important for it calls for a constructive approach in any review: the Panel conducting this Quinquennial Review has borne this very much in mind. Of necessity many critical observations (as well as commendations) are made; but all have been used as the bases for constructive recommendations designed to assist both Board and Management in the re-structuring process the Panel sees as necessary.

(3) The structure of the report is functional - proceeding from an Introduction and Background History of ILCA to statement and examination of:

- Mandate (Chapter III)
- Meaning given to Systems Research (Chapter IV)
- Zonal Research Programmes (Chapter V)
- Headquarters Research and Support Services Activities (Chapter VI)
- Administration, Structure and Board/Management Relations (Chapter VII)

Each Chapter contains the relevant recommendations which, however, are also assembled together at the end of each section of this Overview and Summary of Recommendations.

(4) For the most part, the observations made in this Overview and Summary of Recommendations are reflected more fully in the Chapters and are here expressed in the same sequence. At the end of the Overview, however, is a short statement (Postscript) on the continuing role of ILCA as the Panel sees it and its critical need for resources more adequate

to its task. It is important to begin with a reminder of a basic contrast between ILCA and the majority of the CGIAR Institutes and especially the crop research institutes.

(5) The striking difference between ILCA and most other institutes lies in the geographical spread of its operation. Other Centres offer some small similarity, but it needs to be stressed that ILCA maintains full-scale research operations in several countries within the wide range between the southern Sahara and South Africa, extending from semi-arid areas of Mali and East Africa to the humid zones of Nigeria. The Centre at Addis Ababa conducts important research operations and is responsible for the overall efficiency of all zonal operations. The variations in livestock systems naturally reflect the different physical environments and sociological structure of the pastoralists and agro-pastoralists. The background conditions therefore reflect great variety and present rather exceptional difficulties to those undertaking research oriented towards practical results - i.e., "improvement in the quality of life" of the people concerned.

(6) The Panel believes it fair to say that the crop research institutes are able to concentrate their research (especially in plant breeding) in a way that facilitates outreach activities (their own and through national research systems) which are adaptive of centrally evolved plant material and farming systems ideas. One of the problems that ILCA has to face is an effective leadership and supportive role between Headquarters and the Zonal Programmes (a term the Panel has used to differentiate the work in Mali, Nigeria, Kenya, Ethiopia and Botswana from the work undertaken solely or fully directed by Headquarters staff).

(7) The most striking requirement arising from the geographical (zonal and country) spread of ILCA's work is a clear sense of common purpose, of research procedures and high standards expected to operate in all Centres. These goals require a constructive and effective relationship between Management and the decentralized research workers and between Board and Management, if first-class results are to be obtained. As might be naturally expected, actual achievement does not always reach the level hoped for. The Panel has to say that it often does not reach the standard which could be expected, despite the very real difficulties of operation. The recommendations made in this report are, as stated in para (2) above, designed to assist ILCA to reach a higher level of achievement - within the widespread political, geographical and sociological environment in which it operates.

MANDATE

(8) The Panel now proceeds to a brief comment on each chapter listed in the outline in para (3) above. The Panel begins with the Mandate. Chapter III sets out the terms of the Mandate. Although specifically embodied in the Memorandum of Agreement between ILCA and the Government of Ethiopia, its terms are accepted as of general application. The Mandate is wide and in the view of the Panel certainly adequate. There is an expectation that its own research will lead both to improved animal production and marketing systems "in tropical Africa south of the Sahara" and to improvement in the effectiveness of the "national efforts" to effect changes for the better in existing systems.

(9) The comments in Chapter III hopefully speak for themselves. It is not proposed that the Mandate be recast. It is noted, however, that the one extract from the Mandate most frequently used by ILCA fails to stress a most vital point. The primary purpose of ILCA is to conduct research designed to achieve the improvements in existing systems which are both applicable and practicable. Its training activities, its advice to national agencies need to be clearly based on demonstrated or demonstrable improvements derived from ILCA's own research, or from the research of others no less clearly demonstrated or demonstrable in the areas on which advice is sought.

(10) The Panel does recommend invariable use of the word research in ILCA documents which cite the Mandate. This is desirable in order to make clear the primary instrument on which ILCA's real authority as an adviser to national authorities must rest. The Panel has not formally proposed an amendment, but does suggest that very few words are needed in practice to clarify the major basis and requirements for any authority ILCA has to proffer advice in the development of new or modified livestock systems in African countries.

SYSTEMS RESEARCH

(11) As is reflected in the Panel's detailed observations on the research programmes, probably the single most important difficulty has rested in the understanding and use of the term "systems research". ILCA was launched before TAC promoted a study of systems research in relation to the work of the crop research institutes. This resulted in the "Dillon Report" referred to in Chapter IV. It is shown there that for the most part Farming Systems Research (FSR) grew out of the need to study how best to make effective a crop improvement within the systems now operating in various environments. The constraints on adoption were found

to be both within the farm boundary and outside. Various constraints on adoption had to be considered - sometimes by the farmer, often by institutions, public and private, on which the farmer was dependent if the new high-yielding variety was to be adopted.

(12) It is indicated in Chapter IV that the significance of constraints on improvement were recognized in the reports and discussions which led to the establishment of ILCA: improvements from research could only be effective if they could be fitted into prevailing systems or prevailing systems modified to accept them. The vital importance of component research (e.g., on pasture improvement or improvement of animal health) is repeatedly stressed by the Panel. Nevertheless, the Panel agrees with the primary emphasis on systems research in establishing ILCA. For without an adequate understanding of the prevailing system, it is difficult to identify those components most in need of research and likely to provide an improved input into the system. Without such improvements, no lift in income and/or quality of life of the people concerned is likely to eventuate.

(13) As the Chapter on Systems (IV) and the subsequent Chapters on the Research Programmes indicate, the Panel's uneasiness in several instances is less with the description of prevailing systems than it is with the lack of adequate progress in the identification of constraints and of the priority needs for component research designed to remove or lessen those constraints. It can fairly be said that marked log-jams have occurred in breaking out from the necessary but sometimes over-prolonged work in establishing what the prevailing systems are. The Panel has made known its understanding of the procedures which best enable systems and derivate component research to lead to adoptable results which in turn lead to improvements in the prevailing systems. As the following Chapters show, some research systems follow the recommended course; others need help if progress is to be made.

(14) As a not unimportant observation in passing, the Panel has noted an eagerness to intervene in an established system with "improvements" either not derived from research (its own or that of others) or not yet adequately tested under field conditions. ILCA's work is finally related to "development" (that is introduction of one or more improvements in prevailing systems); but its usefulness as an adviser in and contributor to development will increase the more its real understanding of prevailing systems and its component research indicate a sound basis for intervention in the developmental sense of that word.

(15) Once again the Panel's effort to outline its understanding of the nature of systems research in relation to ILCA's mandate is intended to be constructive. Its remarks on research protocols and other procedures are designed to reduce the risks of dissipating too much effort on system

description and too little on identifying potentially profitable research related to components. In a short sentence: the systems approach requires an inter-disciplinary team, but interventions will not be easily developed without research on components requiring the concentrated attention of a single discipline. The Panel hopes its comments throughout the Report will make this clear. Systems and component research are complementary to each other, not rivals in the search for improved systems.

ZONAL RESEARCH PROGRAMMES

(16) Chapter V, which reviews the Zonal Research Programmes, while comparatively lengthy is, in fact, a considerable condensation of the Panel's views in response to its reading the volume of relevant material provided by ILCA, to the quite lengthy discussion and inspections in the field with the teams and members of collaborating institutions (national and international) and to the final discussions in Addis Ababa. Whilst it is difficult to apply objective criteria to any decision regarding zonal balance, the Panel believes that the major ecological zones, other than the arid one, and some major systems within each zone are represented in ILCA's programme. Nevertheless the wide ecological variation between the zones and the variation between the systems within each zone is recognized and acknowledged.

(17) The quality of the work between the zones is variable; in some zones the quality and detail of the baseline data are sufficient to identify the major constraints to the point where meaningful component research can be commenced. In others, the baseline data still need more detailed observation. In the drier areas, e.g. Mali, Northern Nigeria, where seasonal and annual climatic components are more variable, the collection of baseline data must necessarily be more prolonged.

(18) In spite of good advances achieved, the variability in the quality (and, indeed, volume) of work is a function of a number of explanatory factors. These are difficult to quantify, but many of the factors such as inadequate research qualifications and inexperience, imbalance in the disciplinary composition of the teams, unfamiliarity with the requirements of systems research are all to be found together with the sheer difficulty of sustaining first-class effort in the environments in many cases.

(19) There is a discouraging shortage of good animal scientists in the zonal teams and there is almost a total lack of expertise in two vital components in any livestock system namely, reproductive physiology and parasitology. There is an encouraging awareness of the interdependence

of livestock production and cropping in the appropriate zones and the need to incorporate forages (especially legumes) into cropping systems. Social and economic factors are being understood, but the significant links with the livestock sub-system in many cases still need to be identified. The spatial utilization by herders of the pastoral and agro-pastoral systems is still not well defined.

(20) In general, the teams are young and enthusiastic, but they lack, too frequently, adequate research qualifications and experience. Consequently, the diagnoses of constraints within disciplines and an experimental approach to the alleviation of those constraints are weak. This must be rectified and the Panel has indicated that this may be achieved by enhancing the calibre of field teams and strengthening expertise at Headquarters.

(21) The younger scientists will mature through experience, but this process would be more effective if more maturity and experience are brought to bear. This would enhance the promise that is inherent in the keen efforts of the younger people. This view is one of the keys to the Panel's pressure on the Board and Management to give priority to finding appropriate senior scientists stationed at Headquarters, but with a mandate to act as advisers and consultants to the teams in the field. This approach does not preclude the direct use, on particular problems of short-term consultants with direct experience in a particular discipline in particular zonal areas. All told, the effort has to be made to raise the level of experience and competence available to the teams. This applies with particular force to the process of developing the component research without which the attempts to improve the productivity of existing systems will be frustrated.

(22) It will be evident from a reading of Chapter V that some good results have been achieved. The Panel believes these are a function of quality and experience of the scientists involved. The Panel believes also that effective support from Headquarters is vital as is referred to in Chapter V, but also at greater length in Chapter VI. It is not proposed in this Overview to repeat the comments on each programme. They are made in Chapter V, with a view to assisting the restructuring the Panel suggests, in varying degree, for each programme. The specific recommendations made (Nos. 1 to 35) reflect the Panel's response to the strengths and weaknesses of each programme as they were seen by the Panel.

(23) For many people it appears that monitoring is a dubious exercise or at least a vexed question. The Panel sees no impropriety in monitoring, as long as (i) it is already known which parameters should be monitored as an index of the changes under investigation, (ii) resources are available and (iii) the monitoring adds something to ILCA's knowledge of the system and the impact of innovation on those systems. The Panel

doubts if ILCA's knowledge of any system is as yet sufficiently well detailed to enable it to define a collection of relatively few parameters that could be "monitored", in which regularly measured changes would indicate change in a system. Perhaps in the future this will be possible. If so, a monitoring activity may well throw light on constraints which could be subjected to well directed component research. In this way, it would serve the function of baseline data collection. In some cases constraints are very evident without prolonged observations: such was the case with the water supply problem in the Kajiado Masai area.

(24) In the course of the Panel's investigations, it became clear that relations with other CGIAR Institutes are of great importance to ILCA. Mutual interests are invariably involved and are usually capable of negotiated agreements. They require resources, but they also conserve them. The matter is given general discussion in Chapter VI. In the case of ILCA, good relations with IITA and ILRAD are essential and are being developed. The relations with ICRISAT are less well developed as yet, but there is no ground for doubting their development or their value.

(25) One of the items emerging from the Zonal Research Programme is the possibility of a network on animal traction. This matter is taken further in Chapter VI.

(26) Also noted in Chapter V is the need to give more attention to the case for ILCA research in more Francophone areas. At the same time there are signs that interest of southern countries will gather strength in the light of Botswana activities. The resources available represent an obvious constraint. Resources already represent a constraint - a point clearly relevant to many of the observations the Panel makes.

(27) Recommendations on the Arid/Semi-Arid Zone Programme

a. Mali

Recommendation 1: The Panel recommends that the current sociological studies should be finalized by a comprehensive report by the end of 1982. New sociological studies should be more closely integrated with the component needs of the systems under study.

Recommendation 2: The Panel recommends that great care should be exercised in drawing up a research protocol to limit ILCA's commitment to ODEM. 1/ The protocol should define clearly the objectives, the duration of the cooperation and the staff required, and the timing of the required component research.

1/ ODEM = Opération pour le Développement de l'Elevage dans la région de Mopti.

Recommendation 3: The Panel strongly recommends a strengthening of the studies on forage legumes to include aspects of soil fertility, possibly with the cooperation of ICRISAT, and also the consequences of improved protein availability to animal production.

Recommendation 4: The Panel recommends that the programme improve further its animal nutrition studies by greater contact with the expertise now available at Headquarters. Studies on the interaction between animal nutrition, health, management and performance could eventually emerge.

Recommendation 5: The Panel draws attention to the urgent need for studies into the nutritional, parasitic and other disease factors associated with the high incidence of postnatal mortality in cattle, sheep and goats. Results obtained could be of more general application.

Recommendation 6: The Panel recommends that studies on animal traction deserve high priority. Research should have common elements with relevant work in the Ethiopian highlands and elsewhere and would include a specific Malian contribution. These studies could be incorporated in the network which is recommended later (Recomm. 35, p. 12 and 37, p. 13).

Recommendation 7: The Panel recommends that the Mali programme should not stop its activities on "the driest limits of Sahelian cropping". It should build up a state of knowledge on the purely nomadic systems of the true arid zone which will continue to be a problem area. This could be done with a very small input of research or consultant personnel over a relatively limited period of time and further mobilize Francophone Africa's involvement in ILCA's work.

b. Kenya

Recommendation 8: The Panel recommends that no new activities for the present be entertained outside the Kajiado Masai area and that by the end of 1982, a report be prepared for the attention of the Government of Kenya. This report should summarize the experience accumulated at that date in a form usable by the Government of Kenya, especially in the field of socio-economics. This intention and other proposals should be discussed with the Kenyan Government by the Director-General at the earliest opportunity.

Recommendation 9: The Panel recommends that the Masailand ranch surveys be continued until data have been gathered, which adequately define the present system and from which suitable component research experiments can be designed. Those that are of immediate importance to the production system should be identified and carefully thought out plans submitted to the Director-General and the Programme Committee. Provision should be made for Kenyan research authorities to undertake those within their capacity.

Recommendation 10: The Panel recommends immediate strengthening of the range management component in the team to repair the present lack of range management capability necessary to understand the system.

Recommendation 11: Because monitoring is a difficult and confusing concept for a research organization, the Panel recommends that the Director-General and his colleagues reassess the present position and their policies for the future. Objectives and techniques (level of knowledge of parameters to be monitored, use of recurrent visits of monitoring teams v. use of resident personnel, capacity to train host country technicians, etc.) should be defined adequately before implementing monitoring activities.

Recommendation 12: In keeping with the Panel's emphasis on closer working relations with the Kenyan authorities, it is recommended that strong co-operation be established with the national range research station at Kiboko.

c. Botswana

Recommendation 13: The Panel recommends that the part of this programme falling under the core programme of ILCA should be limited to training, through fellowships and other means, Botswana specialists in systems work. All other commitments of ILCA should be in the form of a special project with a clear definition of the role of any consultant appointed under it.

Recommendation 14: The Panel recommends that ILCA develop its documentation capacity to indicate the present state of knowledge and development of livestock research programmes in the Southern African states: this should enable ILCA to assess and respond in the future to requests for relevant assistance from these Governments in a more systematic way than has prevailed in the past.

d. Ethiopia

Recommendation 15: The Panel recommends that Management, given the continued support of the World Bank and/or the Ethiopian Government, provide the resources necessary for the fulfillment of ILCA's commitments to the Ethiopian Government and which will enable the team to produce on time a useful report which should include the first results of the ecological and human studies.

Recommendation 16: The Panel further recommends that, as specific researchable topics are identified by the general systems study, e.g. inefficient water extraction techniques, experiments be designed to ameliorate the constraint.

(28) Recommendations on the Subhumid Programme (Kaduna)

Recommendation 17: The Panel recommends that survey studies of the elements and dynamics of the spatial strategy used by the Fulani in the sedentarization process be initiated.

Recommendation 18: Since the biological work is directed towards increasing milk production, it is recommended that the economic and social aspects of milk transportation, marketing and processing be investigated.

Recommendation 19: The Panel recommends that detailed studies of causes of low reproductive rate and high early-life mortality be undertaken and initiated as soon as possible, with a view to finding managerial solutions rather than relying on additional inputs of supplementary feed or chemical treatment.

Recommendation 20: While sympathetic to an ultimate extension of the programme into Francophone areas, the Panel recommends that no duplication be undertaken until the above studies have been completed and tested for their effects in the Kaduna system. A possible exception to this may be preliminary aerial survey work and accompanying ground work to establish similarities or contrasts with the Kaduna system and the extent to which existing technologies are related.

Recommendation 21: The Panel recommends that the crossbreed dairy cattle studies using Friesian cattle be discontinued. If the pressures to provide a new genotype are too great then these studies should be undertaken on a comparative basis using crossbreeds based on better adapted genotypes, e.g. Sahiwal.

Recommendation 22: The Panel recommends that no expansion of the baseline studies into small stock be undertaken until additional funds and staff become available. The present priority should be for the studies based on cattle. These require more detailed description of the productivity of the cattle, component research to be undertaken, and the effects of new technologies on the system to be evaluated.

Recommendation 23: The Panel recommends that some attention be paid to the contribution of native vegetation to the livestock production despite the fact that it is alleged to be a disappearing resource.

Recommendation 24: The Panel recommends that discussions be held with IITA with a view to increased cooperation on agronomic aspects of the system.

(29) Recommendations on the Humid Programme (Ibadan)

Recommendation 25: The Panel recommends that the team be consolidated and encouraged to work more closely with IITA in the mutual interests of the two Centres and suggests a formal agreement to this end. IITA could provide inputs on the soil/crop aspects whilst ILCA, for its part, could provide scientific strength in at least two areas that are needed by IITA; namely, forage agronomy and animal science.

Recommendation 26: The Panel recommends that an animal scientist work on the biology and health of dwarf sheep and goats and/or N'Dama cattle.

Recommendation 27: The Panel recommends that the humid zone research programme reduce the systems study to one or two specific sites. After the initial baseline data have been collected, work should concentrate as said above, on the biology and health of the trypanotolerant small ruminants and cattle.

(30) Recommendations on the Highlands Programme (Ethiopia)

Recommendation 28: The Panel recommends that the traction work in the highlands programme be strengthened.

Recommendation 29: The Panel recommends that the forage research programme be increased with special emphasis given to the role of native legumes and grasses for forage.

Recommendation 30: The Panel recommends that the senior staff needed for the highlands programme be added to the Headquarters staff, rather than to the highlands programme.

Recommendation 31: The Panel recommends that the sheep production system should be described. When baseline data are gathered, then specific research on components of the sheep production system should be studied.

Recommendation 32: The Panel recommends that the highlands programme examine ways to return manure and other organic litter back to the land rather than sell it for fuel. Some possible approaches would be to investigate the use of methane generators or increase the planting of trees and shrubs for fuel.

Recommendation 33: The Panel recommends that in the next review of the project consideration be given to a supplementary study to test the comparability of the results from the two sites (Debre Zeit and Debre Berhan) and the applicability of the findings to other ecological zones within the African highlands.

Recommendation 34: The Panel recommends that the necessary additional resources be made available to the team in its internal evaluation for future plans.

Recommendation 35 (see also Recommendation 37): The Panel recommends that serious attention be given by the governance of ILCA to the establishment of an African network on animal traction. The Panel would emphasize, however, that considerable work has been done in West Africa on animal traction by national services and several assistance programmes; it is understood that ILCA will devote adequate time to assess the present state of knowledge with a view to integrating eventually the present work on animal traction on the highlands into a proper network.

(31) Francophone Projects. *This review of ILCA's zonal activities would not be complete without reference to imbalance between Anglophone and Francophone areas. The Panel notes the predominance of projects in Anglophone areas. This imbalance needs attention as funds permit. Even ahead of arranging research projects, however, some further steps may be feasible. The network systems, as they develop, must embrace those of Francophone countries able and willing to participate. In addition, exchange visits between ILCA scientists and those in Francophone areas should be encouraged.*

HEADQUARTERS RESEARCH AND SUPPORT SERVICES

Networks

(32) Chapter VI is devoted to research programmes for which Headquarters are directly responsible, to support services, and to the question of raising the overall level of scientific competence by the appointment of a group of senior scientists. In the research programmes one of the bright spots is the development of a network on the use and potential of trypanotolerant livestock in tropical Africa. The ground for this project has been thoroughly prepared and ILCA is succeeding in securing the cooperation of the national research organisations and of ILRAD. The increasing linkage with national research systems inherent in network proposals is vital to the future of ILCA's role in support of national research systems. This programme must carry high priority.

(33) It is clear that there are other possibilities of which three or four are mentioned: namely, animal traction; improving water utilization by grazing ruminants; agro-industrial by-products; and efficient crop/legume rotation and utilization by livestock. It should also be borne in mind that several national institutions and services expressed a strong interest to collaborate in animal health related networks. ILCA would be well advised to play here a catalytic or co-operative role as appropriate. The Panel's view on the principles or criteria which govern the effectiveness of a network are listed.

(34) Recommendations on Networks

Recommendation 36: The Panel recommends that the trypanotolerant programme be continued and strongly supported by ILCA.

Recommendation 37: Within the constraints of budgets, ILCA should give serious support to the proposal for a traction network; as an important means of relating with national research systems, it should not hesitate to seek special project funds for this and other possible networks (animal health, water use, forage legumes, etc.). These must be thoroughly investigated, discussed with national Governments, and the case for them firmly established.

Support Services

(35) As already indicated, the Panel attaches great importance to the appointment of a strong group of senior scientists able to conduct research at or out of Headquarters, but also able to act as an advisory link with the relevant disciplines in the Zonal Research Teams. In Chapter VI, the work presently carried on at Headquarters is outlined. It relates to: (a) Breeds and Management, and (b) Forages and Nutrition. Use is made of both senior scientists concerned, but policy on this function needs clarification and stronger content.

(36) Comments are made on the Computer Facility of which rather much is being asked. It serves administration, library and research. There are proposals for upgrading the equipment which the Panel strongly supports. The Panel offers cautions and support for modelling and makes quite firm recommendations for enhancing the efficiency of the cartographical unit.

(37) In the course of the Panel's visits certain new units were proposed. One was for relief for the Director of Research who has been expected to coordinate Central Research Units as well as guide and oversee work in the zones. This and the provision of posts for testing systems methodology did not enlist Panel support. The Panel also suggested a specific modification of the socio-economic unit proposal. All three ideas have a bearing on the Panel's strong support for the appointment of more senior scientists. This proposal is discussed in paras 135 to 140 in Chapter VI. As already indicated, the Panel attaches great importance to this, not merely for the direct research output likely to be generated, but also because of the very great input several senior men of high repute could make by way of advice to the much needed disciplinary or component research in the zones. The Panel acknowledges the difficulty of determining the priority fields - but the Panel sees them within the general areas of animal science, forage agronomy, range management, economics (including marketing) and sociology. The Panel acknowledges also the cost, but is

adamant on the high priority it gives to its proposals. Some of the costs will come from savings flowing from restructuring; but it is also believed that the Mandate both justifies and requires a higher total allocation of funds. As Management pointed out, the level of funds available is far below that originally envisaged as probably necessary. The Panel's proviso is a major one: the adoption of the recommendations in this report for improving the efficiency of the ILCA operation as a whole.

(38) Recommendations on Central Research Units

Recommendation 38 on Animal Handling Facilities (Forage and Nutrition):

The Panel recommends that the animal facilities at Headquarters be upgraded and expanded to incorporate individual feeding pens and metabolism stalls for large and small ruminants, cattle holding yards and weighbridge and a veterinary crush.

Recommendation 39 on Computer Utilization:

a) The Panel recommends that priority be given to upgrade the capacity of the computer facility so that it can perform more efficiently the statistical analyses and simulation exercises which will become larger and more complex in the near future.

b) Perhaps outside its terms of reference, the Panel nevertheless recommends that the CGIAR (TAC) launch a review of the use of computers by its Institutes, their capacity and the advantages which may be gained by greater compatibility between them or with relevant national research equipment.

Recommendation 40 on Cartography: The Panel recommends that a draftsman be sent for training to strengthen cartographic skill. Certain necessary equipment should be purchased to improve the capability of the laboratory.

Recommendation 41 on Senior Scientists:

a) The Panel recommends that up to six senior research scientists be added at the Headquarters location. Their function should be dual; original research and advisory work in relation to research planning and design, quality control and evaluation.

b) The Panel recommends the earliest possible start of this move both by budget restructuring and by appeal to the CGIAR for upward revision of funds (see Postscript).

Training

(39) The Panel confesses its inadequate investigation here but it also confesses that it did not gain the impression of well developed ideas and programmes. The Panel believes it is a vital part of the Mandate which requires ILCA to assist national research institutes. Naturally the content of training will improve as the output from ILCA's research programmes grows. The Panel regrets its inadequate reporting here, and realizes the Director-General may well wish to arrange a more detailed enquiry or develop further ideas after discussions with his fellow Directors-General in other Institutes.

(40) Recommendation on Training

Recommendation 42: a) Considering the great need in Africa for trained people (research and administration), the Panel recommends that ILCA step up its training activities and opportunities.

b) Until the success of the systems approach has been demonstrated more fully, the Panel recommends that ILCA be conservative in its training directly related to systems research and research for development.

Documentation, Library, Publications

(41) The Panel has comments here which amount to suggesting more promotion both within and outside ILCA of the excellent facilities available. Certainly documentation of past research has played and should play a role in developing current systems research activities. It will almost certainly be no less valuable as component research is further developed.

(42) The Panel does have comments on publication policy and practice. The Panel again emphasizes as it has in other places, the importance of using referees of international standing in publishing the work of ILCA scientists.

Relations with National Research Programmes and with National Governments

(43) In general, the Panel has been impressed with the relation of ILCA staff with members of national institutions. Relations between ILCA staff and Governments in the zonal programmes are necessarily close. In the scientific field the trypanotolerance network and highlands legume collection represent close and highly desirable cooperative relations.

(44) The Panel again comments on relations with Governments which tend to be more complex and difficult than the personal relations with other scientists. One of the bases of difficulties is that some Governments may expect quick results which ILCA cannot really promise. In this whole area ILCA tends to have a greater problem than other Institutes: it is directly involved in complex agreements with several Governments; this arises from the nature of its Zonal Research activities.

ADMINISTRATION, STRUCTURE AND BOARD/MANAGEMENT RELATIONSHIP

(45) In Chapter VII, the Panel addresses itself principally to the problems of sustaining unity of purpose and action in the ILCA operation which, as it was seen, are widespread in every sense of that word. The geographic distribution of the work alone accounts for a significant extra-expenditure, but also calls for uniquely designed administrative structures and processes. These structures and processes should unite all activities with a sense of common purpose. To the inherent difficulties must be added problems remaining from the rather traumatic history of ILCA recorded in early Chapters of this Report and in past reports on ILCA.

(46) It is not surprising that some problems remain. Some of these are addressed in Chapter VII. In this Overview and Summary only some of the main points are mentioned. The major one is the relations between Board and Management, which are crucial to the success of ILCA. There have been strains which can be obviated, given mutual good will and practical working relations.

(47) The Chapter sets out the principles which should guide the parties: the overall responsibility of the Board and the integration with this fact of the day-to-day responsibility of the Director-General as chief executive and principal adviser to the Board of which he is also a member. The Panel attaches importance to its attempt to set out the principal necessities inherent in this relationship, particularly in an effort to avoid any impression that the staff at large are subject to two sources of authority.

(48) The relations between the Board's Committees, especially the Programme Committee, and the Director-General and the Board itself are explored. There has been confusion here resulting either in unnecessary friction or in waste of the excellent talent available as members of the Board and its Committee. The Panel has sought to link not merely the Board and Director-General, but also to suggest means of bringing together the senior staff in the zonal research programmes, in Headquarters and the Board and Board Committee members. There is a great need for bringing together

programme Team Leaders for mutual discussion, but also to interact with senior management and Board Committee members. The Panel has suggested a mechanism for an internal review of research progress which will serve the Board, the Director-General and senior research leaders from the field (and from Headquarters). This review would take place ahead of annual budgetary exercises and the Board meeting concerned. A big advantage of these proposals would be a reduction in the sense of isolation among the widely separated programmes which is very evident: this despite strenuous efforts by the Director of Research to minimize it by many personal visits to the field.

(49) A number of other practicable suggestions are presented to make the relationship of central management with the field operations more effective. The research protocols discussed in Chapters IV and V are very relevant here. They are not repeated in this summary, but the Panel is emphatic that they are vital in the process of raising the operational effectiveness of ILCA.

(50) There are many other matters which are important in staff morale. These include improvement in recruitment and record procedures, in peer reviews of professional work, and the means of assessing the standard of work for publication.

(51) Not the least important matter in the Chapter is the emphasis on negotiating sensible relations with sister Institutes. Many opportunities for mutually beneficial operations are opening up.

(52) All told, the recommendations in this Chapter are as vital in the total review of ILCA as those in the Chapters dealing more directly with the research programmes.

(53) Recommendations on Administration and Structure

Recommendation 43: The Panel recommends that the Board and the Director-General reach agreement on the principles outlined in this Chapter governing their relative functions and relationships.

Recommendation 44: The Panel recommends that the Director-General, given this understanding, exercise a more positive leadership in the research programme and the setting of the intellectual tone for the organization.

Recommendation 45: The Panel recommends that the Director-General develop a more open administration. The Panel does not want to limit the new Director-General in his management style, but he should be encouraged to be open and straight-forward with the staff and be willing to share both his successes and his mistakes with them.

Recommendation 46: The Panel recommends that a reward system should be made visible and be known to all the staff. It should be tied directly to performance. Procedures should be published and followed by Management. Promotions should include peer review of accomplishments.

Recommendation 47: The Panel recommends that clear operational procedures be established and manuals published for the operation of field centres. These should be designed to help rather than control the centres.

Recommendation 48: The Panel recommends that budgets be built from the bottom up, with Team Leaders submitting proposals requesting funds for their specific research areas.

Recommendation 49: The Panel recommends that all scientific and key positions in administration and research support activities be advertised internationally and that selection be based on qualifications and merit. Only then should national origin be a criterion to obtain balances.

Recommendation 50: The Panel recommends that a policy of study leave or visits be established for the research staff.

Recommendation 51: The Panel recommends that scientists be encouraged to publish in technically reviewed journals.

Recommendation 52: The Panel recommends that ILCA establish appropriate language courses at Headquarters for staff and families.

Recommendation 53: The Panel recommends that ILCA continue and develop strong cooperation with ILRAD, IITA, ICRISAT and other international Centres.

POST-SCRIPT

(54) When ILCA was established, it was with a conviction that it was needed and that an international institute working in various climatic and environmental zones and cutting across national boundaries could assist governments and peoples in need of help in efforts to raising the productivity of the livestock industry and so make possible an improvement in the quality of life of the peoples concerned. It is natural to ask the questions: "Does the need still exist?" and "Can ILCA working alongside the national research organizations meet the challenge?" The Panel has asked itself these questions: the answer in both cases is Yes.

(55) Certainly the need still exists, and indeed, has grown dramatically. This is abundantly revealed in the recent publications of FAO, the World Bank, the International Food Policy Research Institute (IFPRI) and many publications of African organizations and of various national agencies operating in Africa. 1/ The population growth in Tropical Africa is at about 2.7% per annum and still rising, while urban populations are growing at 6% per annum.

(56) Africa has a very large asset in its animal population; its annual output is estimated by ILCA to be worth US\$ 10 billion, half being attributable to food commodities (mainly meat and milk), and half to non-food products such as manure, traction, transport, etc. The growth in demand has, however, outstripped the capacity of the livestock industry to supply under the prevailing systems. The quantity of live animals imported into the 45 or 50 tropical African countries appears to be more or less constant at about 2 million units; but the quantity of meat import (mostly from outside Africa) has shot up from 26,000 tons in 1973 (value US\$ 33 million) to 103,000 tons in 1980 (value US\$ 207 million). 2/

1/ - Regional Food Plan for Africa, FAO, 1980.

- Food Problems and Prospects in Sub-Saharan Africa: the Decade of the 1980's, USDA, 1980.
- Food Policy Issues and Concerns in Sub-Saharan Africa, IFPRI, 1981.
- Accelerated Development in Sub-Saharan Africa, World Bank, 1981.
- Livestock Production and Development in Tropical Africa, ILCA, 1981.

The data used in this "Postscript" are drawn from these sources or come from the Statistics Division at FAO, or from the FAO Trade Yearbooks.

2/ Totals for 21 African countries south of the Sahara which have records for meat (fresh, frozen and chilled) imports in both 1973 and 1980.

Concurrently the quantity of imported milk products has more than doubled, its value quadrupling. Much of this picture can be traced to Nigeria and Ivory Coast - but the plain fact is that the great majority of countries in Africa face a growing deficit in meat and milk beyond the capacity of traditional systems to supply.

(57) The intensification of crop production will require more energy and an increased level of fertility; in both cases, livestock, through animal traction and manure, has a capital role to play. The two major areas of research which would require the urgent attention of the CGIAR Institutions based in tropical Africa or playing a significant role on this part of the continent are as follows:

- the preservation and betterment of the livestock production capacity of major producing countries (mostly in the arid/semi-arid belt) in order to maintain and increase the production of meat for urban centres;
- the development or improvement of livestock/crop production systems in these regions, reasonably free of trypanosomiasis, favourable to food production, i.e. a great part of the subhumid belt and the highlands.

In these systems milk, manure and draught power production have to be integrated in the cropping systems.

(58) This picture confirms the need for ILCA and all the research strengths that can be marshalled in the countries concerned. The Panel's task has been to review the operations of ILCA and to advise TAC and the CGIAR whether ILCA can meet its share of the challenge. The Panel has not been afraid to be critical where it felt this was necessary. It has been necessary in respect of a wide number of matters; but it has not lost the sense both of the need for ILCA or of its capacity - given adequate support and structural readjustment - to contribute significantly.

(59) The livestock systems of Africa are not confined within national boundaries. They naturally do vary from zone to zone, but in all zones traditional systems - once adequate to meet low level needs - are no longer adequate even to these needs, let alone the very understandable and widely felt need for higher standards in both rural and urban life. The ILCA approach through a study of systems, the identification of constraints and the mounting of research to combat the constraints, is the right one. It has made generally a very valuable start in getting to grips with the prevailing systems; it is now well known in tropical Africa - in part because its very work in the field is not confined to a research enclave - but is at grass-root level among the people most likely to be directly affected and helped by the research. It is multi-disciplinary and whole systems can be and are being well described. The vital process of identifying the constraints and mounting the necessary disciplinary or component research has proceeded more slowly than the Panel would think feasible. Nevertheless, it has to be recognized that

research is not a simple process of delivering quick remedies; these too often are prone merely to be quick rather than well founded and effective. There has to be a long-term commitment to the work of ILCA - and that not at a niggardly level. Moreover, as the relations with national systems develop more closely (partly but not only through networks) and as those with IITA, ILRAD and ICRISAT (for example) grow, acceleration in progress can be expected.

(60) The Panel's verdict on ILCA is a positive one. As stated in the Report, it is critical but constructively so. The Panel firmly believes that with much of the baseline system surveys now completed or near completion, with growing awareness of the importance of the research on constraints, with the rising and potentially great significance of its network approach and with full attention to the structural changes suggested by the Panel and to the need to raise the level of scientific competence in vital areas, ILCA will meet the challenge before it. It is a tremendous and difficult challenge. Despite all the difficulties in its short history, ILCA has achieved a groundwork which now does enable it to raise the level of output in quality and volume, and, not least, to play an increasing part in strengthening national research institutions who are primary principals in the total endeavour.

Chapter I. INTRODUCTION

1. The Consultative Group on International Agricultural Research (CGIAR) is an informal association of countries, international organizations and private institutions which have agreed to support international agricultural research. There are 32 donors to the CGIAR system which have contributed in 1981 a total of about US\$148 million; research is taking place at thirteen international centres or institutions, ^{1/} in different parts of the world, each one governed by a Board of Trustees or such equivalent. The major concentration of efforts is on research related to food crops.

2. The CGIAR has a Technical Advisory Committee (TAC) which is composed of an independent Chairman and of twelve members who are chosen in their professional capacity and come from different geographical and scientific background. They provide inputs as to the general guidance and direction of the system and of its centres. TAC is also requested to review, on behalf of the CGIAR, the validity of the mandate of each centre, the way the mandate has been implemented and the achievements made; recommendations are also put forward regarding the future of the centre under review. These reviews are effected at intervals of not less than five years and are thus commonly known as quinquennial reviews. TAC operates reviews through individual and independent panels composed of eminent scientists covering the range of disciplines and activities included in the programme of the Centre under review. The Quinquennial Review of ILCA is the tenth review effected so far by TAC.

^{1/} Centro Internacional de Agricultura Tropical (CIAT), Cali, Colombia; Centro Internacional de Mejoramiento de Maiz y Trigo (CIMMYT), Mexico; Centro Internacional de la Papa (CIP), Lima, Peru; International Board on Plant Genetic Resources (IBPGR), Rome, Italy; International Center for Agricultural Research in the Dry Areas (ICARDA), Aleppo, Syria; International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Hyderabad, India; International Food Policy Research Institute (IFPRI), Washington, USA; International Institute of Tropical Agriculture (IITA), Ibadan, Nigeria; International Livestock Centre for Africa (ILCA), Addis Ababa, Ethiopia; International Laboratory for Research on Animal Diseases (ILRAD), Nairobi, Kenya; International Rice Research Institute (IRRI), Los Baños, Philippines; International Service for National Agriculture Research (ISNAR), The Hague, Netherlands; West African Rice Development Association (WARDA), Monrovia, Liberia.

3. The first quinquennium of activities of ILCA was followed closely by TAC as this Centre was considered from the outset as having a particular format and approach to research, which would make visits by TAC missions appropriate and desirable during its formative years. Two TAC missions visited ILCA, once in 1977 led by Sir John Crawford, who had just left the chair of TAC, and the other about two years later, led by Dr. R.W. Cummings, then TAC Chairman. ^{1/} TAC took particular care in preparing the quinquennial review of this Centre: the potential role of ILCA, in the future of the food situation of Africa, was deemed to justify a longer period of review than usual. Close contacts with ILCA's Governance and Management were ensured during the preparatory phase of the review. It was decided not to split the Panel between the several zone programmes ILCA has in Africa, but to give these the full benefit of the whole Panel's attention.

4. ILCA from the beginning was designed very differently from the Crop Research Institutes of the CGIAR system. Its work is not predominantly located at one Centre (contrast IRRI, CIMMYT, ICRISAT, CIAT, ILRAD, etc.). Its Mandate virtually precludes this (see Chapter III). ILCA has to invest significantly in four or five countries at least if it is to meet its Mandate and yet unite all these activities effectively as integral parts of a single research institute. The report will reflect this inherent problem which faces the Board, Management and staff in ILCA. Moreover the Centre has had a chequered development - partly brought about by political instability in its Headquarters country at a critical stage and partly by confusion and contention about its proper course of development. This was also taken into account in granting more time to the review process than is usually the case.

Composition of the Panel

5. The Panel was chaired by Sir John Crawford (Chancellor, Australian National University) and was composed of: Prof. Thadis Box (Dean, College of Natural Resources, Utah State University, USA), Prof. Jean Gallais (University of Rouen, France), Dr. H.H. Messerschmidt (former Director-General, National Association of Animal Production Organizations, Federal Republic of Germany), Dr. P.M. Touade (Senior Regional Officer, Animal Health and Production, FAO Regional Office, Accra, Ghana), Dr. J. Vercoe (Senior Principal Research Scientist, Tropical Cattle Research, CSIRO, Australia). Dr. D. Plucknett, Scientific Advisor, was observer on behalf of the CGIAR Secretariat. Mr. S.A. Risopoulos, TAC Deputy Executive Secretary, acted as Panel Secretary.

^{1/} See Chapter II, § 25, 27 et sqq. for further details.

Panel Operations

6. The Quinquennial Review of ILCA covered more than a month and was divided into two phases. During the first one the Panel, after being briefed by ILCA's Executive Committee and Management at ILCA Headquarters, Addis Ababa, visited the humid and subhumid zones programmes respectively based around Ibadan and Kaduna in Nigeria, and the arid/semi-arid zones programme based around Niono and Mopti in Mali. This lasted from 22 September to 9 October 1981. The Panel reassembled in Kenya on 18 November, visited part of the arid and semi-arid zones programme of ILCA in this country and moved on 22 November to Ethiopia where it reviewed the Highlands and the local arid/semi-arid programme; the Panel reviewed also at that time the central services. ^{1/} On 3 December, Sir John Crawford presented the observations and recommendations of the Panel to the Board Chairman, members of the Executive and Programme Committees, the Director-General and senior staff of ILCA.

Terms of Reference

7. The Panel operated under the standard terms of reference which figure under Annex III. To these terms of reference, TAC - after consultation with CGIAR members and the Governance and Management of ILCA - added the following questions:

"Mandate and Research Philosophy

1. *Is the mandate of ILCA as presently written appropriate or should it be revised in the light of the experience accumulated during the last years?*

2. *Is the approach to research evolved by ILCA (see p. 4 and 8-11 of 1981 Programme and Budget document) an appropriate vehicle to implement the mandate?*

3. *Is the balance between zones and commodities and between production systems research and other studies effective?*

Research Methodology and Programme Implementation

4. *Is the identification of research elements as exemplified in Table 1 of the 1981 Programme and Budget document correct and are target dates for results realistic and what form would the results take?*

^{1/} Further details of the Panel programme can be found in Annex I. The list of documents provided by ILCA to the Panel figures in Annex II.

5. Has the identification of priorities been adequately made in each of the zonal studies (climatic risk threshold, forage production and utilization; prevention of animal diseases, etc.)?

6. ILCA's study of production systems is inter-disciplinary by nature; are the relationships between the different disciplines able to generate results expeditiously?

7. Is the management of research resources adequate and is it correctly balanced with training and documentation?

8. Is the allocation of resources between the current zonal studies optimal or what changes should be made?

9. Monitoring developing systems has been emphasized; is the rationale and methodology correct and will the results justify the expenditure?

10. Are the role and techniques of mathematical modelling appropriate to the present stage of development of the ILCA programme?

11. Do the present sites of the zonal studies adequately represent the problems confronting livestock production in Africa?

12. What is intended as follow-up of the success of the farm units developed by ILCA on the highlands (and later of farm or herd units in other zones)?

13. Recognizing the mandate and programme of ILCA, is the present management structure and staff appropriate also to system component research and to practical application in the field?

Role of ILCA in Africa

14. How can ILCA best contribute to national research and development efforts and what steps could ILCA take to improve its relationships with and contribution to the livestock programmes of the national governments in Africa?

15. Is ILCA's proposal to establish a number of research networks with institutions in Africa, e.g. for the evaluation of trypanotolerant livestock and the use of agricultural by-products as animal feed, an appropriate means of supporting national research on projects of high priority?

16. Is the training role of ILCA adequate to cover the needs of improving livestock production?

17. *Is the relationship with other IARCs and international institutions adequate to ensure complementarity of purposes and efforts?*

18. *Would any change in the relationship of ILCA and ILRAD be appropriate at this time?"*

8. It was simply not practicable to report the Panel's views and recommendations directly in response to the general terms of reference or the some eighteen specific supplementary questions. After the Chairman's presentation of findings and recommendations on 3 December in Addis Ababa, the Panel dispersed. It was, accordingly, not possible to clear precise answers to each question explicit and implicit in the general terms of reference or to the eighteen supplementaries. These latter had been discussed in Panel sessions "on the run" and influenced the Chairman's final presentation and, of course, the recommendations made on 3 December were unanimously adopted by the Panel. Accordingly, although the report here presented does not follow the outline of either the general Terms of Reference or the eighteen supplementary questions, the Panel members are satisfied that they have covered the questions in a way that complies with TAC's wishes for advice.

9. The Panel would like gratefully to acknowledge the thoroughness of the preparations made by ILCA. Not the least important factor in this was the very considerable time and leadership devoted by the retiring Director-General, Mr. David Pratt. The documentation was comprehensive indeed. Our many sessions of questioning of research staff and management were marked by full cooperation not least when the discussion reflected anxious concerns on the part of Panel members. The members know they were considerably helped by this positive attitude and venture to believe also that the exchanges in discussions will prove to have been a contribution by the Panel to the future reshaping of much of the research programmes as recommended by the Panel.

Chapter II. REVIEW OF BACKGROUND HISTORY

10. As the creation of both ILRAD and ILCA proceeded from the same concern of the international community to develop research as a way to improve the productivity of livestock and increase the well being of African populations, the reader should be advised to read Chapter III in the report of the Quinquennial Review of ILRAD (1980). It explains in some details the animal health facet of the decision-making process during the years preceding ILRAD's and ILCA's establishment.

11. As regards ILCA, let us recall briefly the initiative of the Rockefeller Foundation to call a meeting of scientists and administrators at Bellagio (Italy) in 1970 and the subsequent mounting of a Task Force led by Prof. G.H. Beck, 1/ which produced a report "An International African Livestock Center - Task Force Report", dated October 1971. The terms of reference of the Task Force were to identify the major constraints to increased livestock production, assess the current research capability and progress, determine the need and proposed site for an African Livestock Centre, estimate budget requirements and suggest proposed relationship with other countries.

12. The report proposed the division of Africa into three broad ecological zones, analyzed the problems encountered by livestock development and the research done in these and identified the major gaps and weaknesses. It proposed a certain number of targets to be achieved by a research programme and specified the component research which should be effected in priority in the different aspects of the livestock production process.

13. On the institutional side, the report recommended the establishment of a network of national livestock centres in Africa, associated with the proposed international centre through agreements and the holding of a joint research planning conference every year. Geographically, the report proposed organic linkages between the animal disease and animal production centres with a single Director-General supervising both of them. It envisaged the principal research base in West Africa, along a Niger/Nigeria axis where research programmes could be established in the different ecological zones where livestock production is possible. An animal disease centre would be created in East Africa, but would have also a livestock production research involvement.

14. TAC at its first meeting (Rome, June-July 1971) was aware that the above Task Force was under way, and that another Rockefeller Foundation report 2/ was recommending the establishment of an international laboratory for animal diseases research in Africa, and that the Government of Kenya had expressed an interest in hosting it.

1/ G.H. Beck (Chairman), Kansas State University, USA; L. Charette, Laval University, Canada; A.K. Diallo, Veterinary Research Laboratory, Senegal; I. Muriithi, Director of Veterinary Services, Kenya; J. Pagot, Director-General, IEMVT, France; D. Pratt, Land Resources Division, UK; W.R. Pritchard, University of California, USA; B. Shaib, Federal Ministry of Agriculture, Nigeria.

2/ "An International Laboratory for Animal Diseases Research in Africa", by J. McKelvey, Jr. and J.A. Pino, November 1970.

15. At its second meeting (Rome, October 1971), TAC devoted a good amount of time in discussing the Beck report; it came to the conclusion that two separate institutes were warranted and that the establishment of an International Laboratory for Animal Diseases should proceed first. While accepting that reinforcement of animal production research was needed and that prevention of diseases was an essential component of animal production, TAC was not satisfied that the Task Force report had been able to review the evidence of past and present research, national and international, and of their potential for reinforcement. It recommended that a twelve months' study be undertaken by a two-man team to this effect.

16. At its second meeting (Washington, December 1971) the CGIAR agreed that a Sub-Committee be created to negotiate the establishment of an animal disease laboratory which might ultimately be integrated into an African livestock centre; the Sub-Committee would also select another Task Force to undertake the studies recommended by TAC, including a review of past and current research with a view to determining the feasibility of establishing an African Livestock Centre. At this and at the third CGIAR Meeting (November 1972), it was reiterated that ILRAD was to be established as a potential Sub-Unit of an integrated African Livestock Research Organization, if and when established.

17. At its 5th meeting (Rome, March 1973), TAC was appraised of the results of this second Task Force, led by Prof. D. Tribe ^{1/} and endorsed its major recommendations, i.a. to create an international livestock centre in Africa; ^{2/} among the major reasons figures the following: *"most essential is a more thorough study of animal production systems in tropical Africa with a view to full utilization of already available knowledge and to establishing an order of priority for future research. Such a study should embrace biology, economics and social anthropology in all aspects relating to animal production. This production systems approach will make possible research on mixed farming - combined crop and animal production, which are all too often considered independently of one another."* ^{3/} TAC mentioned then a few topics which a research programme should tackle, but left those decisions to the discretion of the Board and Programme Committee of ILCA. These topics were: use of the energy resource of rough herbage that livestock find unpalatable; manufacture of livestock feeds; and study of natural forages and pasture.

^{1/} Chairman: Prof. D. Tribe, Melbourne University (Australia); B. Nestel, (UK), representing IDRC, Canada; D. Pratt, ODM (UK) and M. Thomé, IEMVT (France).

^{2/} Among the different sites proposed for the new centre by the mission, the Livestock Subcommittee of the CGIAR confirmed later the choice of Addis Ababa.

^{3/} Record of the 5th TAC Meeting, Annex V, §4, p. 2.

18. Somewhat unnoticed, it seems, was the fact that the Tribe report did not produce what it was originally set up to do, i.e. a review of past and present research (see paras 15 and 16 above).

19. At its November 1973 meeting, the CGIAR was informed by its Livestock Sub-Committee of the progress made in establishing ILCA and ILRAD; drafts of Memoranda of Agreements with the host countries were being discussed. Two organizations (IDRC, Canada and the World Bank) were to act as executing agencies for the establishment of ILCA.

20. The ILCA programme and structure were originally defined by two meetings of the Board of Trustees in London (26 to 28 October 1973) and Addis Ababa (14 to 16 January 1974). A Director, Dr. J. Pagot, was designated in 1974 and the collection of documentation useful to ILCA was started. The Executive Committee had its first meeting in Addis Ababa from 6 to 8 May 1974 and the Programme Committee developed ILCA's strategy at two meetings in November 1974 and April 1975. The Memorandum of Agreement, where the mandate and objectives of the Centre are explained, was signed with the host country, Ethiopia, in July 1974.

21. In 1975 ILCA was established as a legal entity and the recruitment of senior and support staff was accelerated. A contract was signed with an architect firm for the Headquarters design. In 1976 ILCA signed a 99-year lease with the Ethiopian Government for the land on which the central Headquarters would be located, and construction started. An agreement was signed with the Government of Mali regarding the arid zone programme on January 31, 1976, and a field experiment station at Debre Zeit was made available to ILCA by the Ethiopian Government. An agreement was also signed, in August 1976, with the Kenyan Government.

22. At its 13th meeting at Los Baños (May 1976), TAC expressed concern over the apparent escalation of the budget and wanted it to be recast; it also felt that too much emphasis was given to animal breeding as compared to animal health.

23. At its 14th meeting (Hyderabad, October 1976), TAC expressed satisfaction at the way the programme and budget had been revised and endorsed the 1977 budget. In keeping with its initial plan to review ILCA after two or three years of operation, and because of evident management problems, TAC felt that it was time to send a mission for a joint session with the Programme Committee and the Board, in order to clarify a certain number of points of its future programme (see para 25 below).

24. The first Director of ILCA resigned in December 1976. A first general report to the Programme Committee (which met from 24 to 28 January 1977) gave substantial details on the progress made and knowledge

achieved in the different programme components. During 1977, the ad interim direction was assumed by resident Board members (Messrs. Tribe and Pratt) and staff (Dr. R. Temple). A new Director, Mr. D. Pratt, a Trustee, took up his functions in December 1977. An agreement was signed with the Government of Nigeria in November 1977 regarding the work in the forest belt (humid zone) and in the savannah belt (sub-humid zone). During that year, the political and security situation in Ethiopia made advisable an acceleration of the deployment of staff to the field programmes.

25. At its 16th meeting (Cali, Colombia, May-June 1977), TAC was appraised of the findings of the first TAC Mission, which was led by Sir John Crawford and comprised of two TAC members, Profs Oslage and Camus and the TAC Executive Secretary, Mr. P.J. Mahler. The Mission visited ILCA Headquarters at Addis Ababa from 16-19 March 1977. The new TAC Chairman, Dr. Ralph W. Cummings, was also present and participated in the deliberations of the Mission. The Committee endorsed the Mission report, which supported the establishment of multidisciplinary programmes in four different ecological zones, but considered that the proposed system approach could be supplemented by more conventional research such as the improvement of forage and fodder plants. The Committee noted the proposed reduction of the monitoring studies budget and recommended the elucidation of the methodologies needed in production system studies, particularly with regard to the socio-economic aspects.

26. At its 19th meeting (Nairobi, July 1978), TAC listened to the presentation of the Programme and Budget of ILCA by the new Director, Mr. D. Pratt. Although satisfied by the way the budget document had been presented, the Committee wished to see more evidence of an analytical approach in the identification of the important constraints limiting the production and off-take of livestock products. The need for the relatively large investment in monitoring was questioned, and the transfer of monitoring data and the systems approach into operational research were deemed matters requiring further attention. TAC accepted the invitation of the ILCA Director to have a TAC Mission visit ILCA and decided to postpone discussions related to the timing of the Quinquennial Review pending discussions between ILCA's governance and management and TAC representatives.

27. TAC, at its 22nd meeting (Hyderabad, India, July 1979), reviewed and endorsed the report of the second TAC Mission to ILCA, which was led by Dr. R.W. Cummings, TAC Chairman. The Mission attended a session of the Programme Committee in November 1978 which was reviewing the monitoring, highlands and documentation programmes in Kenya and Ethiopia. It also attended the Board Meeting in April 1979, and visited the arid/semi-arid zone programme in Mali thereafter. The Deputy Executive Secretary of TAC, Mr. S.A. Risopoulos, attended also the Programming Conference of

the Subhumid Zone in Kaduna in March 1979. The TAC Mission comprised also, besides Dr. Cummings and Mr. Risopoulos, Profs Oslage and R. McDowell and Drs. J. Coulter and D. Ritchie from the CGIAR Secretariat.

28. The Mission commented on the monitoring activities of ILCA, saying that ILCA *"should retrace its steps and examine the different alternatives to the implementation of monitoring inputs with adequate definition of objectives and techniques."* 1/ As regards the zonal programmes, the report expressed satisfaction at the progress made by the Highlands programme, but remarked that progress needs to be evaluated on a continuous basis and necessary modifications and technical research introduced as required. The Mission emphasized the potential importance for Africa of the arid/semi-arid and of the subhumid zone programmes. The first one, the oldest of the two, drew the remark that there was *"no convincing evidence that sufficiently serious attempts have been made to devise strategies for the study of the major constraints and means of their alleviations"* 2/ and that the weakest point was *"the manipulation of the livestock factor in assessing the feasibility and output of improved management systems."* 2/

29. The TAC Mission recommended two corrective actions for the future; the assembly of expert assistance at the time of the elaboration of the research programmes, and the production for each programme of research plans in which a logical sequence would be evident from the scientific assumptions made to the inputs required for research implementation.

30. At its 23rd meeting (Rome, February 1980), TAC *"reiterated its concern that monitoring activities were overemphasized while training and cooperation with African countries and institutions would require closer attention and increased efforts to ensure a practical impact of ILCA's programmes on the improvement of animal production systems."* 3/

31. During its 24th meeting (Lima, Peru, June 1980), TAC *"noted the progress made by the Centre in translating its difficult mandate into a programme which is now moving from a general survey and study phase to the design and implementation of research programmes. TAC noted that in so doing, ILCA had taken into account several of the recommendations and observations made by the second TAC Mission. Some aspects of the pro-*

1/ Report of the Second TAC Mission to ILCA: Summary of Major Observations, § 6, p. 1.

2/ Ibid, §§ 8 and 9, p. 2.

3/ Report of the 23rd TAC Meeting, § 186, p. 51.

gramme of ILCA still raised some questions which TAC would refer to the Quinquennial Review of the Centre, scheduled for the fall of 1981". 1/ Meanwhile TAC recommended the consolidation of the 1981 Programme and Budget at the 1980 level.

32. At its 25th meeting (Addis Ababa, March 1981), TAC recommended that the Quinquennial Review Panel examine whether the identification of priorities had been adequately made in each of the zonal studies and *"whether the present management structure and staff were appropriate also to component research and to practical application in the field."* 2/ TAC decided also *"to add to the Review Panel a specialist in research on livestock production systems, with particular responsibility for assessment of the way production systems research has been conducted at field level."* 2/

33. At its 26th meeting (Ibadan, Nigeria, June 1981), TAC approved a 1982 Programme and Budget which would allow only the filling of vacant positions. TAC recommended, however, that caution be exercised in filling these positions so as to give the new Director-General ample flexibility to implement the Quinquennial Review recommendations.

34. It should be noted that the uncertain conditions prevailing in Ethiopia from the end of 1974 to the beginning of 1977 had not prevented the Centre from carrying out its building programme. The Headquarters were inaugurated in Addis Ababa in October 1980 and since then the Centre has available respectable facilities for administration, training, documentation and publications and some central research services. The Headquarters could be further improved and developed, e.g. staff housing and animal handling facilities are needed.

35. The Chairmanship of ILCA's Board has undergone some changes over the years. The first Chairman, Dr. R. Hodgson, was succeeded in 1978 by Mr. Moise Mensah, and at the end of 1980 Prof. R. McDowell took over as Board Chairman. The Chairman of the Programme Committee, Prof. D.E. Tribe, was succeeded in 1980 by Dr. A. Provost. In the past the Programme Committee met at the end of each year and concentrated every year on a certain number of programme topics. From 1979 on it split up into subcommittees for detailed programme examination, before reassembling at the time of the annual Board meeting. There is evidence of considerable analytical work performed by the Programme and Finance Committees of the Board during the last two years, as evidenced by the Board Meeting of April 1981, which coincided also with a Workshop on the Long-Term Plan of ILCA. Nevertheless the Panel sensed a considerable feeling of frustration on the part of the Programme Committee arising out of the apparent lack of attention given to its expressed concerns and recommendations (see also Chapter VII).

1/ Report of the 24th TAC Meeting, p. 2

2/ Report of the 25th TAC Meeting, §§ 146 and 147, pp. 43 and 44.

Chapter III. THE MANDATE

36. The best formal presentation of the Mandate appears in the "ILCA Memorandum of Agreement" between the Government of Ethiopia and the International Livestock Centre for Africa, 1974 (incorporating some subsequent amendments not affecting the Mandate). Section 3 "Purposes" and Section 4 "Activities" are the relevant ones and are here reproduced in full.

"3. Purposes

The purpose of the Centre shall be to assist national efforts which aim to effect a change in the production and marketing systems in tropical Africa south of the Sahara so as to increase the total yield and output of livestock productions and improve the quality of life of the people in this region. The Centre will serve:

- a. as an international centre for research to promote the development and demonstration of improved livestock production systems optimizing the use of human and natural resources in Africa,*
- b. as a focal point for training activities which will increase regional competence in a systems approach to livestock production and development, and*
- c. as a multidisciplinary documentation centre, working in both French and English, for the livestock industry of Africa.*

In carrying forward its program, the Centre will develop close linkage with national and regional organisations undertaking research and training activities in the same or closely related fields of interest.

4. Activities

The activities of the Centre will serve to identify means of increasing the efficiency of the major animal production systems of tropical Africa and to assist the governments and authorities responsible for achieving new levels of productivity. In particular, the Centre will engage in the following types of activities:

- a. retrieve, assemble and make available in both English and French all relevant information on animal production in tropical Africa;*
- b. engage a multidisciplinary research staff to study existing animal production systems (including breeding, feeding management and related health aspects of husbandry, the improvement of range and pastures, and the social and economic factors affecting the livestock industry including processing and marketing), develop new or amended systems of production, and define priorities for other research;*

- c. support, supplement and cooperate with existing national and regional research stations or programs in developing a fully co-ordinated program of production and rangeland research which is related appropriately to the urgent needs of livestock development;
- d. develop the capacity to undertake research programs in specific aspects of livestock production which are appropriate to an international centre. Such programs will require careful justification with particular emphasis given to their timing and to their international application;
- e. organise, or assist in organising, seminars, technical conferences and training courses for staff engaged in livestock research, extension, planning and production, in order particularly to increase regional competence in the multidisciplinary "systems" approach to livestock research and development;
- f. make available statistical support, information or advice to national, regional or international authorities in the various fields relating to animal production in which the Centre is actively engaged. In addition, the Centre will engage in such other activities as may be found necessary in furtherance of its objectives."

37. There are several points, both explicit and implicit which need to be noted and stressed. The first relates to the preamble in the section headed "Purposes" above. The words require special noting for they are the most frequently cited short statement of the Centre's Mandate. The statement is subject to a valid criticism (made later in this chapter) when quoted out of context as it too often is. Because of its importance the sentence is repeated: *"The purpose of the Centre shall be to assist national efforts which aim to effect a change in the production and marketing systems in tropical Africa south of the Sahara so as to increase the total yield and output of livestock products and improve the quality of life of the people in this region."* To these ends, ILCA is established to serve as an institution for:

- (a) "research to promote the development and demonstration of improved livestock systems" (underlined by the Panel);
- (b) provision of training facilities to increase regional competence in a systems approach; and
- (c) provision of a multidisciplinary documentation centre.

38. The next point to note is the clear emphasis on multidisciplinary research ... to study animal production systems (see 4 b) ... develop new or amended systems of production and define priorities for other research (Panel's underlining) which gives added point to 4 d - *"develop the capacity to undertake research programs in specific aspects of livestock production which are appropriate to an international centre"*.

39. The final point to select from the text and to stress is 4 f: *"make available statistical support, information or advice to national, regional or international authorities in the various fields relating to animal production in which the Centre is actively engaged."*

40. Arising out of these several points selected from the stated "Purposes" and "Activities" of ILCA, some observations need to be made. The Panel believes them to be crucial to an understanding of its many comments later in the report:

- (a) The first is that ILCA is an Institute engaged in applied research which seeks to resolve identified problems within the range of its geographical mandate.
- (b) The second is that ILCA, by clear implication, must be interested in relating its research to development.
- (c) The third is that ILCA is to be available to advise national governments, but, again by implication, this advice should - if it is ILCA advice - arise out of its research. This advice can relate to strengthening of national research systems which is also one objective of its training activities. However, the advice can also relate to development but here a very strong caution is needed. Such advice - again if it is official ILCA advice - should be based on its research activities.
- (d) The fourth observation is that while multidisciplinary research staff is stressed, there is no explicit mention of interdisciplinary research. Nevertheless, it is assumed by the Panel that the whole concept of systems research (which is stressed) calls for interaction among the disciplines represented in the teams conducting the systems research in the various research locations selected by ILCA.
- (e) The fifth observation is that interdisciplinary work does not preclude special work of a disciplinary character. It is clear from the Memorandum of Agreement (e.g. 4 b at end of sentence, 4 c and 4 d). This matter is particularly relevant to the Panel's strong emphasis, within a framework of attempting to improve systems, on the need for strong "component" research.

41. The Terms of Reference given the Panel (see Question 1, Chapter I, § 6) ask whether the Mandate "as presently written" should be revised. The Panel has to presume that the Mandate is that covered in Parts 3 and 4 of the Memorandum of Agreement and here reviewed. If so, beyond commenting on the considerable length, the Panel does not see the need for revision. The length is not really a disadvantage for it does spell out usefully the types of activities to be undertaken by ILCA.

42. The Panel's problem rests rather with the one paragraph, so frequently used by ILCA in its publications, but which can lead to misunderstanding, even misuse of ILCA resources. The paragraph in question is the preamble to sub-paras *a*, *b* and *c* in Part 3 "Purposes":
"The purpose of the Centre shall be to assist national efforts which aim to effect a change in the production and marketing system in tropical Africa south of the Sahara so as to increase the total yield and output of livestock products and improve the quality of life of the people in this region."

43. This is a good paragraph and one can understand its dominant use in ILCA publications. However, it does not mention research; and yet the clear expectation in the Memorandum is that this assistance will either be in the field of research itself (a matter for discussion later in the report) or in relation to development where ILCA's research results appear to be relevant (Panel's underlining).

44. The principal concern of the Panel is that ILCA should not be expected to be continuing consultants to governments or to major institutions like the World Bank engaged in development programmes. They can be expected to offer relevant information available from their baseline surveys (see later) or advice based on their research on relevant problems or systems. ILCA is a research institution and cannot be expected to assist development in a significant way except through its research and training activities.

45. The Panel recommends that the Board consider this matter. The very least that could be done, if the favoured paragraph continues to be used, is to preface it with some such words as "Engage in research and related training and documentary activities which will assist national efforts ... etc. ..." It could be that the Board of ILCA assisted by the Management could devise a fresh short version of the Mandate for use in publications. The Panel is in accord with the approach outlined in the Memorandum of Agreement and would recommend that any formulation of a short version remain consistent.

Chapter IV. SYSTEMS RESEARCH

46. The very clearly stated and much stressed basis of ILCA's programme is the study and improvement of African animal husbandry systems. This stress on the basic importance of livestock production systems is in marked contrast with the origins of the crop research institutes where the greater emphasis was placed on improving crop yields by genetic selection and breeding and by raising the quality and quantity of support from fertility building inputs and farm practices. It is in more recent times that the growing knowledge of constraints and the realization that the results for one small farm could be affected by the cropping mixture produced a growing awareness of the significance of systems research. Even so, this term came to have two meanings: one the best mixture of crops, fertilizer and tillage methods given no external constraints; the other this plus how to deal with the external constraints frustrating the best farming systems.

47. A reflection of the growing awareness on the part of the crop research institutes of the importance of "the farming systems" is found in the so-called "Dillon Report". This Report was a "stripe analysis" recommended by TAC in 1976 and approved by the Consultative Group. The Report was presented together with a Report of a TAC Workshop on Farming Systems Research (FSR) held at Nairobi in May 1978. The Report was based on a review of FSR at CIAT, IITA, ICRISAT and IRRI. The report is naturally expressed in terms of cropping systems and at first sight, would appear not to be relevant to ILCA's programmes.

48. One emphasis in the Report which would encourage the view that it is not relevant to ILCA is its stress on the complementary character of FSR: i.e. complementary to the basic crop improvement work. Interestingly, one reference (para. 228) refers to FSR as "*highly complementary to crop/livestock (underlined by Panel) improvement, particularly in providing a research capability to guide the development and integration of new technology.*" This statement really gives a key to a sensible link with ILCA.

49. FSR developed as a felt need in the crop research institutes as clearly relevant to the adoption of improved cropping technology. It is to the credit of the founders of ILCA (established well before the Dillon Report exercise) - the Beck and Tribe Reports and TAC itself, that ILCA was established on a basis of a recognition that animal husbandry improvements would only be usable if they could be fitted into the prevailing systems. In effect, the crop research institutes began with component research but realized that the final benefit from this research

was dependent on the practicability of the system required for the best results. In ILCA the principle is to recognize the system first and then to seek (often through component research or the use of clearly relevant existing results of past research) to modify and improve that system.

50. The Panel stresses this matter for it feels that, although not written with ILCA in mind, there is much to be gained for ILCA research by the continuing use of the Dillon report and other relevant material as a valuable reference and guide in its training courses and, indeed, by the research staff generally. Even at this stage an internal workshop for Programme Leaders on FSR would, we believe, be valuable. The Panel endorses the systems approach but recognizes that it is not an easy one. Nevertheless it believes its proposals for a stronger scientific input from the Headquarters and its proposals for more horizontal interaction among Programme Leaders and personnel, and a better use of research protocols, could help to strengthen general staff understanding.

51. In this Report we are content to offer a short precis of our understanding of the implication of the stress on systems research in the ILCA mandate. In doing so it will become very clear, we hope, that neither the Mandate nor the term "systems research" preclude what we have called component or single discipline research. Also at the outset let us make it clear that while we do not feel that all research workers in ILCA fully understand the meaning or requirements of system research, there is in ILCA an acceptance of its basic character. 1/ Some of the difficulties we met arose out of the inappropriate composition of the project teams 2/ (especially for developing component research) as well as from inadequate staffing at the very senior level of scientific competence.

52. The Panel believes that the first objective of each project team must be to establish the system now in operation. This requires firstly the full use of existing documentation and past research results appropriate to the proposed field work. All the component parts should be identified, described and assessed; their interrelationships established; and any

1/ Moreover there are useful statements in various publications not least in the statements of Director-General Pratt and in the writing of Dr. Jahnke (see "Livestock Production and Development in Tropical Africa" by H.E. Jahnke, ILCA 1981).

2/ These are the teams carrying out zonal research programmes whose work is reviewed in Chapter V.

signs of change now occurring in the system especially noted and explained. If feasible, this basic survey work should include some assessment of the condition of the people in terms of living standards (in the sense of "quality of life" going beyond monetary exchange) which are the end product of the system in operation. It is important to stress that this end result, loosely but understandably described in the Mandate as "quality of life" is the end product of the available land, forage, crops and water and livestock in combination, together with the effectiveness of the husbandry and marketing systems available. It can only improve through changes in one or more components designed to increase the quantity or improve the quality of the end product. The result of the basic survey work is to establish the scope for component research and may be termed the baseline data bank or simply the baseline survey.

53. The next or component research steps which may overlap somewhat in time but must be seen as separate, are to select those components which lend themselves to specialized research as bases for improvement in productivity levels. As examples, critical points or components in the system under study could be pasture improvement, water supply, animal health, or marketing. The team has to make a selection of the components for detailed research having regard to the critical importance in the interconnected system of each component. At this stage, with due regard to feasibility, critical disciplinary research is necessary and undertaken. Subject to an important observation below, we believe this is understood by ILCA staff. It should be stressed again, however, that the basic emphasis on systems in ILCA's Mandate does not imply objection to disciplinary research. Indeed, this was explicitly recognized by the 5th Meeting of TAC in March 1973 (a principal milestone in the history of ILCA) in its report to the CGIAR in these words: *"Concentration on a 'system approach' should not however obscure the need for more traditional research in disciplinary fields, although these should be integrated into a whole to the fullest extent possible."* ^{1/} The objective of the component or disciplinary research in ILCA arising out of an examination of existing systems should be to improve those systems. Their final test will be successful incorporation as improvements or changes for the better in the traditional systems. As will be seen in Chapter V, the Panel felt that the movement to component research had often been slower than necessary and, where undertaken, was not uniformly of high quality.

54. However, perhaps the greatest difficulties and often misunderstandings in discussions between the Panel and staff and senior management arose out of the widespread use of the word intervention. This normally means, in the context of ILCA, an effort to introduce a change in the system. Such intervention requires the backing of proven research within ILCA or elsewhere, e.g. that improved millet or pastures can be grown in the

^{1/} Minutes of the 5th IAC Meeting, p. 31, § 188.

environment in which the particular system operates. ^{1/} (It is assumed that the basic component research has been carried out by proper scientific methods, but isolated from the systems as a whole). Ideally, the intervention which seeks to apply the results needs to be tested under operational conditions, that is, within an operating system, and the results compared with those obtained in a traditional system operating at the same time under similar conditions. This may be difficult but can be supported by analyzing the results also in relation to those described for the same system in the Baseline Survey. Seasonal variations over time can, of course, affect such comparison.

55. In Chapter V we comment that the identification and handling of component research were often less than satisfactory. Sometimes the collection of baseline data was inadequately planned with a resulting unevenness in quality and detail. In particular important components were often not properly identified or described. This in part seemed due to imbalance in the discipline represented (by members or consultants) in the project teams with in some cases a resultant inability to identify critical component research areas. The Panel believes that far more use should be made of research protocols. The original project brief drawn up at the outset should set out the process of system identification proposed with some time scale attached, together with a statement of the documentary research needed and of the type of team required or sought. The proposed project leader and Headquarters scientific staff should collaborate in this first step.

56. As the work of description proceeds, discussions within the team should steadily approach the stage of defining the key constraints in the system and of making decisions as to which components should be studied in depth. Here again, the Panel believes that research protocols should be drawn up for each specific research line at the experimentation stage. These discussions must involve the relevant disciplines in the team which may, and sometimes must be, supplemented from Headquarters, from relevant Crop Research Institutes (e.g. IITA, ICRISAT), from ILRAD, or from relevant national research organizations in Africa or elsewhere. At this stage the protocol defines research hypotheses on:

^{1/} If the intervention does not have a well defined research base, it may nevertheless be a justifiable "development" risk. The Panel saw one or two of these including, e.g. a process for dipping of small ruminants to control mange and with incidental control of three to four other diseases. Research did not appear to be available to demonstrate that this was necessarily the best and most economical means. Nevertheless, some monitoring of a development initiative could be helpful but the intervention could not be described as properly controlled research.

- how to overcome the constraint;
- the research results already available and the further experimentation and observation procedure to be followed and by which institution (e.g. ILCA or IITA);
- procedure needed to study the consequences (impact of results) on other elements in the system;
- the resources required; and,
- duration of the study or studies.

57. The Panel cannot stress too strongly the importance of clearly identified and conducted "component research". This however does not amount to putting the system into disregard. Work can commence concurrently on the impact of changes in this component to be expected on the system when improvements in it are effected. Simulation models can assist this process. However, it is stressed that modelling in advance of actual and necessary experimental work (e.g. on pasture, water systems or crop improvement) is not a substitute for that research. Without the research the improved pasture or crop or water system cannot be obtained. Field knowledge and understanding of the linkages will be necessary to enable judgements to be made about the impact of changes in the component. The computer may well be a valuable aid in this process. (See also Chapter VI "Headquarters Research and Support Services Activities).

58. When results emerge from the component research and when the impact of these results on the original system has been assessed, it will then, and only then, be possible confidently to put together a package for development. This package can be subject to further detailed research with the aid of a cooperative government, or an interested government can and should be encouraged itself to test it under field condition. ILCA must be ready as required by its Mandate, to advise specially on the interpretation of the package, but it must not be trapped into becoming a development authority or an extension agent in its own right.

59. This last comment does carry some implication perhaps for the monitoring activities of ILCA. Monitoring has its place in the ILCA process, but it must be a contributory part of the total research programme and not a substitute for the normal supervision processes of the development authority or of its financial supporter. Monitoring is justified if:

- (a) it is a way of testing the result of research being put into practice, or
- (b) it is seen as a vital aid to establish the facts about systems presently in operation and thereby establishing desirable direction of component research. There are skills required in monitoring; these skills can

reasonably be passed on to development agencies or national authorities charged with this task. This is best done by having national participants involved in the monitoring and/or giving attention to the process in training courses.

60. It is worth adding here that although the Mandate does stress the central role of systems research it need not be, and fortunately has not been, read as excluding important activities such as networks. These are vital research activities in their own right and an important means of co-operating with and, hopefully, strengthening national research systems. These will receive attention and support in later chapters.

Chapter V. ZONAL RESEARCH PROGRAMMES

The Research Programmes of ILCA

61. ILCA conducts research at its Headquarters in Addis Ababa and several field stations located in the major ecological zones of Africa. Work on arid rangelands is conducted in Mali, Kenya, Ethiopia and Botswana. There is a subhumid study team in Kaduna, Nigeria, and a group working in the humid zone at Ibadan, Nigeria. Research on African Highlands is limited to Ethiopia (see Maps, Annex IV).

Field Programmes

A. General Comments

62. The field teams in ILCA have established, with varying degrees of success, an ability to collect baseline data on an interdisciplinary basis. They are to be commended for the manner in which they have been obtaining such data, mostly of good quality, under uniquely difficult situations. They have demonstrated an ability to describe a livestock system in different degrees of detail using both biological and sociological parameters. In some zones the detail of the baseline data has to be improved further in order to pinpoint the most sensitive areas which, given adequate research in the relevant disciplines, could lead to increases in production. Indeed, we are of the view that several field projects are now at the stage where sound experimental work can be conducted that will improve specific components in the systems concerned.

We believe in terms of Chapter IV (Systems) that it is sound component or disciplinary research, identified by the basic systems study, that will establish ILCA as a productive International Centre.

63. We have not been able to determine whether the inability or failure of ILCA field staff to identify and design sound component research has stemmed from the lack of direction or assistance from central staff, or the inadequacy of experience and training in field teams. We suspect both factors are present. Certainly we believe a stronger central core of experienced senior scientists will be a major help here (see Chapter VI, para 137 et sqq). As discussed elsewhere (see Chapter VII, para 168 et sqq), more opportunity for discussions between teams and between members of given disciplines will also help. The baseline work so far done certainly lends itself to more rapid progress in pushing potentially profitable specific research areas.

64. A system can be described in different degrees of detail. For example, the Ethiopian Rangelands System is being described in broad and relatively superficial terms to obtain a "first approximation". On the other hand, the Mali agropastoral system, the subhumid agropastoral system and the Ethiopian Highlands system are being described in relatively greater detail. To an extent this reflects the staff and other resources available. At a particular point in the development of a research programme both levels of detail are valid.

65. A more detailed description of the system should not, however, be confused with research, but it may lead to better research. For example, the Kaduna group now propose to study in greater detail the causes of reproductive failure in cattle by measuring such things as disease status, occurrence of oestrus, date of conception, gestation length, post-partum anoestrus etc. This is not research, but a more precise definition of the basic problem of reproductive failure. The more precise the definition of the problem, the more meaningful the experiment becomes to test the reasons for the failure and the more economical the practical solution to overcome it. The experiment(s), if properly designed, will show if A is causally related to B or whether treatment X is more effective than treatment Y in removing the specific constraint under examination.

66. A reductionist approach is necessary to describe the subsystems within the system, but the fact that the subsystem is recognized as such, should make the experiments and the practical solutions to problems derived from those experiments more relevant and acceptable to the system as a whole. As the description of the subsystem(s) becomes more detailed, so the specialized knowledge associated with the understanding of the subsystem must increase.

67. We have noted in Chapter IV (Systems Research) the uneven quality and even the apparent absence of an ability in some of the teams to identify and pursue the need and scope for component research. To some extent this may

reflect lack of adequate weight in the teams of agricultural and animal scientists with appropriate specialist skills. More important, we suspect, has been the absence of research protocols and an absence, also, of adequate recognition by the field teams of the need for the identification of system components as a basis for building up appropriate research to increase performance or productivity levels in those components.

68. Certainly performance in this whole area of identifying and launching component research could be improved by using as consultants and advisers the proposed establishment at the Centre of a core of senior scientists of high standing. We note sadly that one team leader rejected this idea on the grounds that the team should be intellectually self-sufficient and implied that each member of a team is self-sufficient. This is hardly a tenable proposition unless each team is composed of absolutely first-class senior and experienced members in each relevant discipline; a financially impracticable approach quite apart from the likely unavailability of top class scientists in the numbers required. ILCA does need more top class people; we give priority to recruiting a group of people at the Centre able to do work in their own right and able to act as advisers and consultants to the teams (see Chapter VI "Headquarters Research and Support Services Activities").

69. Our general dissatisfaction with much of ILCA's research programme should not be taken as an indictment of individual scientists or teams. We believe that the research programme has suffered from a lack of protocols or experimental schedules as well as from an "ILCA philosophy", which has resulted in a mix of collecting planning data, description of systems, development interventions, monitoring and research. Our assessment of the overall problem of ILCA's research can be summarized in the following nine general comments:

- (a) The ILCA mandate has been interpreted in a manner which does not reflect adequately the activities outlined in the mandate.
- (b) The interpretation of the mandate has resulted in:
 - (i) assembling of generalist field teams involving a serious rejection of strong disciplinary insights and inputs;
 - (ii) some tendency to believe that a relatively superficial description of the system and particularly the livestock subsystem, is somehow a recipe for development. The description is necessary, but not sufficient;
 - (iii) some confusion in the minds of staff and cooperating governments and authorities as to whether ILCA is primarily a research, extension or development agency.
- (c) The collection of baseline data is usually good or is showing promise, but in most cases there is an inability to pursue the description of the subsystems to the point where sensible,

researchable components can be identified and an appropriate research design set up.

- (d) This possibly reflects the lack of research training and scientific quality of many of the field staff and a lack of scientific leadership and advice from Headquarters.
- (e) With some exceptions, the type and timing of interventions have been ill-considered and are the consequence of only defining susceptible parts of the system in extremely broad terms. For some of the interventions made no baseline data were necessary.
- (f) Many teams are unbalanced in regard to biological and social sciences. Both are necessary, not merely for description of the systems but also for developing areas for special research. In some cases, social sciences seemed too dominant while often quite critical biological areas (such as pastures research) were unrepresented. ILCA's role in improving livestock systems certainly requires significant biological interventions, as well as improvements in socio-economic environment.
- (g) There is an obsession in parts of management with the ILCA methodology - whatever that may mean - which has clouded the thinking of field teams to the point where the objective has been to apply a method of descriptive analysis rather than obtain sound biological and socio-economic data to serve as a basis for research and consequent improvement in the system.
- (h) In the past four years ILCA has, nevertheless, managed to work its way into a variety of systems and at grass roots level is collecting unique and enviable data which should and could form the basis of more detailed descriptive work and experimental work on possible improvements to the livestock production. These could be fed back into the system and the effects estimated on a range of relevant sub-systems and the systems as a whole. The question is: can ILCA do this? We believe the answer is "yes", given the adoption of the numerous suggestions we have made.
- (i) For the next few years, ILCA must concentrate on building up its research reputation and resist the temptation to enter into agreement with governments and development agencies which it cannot honour without crippling its basic mandate as a research institute.

70. Overall, we believe that the first priority for ILCA is to improve its scientific competence. Realistically, this will mean new research personnel at both the Headquarters and the field level. It is unrealistic to think that these positions can be added within the present budget; and funds must be made available in part from restructuring existing programmes and reassigning funds. As we argue elsewhere, given the considerable reconstruction we recommend, ILCA has a strong case for greater financial support in keeping with the original TAC projections.

71. We suggest that all programmes justify themselves on the quality of their science. Each should be asked to complete its contractual obligations as quickly as possible with a minimum of personnel. Each programme should be asked to identify two or three component research projects based on the understanding of the system and present them for consideration of the Director-General and Programme Committee. Those programmes that can identify researchable problems that could improve the livestock system should receive priority.

72. This preamble might well have come after the comments which follow on the zonal projects, but they also relate to parts of other Chapters (e.g. that on Central Research). At least they will help to explain the relatively brief comments in each programme.

B. Specific Comments

73. While we think that each programme should have the chance to restructure itself and make a case for research under the mandate as we see it, we record some views and recommendations in each case. The presentations related to each zone include in each case the official ILCA project brief together with Management's comment on progress. The Panel's comments then follow.

i) Arid/Semi-Arid Zone Programme

74. There are four locations where ILCA claims to study arid rangelands; Mali, Kenya, Botswana and Ethiopia. We do not believe that any of these represents the extreme aridity that occurs immediately south of the Sahara. The Mali production system, although it uses arid rangelands for part of the system, is related primarily to the flooded areas of the delta of the Niger river. The four programmes vary in their design, objectives and accomplishments. Our perception of each follows.

Arid/Semi-Arid Zones: 1. Mali

75. The project in Mali is the oldest of the field studies of ILCA and the only one in French-speaking West Africa. The Mali project started in a rather uncoordinated way and has been the subject of criticism from different quarters. Apparently a number of unrelated studies were started as early as 1976 and finally resulted in the work that we reviewed when we were in Mali.

76. The following research brief was presented by ILCA Management to describe the objectives and progress of the project.

Research Brief: Mali

Origin

Memorandum of Agreement ILCA/Mali 31 January 1976 (revised 20 September 1980).

Objectives

To develop improved technology and organizational frameworks which will sustain livestock productivity and human welfare in the arid zones of West Africa.

Phase 1: Initial Problem Analysis (July 1976 - December 1978), comprising a rather unorchestrated variety of surveys and studies within the designated study area theoretically to generate data for the improvement of these and related production systems - and culminating in an "intensive phase" over the final six months.

Phase 2: Progressively more detailed studies (1979-1981) to quantify the constraints in two selected systems, the agropastoral millet/livestock system, and the pastoral transhumant system of the Inner Delta of the Niger. The methods used consisted of baseline studies on vegetation, crops, livestock productivity and nutrition, household economics, and farmer perceptions in the agropastoral systems, and, on the same components, plus existing forms of social-territorial organization in the pastoral system.

Progress

Phase 1: resulted in a report to government entitled "Livestock Production Systems in Mali" (ILCA, 1978).

Phase 2: has now been summarized in "Systems Research in the Arid Zones of Mali"; Initial Results (ILCA Systems Study No. 5), Addis Ababa (in press). This report will now be presented to the Malian Government for further comments, and will be published in 1982. In the agropastoral system, nitrogen deficiency seems to be the main factor affecting livestock productivity. Through the introduction of forage legumes, nitrogen availability for plant and animal could be improved. The prime objective is to improve, through traction efficiency, the food production of the system. The high small ruminant mortality warrants further study. In the pastoral system, management schemes for the natural vegetation have been developed. The high calf mortality requires further investigation both from the nutrition as well as from the pure disease aspect. The introduction of these innovations can only be achieved through the development of social territorial units. Such units should be established with

an active participation of the pastoral population. The methods being developed by ILCA are already being adopted by the Malian Government.

Resources allocated (US\$ '000)

| | <u>1976</u> | <u>1977</u> | <u>1978</u> | <u>1979</u> | <u>1980</u> | <u>1981</u> | <u>Total</u> |
|-------------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|
| <i>Capital</i> | 162 | 206 | 180 | 127 | 60 | 40 | 877 |
| <i>Operations</i> | 636 | 829 | 879 | 805 | 810 | 710 | 4599 |
| <i>Man-years</i> | 9.6 | 10.6 | 10.9 | 7.7 | 6.6 | 6.5 | 51.9 |

Comments

(a) Strengths

77. The strength of this project appears to be in the quality of the baseline data. Although the project has had a stormy past, the written material presented to us shows a useful and detailed description of two systems, one an agropastoral system and the second a pastoral system. The preliminary analysis of the data collected is good. The team should be commended on bringing together a series of individually designed projects into a working document that gives good baseline data on most of the system. We believe that analysis of the various socio-economic elements of the production system on (1) straight pastoralism, (2) livestock production associated with rice cultivation, (3) livestock production associated with rainfed cropping of pearl millet, is appropriate. The samples have been well selected and are usually adequate for drawing up village monographs. Considerable data have already been obtained on work times, budgets, nutrition and demography.

78. Their description of the vegetation is adequate, though lacking in vegetation dynamics. The possible use of a Dutch study on the primary productivity of Malian rangelands might help as regards the understanding of the ecology of the system. The preliminary studies on animals in the system form a basis for further work.

(b) Weaknesses

79. The major weakness in the programme is the lack of specific proposals for component research that will lead to increased productivity of the system. Instead the team proposes to help implement, and supposedly study, the establishment of social territorial grazing schemes. 1/ These schemes offer a unique chance to study public participation by pastoralists and will offer an opportunity for more precise description of a social system under change. However, the Panel believes that the identification of

1/ In the framework of ODEM ("Operation pour le Développement de l'Elevage dans la région de Mopti").

researchable problems and experiments designed to solve those problems should receive higher priority. Here as elsewhere (see relevant para regarding the arid land programme in Kenya and Ethiopia), the plant/animal interaction should be studied. There is considerable room for expanding a working relationship with ICRISAT which recently has become more feasible. It would be beneficial for the two Directors-General concerned to review their common interests at an early date.

Recommendations on the Mali Programme

80. In making the following recommendations, the Panel recognizes the need to honour ILCA's present contractual obligations, but strongly urges a restructuring as quickly as feasible along the following lines.

Recommendation 1: The Panel recommends that the current sociological studies should be finalized by a comprehensive report by the end of 1982. New sociological studies should be more closely integrated with the component needs of the systems under study.

Recommendation 2: The Panel recommends that great care should be exercised in drawing up a research protocol to limit ILCA's commitment to ODEM. The protocol should define clearly the objectives, the duration of the co-operation and the staff required, and the timing of the required component research.

Recommendation 3: The Panel strongly recommends a strengthening of the studies on forage legumes to include aspects of soil fertility, possibly with the cooperation of ICRISAT, and also the consequences of improved protein availability to animal production.

Recommendation 4: The Panel recommends that the programme improve further its animal nutrition studies by greater contact with the expertise now available at Headquarters. Studies on the interaction between animal nutrition, health management and performance could eventually emerge.

Recommendation 5: The Panel draws attention to the urgent need for studies into the nutritional, parasitic and other disease factors associated with the high incidence of postnatal mortality in cattle, sheep and goats. Results obtained could be of more general application.

Recommendation 6: The Panel recommends that studies on animal traction deserve high priority. Research should have common elements with relevant work in the Ethiopian highlands and elsewhere and would include a specific Malian contribution. These studies could be incorporated in the network which is recommended later (see Chapter V, recomm. 35, and Chapter VI, recomm. 37).

Recommendation 7: The Panel recommends that the Mali programme should not stop its activities on the "driest limits of Sahelian Cropping". It should build up a state of knowledge on the purely nomadic systems of the true arid zone which will continue to be a problem area. This could be done with a very small input of research or consultant personnel over a relatively limited period of time and further mobilize francophone Africa's involvement in ILCA's work.

Arid/Semi-Arid Zones: 2. Kenya

81. The Kenya rangelands programme now concentrates its work on the group ranches of the Kajiado District. It was originally established as a monitoring programme for the group ranch development project. It has recently been redesigned, with the help of a part-time sociologist, to gather information on the livestock production systems. Some Government of Kenya representatives (from one Department) were critical of the programme, although they expressed confidence in the current Team Leader. Their complaints were twofold: that ILCA had promised too much and delivered too little (a statement which was also made to Panel members by group ranches leaders); and that the current effort was primarily a social science project that would not be useful to them when completed. These criticisms came too late for the Panel as a whole further to probe them, but we do not doubt that some of the weaknesses we outline below are relevant.

82. The project brief as presented by ILCA's Management follows:

Research Brief: Kenya

Origin

Memorandum of Agreement ILCA/Kenya 19 August 1976

Supplemented by project memoranda of February 1976 - August 1980

Objectives

Phase 1: Establishment of monitoring procedures (October 1976 - June 1979), comprising initially selection and description of study units and implementation of recording systems, followed (mid-1978) by more specific vegetation, animal and social studies, aimed at developing alternative methodologies for different levels of study and, particularly, methodologies that could be applied widely by national authorities.

Phase 2: Continuing Studies (July 1979 to present) to establish the dynamics of pastoralism, as represented at the household level across an ecological and development gradient in Kajiado District.

Phase 3: Analysis and interpretation of data in mid-1982 is expected to lead to the identification of major constraints in the production and marketing of livestock. Some of the constraints may require only policy and/or administrative decisions by government. These will be passed to

the government as recommendations. Other constraints may be solved by the application of already existing research results. These will be tested and recommendations on them will be passed to the extension service in the form of reports, organized seminars and workshops. Some constraints may require experimentation, which may be conducted by ILCA or in collaboration with national research institutions.

Another expected outcome of the data analysis and interpretation is developing a reliable methodology for monitoring range livestock production and marketing using a permanent sample of production units and livestock markets in various parts of the Kenyan rangelands. The methodology needs to be tested and Kenyans trained as per the agreement with the Government of Kenya. For this purpose and for obtaining baseline data for extending the range livestock production systems study into the drier and non Massai sections of the Kenyan rangelands, field activities will be expanded into Samburu, Isiolo and perhaps the North Eastern districts beginning in early 1983.

Progress

Phase 1: Helped develop experience and led to a national monitoring activity in Kenya but was not continued (on TAC/Board recommendation) to the establishment of national capabilities elsewhere.

Phase 2: Has established a selective field data collection system and is indicating both key parameters and relationships in the system under study, but has not yet yielded sufficient time series data for analysis.

Resources Allocated (US\$ '000)

| | <u>1976</u> | <u>1977</u> | <u>1978</u> | <u>1979</u> | <u>1980</u> | <u>1981</u> | <u>Total</u> |
|------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|
| Capital | 40 | 117 | - | - | -- | 10 | 167 |
| Operations | 159 | 474 | 573 | 447 | 597 | 577 | 2827 |
| Man-years | 2.4 | 6.0 | 7.2 | 4.5 | 5.0 | 4.0 | 29.1 |

Comments

(a) Strengths

83. The programme has come through difficult phases which we discuss below. In the process valuable experience has been gained, that is likely to be put to good use. The programme has a competent Team Leader, some good junior scientists, particularly in the social science area, and the team is making excellent use of part-time and special funded personnel. Their description of the social structure at the household level and changing land tenure patterns in the group ranches appears to be well designed and should produce baseline data on which experiments can be based.

(b) Weaknesses

84. We have a good deal to say about weaknesses but this is intended to assist the reconstruction of the project now in progress.

85. The research design has been weak in that it has overstressed sociological descriptions; livestock production has been under-emphasized. The project is purported to be a systems study yet major ecological components of the study have not been measured. Soils and climatic measurements have been superficial and there is no specialist on the team to handle these aspects. Although the ranches are in one of the major wildlife regions of East Africa, there has been no measurement of the wild animals or their impact on the grazing resource. Assessments of vegetation have been descriptive without useful measurements of actual or potential production. The livestock components are also descriptive with no experimental work.

86. The intention of the Kenya arid lands programme was to gain an understanding of range livestock production in Kenya's arid zone. It is the more surprising, therefore, that such a programme has no measurement of range production, animal preferences or diets, or other basic measures of the vegetative resource. Although a senior plant ecologist and two range management graduates have been assigned to the project for several years, basic range management data are not available. The ecologist purportedly was developing procedures to assess range conditions and trends. This would normally include an estimate of actual and potential productivity. Apparently this has not been possible - and this is unfortunate. One of the two range management graduates has been assigned to economics, the other to sampling social parameters. The new ecologist who has had experience in functional ecology in West Africa has recently been appointed and should improve the data collected. However, there is no one on the staff, or planned to be added, who has training in the plant-animal interactions that are necessary to understand the system.

87. The Kenya arid zones programme suffers from imbalance in staffing and is particularly short in areas vital to the full understanding of the range livestock system. We think the coordinator position is no longer needed. The valuable work of the senior social scientist should be presented as soon as possible, preferably by the end of 1982. It is essential that the plant production component be understood. The addition of a range management specialist is needed. The animal science segment should be strengthened either by adding an animal scientist or replacing the present senior animal scientist with one more appropriate for systems work. The team has not yet identified researchable components of the systems that will significantly improve animal production. Our own visits, hurried though they were, strongly suggested that there are components which can be clearly identified, e.g. in the pasture development and water provision and management. (The prospects here are now improved). Leadership has been haphazard and the staff has not functioned as a team.

Contractual and other agreements with the Government of Kenya have apparently not been fulfilled satisfactorily. There appears to have been little intellectual leadership from Headquarters. A large percentage of the budget (some 60%) has gone to pay salaries of senior staff, yet scientific results still are not promising. There are promising data being collected by junior scientists working with ILCA staff which, when subject to analysis, could form the basis for good component research.

88. Monitoring: Few of the components of the ILCA research programme have elicited as many criticisms and queries as the monitoring programme. From the onset of ILCA the lack of success of investments in the livestock subsector in tropical Africa, during the last decade or so, has been very much on the mind of ILCA promoters and Management. In order to do something about it, it was decided to establish a monitoring unit, the basic objectives of which would be to study ongoing livestock development schemes. The implied hope was that, by so doing, ILCA would be able to detect eventual flaws in existing development schemes and instruct recipient governments and lending agencies better to plan and implement such future schemes. It was thought that this work would commence at several locations: it started in fact in the Jigjiga area of Ethiopia, where - due to security reasons - it had to be stopped. In the end the large bulk of the monitoring programme was concentrated in Kenya. The reasons were that the first investment by the World Bank in the livestock subsector in Africa was made there ("First Livestock Development Project"). It had also the advantage of addressing itself to different forms of livestock enterprises, some of which would be new and would involve traditional pastoralists. 1/

89. The comments made by TAC and the two TAC missions to ILCA on monitoring have been referred to elsewhere.^{2/} They illustrate the concern that the resources allocated by ILCA to monitoring were not consistent with expected results, that the methodology applied by ILCA was far from clear and that ILCA was in fact filling more of a development (i.e. simply supervision), than a research role.

90. It is interesting to read a note prepared in January 1979 by ILCA on the subject which answers some of the above criticisms which were emerging in 1978. That note outlines the experience gained during the preceding two years by ILCA in Kenya. In this document the concept is still held that monitoring is a programme component which has an identity of its own. It would fill three functions: research - by the testing and development of methodologies and the definition of research priorities;

1/ Group ranches in this case. The other types of ranching enterprises were individual, company and commercial ranches.

2/ Chapter II.

extension - by helping national authorities strengthen their own monitoring capabilities; development - to the extent that it involves direct inputs to development schemes."^{1/} No detailed explanation of this statement was given in the above document.

91. The conclusions arrived at by ILCA here were that "ILCA's monitoring activities need to maintain its identity under its own Management".^{2/} It was, however, announced that a handbook of monitoring methodologies, which ILCA had undertaken to prepare, would be completed by mid-1980. It was also recognized that "although monitoring data are essential to improve livestock development, they are insufficient in themselves. They need to be supplemented by experience drawn from related development situations and by the results of a vigorous research programme" ^{3/}. ILCA was confident at that time that, during the period extending from mid-1980 to end-1981 "data should begin to be available to feed back into development schemes and to support generalizations on development policies and practice. If these hopes are not realized during 1981, then the whole future of ILCA's monitoring activity will have to be reassessed." ^{4/} In this view the Panel concurs.

92. Also in 1979 ILCA hired two senior consultants on livestock production and in sociology to review the monitoring programme. After completion of their tasks these two specialists were added to the ILCA staff, one as senior sociologist in Kenya and the other as coordinator of the arid zone programmes in East Africa.

93. In another note, "ILCA's Arid Zones Research", prepared by ILCA for the attention of TAC, two concepts were put forward: the first was that there was a need for ILCA to approach development schemes in a different way than production systems as it was not possible in the first case to apply ILCA methodology because of the existence of development variables. The other was that the interdisciplinary study of small samples of development units (monitoring several types of ranches) had given way to the testing of monitoring methodologies. At this point (1979), ILCA seemed to withdraw from direct monitoring of development projects.

94. Monitoring, which was considered at the outset as having a separate identity, changed its name to "monitoring pastoral systems under induced changes". Finally, it assumed the title of "East African Range Livestock

^{1/} "Monitoring Livestock Development Schemes - A Perspective for 1979-81", ILCA, January 1979.

^{2/} Ibid, p. 3, last para.

^{3/} Ibid, p. 11, para 3.

^{4/} Ibid, p. 14.

Systems Programme" (EARLS) and became a part of the general arid zone programme. As seen from the above comments, this programme still suffers seriously from conceptual difficulties which explains, inter alia the development of some strains in the relationship with the Government of Kenya. We noticed also some puzzlement and even impatience on the part of the pastoralists involved.

Recommendations on the Kenyan Programme

Recommendation 8: The Panel recommends that no new activities for the present be entertained outside the Kajiado Masai area and that by the end of 1982, a report be prepared for the attention of the Government of Kenya. This report should summarise the experience accumulated at that date in a form usable by the Government of Kenya, especially in the field of socio-economics. This intention and other proposals should be discussed with the Kenyan Government by the Director-General at the earliest opportunity.

Recommendation 9: It is recommended that the Masailand ranch surveys be continued until data have been gathered which adequately define the present system and from which suitable component research experiments can be designed. Those that are of immediate importance to the production system should be identified and carefully thought out plans submitted to the Director-General and the Programme Committee. Provision should be made for Kenyan Research authorities to undertake those within their capacity.

Recommendation 10: It is recommended immediate strengthening of the range management component in the team to repair the present lack of range management capability necessary to understand the system.

Recommendation 11: Because monitoring is a difficult and confusing concept for a Research Organization, the Panel recommends that the Director-General and his colleagues reassess the present position and their policies for the future. Objectives and techniques (level of knowledge of parameters to be monitored, use of recurrent visits of monitoring teams v. use of resident personnel, capacity to train host country technicians, etc.) should be defined adequately before implementing monitoring activities.

Recommendation 12: In keeping with our emphasis on closer working relations with the Kenyan authorities, we recommend that strong cooperation be established with the national range research station at Kiboko.

Arid/Semi-Arid Zone: 3. Botswana

95. The work in Botswana consists of a consultative effort with the Government of Botswana to help it establish a monitoring capability. The single post is now vacant. No one on the Review Panel visited the programme. Accordingly, the Panel's impressions are based on presentations and the written reports.

96. The description of the project and its progress given to the Panel by ILCA's Management follows:

Research Brief: Botswana

Origin

Memorandum of Agreement ILCA/Botswana, 12 July 1977

Objectives

Phase 1: Monitoring of the Second Livestock Development Project, Modelling Beef Cattle Production Systems and Consulting on the Design of Socio-Economic Evaluation for the Tribal Grazing Lands Policy (TGLP).

Phase 2: GOB is directing its agricultural research towards the "communal areas" (mixed range livestock/traditional agricultural production systems) containing two-thirds of the country's human and livestock population. It is requesting ILCA to cooperate in the analysis and evaluation of data from the data bank of the Animal Production Research Unit and in the formulation of strategy and methodology of an action research programme for the communal areas.

Progress

Phase 1: The design and establishment of an implementation monitoring procedure for the project has been completed and is being implemented by Government. The ILCA plant herd level model to study economic trade-offs between milk and meat in Botswana with different genetic improvement options has been applied. A proposal for a national sample study of range livestock production systems has been submitted.

Resources Allocated (US\$ '000)

| | <u>1977</u> | <u>1978</u> | <u>1979</u> | <u>1980</u> | <u>1981</u> | <u>Total</u> |
|------------|-------------|-------------|-------------|-------------|-------------------|--------------|
| Capital | 30 | - | - | - | - | 30 |
| Operations | 39 | 82 | 91 | 98 | 155 ^{1/} | 465 |
| Man-years | 0.5 | 1.0 | 1.0 | 1.0 | 1.2 | 4.7 |

^{1/} GOB contribution calculated at US\$113,000 (73%) which makes ILCA core fund contribution US\$42,000.

Comments

(a) Strengths

97. The strength of this project is that it gives an opportunity for ILCA to extend information it has developed from its work to a new project in yet another country. The Government apparently wants the programme and pays 80% of the cost.

(b) Weaknesses

98. The weakness of this programme is that it is not research. While it is a valid extension effort and well within the ILCA mandate for helping national governments, it should move quickly to establish either a research or training phase. There is no staff now in Botswana; the project is being handled by the coordinator of the East African Arid Zones programme. Consulting ought not to be continued indefinitely without a careful examination of its usefulness from a research viewpoint. A further reason for reviewing policy is that similar needs may arise in relation to other countries in southern Africa.

Recommendations on the Botswana Programme

99. The Panel notes the special nature of the collaboration which has prevailed so far between the host Government and ILCA. The ILCA specialist has acted as an operational executive in assisting the national services to monitor the impact of the changes induced by development in the modern part of the livestock sector. The Panel understands also that the Government of Botswana has requested from ILCA a senior systems scientist experienced in range management and nutrition to work out guidelines for developing communal areas and participate in other assistance programmes.

Recommendation 13: The Panel recommends that the part of this programme falling under the core programme of ILCA should be limited to training, through fellowships and other means, Botswana specialists in systems work. All other commitments of ILCA should be in the form of a special project with a clear definition of the role of any consultant appointed under it.

Recommendation 14: The Panel recommends that ILCA develop its documentation capacity to indicate the present state of knowledge and development of livestock research programmes in the Southern African states. This should enable ILCA to assess and respond in the future to requests for relevant assistance from these Governments in a more systematic way than has prevailed in the past.

Arid/Semi-Arid Zones: 4. Ethiopia

100. The arid/semi-arid zone programme in Ethiopia was one of the first started by ILCA. The first attempts to carry out research were in areas where security problems forced abandonment of the original goals. The present work (Phase 3) is concentrating on the rangelands of the Borana and Afar regions. The official brief presented by ILCA's Management follows:

Research Brief: Ethiopia

Origin

*Memorandum of Agreement ILCA/Ethiopia 16 July 1974
Supplemented by project memoranda of April 1976, May 1980
and October 1981 to be signed.*

Objectives

Phase 1: JIRDU ^{1/} Land Use and Development Study (July 1975-April 1977), a multidisciplinary baseline survey designed to indicate (a) development options and (b) continuing studies.

Phase 2: NERDU ^{2/} Land Use and Development Study (July 1977-December 1979), a baseline survey, initiated when field work in JIRDU became impracticable, to define a monitoring activity and more specific continuing studies.

Phase 3: Ethiopian Range Livestock Systems Study, initiated in 1980 and designed to become fully operational in January 1982 with special project funding, allows for detailed study of the NERDU and SORDU ^{3/} pastoral systems, leading directly to further development.

Progress

Phase 1: Although curtailed by hostilities, resulted in a report to Government entitled "Jigjiga Rangeland Development. Survey of Present Land Use and Preliminary Assessment of Land Capabilities" (ILCA, 1977).

Phase 2: Also resulted in a report to Government entitled "NERDU Baseline Study Report" (1980).

Phase 3: Is now being implemented and covers studies on Borana production units, in human demography, household economy, livestock productivity, nutrition, trade and social factors. Special attention is being given to role of wells, their capacities, utilization and the social organization regulating this utilization as the focal point for pastoral development. On the Afar production system similar production unit data

^{1/} JIRDU = Jigjiga Rangeland Development Unit.

^{2/} NERDU = North-East Rangeland Development Unit.

^{3/} SORDU = Southern Rangeland Development Unit.

are being collected as in the Borana system. Special attention is given here to the areas essential for the survival of the systems, e.g. the highland swamp areas and the arable farming communities in the same area.

Resources allocated (US\$ '000)

| | <u>1976</u> | <u>1977</u> | <u>1978</u> | <u>1979</u> | <u>1980</u> | <u>1981</u> | <u>Total</u> |
|------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|
| Capital | 120 | 147 | - | - | - | - | 267 |
| Operations | 478 | 592 | 164 | 220 | 226 | 221 | 1901 |
| Man-years | 7.2 | 7.5 | 2.1 | 4.0 | 2.9 | 2.3 | 26.0 |

Comments

(a) Strengths

101. The early work consisted of description of vegetation and other components of livestock systems - but were undertaken without a careful systems study design. The present work under a new Team Leader has designed its approach to the systems study and is applying it to the Borana and Afar systems. Cooperation with the Government of Ethiopia is excellent: there is good collaboration with national services in the preliminary survey work which includes description of constraints in the two pastoral systems. The present position reflects excellent problem definition in both zones of study; a good understanding of linkages between research and development; good use of historical research; and reasonable interpretation of what can be quantified. The major strength of the project is the close collaboration between the Ethiopian Government and ILCA scientists. The Government's interest is indicated by its willingness to pay for the project. The Team Leader thinks in interdisciplinary terms and is able to identify researchable programmes. He is supported by a young cooperative staff and is further supported by the ability to use Headquarters facilities.

(b) Weaknesses

102. The major weakness of this programme is that it is attempting to understand vast, extensive livestock production systems in two areas in Ethiopia, it has few senior staff, and some components of the production system have hardly been studied at all. The lack of information on productivity of the vegetation appears to be a major shortcoming. A plant ecologist has been assigned to the project recently, and perhaps a better understanding of the dynamics and productivity of the range vegetation will be forthcoming. However, at present there is little understanding of the range condition and trend in the areas that we visited. Work on the dynamics on the vegetation is needed at a very early stage.

Recommendations on the Ethiopian Programme

Recommendation 15: The Panel recommends that Management, given the continued support of the World Bank and/or the Ethiopian Government, should provide the resources necessary for the fulfillment of ILCA's commitments to the Ethiopian Government, and which will enable the team to produce on time a useful report which should include the first results of the ecological and human studies.

Recommendation 16: It is further recommended that, as specific researchable topics are identified by the general systems study, e.g. inefficient water extraction techniques, experiments be designed to ameliorate the constraints.

ii) Sub-Humid Zone Programme: Kaduna

103. The work in the sub-humid zone is located at Kaduna, Nigeria where a study is being made of the problems of settled Fulani, transhumant Fulani and settled arable farming people. The official project brief and progress report follows:

Research Brief: Kaduna

Origin

Memorandum of Agreement with Nigeria November 1977.

Objectives

To develop packages of improved technology for settled Fulani livestock owners, which require a minimum of inputs from outside the production unit, and will increase livestock productivity, in particular the dairy component.

Phase 1: Initial problem analysis through literature review, and a symposium to bring all available knowledge together (1978-1979).

Phase 2: Detailed problem identification in the existing study in four case study areas selected to include the different variable in the zone, e.g. population density, the tsetse challenge, degree of government assistance and access to land. Through comprehensive data collection on input/output relations in crop and livestock production, and animal health (1979-ongoing).

Phase 3: Initial problem solution and further problem identification through introduction of concentrate feeding for lactating cows, legume intercropping and in pure stands, and supporting experimentation and studies on existing forms of land-tenure and relations between the arable farmers and settled Fulani pastoralists (1980 onwards).

Progress

Phase 1: Is reported in ILCA (1978): Livestock Production in the Subhumid Zone, a Regional Review. ILCA Systems Study No. 2.

Phase 2: Is reported in numerous internal communications of the subhumid programme; it established the baseline parameters in cropping practices, livestock production and land, labour and cash constraints in the settled Fulani system.

Phase 3: Also reported in internal documents, established a significant positive response of traditional managed cows to concentrate feeding, and of the Fulani land owners to selective feeding. It justified further intervention testing and experimentation on legume introduction as an attractive alternative to concentrate in view of the requirements of outside inputs and the projected economic feasibility.

Resources allocated (US\$ '000)

| | <u>1978</u> | <u>1979</u> | <u>1980</u> | <u>1981</u> | <u>Total</u> |
|-------------------|-------------|-------------|-------------|-------------|--------------|
| <i>Capital</i> | 79 | 75 | 91 | 110 | 355 |
| <i>Operations</i> | 151 | 372 | 528 | 844 | 1895 |
| <i>Man-years</i> | 1.5 | 2.8 | 4.8 | 6.6 | 15.7 |

Comments

(a) Strengths

104. The team at Kaduna works very well together: it has good morale and a very strong interest in what it is doing. They are making good use of local talents. The team provides a basis for excellent work, given a more effective input from senior scientists.

(b) Weaknesses

105. The weaknesses are primarily in the design of the project. The team has attempted interventions without fully understanding the systems or essential components such as the native vegetation. It is not clear how they will measure the interventions to see whether they prove to be successes or failures. The programme is staffed by a young, enthusiastic, but

inexperienced research team from a research point of view. It is collecting good baseline data, but not as yet in sufficient depth. The team appears to lack the desire and possibly lacks the capability to probe in an experimental way the obvious causes of low productivity associated with low fertility and high early-life mortality or to test possible managerial solutions. They would benefit greatly from a strong disciplinary input into such areas as parasitology, reproductive physiology, and animal nutrition. More attention should be paid to the native vegetation. A sociologist working on spatial strategy of the sedentarized Fulani is also needed in order to study the combined utilization by herders of grazing reserves and farming areas. Starting from the present practices of the Fulanis, the study would aim at defining the technical factors and principles involved in establishing a sedentarization area which would minimize present tensions and constraints.

Recommendations on the Sub-Humid Programme (Kaduna)

Recommendation 17: It is recommended that survey studies of the elements and dynamics of the spatial strategy used by the Fulani in the sedentarization process be initiated.

Recommendation 18: Since the biological work is directed towards increasing milk production, it is recommended that the economic and social aspects of milk transportation, marketing and processing be investigated.

Recommendation 19: It is recommended that detailed studies of causes of low reproductive rate and high early-life mortality be undertaken and initiated as soon as possible with a view to finding managerial solutions rather than relying on additional inputs of supplementary feed or chemical treatment.

Recommendation 20: While sympathetic to an ultimate extension of the programme into Francophone areas, it is recommended that no duplication be undertaken until the above studies have been completed and tested for their effects in the Kaduna system. A possible exception to this may be preliminary aerial survey work and accompanying ground work to establish similarities or contrasts with the Kaduna system and the extent to which existing technologies are related.

Recommendation 21: It is recommended that the crossbreed dairy cattle studies using Friesian cattle be discontinued. If the pressures to provide a new genotype are too great, then these studies should be undertaken on a comparative basis using crossbreeds based on better adapted genotypes, e.g. Sahiwal.

Recommendation 22: It is recommended that no expansion of the baseline studies into small stock be undertaken until additional funds and staff become available. The present priority should be for the studies based on cattle. These require more detailed description of the productivity of the cattle, component research to be undertaken, and the effects of new technologies on the system to be evaluated.

Recommendation 23: It is recommended that some attention be paid to the contribution of native vegetation to the livestock production despite the fact that it is alleged to be a disappearing resource.

Recommendation 24: It is recommended that discussions be held with IITA with a view to increased cooperation on agronomic aspects of the system.

iii) Humid Zone Programme: Ibadan

106. The humid zone work is located in southern Nigeria. The scientists are located on the IITA campus and have close cooperation with that Centre. The project brief prepared by ILCA's Management follows:

Research Brief: Ibadan

Origin

Memorandum of Agreement with Nigeria, November 1977

Objectives

To develop (a) packages which will improve small ruminant production at the village level, and (b) more intensive grazing systems which will use fallow land more effectively and economically and contribute to the long-term sustenance of soil fertility.

Phase 1: Initial problem analysis, consisting of a literature survey and field visits (1977-1978).

Phase 2: (a) Constraint identification through data collection on village flocks, households, and farmers perception to small ruminant production, establishing production parameters, mortality and its causes, nutritional practices and farmers perceptions on small ruminant production (1978-1980). (b) Establishment of more intensive production units, to determine the feasibility of year round grazing (1979-1981).

Phase 3: Preliminary problem solution and further problem identification through: (a) introduction of a health package to eliminate the main disease constraints (1980 to present); (b) experimentation on browse/grass/legume systems with and without a crop component and on the different component of that system (1980 to present).

Progress

Phase 1: Is reported in "Small Ruminant Production in the Humid Zone of West Africa", ILCA Systems Study No. 3, (1978), Addis Ababa.

Phase 2: Is reported in several working documents, and revealed (a) a high mortality especially caused by PPR ^{1/} and ecto-parasites, (b) an effect of nutrition on mortality, (c) interest of farmers to invest in health improvement measures, and (d) the need for improved dry season feeding in pure grass/legume systems. Also during that phase quarantine measures were developed.

Phase 3: Indicated the scope for health improvement (and is now started to being taken over by Government) and the potential of browse both as a supplement for the dry season, as well as means of improving soil fertility.

Resources allocated (US\$ '000)

| | <u>1978</u> | <u>1979</u> | <u>1980</u> | <u>1981</u> | <u>Total</u> |
|------------|-------------|-------------|-------------|-------------|--------------|
| Capital | 189 | 164 | - | 115 | 468 |
| Operations | 303 | 544 | 579 | 682 | 2108 |
| Man-years | 2.8 | 5.0 | 6.2 | 5.6 | 19.6 |

Comments

(a) Strengths

107. The major strengths of the humid zone programme are a relatively young and enthusiastic group of scientists working in an area of great potential who commenced their systems study with a good state of knowledge report. We commend this programme for its promising and potentially valuable cooperative work with IITA and encourage its continuation. We favour the siting of ILCA staff on the IITA campus. The alley cropping work of IITA should be supported and the forage trials show promise of fitting into the bush/fallow system in the Humid Zone.

(b) Weaknesses

108. The major weakness appears to be that ILCA is trying to develop a system study for livestock production in an agricultural system that has no traditional role for livestock. They have gathered extensive baseline information on small ruminants in the villages, but there is a lack of information on the native vegetation. Much of the work that they are doing is agronomic work which will be enhanced by the proposed agreement with IITA. There is no appointed Team Leader, only a Technical Coordinator who is doing a good job in executing a difficult programme. The team is young, and inexperienced and needs senior scientific guidance, particularly in the biological components. A stronger input from the animal sciences is required. Our recommendations do not indicate a lack of confidence in livestock systems studies in the Humid Zone. We believe that a livestock system can, and should, be established in this zone. However, we believe

^{1/} PPR = "Peste des Petits Ruminants".

it is premature to put much effort into small-scale ranches or to test improvement packages at the village level until more is known about the biology and production possibilities of animals that are likely to be used in a more formal livestock system. The understanding of the biology and production parameters of the animals should produce ideas to how they can be introduced into the existing systems or what new systems of livestock production might be established.

Recommendations on the Humid Programme (Ibadan)

Recommendation 25: It is recommended that the team be consolidated and encouraged to work more closely with IITA in the mutual interests of the two Centres and suggest a formal agreement to this end. IITA could provide inputs on the soil/crop aspects whilst ILCA for its part could provide scientific strength in at least two areas that are needed by IITA, namely, forage agronomy and animal science.

Recommendation 26: It is recommended that an animal scientist work on the biology and health of dwarf sheep and goats and/or N'Dama cattle.

Recommendation 27: It is recommended that the humid zone research programme reduce the system study to one or two specific sites. After the initial baseline data have been collected, work should concentrate, as said above, on the biology and health of the trypanotolerant small ruminants and cattle.

iv) Highlands Programme

109. The highlands programme is located at two places in Ethiopia - Debre Zeit and Debre Berhan. The project brief prepared by ILCA's Management follows:

Research Brief: Highlands

Origin

Memorandum of Agreement ILCA/Ethiopia, 16 July 1974

Objectives

To develop packages which will increase total food production of smallholder mixed farming systems in the eastern African highlands, through an increased (direct and indirect) contribution of livestock to those systems.

Phase 1: Development of Debre Zeit Field Station (July 1975-December 1976), to establish an experimental area on land donated by Government (before the concept of a highlands programme was developed).

Phase 2: The ILCA approach (January 1977 to present) applied to Debre Zeit, combining studies in the existing system, intervention testing on ILCA farms and with participating farmers, experimentation and modelling, to develop and test improved highland farming systems, emphasizing the livestock component.

Phase 3: Extended Studies (January 1979 to present), applying the same approach to alternative highland conditions, incorporating Debre Berhan Field Station.

Progress

The baseline studies on input/output relationships on the cropping component and on livestock productivity have been completed for the lower elevations in the highlands (Debre Zeit) and is in progress for the high elevations. The introduction of a package of innovations at Debre Zeit, has indicated that there is scope for improvement on both the crop and livestock side, and has given guidelines for further research in particular on forages and animal traction. The harsher environment at the higher elevations poses serious constraints on cereal and pulse production. Milk and potato production seem attractive alternatives here which warrant further investigation. The preliminary results, at both sites with valley bottom development are encouraging, and further work can be expected to have a significant impact on the overall output of highland agriculture in eastern Africa. The methodology used is effective in identifying relevant problems, however, more studies are required, especially on how to ensure transferability of research results.

Resources allocated (US\$ '000)

| | <u>1976</u> | <u>1977</u> | <u>1978</u> | <u>1979</u> | <u>1980</u> | <u>1981</u> | <u>Total</u> |
|-------------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|
| <i>Capital</i> | 81 | 88 | 77 | 72 | 73 | 56 | 447 |
| <i>Operations</i> | 318 | 356 | 363 | 481 | 654 | 717 | 2889 |
| <i>Man-years</i> | 4.8 | 4.5 | 6.2 | 5.9 | 5.6 | 6.3 | 33.3 |

Comments

(a) Strengths

110. This programme is the best example we saw of the systems approach to research. A good job has been done in collecting baseline data followed by identification of specific areas for experimental research. For example,

the traction programme was a logical outcome of the baseline study that showed a need for additional animal power at specific times. The strengths of the highlands programme include a good Team Leader who understands systems and science. It has good young staff and a lot of enthusiasm. In addition, the highlands programme has adequate facilities, it is close to the Headquarters and can make good use of the facilities at Addis Ababa. Their animal traction research is a good example of what can be done at a specific location, some aspects of which can have more general application. When funds permit, extension of this work to other highland areas could be contemplated. In addition work on the role of the donkey for transportation could be contemplated.

(b) Weaknesses

111. A major weakness of the programme is that they do not have adequate staff to cover all of the areas in which they are conducting research. For instance, they need someone trained in stress physiology of animals for the traction work and to analyse in more detail possible health problems. The fact that the work is split between two locations, one in Debre Zeit and one in Debre Berhan, may also lead to logistical problems. In addition, there is the question of the relevance of these studies to each other and to other African highland areas caused by the variation in ecological conditions due to altitude. The highlands programme needs senior staff in a number of areas such as animal physiology, traction and other specific fields. However, these people could, and probably should, be added to the Headquarters staff rather than to the highlands programme.

Recommendations on the Highlands Programme (Ethiopia)

Recommendation 28: It is recommended that the traction work in the highlands programme be strengthened.

Recommendation 29: It is recommended that forage research programme be increased with special emphasis given to the role of native legumes and grasses for forage.

Recommendation 30: It is recommended that the senior staff needed for the highlands programme be added to the Headquarters staff, rather than to the highlands programme.

Recommendation 31: It is recommended that the sheep production system should be described. When baseline data are gathered, then specific research on components of the sheep production system should be studied.

Recommendation 32: It is recommended that the highlands programme examine ways to return manure and other organic litter back to the land rather than sell it for fuel. Some possible approaches would be to investigate the use of methane generators or increase the planting of trees and shrubs for fuel.

Recommendation 33: The Panel recommends that in the next review of the project, consideration be given to a supplementary study to test the comparability of the results from the two sites (Debre Zeit and Debre Berhan) and the applicability of the findings to other ecological zones within the African highlands.

Recommendation 34: The Panel recommends that the necessary additional resources be made available to the team in its internal evaluation for future plans.

Recommendation 35 (see also Recommendation 37): The Panel recommends that serious attention be given by the Governance of ILCA to the establishment of an African network on animal traction. The Panel would emphasize, however, that considerable work has been done in West Africa on animal traction by national services and several assistance programmes. It is understood that ILCA will devote adequate time to assess the present state of knowledge with a view to integrating eventually the present work on animal traction on the highlands into a proper network.

Francophone Projects

112. This review of ILCA's zonal activities would not be complete without reference to imbalance between Anglophone and Francophone areas. The Panel notes the predominance of projects in Anglophone areas. This imbalance needs attention as funds permit. Even ahead of arranging research projects, however, some further steps may be feasible. The network system as it develops must embrace those of Francophone countries able and willing to participate. In addition, exchange visits between ILCA scientists and those in Francophone areas should be encouraged.

Chapter VI.

HEADQUARTERS RESEARCH AND SUPPORT SERVICES ACTIVITIES

A. Research Programmes

i) Networks

113. The major central activity at present is that related to trypano-tolerant livestock. It is headquartered in Nairobi and involves close and effective collaboration with ILRAD. The Panel was impressed by the objectives of the work and the accomplishments to-date. The project brief, prepared by ILCA's Management, follows:

*Research Brief: The Use and Potential of
Trypanotolerant Livestock in Tropical Africa*

Objectives

To determine the productivity of trypanotolerant breeds of livestock, and the effects of management system and tsetse challenge on those breeds.

Phase 1: Exhaustive review of the state of knowledge (in cooperation with FAO and UNEP), to collect and analyse all available information on trypano-tolerant cattle, sheep and goats.

Phase 2: On basis of Phase 1, to establish and coordinate a network which incorporates different sites throughout the humid zones of West and Central Africa, and which allows the determination of the interactions between breed, management system and trypanosomiasis risk.

Progress

Phase 1: Was reported in ILCA (1978): Trypanotolerant Livestock in West and Central Africa, ILCA Monograph 2 (Volumes 1 and 2), Addis Ababa. It highlighted the comparative high productivity of trypanotolerant breeds, and indicated the considerable effects of management system and trypanosomiasis risk on productivity.

Phase 2: Is now being implemented in the form of a network, operates mainly under special project funding and incorporates standardized data collection on productivity management system and trypanosomiasis risk at approximately 10 sites. Agreements are concluded already with Zaire, Senegal and Ivory Coast, and under negotiations in Gabon, Congo, Nigeria and Benin.

Resources allocated (US\$ '000)

| | <u>1977</u> | <u>1978</u> | <u>1979</u> | <u>1980</u> | <u>1981</u> | <u>Total</u> |
|-------------------|-------------|-------------|-------------|-------------|-------------|--------------|
| <i>Capital</i> | 30 | - | - | - | - | 30 |
| <i>Operations</i> | 129 | 298 | 209 | 171 | 187 | 994 |
| <i>Man-years</i> | 1.5 | 3.3 | 2.3 | 1.5 | 2.0 | 10.6 |

Comments

(a) Strengths

114. The strength of this programme is that it addresses a problem common to most states in Tropical Africa. The programme has good leadership. It has good cooperative arrangements with international centres and national research organizations.

(b) Weaknesses

115. We were not able to identify any major weaknesses in the programme.

Recommendation on the Use and Potential of Trypanotolerant
Livestock in Tropical Africa

Recommendation 36: The Panel recommends that the trypanotolerant programme be continued and strongly supported by ILCA.

116. Scope for Further Networks: The use of networks should become an increasingly important feature of ILCA's programme because they provide: (a) a method of increasing the research effort into components which are common to a number of systems; (b) a way of increasing scientific support to national research institutions and improving the cooperation between national, international and aid agencies; and (c) a vehicle for introducing national institutions to the systems approach to research.

117. To be effective a network should meet several important criteria:

- It must focus on a problem which is common to a number of systems which transcend national boundaries;
- It must be undeniably established that a need exists (through literature reviews, i.e. status of knowledge, consultations, workshops and seminars with national, international and aid authorities);
- It must be coordinated by a top class scientist in the particular discipline with good scientific and technical support;

- The calibre of the participating institutes must be carefully assessed and where deficiencies are found, training of the appropriate personnel may be undertaken by ILCA or a relevant institute;
- The progressive results of the whole network must be made available to all participants on a regular basis via newsletters, workshops or seminars;
- ILCA should participate in the planning of each project and, where necessary, assist in data analysis and interpretation;
- ILCA should seek to ensure that when the particular component studied with the network is incorporated into its relevant system that the effects on the systems are measured in an appropriate way. (This may require further training of the national staff).

118. The trypanotolerance network could serve as a model for the way in which networks may be established. It remains to be seen whether the feeds information network on agro-industrial by-products develops into a research network along the lines of the trypanotolerance network. Much will depend on the development of ILCA's own research effort in this field.

119. The other possible network on animal traction now being investigated by ILCA fulfils some of the criteria mentioned above, and, with adequate planning by appropriate staff (a new appointment would be necessary), has great potential.

120. The possibility of starting a network on water utilization by grazing ruminants, using Dr. King's status of knowledge report as a starting point, could be investigated. Other topics that spring to mind are causes of low reproduction performance in different systems and the causes of high neonatal losses. Both these studies would incorporate disease and other health components for which there are good prospects for collaboration. These factors seem common to all systems studied so far by ILCA. On the plant side, the possibility of a network on efficient crop/legume rotation and forage legume utilization by livestock could be considered.

121. The location of the coordination unit of each network need not necessarily be Addis Ababa, but will be determined largely by the needs of the network and the location of the senior scientist concerned. We do not see all of these as being feasible in the short-run. Care should be exercised by Management so that networks do not become unbalanced in relation to the total ILCA programme. Moreover, none should be adopted without the most careful preparation and assurance of full and willing co-operation on the part of participating institutions. This, we believe, has been one of the hallmarks in developing the trypanotolerance network .

Recommendation on Animal Traction and other Networks

Recommendation 37: Within the constraints of budgets, ILCA should give serious support to the proposal for a traction network (see Chapter V, p.47. Recc. 35). As an important means of relating with national research systems, it should not hesitate to seek special project funds for this and other possible networks (animal health, water use, forage legume). These must be thoroughly investigated and discussed with national Governments and the case for them firmly established.

ii) Other Central Research Activities; Role of Senior Scientists

122. The concept of central research units at Addis Ababa is good. However, the central research units are not adequate at present time because they are too small. They are not being used for evaluation or in any major way for research planning and design throughout ILCA. There is a number of subject matter areas absent from the roster of senior scientists at Headquarters. In the last stage of our enquiry, proposals were made to strengthen this area. We discuss this later and strongly support the concept of having senior scientists with high standing available to do their own work and to serve as role models for the junior members of the staff.

123. No project brief was given to us to describe the role of the central research units. There are two major units: Breeds and Management; and Forages and Nutrition. There is also a set of activities under the title of Data Analysis and Modelling. Our understanding of their operation follows:

124. Breeds and Management. This Unit provides expertise in animal genetics and assists in the interpretation of animal production data collected from the field programmes. It is headed by an eminent senior scientist, and has made significant contributions with its completed studies on Sahiwal and Boran breeds. We commend this Unit for its accomplishments, and suggest that its work provides a small, but valuable, way to help improve national programmes.

125. Forages and Nutrition. This Unit undertakes routine analyses for the field programmes, identifies and screens highland legumes, and has helped to establish an information network on the use of agricultural by-products for animal feed (see comments thereon on § 118). We were pleased to see the progress made in collecting and characterizing native Trifolium species from highlands of Ethiopia, and the dedicated efforts which this Unit has made in analyses of samples for field programmes. However, we suggest, where possible, that samples from field programmes should be analyzed by host country laboratories. In order to reduce the number of unnecessary

analyses, field teams should plan jointly with the Senior Nutritionist at Headquarters to ensure that good research design is followed, so as to gain maximum benefit from the work. We observed that the animal research facilities at Headquarters are not adequate for many nutritional studies. Also, the difficulty in obtaining laboratory supplies and repair services in Ethiopia was noted. ILCA may wish to consider placing orders with other laboratories for sufficient stores of needed items to assure continued, uninterrupted operation of the laboratories. In this regard, the lack of a store facility at ILCA was noted; such a facility may be required if large-scale orders of supplies are to be made.

Recommendation on Animal Handling Facilities (Forages and Nutrition)

Recommendation 38: The Panel recommends that the animal facilities at Headquarters for intensive animal work be upgraded and expanded to incorporate individual feeding pens and metabolism stalls for large and small ruminants, cattle holding yards and weighbridge and a veterinary crush.

126. Data Analysis and Modelling - Computer Facilities. ILCA has a computer facility which is primarily an administrative machine. It is used for research and for the documentation work of the library as well as for the administration in its affairs. These three uses appear to conflict somewhat, and a computer study committee has been organized to assess needs and recommend priorities and policies for use. There has been some discussion as to whether or not the present computer is adequate to meet the needs. The Panel feels that the machine is inadequate for the growing research need. A consultant had been engaged to study this and his report had concluded that the machine was satisfactory for most tasks for the time being, but suggested an upgrading of disk storage capacity and some staff improvements. The improvements suggested would cost about US\$150,000 per annum for the first three years of improvement. The Panel would support this capital investment as a necessary interim measure.

127. We observed that the computer has been used widely, by field research teams, by the library and by Management, although the business and accounts procedures are not yet fully workable. When this is completed, ILCA business affairs should function more smoothly. It appears that a better linking of field groups with Headquarters is required. Also, it was suggested that the field teams need a simple mini-computing facility in the field that could be used for data storage and simple preliminary analyses, but compatible with the central processing unit. The computer facility needs a full-time manager.

Recommendation on Computer Utilization

Recommendation 39: The Panel recommends that (a) priority be given to upgrade the capacity of the computer facility so that it can perform more efficiently the statistical analyses and simulation exercises which will

become larger and more complex in the near future; (b) perhaps outside its terms of reference the Panel, nevertheless, recommends that the CGIAR (TAC) launch a review of the use of computers by its Institutes, their capacity and the advantages which might be gained by greater compatibility between them or with relevant national research equipment.

128. Modelling. ILCA has placed considerable emphasis on the use of computer simulation modelling in its research programme. It considers modelling to be a later phase of its systems studies work, and some of the field teams already have run - or are planning to run - modelling studies of the systems with which they are working.

129. The Panel considers modelling to be a valuable tool in research. It can help to organize thoughts and ideas, and in some cases can assist in spotting weak points in systems studied. Modelling is an intellectual exercise, on neutral ground, but is severely limited in application because of the inability to quantify many factors affecting a system. We suggest that information from modelling should feed back more into the research programme. Recommendations to Governments based on modelling are extremely dangerous, because the animal physiology basis of present models is totally inadequate. We strongly emphasize that modelling exercises should not substitute for field based research.

130. Aerial Survey and Cartography. This Unit is composed of two groups, aerial survey and cartography. To our surprise, these groups do not relate to each other in their work. The aerial survey group based in West Africa serves the field programmes in Mali and Northern Nigeria. It has detected unexpected migratory movements of herds in Northern Nigeria, with corresponding implications on land use, quantified relationships between livestock and cropping, and has enabled a better knowledge of territorial organizations and types of land use in semi-arid zones of Mali. It is expected that the group will obtain significant contract work from outside, an important factor in helping to meet the cost of the ILCA aircraft and pilot.

131. The Panel commends the early work of the aerial survey team, but it would like to see closer ties between the aerial survey work and the field team research. Perhaps as the field team identifies important researchable components within the systems being studied, the aerial survey work may be used to measure data related to testable hypotheses.

132. The cartography unit is not as valuable to the research programme as it could and should be. The only cartographer of this unit ensures several services and deals principally with photointerpretation. Most of the staff are draftsmen who are often kept busy designing administrative documents. We were not impressed by the way ILCA uses maps as a system of analysis in its scientific work. Maps can be used in relation to the establishment of research hypotheses and the identification of problems

to study. Most maps appended to ILCA documents are rough orientation sketches conveying little information.

Recommendation on Cartography

Recommendation 40: The Panel recommends that a draftsman be sent for training to strengthen cartographic skill. Certain necessary equipment should be purchased to improve the capability of the laboratory.

New Central Units Proposed by Management

(a) Coordination

133. This Unit is proposed both to relieve the Director of Research from the load of coordination of the Central Research Units and to provide a home for the present farm manager at Headquarters. The Panel deems it inappropriate to comment at this point, beyond expressing doubts. The decision should be left to the new management of the Centre, in the light of future decisions on administrative structure.

(b) Research Methodology

134. The 1982 budget proposes two posts for testing systems methodology, and extending its use to African countries. The Panel views this proposal as premature, considering it more essential that ILCA provide solid research information from its systems work. Meetings of Team Leaders and field programme staff can then be used to compare and adjust methodology concerns in order to develop reasonable methodologies for the study of livestock systems. The Panel does not consider that an "ILCA methodology" yet exists.

(c) Socio-Economic Unit

135. This Unit has been involved in the past in herd modelling and in determining economic effects of national or regional policies. The 1982 budget proposed to add a livestock marketing specialist to this Unit. The Panel would not necessarily give priority to a specialist in marketing, but would favour the addition of a senior agricultural economist to assist the field programmes and to conduct research on important livestock problems which could include marketing. The proposal relates to the more general case for more senior scientists to be located at the ILCA Headquarters.

136. As part of the documentation prepared in advance for the Panel, there were important papers by Dr. H.E. Jahnke and Dr. C. Kouevi. ^{1/} In addition, on the initiative of Mr. Pratt, a major document entitled "ILCA's Longer Term Plan: Towards the Year 2000" was presented on behalf of ILCA. The first two documents are excellent and the long-term plan is valuable, but we did not try to review them specifically. The projections in the long-term plan must be affected by the considerations put forward by the Panel. In any case, it was indicated that the document was a draft for reconsideration in the light of the Quinquennial Review Report. We agree that longer term planning is sensible and understand that the new Director-General and the Board would wish to consider the Panel's view in the final shaping of the programmes for the next decade.

More Senior Scientists

137. As indicated earlier in this review of Central Research Units, Management put forward proposals for more senior scientists - a matter frequently discussed by the Panel during its enquiries. It arose naturally from our observations in the field where the need for a stronger scientific input into the zonal research programmes from the Centre was frequently evident. This was especially so in relation to the phase of moving from systems work into component research. But unless the Centre has strength, it is difficult to provide this needed input and backing to the zonal research activities.

138. As we have noted, the Central Research Units do include a strong enthusiastic scientist in animal nutrition and another in the trypano-tolerant animal science and modelling area. There are good physical facilities for research with access to the library, computer and other necessary tools. The major weakness is that too few subject matter areas are covered. The chief animal scientist in charge of modelling is stationed in Nairobi rather than in Addis Ababa and may not be available on a day-to-day basis. The animal nutritionist is also head of the data analysis section by default.

139. This evident weakness in the number of senior scientists of high standing greatly concerned the Panel. They are needed to contribute to research results through their own work and to be available for advice to ILCA's field teams and to advise national programmes. ILCA's own world standing is jeopardized unless this need is met.

^{1/} Livestock Production and Development in Tropical Africa, September 1981 (Jahnke), and Livestock Production Prospects for Tropical Africa in the Year 2000, December 1980 (Kouevi).

140. The Panel believes that at least six senior positions are needed. It does not presume to be able to define a job description or disciplinary speciality for each position, but weaknesses observed or suggested to the Panel included four general areas of animal science, forage agronomy, range management and human sciences. Present specific weaknesses or needs seem to be animal science (either reproductive or stress physiology and animal health); range management (plant-animal relations), forage agronomy and economics. It is also recognized that a senior sociologist, with particular competence in territorial organizations, should be added to the above positions; the description of the post would best be made after the completion of the sociological studies in Mali and Kenya at the end of 1982, as recommended elsewhere by the Panel (see Chapter V, p. 28, Recomm. 1, and p. 34 Recomm. 12).

141. The role and function of these senior scientists were discussed at length. It was agreed that each should have his own research interest, with perhaps 50 percent of his time devoted to that work, with the remaining time being available for advice and consultation for field teams and national programmes. The relationship with field programmes is not viewed as authoritarian in nature, but it should be free and based on needs for disciplinary integrity, research methodology, career guidance for young staff members, and peer review of research proposals and publications. This scientific cadre should be seen as a special resource for the Director-General and his top research administrators and should be a prime source of scientific quality control decisions within ILCA. The Panel again recognizes that some positions or programmes may have to be changed or trimmed to provide the resources to make the hiring and support of these senior scientists possible, but it is imperative that this essential step be given the highest priority.

142. We are aware that this is a costly proposal but we regard it as vital. It can be phased, but cannot be ignored. It implies some cuts elsewhere in the short run, but in our view the step would greatly improve the level of confidence justified on the part of the donors. We would not exclude as interim steps the appointment of senior scientists on part-time assignments, preferably extending over several years.

Recommendation on Senior Scientists

Recommendation 41: (a) The Panel recommends that up to six senior research scientists be added at the Headquarters location. Their functions should be dual; original research and advisory work in relation to research planning and design, quality control and evaluation.

(b) The Panel recommends the earliest possible start of this move, both by budget restructuring and by appeal to the CGIAR for upward revision of funds (see comments in postscript of Overview).

B. Central Support Services: Training, Documentation and Publication

i) Training

143. Training is an essential part of ILCA's programme, and the need for a strengthened training programme has been emphasized repeatedly in reports of the Programme Committee - we suspect without adequate response. Regrettably, this is one of the areas quite inadequately investigated by the Panel - for sheer lack of time. We suggest the Director-General may wish to seek help in developing his own thoughts and proposals. However, the Panel did have some discussions which underlie the following observations and the two recommendations made.

144. While the Panel was unable to assess in any depth the results of past training, it does wish to stress certain points:

- (a) that training is a vital element in support of national research (an important part of its mandate);
- (b) that it gained no impression of a clear training policy, particularly as regards Francophone countries;
- (c) that while ILCA's training programme should be oriented towards its own research programme, it faces a difficult problem in striking a balance between training in systems work and in disciplinary or component research;
- (d) that junior professional staff and support staff should be included in the training programme;
- (e) that research networks and cooperative agreements offer opportunity for on-the-job training and training in specific subjects.

Recommendations on Training

Recommendation 42: (a) Considering the great need in Africa for trained people (research and administration), the Panel recommends that ILCA step up its training opportunities and activities.

(b) Until the success of the systems approach has been demonstrated more fully, the Panel recommends that ILCA be conservative ^{1/} in its training directly related to systems research and research for development.

^{1/} This is not negative: it is simply a caution that the difficulties met in doing systems work are to be expected and should be reflected in the training programmes.

ii) Documentation, Library Publications

145. As a collector, organizer and disseminator of information, the library is capable of providing a first-rate service to ILCA staff, other African institutions and the larger scientific community. The computerizing, cataloguing, search facility, and its microfiche service, coupled with the compatibility with AGRIS and links with PADIS, makes it an extremely valuable resource. Indeed, it is a principal and well developed source of information on livestock in Africa.

146. The balance between the publications devoted to the various components of livestock systems appears adequate, but regular reviews of the serial acquisition should be undertaken so that, based on usage, the subscriptions to journals can be revised. The move to catalogue ILCA's own aerial survey maps of its study zones should be expedited.

147. Because the library is undoubtedly a major source of both "conventional" and "unconventional" literature on African livestock, it is anticipated that more use will be made of its services in planning future component research and preparing "status of knowledge" reports on specific topics. Development agencies should also find this resource valuable. The Panel observes the full potential of the library is not presently being realized, either in its use by ILCA staff or by others.

148. A major task now facing Management is for the library to promote its facilities, capabilities and services, initially to increase its usage by ILCA's staff and especially the field teams, but also by other potential customers (e.g. national research bodies). We believe that its usage by field staff will increase with the completion of computerization and a monthly announcement of acquisitions to the field teams.

Publications

149. The printing facility and its operation (including editing, layout, printing and binding) are excellent. It will be used increasingly by ILCA (and possibly outside bodies) in the future. However, the Panel has severe reservations about the scientific standard of the published material in the form of Systems Studies and Monographs, and therefore, the function and operation of the Publications Committee. It is imperative that ILCA uses referees of international standing for its scientific publications. Exacting standards should not be sacrificed for the deadlines and priorities of the printing presses. Perhaps an Editorial Board consisting of scientists of international repute should be considered.

150. The difficulty of publishing the Systems Studies in existing international journals because of their length is appreciated, but ILCA's own standards of publications must therefore be comparably high. Also, ILCA

should resist the temptation to publish most of its research results in its own in-house publications. There is a tendency for an interdisciplinary approach to lead to compromises within a discipline to such an extent that the results from each component of the system are unpublishable in their own right; in fact, they should be more publishable because of the additional information gained by the team effort. The Panel urges that ILCA research results be published in refereed international journals.

151. The physical dimensions of the ILCA Systems Studies and Monographs should be reviewed because they do not conform to the usual sizes of scientific journals. This leads to difficulty in shelving in some libraries.

152. The placement of the Economic and Statistical Research Unit in the Documentation Division is anomalous. If viable, it should be placed with the Central Research Units.

153. An Audio-Visual Unit is proposed. The Panel could not see any immediate justification for the creation of this Unit. We suggest that the Director-General examine the proposal but presently we see it only as low in priority terms.

C. Relations with National Research Programmes and
with Governments

154. The mandate of ILCA places a good deal of stress on its supportive relations with national research programmes. ILCA has several options here. Its most obvious way is to work with them in cooperative research, either through networks (trypanotolerance, agricultural byproducts, traction), the animal breeds and management studies (such as those on Sahiwal or Boran breeds completed this year, or the projected studies of Sudanese breeds next year); or joint endeavours in field research programmes on site. Also, experienced senior scientists stationed at Headquarters should be called upon to visit individual countries to consult and advise on important problems. Such relationships are entirely dependent upon the amount of trust that ILCA staff members can engender in national officials.

155. The documentation centre offers another strong point of focus for relationships with national programmes, both in direct service through provision of state-of-knowledge documents, lists of conventional and non-conventional literature available, as well as in accessing and photocopying key local documents for storage in the ILCA library. Running across all of these activities is the potential for training at all levels, both formal and informal.

156. ILCA field programmes offer a great opportunity for on-the-job training in research and research techniques for young scientists. ILCA publications should provide a useful source of information for national personnel. The formal ILCA training programme should provide an array of practical, compelling training opportunities in research methodology (forage analysis, data processing, field research methods, etc.) applicable to the strengthening of national institutions.

157. In general, we have been impressed with the relation of ILCA staff with the national institutions we have visited. Many of these relationships are on a personal basis rather than official, but most are cordial. However, we did not get the impression that as many of the relationships as would be desired were based on the concept of ILCA as a scientific and technical leader in animal science and related fields. The trypano-tolerance network and the highlands legume collection programme were notable exceptions.

158. Relations in the research field are part of the wider relationship with Government; this must be expected to develop from the initial research agreements in the countries selected and with others through network endeavours, training programmes, etc. as ILCA results become more widely available and known. The Panel noticed some relationships in the research and monitoring fields which have not been without trouble. It is a difficult area, especially if false hopes are raised of quick results in the research field. We suggest caution, not rejection, as the key word. Caution is needed because ILCA is not always in the position to perform. On the other hand, informal advisory relationships are inevitable especially in the countries in which ILCA staff are working. These can and will occur in respect of development proposals. All we can stress is that advice offered (as is encouraged in the mandate) be restricted to the known competence of the ILCA staff concerned and not be offered as formal advice from ILCA except where based on definite research. It is or can be a difficult area in which the Director-General will have to exercise diplomacy and leadership on behalf of his staff.

Chapter VII.

ADMINISTRATION, STRUCTURE AND BOARD/MANAGEMENT RELATIONSHIP

159. It has not been easy for the Panel to get a good understanding of Management policies and administration. There can be no other research institute within the CGIAR system with more natural, inherent and often financially costly difficulties than ILCA in devising appropriate management and operational principles and practices. Its work is not concentrated at its base at Addis Ababa; it in fact operates at seven research locations in five countries. There are indeed five host governments and the work in the zones embracing countries other than Ethiopia cannot simply be described as outreach activities marginal to the core work at Addis Ababa. Its network activities embrace, moreover, many more than five countries referred to above and these activities are likely to grow. It has (as do other institutes) cooperative agreements with other CGIAR institutes; in this case ILRAD, IITA and, in the making, ICRISAT. It is necessarily a bilingual organization; its staffing must reflect this and its documents must be produced in French and English.

160. To these difficulties must be added, as significant background to the Panel's enquiries, a rather traumatic history. This history reflects not merely the political situation which threatened its permanence and certainly hampered the work of ILCA in the mid-seventies. To this can fairly be added two Director-Generals with very different management styles and each being involved in difficulties of governance with his Board and in varying degree with staff. The Panel found the morale of staff in the field often to be poor, and there is much evidence of inadequacy in relations of Centre Management and Zonal teams and in staffing and recruitment policies. These strains certainly affect the general standing of ILCA in the world of relevant scientific communities.

161. All these elements in the background of ILCA's short history certainly increased the difficulties of the task of developing a new type of research programme itself rather more difficult in concept and locale than those undertaken in the crop research institutes.

162. There is now a new Director-General who can profit from history and hopefully from this Report. While the Report is not written in historical vein and the Panel does not wish to limit management initiatives, the Panel believes there are some essential elements of Board, Management, Research Staff relations which must be recognized by both Board and Management. This chapter attempts, constructively, to restate these elements. In doing so we sometimes offer explicit, often implicitly, criticisms of what we have seen and found in the course of our visits and discussions. We begin with a note on the relations of Board, Management and Research Staff.

Board, Programme Committee and Management

163. There have been evident strains in the relations of the ILCA Board and its Committees, especially Executive and Programme Committees, with the Director-General representing Management. For the reason given below this is always possible, but it should be obviated if at all possible. We believe a major factor in unrest has been the unsatisfactory relations of Board and Management. Accordingly we devote more space to this than might normally have been expected. The key concepts are as follows:

- (a) The Board is responsible for the policy for the operation of the Institute. (It is, in the case of CGIAR Institutes, responsible to donors as represented in the CGIAR. There are inherent constraints here as illustrated in (c) and (d) below).
- (b) The overall responsibility of the Board covers all activities, including the Budget and its allocations to the programme, and for approving the programme of the Centre as developed and submitted by the Director-General.
- (c) There are two practical constraints in the freedom of both the Board and Management:
 - (i) The amount of money available which is principally provided through the CGIAR. Additional (special project) money often comes, however, on a bilateral basis from donors.
 - (ii) The views on research priorities expressed by TAC and endorsed by the CGIAR. This constraint may be less powerful in deciding the programme content than the overall financial limitations now being experienced.
- (d) The Board is not in a position to be its own executive agent. It appoints a Director (or Director-General) to exercise this function. Not always formally recognized is another facet of the latter's responsibility. He is normally to be regarded as the principal adviser and initiator of ideas to the Board and its Committees. As already indicated, he develops the programme for submission to the Board. He should present not only his ideas, but hopefully, also the joint ideas of himself and scientific colleagues on suitable research programmes and the staffing budget required.

164. Let us look more closely at this last statement. It is the responsibility of the Director-General to submit a budget and justify the allocation of funds to the various "research projects". He submits the research programme separately, or as part of the budget. In approving the budget, the Board approves the programme or calls for a readjustment of the allocation within the total expenditures it is prepared to approve.

The Board is advised by its Programme Committee which however, cannot properly do its work without a considerable input also from the Director-General. Unless the relationship is sensible there is a danger of irrational decisions being made. The Board will have the views of its own Committee and the views of the Director-General. It will be happy, indeed, if both parties always agree. In the course of its work, the Programme Committee will properly have contact with Project Leaders and will form views which may not always be consistent with those of senior management. This is one area in which conflict of views can arise, a conflict which can only be resolved by open-minded discussions between the Board and the Director-General.

165. One particular element of research management and direction becomes important in these circumstances. This is the protocol under which the research teams operate as already noted in Chapter VI of this Report. As stated in that Chapter, the protocol needs to set out its programme for a period of time (e.g. 3 to 5 years), the staffing appropriate and to be provided and the nature of reporting required. The protocol should not be subject to arbitrary alteration during the period provided; but it can, and should, be subject to performance review during the protocol period. It is in this respect that conflict between the Board's Programme Committee and the Director-General should be avoided or resolved by agreed discussion methods. The last thing a research team needs is competing overseers or "bosses". If a Board is not satisfied, it should not give arbitrary directions to the people in the programme, but should ask the Director-General and his senior colleagues to consider and report on the difficulties seen by the Board. Having said this, it is still important to recognize a proper role for the Programme Committee.

166. Thus it is important to observe that, if the Board's Programme Committee includes members of calibre in the professions relevant to ILCA's projects - as indeed it does - there can be great gains from their interaction in the field with project staff and Team Leaders. Their comments will not only influence the Board, but should also be available to the Director-General and all staff concerned. They are not, however, a substitute for the discussions between Project Leaders and the Management or for the in-house reviews discussed elsewhere. Accordingly, the relationship between the Board and the Management has to be one of constructive discussion of observations made by the Programme Committee. The Panel met this uncertainty about Programme Committee suggestions in the field. Some scientists were unclear whether their responsibility was to management or directly to the Programme Committee. The Committee did not claim this authority; nor did management seem to take steps to deal with Committee suggestions or to remove doubts in the field.

167. The Programme Committee was established to help the Board (of which the Director-General is a member) to develop research policy, identify research opportunities, advise the Board on priorities and review

research programmes to ensure that quality is maintained. We find that the Programme Committee has not always been effective as it would wish in its assigned role. At least the Panel did not gain a clear impression whether management and staff were able to respond to suggestions made by the Programme Committee. Indeed often it seemed that staff did not see the Committee's reports: certainly some Team Leaders did not see them. The Panel was not able to determine whether the lack of effectiveness was due to the operation of the Programme Committee, the attitude of management, inadequate discussions at the Board, or all three. The Panel does believe that a Programme Committee can, and should be, an important mechanism for research direction. However, it will not be effective unless there is recognition by the Director-General and the Board that the principal value of the Committee is to enable the Board to keep in touch with the needs for livestock research in Africa and with ILCA's own research activities. This would render the Board's discussions with the Director-General and senior staff better informed.

168. The Panel believes that this function of the Programme Committee will be better performed if it participates in an annual internal review of research at which each Team Leader presents the accomplishments (or problems) of the programme for the past year and the objectives of the new year. For programmes nearing completion, or for which a major change of direction is under consideration and may be thought desirable, the Programme Committee could, through the Director-General, initiate an intensive review using their own talents and/or external professionals and/or one or more of the senior scientists which the Panel proposes for appointment at the Centre. This review would then be the subject of consideration by the Board, Director-General and senior people of the programme affected before a final decision is made and appropriate budgetary allocation determined by the Board.

Decentralization of Research: Dangers of Isolation

169. This approach would be assisted by a proposal which would also meet another major need on which the Panel feels strongly. The Panel's discussions with Project Team Leaders and research people at Headquarters have highlighted the lack of adequate consultation between them. This is particularly true of those relatively isolated in zonal centres remote from Addis Ababa. The suggestion is that Team Leaders and the Programme Committee meet together every year for several days preceding the annual December meeting of the Programme Committee at which it prepares for the following April meeting of the Board. The Panel sees great advantages in this proposal which could also encompass contributions from senior scientific staff at Headquarters.

170. One of the real advantages of the foregoing proposal is a reduction in the isolation of research groups from one another and from Headquarters contact which is inherent in the structure of ILCA. Because of its mandate, the work is appropriately allocated to climatic zones and, of necessity therefore, to different countries (see map, Annex IV). This inevitably leads to some problems which follow from isolation from Headquarters and between them.

171. The Panel supports the decentralization of management and administration to the field stations. However, this requires clear understandings and consistent practice about powers which are delegated to research Team Leaders in the field; it also requires recognition of, and therefore steps to combat, the dangers of isolation of the teams from the overall leadership of the Director-General and from colleagues in other zones. There are great advantages in delegating responsibility to Team Leaders; but for such a system to operate properly, there must be trust from Headquarters backed by fully adequate delegation of authority. Since the quality of local staff varies and Team Leaders likewise differ in their ability to supervise staff and budgets, sound, clear procedures must be developed by the central office. These must be straight-forward, direct and clear. Audit procedures must include management activities as well as just checking accounts. While the Panel recommends a clear and firm direction of field centres, it cautions that these audit procedures must be seen as helpful to the field stations and not a check on their ability to manage their own resources. The Panel cannot emphasize too strongly that administration is a service unit. It exists only to help the research units do the job for which ILCA was formed.

172. One of the major disadvantages of decentralization is that it, of necessity, results in the Team Leader becoming the Chief Administrator in the field location, and in diverting much of his/her time from research to solving administration problems. The Panel realizes that this is inevitable. Host country representatives will want to deal with the top person in the country. Conflicts between research personnel and local administrators will eventually have to be solved by the Team Leader. In all these matters we can only suggest that Headquarters give as much support as possible in administration, but also in the direction of research on which more needs to be said.

173. At the zonal level, given an agreed protocol of research covering the programme (see earlier comments in Chapter IV and again in Chapter V), the Team Leader must be allowed to direct the team's work. He must be consulted on his wishes for staff and not have perhaps unwanted appointments thrust upon him. Similarly, budget possibilities and limitations must be discussed with him. Systems work requires multidisciplinary teams, and their composition is a matter for agreement between the Director-

General and the Team Leader. Likewise, the scope for disciplinary work has to be assessed and, at the appropriate time (see Chapter III), steps taken to launch it - whether within ILCA or another cooperating institute. On these matters there must be interaction between Headquarters and the Team Leader to ensure proper standards of research design, high standards in appointment and the fullest support as appropriate from disciplines available at Headquarters. Not less important, and with same purpose, is the provision for interaction between zonal activities -- that is between scientists in any one discipline as well as between Team Leaders. On all these matters, as Chapter V has shown, the Panel was less than fully satisfied. The Panel strongly recommends that the new Director-General restate policies and practices in these areas. The Panel believes that the suggestion made earlier (para 169 in this Chapter for bringing Team Leaders together for several days each year) would help. The Panel believes that the people representing specific disciplines in each team also need opportunities for contact with each other and with the group of senior scientists the Panel proposes for Headquarters. Occasional participation by senior people from the zonal teams as lecturers in special training courses for nationals of research organizations in countries within ILCA's "territory" would be helpful to the course and to themselves.

174. The basic aim in devising the management structure is, or should be, the achievement of high quality research without which ILCA will fail to achieve its objectives. The Director-General is responsible to the Board for the management structure and for its efficient operation. The structure must inevitably reflect his style; our observations nevertheless are reminders about basic needs to be met. Secretive and arbitrary management decision-making is to be avoided at all costs. Fundamentally the research scientist must know where he stands and be fully supported within the agreed statement of his authority. He must be consulted on key decisions properly made by the Director-General but which will affect his ability to operate. All this is repeated to give stress to the recommendation that the new Director-General clearly state his approach to management (including research direction). Within this he must trust his scientists (subject to appropriate in-house reviews) and support them. The quality of the scientists will finally prove more important than the formal shape of administrative structures (see also Chapter VI, para 122 et seq.).

Staff Recruitment

175. The Panel was not able to give time to very detailed reviews of administrative personnel or of financial matters. The Panel has earlier in this Report reviewed the direct support services offered by Central Management to research activities throughout ILCA (see Chapter VI) but, partly because it was impossible, the Panel did not attempt staff

or financial audits. The Panel does wish to comment on staff recruitment procedures, especially for research staff. On this the Panel observed the following:

- (a) Inadequate advertisement of vacant positions; the Panel believes that international advertisement should be done in professional scientific journals, scientific societies, universities and research organizations.
- (b) Staff appointments seem too often to have been made on a haphazard basis with little regard for scientific competence, past training or suitability for the post. In some cases, internal transfers or assignments have been made, apparently to provide a position for someone not found suitable for another post.
- (c) The staff does not have confidence in the past system of handling personnel matters. They see the process as secretive and capricious, without much regard for the person as an individual who needs to feel wanted. Favouritism is seen by some as an underlying factor in some personnel decisions.
- (d) The reward system is not fully understood, especially among scientific staff.
- (e) Classification of staff into professional and support categories is not viewed by the staff as always objective and rational. From its admittedly limited observations, the Panel tends to agree.
- (f) The Panel believes that the lack of stringency in criteria and procedures in staff recruitment have contributed to the generally weak scientific staff situation at ILCA and inappropriate balance between youth and experience. The Panel believes that the Management and Board should take immediate steps to prepare an understandable list of procedures for staff recruitment, and that these be widely circulated to staff.
- (g) Job descriptions for most positions are not precisely written, and job titles are too general to be useful in understanding the role and function of the position. It is urged that these be more specific.
- (h) Staff promotion procedures need to be clarified. The staff does not have confidence that the procedures are fair. The Panel recommends that the procedures be set out clearly and made available to staff. The procedures should include opportunity for a staff member who may consider he is being treated unfairly to initiate his own request for promotion.

- (i) ILCA staff are mainly young and operate over a wide geographical area, often in isolation. Management should investigate the possibility of study leave or study visits for its research staff to keep them in contact with the international scientific community.
- (j) The Panel observed that ILCA has not used peer review as a means of achieving scientific and professional quality. The Panel recommends that peer review should be included as a key procedure in staff promotion and in evaluation of staff publications.
- (k) ILCA has not given due weight to the importance of scientific publications. The Panel urges that publications in refereed scientific journals should be one of the major measures of progress towards promotion. In recommending this, the Panel does not mean to diminish the role a scientist might play in writing systems studies or other internal publications that are important to ILCA's programme.
- (l) The question of geographical balance versus scientific ability was raised with the Panel. The Panel believes that scientific quality must be the first and foremost criterion in staff recruitment. However, it does appear that some national groups seem to be over-represented on the staff. The Panel recommends that ILCA, in its future efforts to upgrade its staff, should re-examine the balance in scientific quality and that language competence should weigh heavily, given equal scientific qualifications.
- (m) ILCA should investigate the possibility of making French language training available for its staff and their families. There can be no question of the need for ILCA to operate as a bilingual institution.
- (n) The Panel does not consider that it is necessary for all staff members to work in interdisciplinary teams; indeed too much emphasis in this regard may tend to hinder good component research. Also, it would hinder the interest of first-rate scientists in joining the ILCA teams. What is important is that the interdisciplinary team can identify significant problems, and that the component researchers can focus their work so that it will fit into the system as it is or as it may be improved.

176. Financial arrangements. As earlier indicated, the Panel did not attempt a financial audit. The Panel was aware that the Board was wrestling with the results of inadequate and, indeed, inefficient management in this area. The Panel's leader discussed these matters with the Chairman and some members of the Board. He became aware that a major re-organization

had taken place. It was too early to assess the results, but he wishes to express confidence that the financial and administrative management at the Centre has now been effectively strengthened. It is naturally for the Board and the Director-General to ensure the continuance of this necessary improvement.

177. Overall Staff Structure. The staff structure of ILCA has changed relatively often over time. One major change took place in 1977 when ILCA shifted from being organized around disciplinary departments to a structure reflecting the division between systems studies (the zonal programmes), special studies (e.g. trypanotolerance) and monitoring. Later on further changes took place which reflected internal tensions and/or an inability to define clearly the proper role of ILCA. The Panel does not want to limit the necessary flexibility the new Director-General will require to meet the challenges brought to ILCA by recent and future events, which include this review and its interpretation by TAC and the CGIAR. The Panel will therefore not make proposals for a staff structure but will observe that it should be functional - as already remarked by the Board and TAC missions - and also be clear and well understood by the staff.

Relations with other International Centres

(a) Other CG Centres

178. The Panel recognizes that there are problems in working out mutual relationships with another international agricultural research centre, but the Panel suggests that the following principles must be met if successful cooperation is to be achieved: (1) there must be a mutual need for the work, i.e. there must be benefit in the relationship for both parties, (2) both institutions must bring special skills to the partnership, and (3) both partners will have to give some of their resources, and perhaps a bit of operational freedom, to make the relationship work.

179. The Panel welcomed the growth of cooperative relations between ILCA, IITA and ICRISAT. Similarly the Panel noted the strong and effective collaboration with ILRAD in the trypanotolerant work, but sees no need for a change in the structural relationship between the two Centres.

(b) Other International Institutes

180. ILCA programmes have much to gain from maintaining strong links with specialized departments in overseas institutes, e.g. Texas A&M University and the Winrock Foundation for herd and systems computer simulation models. There are other such links that could be formed in other areas. The trypanotolerance studies, initiated in collaboration with FAO and UNEP, could further strengthen their links with multilateral and bilateral aid

projects involved with trypanotomiasis and trypanotolerance, e.g. IEMVT/GTZ project at Bobo Dioulasso, Upper Volta. Some programmes may benefit through contacts with organizations such as FAO/UNDP which are supporting national research centres in Africa. The Panel encourages this type of contact and cooperation where programme needs dictate.

Recommendations regarding Administration and Structure

Recommendation 43: The Panel recommends that the Board and the Director-General reach agreement on the principles outlined in this Chapter governing their relative functions and relationships.

Recommendation 44: The Panel recommends that the Director-General, given this understanding, exercise a more positive leadership in the research programme and the setting of the intellectual tone for the organization.

Recommendation 45: The Panel recommends that the Director-General develop a more open administration. The Panel does not want to limit the new Director-General in his management style, but he should be encouraged to be open and straight-forward with the staff and be willing to share both his successes and his mistakes with them.

Recommendation 46: The Panel recommends that a reward system should be made visible and be known to all the staff. It should be tied directly to performance. Procedures should be published and followed by management. Promotions should include peer review of accomplishments.

Recommendation 47: The Panel recommends that clear operational procedures be established and manuals published for the operation of field centres. These should be designed to help rather than control the centres.

Recommendation 48: The Panel recommends that budgets be built from the bottom up, with Team Leaders submitting proposals requesting funds for their specific research areas.

Recommendation 49: The Panel recommends that all scientific and key positions in administration and research support activities be advertised internationally and that selection be based on qualifications and merit. Only then should national origin be a criteria to obtain balances.

Recommendation 50: The Panel recommends that a policy of study leave or visits be established for the research staff.

Recommendation 51: The Panel recommends that scientists be encouraged to publish in technically reviewed journals.

Recommendation 52: The Panel recommends that ILCA establish appropriate language courses at Headquarters for staff and families.

Recommendation 53: The Panel recommends that ILCA continue to develop strong cooperation with ILRAD, IITA, ICRISAT and other International Centres.

Chapter VIII. ACKNOWLEDGEMENT

181. The Panel has already said (see Chapter I, para 9, p. 5) that it was pleased by the thorough preparations made for its visit to ILCA and by the constructive collaboration of all concerned. It would wish to state again its gratefulness for the hospitality enjoyed during its field visits, particularly to the zonal programmes.

182. The readiness of Government Officials and collaborative Institutions to receive the Panel and the open exchange of views which the meetings generated, helped a great deal the Panel in assessing the role and usefulness of ILCA in Africa. The Panel would wish also to record its appreciation to the Board Chairman and members of the Programme and Finance Committees for their presence and active participation in the last phase of the Review, particularly during the presentation of the Panel findings.

183. The Panel was much helped during its travel and labour by the valuable assistance of Ms. T. Gaillard, who translated with speed and accuracy discussions from English into French and contrariwise. During the last stage of the review, Ms. E. Benamar came to the rescue when translation was needed as well as interpretation.

184. Last but not least the Panel is much grateful to the ILCA Secretaries, Ms. A. Bayene and Ms. F. Vitali who typed the elements of the review report in Addis Ababa; later on Ms. P. Chapman in Canberra assisted the Chairman and the editorial Sub-Committee of the Panel during the last phase of project report writing. Ms. P. Dionori typed the present report in FAO, Rome, with her usual speed and efficiency.

ANNEX I

PANEL SCHEDULE

First Phase: 22 September - 9 October 1981

Tuesday 22 September

Addis Ababa: Assembly of Panel. Internal Panel Discussions.
17:00 Drinks and informal gathering with ILCA Staff and Training
Course Participants.

Wednesday 23 September: Meeting at ILCA Headquarters

08:15 Welcome by Chairman of ILCA Board;
Introductions Panel/ILCA Staff
09:00 Briefing of Panel by ILCA Management
11:00 Response by Panel: Issues, Questions and Discussions
14:30 Briefing and Discussion (cont'd)
15:30 Closed Meeting of Panel and Board Members
18:30 Reception at ILCA Headquarters

Thursday 24 September: Tour of Work and Facilities

08:00 Shola - Debre Zeit (by car)
09:00 Introduction to Debre Zeit by Dr. C. de Haan
Introduction to Highlands Staff
10:00 Tour of Station
11:00 Discussion
13:30 Debre Zeit - Shola (by car)
14:30 Introduction to Headquarters Facilities by Dr. D.J. Pratt
Tour of Facilities
14:50 - Library and Documentation (A.V. Martin)
- Conference and Training Facilities (D.H. Hill)
15:30 - Recreation, Cafeteria, Hostel (J.T. Thersby)
16:00 - Farm Area, Greenhouse, Laboratories, Computer (J. Lambourne)
17:00 - Administration (Ghirma Tadege)
17:30 Briefing of Panel on Travel Arrangements for W. Africa Tour

Friday 25 September: Transfer Addis Ababa - Ibadan

12:30 Addis Ababa/Lagos (by plane)
21:00 Lagos/Ibadan (by car)

HUMID ZONE RESEARCH

Saturday 26 September

a.m. Meetings at IITA Seminar Room
08:15 Welcome to IITA (Dr. E.H. Hartmans)
Introduction to ILCA Humid Zones Research (Dr. C. de Haan)
Introductions Panel/Staff
09:00 Briefing of Panel by ILCA Humid Zone Team:

Saturday 26 September (cont'd)

- Farming Systems (C. Okali)
- Village Livestock (M. Velez-Nauer and B. Carew)
- Innovative Systems (M. Velez-Nauer and J. Lazier)
- Future Prospects (M. Velez-Nauer)
- 11:00 Discussion
- p.m. Visit to Badaku Villages
- 14:00 IITA/Badaku (by car)
- 15:00 Presentations and Discussions on Village Work with Small Ruminant Production
- 17:00 Badaku/IITA (by car)

Sunday 27 September: Tour of Station Work

- 08:00 IITA/Fashola (by car)
- 09:30 Presentations and Discussions on Station Work at Fashola on Small Ruminants Production
- 11:30 Fashola/IITA (by car)
- 14:30 Tour of IITA Station Work including:
 - Farming Systems Research and Presentations
 - Discussions on ILCA Research on-campus on Small Ruminant Production

Monday 28 September

- a.m. Visit to University of Ibadan
- 07:30 IITA/University (by car)
- 08:00 Briefing of Panel on National Research in S. Nigeria by Prof. Olaloku, Institute of Agricultural Research and Training, University of Ife
- 09:00 Visit to Departments of Animal Science and Veterinary Science, University of Ibadan
- 11:30 University/IITA (by car)
- p.m. Meetings at IITA Seminar Room
- 13:30 Discussions with IITA Farming Systems Group
- 15:00 Individual Discussions with ILCA staff
- 17:00 Internal Panel Discussions followed by Meeting with Dr. Hartmans
- 18:30 Reception at IITA

Tuesday 29 September

- a.m. Transfer Ibadan/Kaduna
- 07:45 IITA/Lagos (by car)
- 13:50 Lagos/Kaduna (by plane)

Tuesday 29 September (cont'd)

SUBHUMID ZONE RESEARCH

| | <u>p.m.</u> | <u>Meetings at Team Leader's House</u> |
|-------|---|--|
| 16:30 | Introductions Panel/Staff | |
| 17:00 | Briefing of Panel by ILCA Subhumid Zone Team Leader (R. von Kaufmann) | |
| 17:30 | Introduction to Aerial Survey Work by Coordinator (covering both subhumid and other zones) (K. Milligan) | |
| 18:00 | Discussion | |
| 19:00 | Drinks and Informal Gathering with Team | |

Wednesday 30 September: Visit to National Animal Production Research
Institute (NAPRI) and University of Ahmadu Bello

| | |
|-------|---|
| 07:30 | Hotel/NAPRI, Shika (by car) |
| 09:00 | Briefing of Panel on National Research in N. Nigeria (by Prof. Saka Nuru, Director NAPRI) |
| 10:00 | Tour of NAPRI |
| 12:00 | Shika/Zaria (by car) |
| 14:30 | Discussion at Ahmadu Bello University (ABU) with Prof. Saka Nuru, and Drs. Davies, Abalu and Akinola |
| 17:00 | ABU/Kaduna (by car) |

Thursday 1 October: Visit ILCA Field Sites

| | |
|-------|--|
| 07:30 | Kaduna/Abet (by car) |
| 10:00 | Tour ILCA Work or Abet Settlement Area |
| 14:00 | Abet/Zonkwa (by car) |
| 15:00 | Discussion at ILCA Guest House, Zonkwa |
| 16:30 | Zonkwa/Kafachan (by car) |

Friday 2 October

| | |
|-------|---|
| 08:00 | Kafachan/Kurmin Biri (by car) |
| 09:30 | Tour Kurmin Biri Grazing Reserve Visit ILCA/Livestock Project Unit Experimental Area |
| 13:30 | Discussion |
| 14:30 | Kurmin Biri/Kaduna (by car) |
| 17:00 | Transfer Kaduna/Lagos |

Saturday 3 October

| | |
|-------|----------------------------------|
| 10:00 | Internal Panel Discussions |
| 14:30 | Transfer Lagos/Bamako (by plane) |

ARID ZONES RESEARCH (MALI)

Sunday 4 October: Meetings at ILCA Guest House

| | | |
|-------|---|------------------------------------|
| 08:15 | Introduction to ILCA Arid Zones Research (C. de Haan) | |
| | Introductions Panel/ILCA Pastoral Group | |
| | Briefing of Panel by ILCA Pastoral Group | |
| 09:00 | - Pastoral Systems of W. Africa (J. Swift) | |
| | - Pastoral Systems Studies, Mali (P. de Leeuw and J. Swift) | |
| 10:30 | Panel separates into Groups A and B | |
| | Group A | Group B |
| | <u>Pastoral</u> | <u>Agropastoral</u> |
| 11:00 | Discussion on foregoing presentation | Bamako/Segou (by car) |
| 14:00 | Bamako/Niono (by car and | Lunch at Segou |
| 1500 | ILCA plane)* | Visit ICRISAT Field Station, Segou |
| 16:30 | Arrive Niono (by plane) | Segou/Niono (by car) |

Monday 5 Octobera.m. Meetings and Tour of Facilities at Station du Sahel

| | | |
|-------|--|--|
| 08:00 | Introductions Panel/ILCA Agropastoral Group | |
| | Briefing of Panel by ILCA Agropastoral Group | |
| | - Agropastoral Systems Studies (R.T. Wilson, P. Gosseye, C. Toulmin <u>et al</u>) | |
| 10:30 | Discussion | |
| 15:00 | Internal Panel Discussions | |
| 17:00 | Tour of Station du Sahel | |
| 18:30 | Drinks and informal gathering with Mali team | |

Tuesday 6 October: Visit to Field Sites and Collaborators

| | | |
|-------|--|---|
| | Group B | Group A |
| | <u>Agropastoral</u> | <u>Pastoral</u> |
| 08:00 | Discussion ILCA team | Niono/Molodo (by car) |
| 08:30 | | Molodo/Sevare (by plane overflying Sahel and Delta) |
| 11:00 | Niono/Molodo (by car) | Arrive Sevare |
| 11:30 | Molodo/Sevare (by plane) | |
| 12:30 | Arrive Sevare | |
| 15:00 | Visit Office de Developpement de l'Elevage de la Region du Mopti (ODEM, Drs. N. Diakite, M. Keita and staff) by both groups. | |
| | Discussions with ILCA/ODEM staff. | |

* Two Panel Members and two ILCA Team Members to travel by car, continuing discussions on pastoral systems en route, and three Panel Members and one/two ILCA Team Members to travel by plane ETD Bamako (Senou) 14:30, ETA Molodo (for Niono) 16:00.

Wednesday 7 October

| | <u>a.m.</u> | <u>Tour of Mopti and Delta Pastoral Systems</u> |
|-------|--|---|
| 08:00 | Sevare/Mopti (by car) | |
| 08:30 | Tour of Mopti and visit of a village cattle near the river | |
| 10:00 | Panel discussions with ILCA staff | |
| | <u>p.m.</u> | <u>Transfer Mopti/Bamako</u> |
| 13:30 | Mopti/Sevare (by car) | |
| 14:00 | Sevare/Bamako (by plane) | |
| 17:00 | Presentation and discussions on future work plans | |

Thursday 8 October: Meetings in Bamako

| | |
|-------|--|
| 08:00 | Visit to Minister of Livestock Production, H.E. Mady Diallo |
| 09:00 | Sotuba - Meeting with Malian Livestock Research representatives: <u>Dr. O.C. Diop, et al.</u> |
| 14:00 | Internal Panel discussions |
| 16:30 | Meeting with the D-G of ILCA on organization of second phase of Review and interim actions |
| 19:30 | Reception at ILCA Guest House |

Friday 9 October Departure Panel via Paris and Abidjan.

PANEL SCHEDULE

Second Phase : 18 November - 4 December 1981

Wednesday 18 November

Panel reconvenes Kenya

a.m. Arrival Nairobi and transfer to Kiboko

p.m. Internal Panel discussions

Thursday 19 November

07:00-10:30 (1) Arrival Nairobi and transfer to Kiboko of Panel members
unable to arrive 18 November

08:30-10:30 (2) Optional visit for those already at Kiboko to Kiboko Range Research Station

12:00 Introduction to Second Phase Programme

ARID ZONES RESEARCH (KENYA)

Briefing of Panel on East African Range Livestock Systems Studies (EARLSS)

13:30 The ILCA/Kenya Programme 1977-1980; discussion with Panel
(P. Sihm; N. Dyson-Hudson; S. Bekure; B. Grandin; J. King).

Visit Field Study Site and Kajiado Rangelands

16:40 Depart to Okarkar Group Ranch (by car)

17:10 Visit sample households during evening activities

- Observations and measurements on sheep and goats
(C. Peacock)

- Observations and measurements on calves and their dams
(P. Semenyé)

Friday 20 November

08:30 Depart Kiboko (by car)

09:00 Ilkilunyeti: Watering of livestock from shallow river bed wells (Ms Myrtle de Souza; Mr. Karasinga Amisi (elder))

09:45 Depart for Merueshi borehole: Observation of olopololi
(reserved grazing area) en route

11:00 Arrive Merueshi borehole: Observation of livestock watering at a borehole (Ms. Myrtle de Souza; Mr. Mutelewo ole Amisi (Chairman, Merueshi Group Ranch))

11:30 Depart for Mbirikani Group Ranch

12:00 Arrive at Mbirikani Group Ranch: Herd Movements in Mbirikani
(Ms C. Peacock); Group Ranch Administration and Politics
(Mr. Ishmael ole Pasha); Land Adjudication in Loodariak
Section (Mr. D. Caddis); Discussion with elders.

15:30 Return Nairobi.

Saturday 21 November

Meetings with Ministry of Livestock Development

- 08:30 - Part of Panel: Meeting with Ministry of Livestock Development
 Officials (Messrs. Z. Owiro, L. Ayuko and Oyo)
 - Part of Panel: Meeting with local World Bank officers
 (Messrs. C. Blanchi, E. Rice, N. Worker, F. Thomas)

TRYPANOTOLERANCE AND OTHER STUDIES

- | | |
|-------|--|
| 10:30 | Introduction (J.C.M. Trail); Water and Livestock (J. King); Trypanotolerance (J.C.M. Trail and Y. Wissocq) |
| 11:40 | Discussion |
| 12:45 | Lunch at ILRAD (with D-G ILRAD) |
| 14:45 | Tour of ILRAD |
| 16:45 | Discussion on Trypanotolerance and ILCA/ILRAD Collaboration |
| 19:00 | Reception at ILRAD |

Sunday 22 November

Transfer Nairobi/Addis Ababa

- 08:30 Nairobi/Addis Ababa (by plane)
p.m. Internal Panel discussions

Monday 23 November

- 08:00 Internal Panel discussions
- ARID ZONES RESEARCH (ETHIOPIA AND BOTSWANA)
- 10:15 Introduction: Comparative Objectives of Studies in Kenya,
Ethiopia and Botswana (P.A. Sihm)
- 10:30 Briefing of Panel on Ethiopian Programme
- Introduction (Gebre Hiwot Zere)
 - ILCA Studies (N. Cossins)
- 11:20 Discussion
- 13:30 Panel separates into Groups A and B
- Group A: Visit Southern Rangeland
- 14:00 Addis Ababa/Yavello (by plane)
Yavello/Medecho (by car)
- 18:00 Arrive Medecho
- Evening free for campfire discussion

Tuesday 24 November

- | | |
|-------|--|
| 06:00 | Optional visit to Borana encampment |
| 08:30 | Field presentations and discussions |
| 12:00 | Picnic at Dambello Wacha |
| 13:00 | Arrive Yavello - Visit Project Headquarters |
| 14:00 | Yavello/Addis Ababa (by plane) |
| 17:00 | Arrive Addis Ababa and transfer to ILCA Headquarters |

Group B: Introduction to Information and Training Services

Monday 23 November

14:15 Overview; Introduction of Staff (D.J. Pratt)
 14:45 Training Activities: Africa's Needs (M. Sall); ILCA's Programme (D.H. Hill)

Tuesday 24 November

Information Services

08:15 Introduction (C. de M. Kouévi)
 Library: Books and Periodicals; Microfiche; Photos and Maps (C. Ranaivojoelina)
 09:40 Information Processing (R. Portegies Zwart)
 Publications: Editing and Translating; Layout; Printing; Reports Unit (C. de M. Kouévi)
 12:00 Discussion
 14:00 Group discussion on information and training
 16:00 Visit to ECA: Meeting with Dr. Quirino, Director of Pan African Development Information Service, and with Dr. Adadeji, Executive Secretary of ECA

Wednesday 25 November

HIGHLANDS RESEARCH

08:00 Shola/Debre Berhan (by car)
 09:30 Arrive Debre Berhan Field Station
 10:00 Briefing of Panel by Highlands Research Team (Drs. F. Anderson, G. Gryseels, Amde Wondafrash, E. Mukasa-Mugerwa)
 11:30 Discussion
 14:00 Tour of Debre Berhan Field Station (J. Whalley, J. Kaharananga et al.).
 16:30 Internal Panel discussion
 18:00 Discussions
 19:00 Meeting with local officials and staff

Thursday 26 November

06:00 Optional tour of early morning farm activities
 08:00 Debre Berhan/Addis Ababa (by car)
 09:30 Briefing of Panel on Central Research Units
 Introduction (C. de Haan)
 10:15 Forages and Nutrition (J. Lambourne)
 10:30 Data Analysis and Modelling (J. Lambourne and J.C. Trail)
 14:00 Briefing of Panel on ILCA Administration
 16:30 The Perspective of Management:
 Present (D.J. Pratt)
 16:50 Future (P.J. Brumby)
 17:15 Internal Panel discussion

Friday 27 November

Visits to Government and International Organizations

08:30 Meeting with Commission for Science and Technology (Messrs. Ato Hailelal Tebikē, Ato Taye Worku, Lakew Birke)

09:30 Panel separates into Groups A and B

Group A

Group B

10:00 Meeting with Ministry of Agriculture Officials: Messrs. Ato Tsegaze Asfan, and Makonnen Kibret

10:30 Visit Holetta Agricultural Research Station (Messrs. Taye Teferedegn, Hailu Keno, Galal and M. Taylor)

14:00 Meeting of Panel with Dr. K. King, UNDP Representative

14:30 Internal Panel discussions: review of preliminary observations and findings

Saturday 28 November

a.m. and p.m. Internal Panel discussions: review of preliminary observations and findings

Sunday 29 November and Monday 30 November

Individual interviews of team leaders and senior officers/ programme leaders by Panel

Tuesday 1 December and Wednesday 2 December

Preparation of summary of observations and recommendations

Thursday 3 December

Presentation by Panel Chairman of Panel findings to Board Chairman, Programme and Finance Committees, Director-General and Senior Staff. Discussion.

Friday 4 December

a.m. Discussion between Panel and Senior Staff on above
p.m. Departure Panel

LIST OF DOCUMENTS PROVIDED BY ILCA TO THE PANEL

Before the First Phase

(A) General Background

1. ILCA's foundation report (Animal Production and Research in Tropical Africa: Report of the Task Force commissioned by the African Live-stock Subcommittee of the CGIAR). Second edition with annexes, 1973.
2. Second TAC Mission to ILCA (November 1978-April 1979). (AGD/TAC:IAR/79/8 Rev. 1, 1980)
3. ILCA: the First Years, 1980.
4. ILCA Proposed Programme and Budget 1981.

(B) Zonal Programmes

Subhumid zone

5. Livestock Production in the Subhumid Zone of West Africa: a Regional Review. ILCA Systems Study 2. 1979.
6. ILCA Subhumid Zone Research: a Compendium of Background Papers. 1981.

Humid zone

7. Small Ruminant Production in the Humid Tropics. ILCA Systems Study 3. 1979.
8. Small ruminants. ILCA Bulletin 7. 1980.
9. ILCA Humid Zone Research: a Compendium of Background Papers. 1981.

Arid zone

10. ILCA's Arid Zones Research. Paper prepared for TAC 1980.
11. Report on Activities/Programme and Budget for 1977 (included here for its statements of intent regarding arid zone research in Mali and eastern Africa). 1976.
12. ILCA Sahelian Research: a Compendium of Background Papers. 1981.
13. Man's Role in the Changing Habitat of Mema under the old Kingdom of Ghana. ILCA Headquarters working document 2. 1979.
14. Changes in Land Use and Vegetation in the ILCA/Mali Sudano-Sahelian Project Area. ILCA Headquarters working document 3. 1980.

15. ILCA Range Livestock Research in East and Southern Africa: a Compendium of Background Papers. 1981.
16. Studies of Range Livestock Production Systems under Induced Change. Brochure 1980.
17. Pastoral Development Projects. ILCA Bulletin 8. 1980.
18. New Ways for Old Worlds: Development and Research. A New Approach to the Ethiopian Rangelands Development Project. 1981.

Highlands

19. ILCA Highlands Research: Initial Results. 1981.
20. Dairy Development. ILCA Bulletin 11. 1981.

(C) Central Research

Networks and Specialist Research

21. Introduction to ILCA's Network and Specialist Research Activities. 1981.

Comparative breed studies

22. Trypanotolerant Livestock in West and Central Africa. ILCA Monograph 2 (Volume 1). 1979.
23. Sahiwal Cattle: an Evaluation of their Potential Contribution to Milk and Beef Production in Africa. ILCA Monograph 3. 1981.

Mathematical Modelling

24. Mathematical Modelling of Livestock Production Systems: Application of the Texas A&M University Beef Cattle Production Model to Botswana. ILCA Systems Study 1. 1978.
25. Economic Trade-offs between Milk and Meat Production under various Supplementation Levels in Botswana. 1981.

(D) Information and Training

26. ILCA Information Services: Background Papers. 1981.
27. ILCA Training. Brochure 1981.
28. Livestock Development Projects Planning and Evaluation: Report of a Course by ILCA and EDI held in Nairobi, Kenya, 20 March-5 May 1978. ILCA Bulletin 2. 1978.
29. ILCA Research 1980. ILCA Bulletin 13. 1981.

30. ILCA Proposed Programme and Budget 1982.
31. ILCA Longer Term Plan. Second draft 1981.
32. Livestock Production Prospects for Tropical Africa in the Year 2000. ILCA Bulletin 10. 1980.
33. Livestock Production and Development in Tropical Africa: an Analysis of Production Systems and Development Potential (first part(s) of a three-part analysis). 1981.

Before the Second Phase

34. Organization and Development of the ILCA Programme.
35. Memorandum of Understanding between the Rangeland Development Project and ILCA for the Joint Ethiopian Pastoral Systems Study.
36. Introduction to East African Range Livestock Study (Kenya).
37. Research on Farm and Livestock Productivity in the Central Ethiopian Highlands (Draft ILCA Systems Study 6).
38. CGIAR: Integrative Report 1981.
39. Research Briefs: Progress and Inputs by Programme Component.
40. Consultancy Reports in Animal Traction and Human Nutrition.
41. ILCA Professional Staff
 - Staff list
 - Short curricula
 - Recent publications
42. Memoranda of Agreement.
43. ILCA's Longer Term Plan (November 1981).
44. Livestock Production and Development in Tropical Africa (H.E. Jahnke, September 1981).
45. Trends and Prospects for Livestock and Crop Production in Tropical Africa (C. de M. Kouevi, April 1981).
46. ILCA Programme Committee Reports of 1977, 1978, 1979 and 1980.
47. Current Rules of Procedure for the ILCA Board (to be submitted for Board adoption in March 1982).

Besides the above documents, the Panel was also provided during its visits with situation reports and other internal documents by Project Teams and Central Units.

TERMS OF REFERENCE

On behalf of the Consultative Group, to assess the content, quality, impact and value of the overall programme of ILCA and to examine whether the operations being funded are being carried out in line with declared policies and to acceptable standards of excellence.

It is hoped that the review will inter alia assist ILCA itself in planning its programmes and ensuring the validity of the research priorities recognized by the Board of the Centre.

In pursuance of the main objectives, defined above, the Mission is requested to give particular attention to the following aspects:

- i) The mandate of the Centre, its appropriateness and the interpretation thereof with respect to:
 - (a) the immediate and long-term needs for improved food supply and human welfare in developing countries;
 - (b) present and possible future areas of work.
- ii) The relevance, scope and objectives of the present programme of work and budget of the Centre and of its forward plans for the next five years in relation to:
 - (a) its mandate and the criteria for the allocation of resources as defined by TAC;
 - (b) the ongoing activities of other international institutes and organizations, and of relevant national institutes in cooperating countries and in others where the work of the institutes has bearing;
 - (c) the policy, strategy and procedures adopted by the Centre in carrying out its mandate, and the mechanisms for their formulation;
 - (d) the Centre's rationale for its present allocation of resources, its present and future overall size, and the composition and balance of the programme in the fields of research, training, documentation, information exchange and related cooperative activities.
- iii) The content and quality of the scientific and related work of the Centre with particular reference to:

- (a) the results of past research;
 - (b) the current and planned research and the role of the scientific disciplines therein;
 - (c) the information exchange and training programmes, their methodologies and the participation of the research staff therein;
 - (d) the adequacy of the research support and other facilities;
 - (e) the management of the scientific and financial resources of the Centre and the coordination of its activities.
- iv) The impact and usefulness of the Centre's activities in relation to:
- (a) the present and potential impact of the research conducted by the Centre;
 - (b) its information exchange and training programmes;
 - (c) cooperation with national research and development programmes;
 - (d) cooperation with other international institutes and organizations.
- v) Constraints on the Centre's activities which may be hindering the achievement of its objectives and the implementation of its programmes, and possible means of reducing or eliminating such constraints.
- vi) Any specific questions which concerned members of the CGIAR, co-operating institutions, the Centre's Director or its Board of Trustees, may request TAC to examine.

On the basis of its review, the Mission will report to the Chairman of TAC its views on the need for any changes in the basic objectives or orientation of the Centre's programme elements, and on means of improving the efficiency of operations, and will make proposals for overcoming any constraints identified under item (v).

While the Mission should feel free to make any observations or recommendations it wishes, it must be clearly understood that the Mission cannot commit the sponsoring organization, viz. the CGIAR/TAC.

ILCA's research sites
(Network sites not presently included)



(Human / livestock populations in loose-leaf)

HUMAN/LIVESTOCK POPULATION

| KENYA | | MALI | |
|---------------------------------|------------|---------------------------------|------------|
| SURFACE AREA (Km ²) | 582,650 | SURFACE AREA (Km ²) | 1,240,000 |
| HUMAN POPULATION | 14,658,000 | HUMAN POPULATION | 6,146,000 |
| LIVESTOCK POPULATION | 9,100,000 | LIVESTOCK POPULATION | |
| CATTLE | 3,980,000 | CATTLE | 4,263,000 |
| SHEEP | 4,415,000 | SHEEP | 5,849,000 |
| GOATS | 2,000 | GOATS | 5,629,000 |
| EQUINE | 574,000 | EQUINE | 629,000 |
| CAMELS | | CAMELS | 198,000 |
| BOTSWANA | | ETHIOPIA | |
| SURFACE AREA (Km ²) | 600,370 | SURFACE AREA (Km ²) | 1,221,900 |
| HUMAN POPULATION | 750,000 | HUMAN POPULATION | 30,350,000 |
| LIVESTOCK POPULATION | | LIVESTOCK POPULATION | |
| CATTLE | 3,000,000 | CATTLE | 27,500,000 |
| SHEEP | 440,000 | SHEEP | 23,150,000 |
| GOATS | 1,150,000 | GOATS | 17,120,000 |
| EQUINE | 51,000 | EQUINE | 6,825,000 |
| | | CAMELS | 960,000 |
| NIGERIA | | | |
| SURFACE AREA (Km ²) | 923,770 | | |
| HUMAN POPULATION | 68,724,000 | | |
| LIVESTOCK POPULATION ESTIMATE | | | |
| CATTLE | 11,566,000 | | |
| SHEEP | 8,254,000 | | |
| GOATS | 24,188,000 | | |
| EQUINE | 962,000 | | |
| CAMELS | 18,000 | | |

Source: 1978 FAO Production Yearbook, Vol. 32
 FAO Statistical Series No. 22, published in 1979.

The regions and agroclimatic zones of tropical Africa,

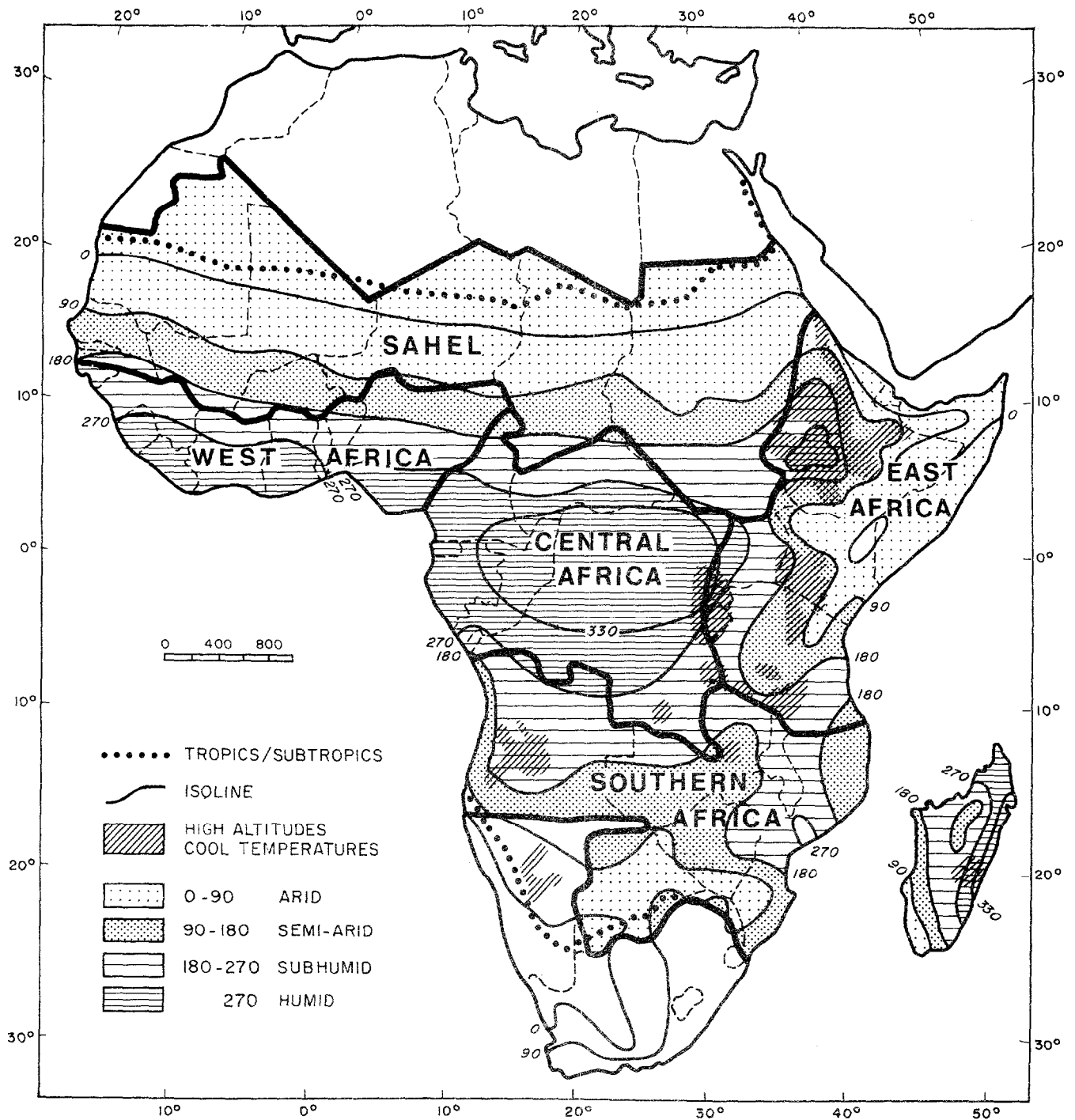


Table 1.

Land Area and Population Distribution by Agroclimatic Zone

| Zone | Land area ^{a/} | | Rural population ^{b/} | | | TLU ^{c/} | | | Stock:man ratio (TLU/capita) |
|-----------------|-------------------------|------|--------------------------------|------|-----------------------------------|-------------------|-----|-----------------------------------|----------------------------------|
| | 000 Km ² | % | 000 | % | Density (per km ²) | Million | % | Density (per Km ²) | |
| Arid | 7,372 | 34.2 | 24,768 | 10.4 | 3.4 | 40.2 | 30 | 5.5 | 1.6 |
| Semi-arid | 4,425 | 20.5 | 65,382 | 27.5 | 14.8 | 36.4 | 27 | 8.2 | 0.6 |
| Subhumid | 4,756 | 22.1 | 59,442 | 25.0 | 12.5 | 27.6 | 21 | 5.8 | 0.5 |
| Humid | 3,898 | 18.1 | 50,307 | 21.2 | 12.9 | 7.3 | 5 | 1.9 | 0.1 |
| Highland | 1,096 | 5.1 | 37,927 | 15.9 | 34.6 | 23.0 | 17 | 21.0 | 0.6 |
| Tropical Africa | 21,547 | 100 | 237,826 | 100 | 11.0 | 134.5 | 100 | 6.3 | 0.6 |

a/ Limits of tropics as defined by FAO (1979a).

b/ Total from *FAO Production Yearbook* (1978), using political definition of tropical Africa. Population figures for zones are not known; they were estimated by ILCA, using various assumptions.

c/ ILCA estimates of livestock population by zone; TLUs were calculated using the following coefficients: one camel = 1.0 TLU; one head of cattle = 0.7 TLU; one sheep or goat = 0.1 TLU.

Source: Adapted from Jahnke (1980).

