Action Plan for Restructuring, Reprogramming and Rehabilitating the Institute of Animal Research (IRZ)

Plan d'Action de Restructuration, de Reprogrammation et de Réhabilitation de l'Institut de Recherches Zootechniques (IRZ)

Submitted to the Mission for Rehabilitation of Enterprises in the Public and Parastatal Sector of the Government of Cameroon

January 1990

Institute of Animal Research (IRZ), Nkolbisson, Cameroon
with the assistance of the
International Service for National Agricultural Research (ISNAR), The Hague, Netherlands

ISNAR

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The Government of the Republic of Cameroon is restructuring its public and parastatal sector. The research institutes under the Ministry of Higher Education, Computer Services and Scientific Research (MESIRES) are among the enterprises maintained in the government portfolio. Of these, the two largest are the Institute of Agricultural Research (IRA) for research on crops and forestry, and the Institute of Animal Research (IRZ) for research on farm animals, poultry, wildlife and fisheries.

The Technical Commission of the Mission for Rehabilitation of Enterprises in the Public and Parastatal Sector asked ISNAR to assist IRA and IRZ in the preparation of their five-year Action Plans for rehabilitation and in drawing up corresponding Performance Contracts setting out the respective obligations of the Government and the institutes. ISNAR responded to this request and worked intensively with the IRZ and IRA directorates in the period April to November 1989 to support them in their assignment. The Government signed the Performance Contracts in December 1989.

ISNAR believes that the concept, structure and contents of the IRA and IRZ Action Plans provide a good illustration of what can be achieved if research institutions are seriously challenged by their governments to plan for better service and increased efficiency under conditions of severe budgetary stress. It is pleased therefore to have the approval of the institute directors to give a wider distribution to the Action Plans.

The IRZ Action Plan is enclosed herewith. The IRA Action Plan will follow.

The Hague, July 1990.

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LIST OF ACRONYMS

CAC	Crédit Agricole du Cameroun
CDC	Cameroon Development Corporation
CIRAD	Centre de Coopération Internationale en Recherche Agronomique pour le Développement
CUDS	Centre Universitaire de Dschang
DSE	German Foundation for International Development
EEC	European Economic Community
ENSA	Ecole Nationale Supérieure Agronomique, CUDS
FAC	Fonds d'Aide et de Coopération (France)
FAO	Food and Agriculture Organization
GTZ	German Agency for Technical Cooperation
IDRC	International Development Research Centre (Canada)
IEMVT	Institut d'Elevage et de Médecine Vétérinaire des pays Tropicaux
IFS	International Foundation for Science
ILCA	International Livestock Centre for Africa
IRA	Institut de la Recherche Agronomique
IRAT	Institut de Recherche Agronomique Tropicale
IRZ	Institut de Recherches Zootechniques
ISNAR	International Service for National Agricultural Research
IUCN	International Union for the Conservation of Nature and Natural Resources
LANAVET	Laboratoire National Vétérinaire
LLU	Livestock Liaison Unit
MESIRES	Ministry of Higher Education, Computer Services and Scientific Research
MIDENO	Mission de Développement du Nord-Ouest
MINAGRI	Ministry of Agriculture
MINEPIA	Ministry of Livestock, Fisheries and Animal Industries
MINFI	Ministry of Finance
MINPAT	Ministry of Planning and Regional Development
NWCA	North West Cooperative Association
ODA	Overseas Development Administration (United Kingdom)
ONDAPB	Office National de Développement de l'Aviculture et du Petit Bétail
PAFSAT	Promotion de Systèmes d'Exploitation Agricoles Appropriés basés sur la Traction Animale
NARP	National Agricultural Research Project
SODEPA	Société de Développement et d'Exploitation des Productions Animales
TLU	Testing and Liaison Unit
TUB	Technical University of Berlin
USAID	United States Agency for International Development

RESUME

1. Introduction

Le présent plan de restructuration de l'IRZ vise à renforcer les bases de la recherche de l'Institut de manière à lui permettre d'atteindre les objectifs de développement national. Il consiste à créer les structures, l'organisation, les ressources humaines et les conditions matérielles favorables à son bon fonctionnnement. Ce plan prévoit la subvention par l'Etat du financement des programmes prioritaires de recherche ainsi que les activités de service public et de formation qui y sont liées. Le plan vise également à attirer les fonds de la communauté internationale de recherche dans le cadre de la coopération scientifique. Il couvre la période 1989/90 - 1994/95 avec une subvention annuelle constante de 2.400 million FCFA par l'Etat.

2. Mission et Objectifs de l'IRZ, et Importance de la Recherche

La mission de l'IRZ consiste à planifier, programmer et mener les activités de la recherche en vue d'améliorer la production animale, la pêche ainsi que la conservation de la faune du Cameroun.

Le secteur agricole du Cameroun est la pierre angulaire de son économie. La production agricole représentait 30 % du PNB et 80 % des exportations totales avant l'avènement de l'exploitation pétrolière. Cette part est descendue à près de 25 % du PNB en 1987/88. Cependant, ce secteur contribue encore près de la moitié des exportations totales et fournit des emplois à près de 75 % de la population active. La part de la production animale est de 16 % du PNB provenant de l'agriculture et constitue la source de revenu pour 30 % de la population rurale.

La consommation annuelle de viande par habitant est de 15kg soit une demande d'à peu près 150.000 tonnes, dont 110.000 tonnes seulement sont produites localement. On prévoit une demande totale de 240.000 tonnes en l'an 2000.

Pour que l'IRZ puisse atteindre les objectifs de sa mission, son programme de recherche doit être conçu de manière à contribuer aux objectifs du Gouvernement qui sont d'assurer la sécurité alimentaire et de permettre à l'agriculture de rester la force principale de la croissance économique.

La stratégie d'intervention du Gouvernement serait de renforcer les capacités de vulgarisation et de la recherche de l'IRZ, de faire en sorte que les intrants tels que les médicaments vétérinaires et les engrais soient disponibles à temps et d'améliorer les liaisons routières entre les points de production et de consommation. Pour renforcer les actions du Gouvernement dans ce sens, l'IRZ doit s'engager dans les activités essentielles suivantes:

- recherche technique et économique permettant une croissance soutenue de la production et de la consommation par habitant ainsi qu'une distribution géographique équilibrée;

- la recherche sur les systèmes pastoraux par l'approche multidisciplinaire afin de toucher la majorité de la population rurale;

- la recherche visant à introduire l'intensification viable de l'exploitation des terres et de la production animale dans le but de réduire la détérioration de l'environnement visible dans les zones d'élévage du pays.

3. Objectifs et Actions Stratégiques

Dans le souci de mener à bien sa mission, l'IRZ a inscrit des objectifs stratégiques nouveaux dans son plan de restructuration et défini les actions conséquentes. Ceux-ci sont présentés ci-après.

Réorienter les méthodes de recherche en définissant les objectifs et programmes/ projets de recherche basés sur les objectifs de développement national et de ceux du secteur de l'élevage et en identifiant les thèmes de recherche à partir de la base. Cette stratégie met l'accent sur la recherche sur le terrain et l'étude des systèmes pastoraux qui seront appliquées dans toutes les zones agro-écologiques. Ceci amènera l'IRZ à intégrer la pré-vulgarisation dans ses activités de recherche et à intensifier la coopération avec les services de vulgarisation et les projets de développement.

Fournir les données sur les paramètres macro-économiques aux pouvoirs publics, en particulier, les informations sur les contraintes et potentialités de développement de l'élévage et de la pêche. Ceci se fera par les études économiques des tendances de la production, de la commercialisation et de la consommation.

Améliorer l'efficacité et coordonner les activités de recherche de l'IRZ en renforçant les liens entre les institutions nationales de recherche par l'établissement de mécanismes de coopération fonctionnelle. L'IRA, les centres universitaires de Dschang et de Ngaoundéré sont particulièrement concernés ici ainsi que les institutions étrangères et internationales de la recherche et de développement.

Obtenir l'autonomie de l'IRZ en changeant son statut légal et en faisant de lui une institution publique dotée d'un Conseil d'Administration. Cette mesure lui permettra de décentraliser les responsabilités internes pour une meilleure efficacité et une simplification des procédures administratives.

Organiser la recherche selon les zones agro-écologiques en opérant à partir de quatre centres:

- centre de recherche en zone de Sahel;
- centre de recherche en zone de Savane;
- centre de recherche en zone Forestière; et
- centre de recherche en zone de Haute et de Moyenne Altitude;

avec stations, laboratoires et antennes. Chaque station et antenne aura une spécialisation dans un domaine de recherche bien défini.

Assurer une couverture de recherche régionale par l'établissement de nouvelles stations et antennes à partir des besoins exprimés par les populations rurales. On prévoit:

- une station de recherche sur la faune sauvage à Maroua en 1991/92;
- une station régionale dans la Province du Sud aux alentours de Ebolowa en 1992/93;
- une antenne d'observation et de démonstration à Bangem en 1991/92;
- une antenne régionale à Sangmélima en 1993/94;
- une antenne pour la collecte des données sur la pêche près du port de Douala en 1993/94;
- une antenne d'observation et de démonstration à Poli en 1994/95;
- des antennes régionales à Mokolo, Banyo et Maiganga pendant le deuxième quinquennat.

Des études seront menées sur les raisons d'être sociales et économiques des nouvelles unités prévues et également sur les lieux convenables et le montant des investissements requis.

Afin d'assister l'IRZ dans le développement des stratégies en matière de recherche régionale et dans le suivi des programmes existants de recherche et de pré-vulgarisation, **des Comités Zonaux des Programmes** seront établis dans les six zones agro-écologiques. Ceux-ci seront appelés à informer le Comité National des Programmes des besoins régionaux nécessitant l'intervention de la recherche.

Développer la capacité stratégique de la gestion du programme de recherche pour assurer:

- une bonne gestion des programmes de recherche;
- le développement de la sociologie rurale et des liens avec la vulgarisation;
- le développement des ressources humaines; et
- l'étude économique de la production animale.

On peut atteindre ces objectifs par le renforcement de la Direction de l'IRZ avec la Division de la Recherche comprenant un chef de Division et quatre Chargés d'Etudes Assistants.

Introduire un système de gestion efficace de recherche en établissant une procédure de planification pour tous les programmes et les formats standards des protocoles des opérations et projets de recherche correspondants. Ceci constituera ultérieurement la base d'un plan directeur intégré pour une bonne politique en matière de recherche, vulgarisation et développement national.

Introduire une gestion administrative efficace avec la création de la Division des Services d'Appui comprenant les services administratifs et financiers, la bibliothèque, les services de la documentation et de la publication assistés des nouveaux services de traitement des informations à l'ordinateur et de la biométrie.

Réhabiliter l'infrastructure de recherche de l'IRZ avec les réparations et les améliorations nécessaires afin de l'amener à un état fonctionnel. Le manque d'un budget d'entretien approprié a été à l'origine de la détérioration des bâtiments, de l'infrastructure de la recherche, des troupeaux, des véhicules, des machines ainsi que de l'équipement et des autres moyens de communication. Tout ceci doit être amélioré pour permettre à l'IRZ de tenir ses engagements. Toutes ces mesures nécessitent un investissement total de 1.342,9 million FCFA en cinq ans. Le tiers de ce montant sera consacré à finir les nouveaux projets de construction et les deux autres tiers serviront à l'achat de véhicules, machines et équipement et également à la création de nouvelles stations et antennes.

Améliorer l'efficacité du personnel avec la mise en place et l'exécution d'un plan de développement des ressources humaines. Ceci demande d'arriver à un rapport acceptable des nombres de chercheurs, techniciens et administrateurs par la réduction de l'effectif du personnel de 840 à 715 en 1989/90, suivie d'un recrutement sélectif ramenant l'effectif à 799 en 1994/95. Ces chiffres sont obtenus de la manière suivante:

- une réduction du nombre des chercheurs nationaux de 91 à 76 en 1989/90 et une augmentation à 88 à la fin de 1994/95;
- une réduction du nombre des techniciens de 142 à 132 en 1989/89 suivie d'une augmentation à 157 en 1994/95;
- une légère réduction du nombre des ouvriers de 371 à 357 en 1989/90 avec une augmentation à 392 en 1994/95; et finalement
- une réduction de l'effectif du personnel administratif de 255 à 139 en 1989/90 suivie d'une augmentation à 152 en 1994/95 avec la création de nouveaux services administratifs.

Les recrutements se feront en fonction des besoins d'emplois effectifs bien définis, de la qualification des candidats et des lettres de référence fiables. Les devoirs et responsabilités des postes clés internes de l'IRZ seront bien étudiés et la performance du personnel correspondant sera évaluée.

Améliorer la qualité des chercheurs de l'IRZ dans les différents domaines de spécialisation par un programme de formation étendu dont bénéficieront 16 chercheurs au niveau M.Sc. ou DEA et 26 au niveau du doctorat à la fin de 1994/95. Une formation complémentaire à court terme à l'étranger non sanctionnée par un diplôme dans des domaines spécialisés est prévue pour 11 chercheurs, 24 techniciens et 20 administrateurs dans la même période. Un programme de formation continue au sein de l'IRZ est également conçu et consiste en cours, ateliers et conférences nationales et internationales organisés au profit des chercheurs.

L'IRZ assurera **la formation de près de 30 étudiants** par an venant des institutions nationales et internationales. Il s'occupera de la démonstration et de la simplification des résultats de recherche au profit **des agents de vulgarisation et des paysans** par le biais des ateliers, journées porte ouverte, manuels techniques et autres activités de pré-vulgarisation.

Fournir les services de laboratoire liés à la recherche et demandés par les paysans, en particulier les analyses biochimiques et pathologiques. Ceci servira de service d'appui à la vulgarisation. L'analyse d'évaluation de la qualité de viande et des produits laitiers sera assurée en vue d'établir les normes nationales de la qualité des produits alimentaires. L'analyse des rapports coût/bénéfice sera confiée à toutes les unités de l'IRZ qui fournissent des services dans le but de déterminer l'économie des opérations et de rendre un service de meilleure qualité aux différentes catégories de clients à des prix appropriés. Les races et les espèces fourragères améliorées et adaptées aux différentes conditions climatiques seront produites et disponibles pour les projets de développement, les vulgarisateurs et les paysans.

Obtenir des revenus à partir des produits de la recherche tels que les animaux de races améliorées, les semences d'espèces fourragères, la viande et les produits laitiers, les oeufs, etc. Les résultats des activités de production et des ventes seront vérifiés et les profits estimés régulièrement.

4. Plan de Financement et Budget Prévisionnels

L'un des objectifs du processus de restructuration de l'IRZ est de proposer un budget supportable par l'Etat à long terme.

Le montant du budget approuvé de 1989/90 est de 2.777,7 million FCFA. Ceci comprend la subvention par l'Etat de 1.350,0 million FCFA, et le crédit de la Banque Mondiale de 1,141.8 million FCFA destiné au Projet de Recherche Agricole Nationale. Au cours des cinq prochaines années, le budget de l'IRZ sera réduit à 2.449,9 million FCFA en 1994/95. L'augmentation de la subvention par l'Etat à 2.480,8 million FCFA nécessaire en 1990/91 reflète la diminution du crédit de la Banque Mondiale. A partir de 1991/92, la subvention par l'Etat se stabilisera autour de 2.400,0 million FCFA par an.

Les budgets proposés sont basés sur les estimations des coûts présentés dans ce document et tiennent compte des frais de personnel, d'administration, d'entretien, de formation, d'opérations de recherche et d'investissements. Les changements par rapport aux budgets précédents comprennent les lignes budgétaires réalistes pour entretien et investissements de remplacement ainsi que le financement du renforcement du programme de formation.

Dans le passé, il n'y avait pratiquement pas d'entretien. Assurer un entretien adéquat des actifs de l'IRZ évalués à 7.000 million FCFA reste un objectif de base de ce plan de restructuration. Pour augmenter la longévité des bâtiments, infrastructure de recherche et équipement, on a prévu un budget réaliste d'entretien de 255,0 million FCFA en 1990/91 qui sera augmenté à 286,4 million FCFA en 1994/95 à cause des investissements supplémentaires nécessaires.

Le programme de formation pour améliorer la qualité du personnel de l'IRZ sera financé partiellement par les bourses accordées par les donateurs et en partie par l'IRZ à partir du crédit de la Banque Mondiale et également à partir de la subvention par l'Etat.

A partir du début de 1990/91, les fonds de fonctionnement de la recherche seront séparés du budget d'investissement. Ce changement est lié à la procédure de déblocage de fonds disponibles pour un fonctionnement normal de la recherche zootechnique. Le budget total de fonctionnement de 324,0 million FCFA en 1991/92 est basé sur le salaire moyen annuel par chercheur de 3,6 million FCFA. Il sera augmenté à 4,0 million FCFA par chercheur en 1994/94, soit un total de 392,0 million FCFA.

Le budget de l'IRZ comprend deux éléments, le budget de base et le budget de projets particuliers. Le budget de base reflète les principes du plan de restructuration et permet à l'IRZ d'assumer selon des priorités définies de manière rationnelle. Le budget de base doit être financé à 100 % par l'Etat. Les besoins de recherche qui ne sont pas compris dans ces priorités mais qui sont importants pour le développement économique, social et environnemental du pays à long terme seront financés par les institutions étrangères et internationales de recherche ainsi que par les donateurs. Ils entreront dans le budget de projets particuliers.

EXECUTIVE SUMMARY

1. Introduction

The present plan for restructuring IRZ aims at strengthening the Institute's focus on research to meet the Government's development goals, and at creating the structural, organizational, human resource and material conditions to make this operational. The Government subvention will be expected to finance priority research programmes and connected service functions and training activities. At the same time the plan aims at attracting funds from the international research community. It covers the period from 1989/90 to 1994/95, and proposes an annual Government subvention stabilizing at 2,400 million FCFA.

2. IRZ's Mandate and Goals, and the Need for Research

The mandate of IRZ is to plan, program and carry out research and related activities with a view to improving livestock and fisheries production and wildlife conservation in Cameroon.

Cameroon's agricultural sector is the backbone of the economy. Before the advent of oil production agriculture accounted for 30% of the GDP and 80% of total exports. The share has declined to about 25% of the GDP in 1987/88. But the sector still contributes to about half the total exports and generates employment for about 75% of the total working population. Of this, livestock production accounts for 16% of the agricultural GDP and provides a source of income for 30% of the rural population.

Per capita consumption of meat per year is about 15 kg resulting in a demand for roughly 150,000 tons, of which only 110,000 tons are domestically produced. Total demand is expected to increase to 240,000 tons by the year 2000.

To achieve the objective of its mandate, IRZ's research programme must aim to make a contribution towards the Government's goals for food security and maintaining agriculture as the main source of growth in the economy.

The operational implication of the Government's strategy would be to improve basic supply services such as extension and research, timely delivery of inputs such as veterinary drugs and fertilizer, and improving road links between surplus and deficit areas. Animal research has to reinforce these strategies in essential areas:

- technical and economic research to sustain the desired growth in production and per capita consumption, and to spread these more evenly;
- livestock systems research incorporating a multidisciplinary approach to reach the majority of the rural population;
- research with a focus on sustainable intensification of the use of land and animals in order to reduce ecological damage which appears in all parts of the country where livestock is important.

3. Strategic Objectives and Actions

To achieve its mandate, in the course of its restructuring programme IRZ has developed new strategic objectives, and specified actions to be carried out in order to meet these objectives. These are outlined below.

Reorientate research approaches by deriving research objectives and programmes/projects from national development goals and sector objectives, and by identifying research needs from the grass roots level. This strategy emphasizes on-farm and livestock systems research which will be extended to all agro-ecological zones. This leads IRZ's research into pre-extension and demonstration activities integrated with the extension services and development projects.

Provide national and regional decision makers with macro and micro economic parameters of the opportunities and constraints in animal and fisheries development. This will be carried out through economic studies of trends in production, marketing and consumption.

Improve research effectiveness and coordinate research activities. IRZ aims to reinforce links and establish coordination mechanisms with national research institutions, in particular with IRA, and the university centres of Dschang and Ngaoundere as well as with foreign and international research and development institutions.

Obtain more autonomy for IRZ by changing its legal status to a public institution with a Board of Administrators. This will allow the Institute to decentralize its internal responsibilities for greater efficiency and to shorten administrative procedures.

Organize IRZ's research according to agro-ecological zones by operating from four centres:

- Sahel zone research centre;
- Savanna zone research centre;
- Forest zone research centre; and
- High and Mid Altitude research centre;

with their attached stations, laboratories and antennas. Each station and antenna will be given a research area for specialization.

Provide an improved regional research coverage by establishing new stations and antennas in areas where there has been an expressed need from the rural population, which tentatively are scheduled as follows:

- a wildlife station at Maroua in 1991/92;
- a regional station for the South in the vicinity of Ebolowa in 1992/93;
- an observation and demonstration antenna at Bangem in 1991/92;
- a regional antenna at Sangmelima in 1993/94;
- an antenna for collecting fisheries statistics in the port region of Douala in 1993/94;
- an observation and demonstration antenna in Poli in 1994/95;

- regional antennas at Mokolo, Banyo and Maiganga during the second five-year period.

Studies will be carried out on the social and economic justification for the planned new units and appraisals on the exact location and needed investments required for their establishment.

To assist IRZ in developing provincial research strategies and in following up existing research and pre-extension programmes, **Zonal Programme Committees will be established** in all six agro-ecological zones. These zonal committees will inform the National Programme Committee of the regional requirements of research.

Create a strategic capacity for:

- research programme management;
- rural sociology and extension linkages;
- human resource development; and
- livestock economics.

This will be achieved by strengthening the Directorate with a Research Division comprising a Chief of Division and four "Chargés d'Etudes Assistants".

Introduce an effective research management system by finalising the research planning guidelines for all programmes and preparing protocols for the corresponding research projects and operations. This will eventually form the basis for an integrated master plan for research, extension and development policy.

Introduce effective administrative management by creating a Support Services Division comprising the Administration and Finance Service, the Library, Documentation and Publication Service and to build up the additional requirements for the new service, Computing and Biometrics.

Rehabilitate the research infrastructure of IRZ by carrying out essential repairs and improvements to regain the Institute's good functioning. Due to the lack of a normal budget proper maintenance of buildings, research infrastructure, breeding herds, vehicles and machinery, equipment and communication facilities have seriously deteriorated, and need to be improved to enable IRZ to fulfil its research commitments. The estimated investment cost of these measures totals 1,342.9 million FCFA to be spread over five years. One third of this amount will be used for immediate repairs and improvements, the other two thirds will be used for the completion of construction projects, purchase of vehicles machinery and equipment and the creation of new stations and antennas.

Improve the efficiency of IRZ's personnel through the implementation of a personnel development plan. This will include obtaining an acceptable ratio between researchers, technicians and administrative staff through immediate reduction in personnel from 840 to 715 during 1989/90, followed by selective recruitment to reach 799 in 1994/95. These overall figures are obtained by:

- a reduction in national researchers from 91 to 76 in 1989/90, followed by an

increase to 88 by the end of 1994/95;
- reducing the number of technicians from 142 to 132 during 1989/90, followed by an increase to 157 by 1994/95;
- slightly reducing the number of labourers from 371 to 357 in 1989/90, followed by an increase to 392 in 1994/95;
- a reduction in administrative personnel from 225 to 139 during 1989/90, after which the number would increase with the addition of new units to 152 by 1994/95.

Recruitment will be based on operational job descriptions, qualifications and reliable references. The tasks and responsibilities of the key positions within IRZ will be verified and personnel performance will be evaluated.

Enhance the quality of IRZ researchers in specialized subject matters by implementing a comprehensive training programme whereby 16 researchers will have completed an M.Sc. or DEA course and 26 researchers will have completed Doctorate training before the end of 1994/95. Further development of specialized skills for 11 researchers, 24 technicians and 20 administrators will be carried out by short-term non-diploma training abroad during this period and complemented by in-service training workshops and courses at the Institute, and through national and international conferences hosted by IRZ.

IRZ will provide **training for up to 30 students** each year from national and international institutions and demonstrate research results **to extension workers and farmers** through workshops, field days, technical pamphlets and other pre-extension activities.

Provide research-related laboratory services required by the farming community, for feed and pathological analysis as an essential support service to extension work. Quality control analysis of meat and dairy products will be provided with the aim of eventually establishing national quality standards. Cost/benefit analyses will be carried out on all IRZ services aimed at improving the economics of their operation, providing a better service to different categories of clients and charging appropriate prices. Improved genetic material of different animal species and forage plants will be bred and adapted to regional conditions for development projects, extension services and farmers.

Generate revenues from the produce of research such as genetically improved animals and forage seeds, meat and dairy products, and eggs, and from additional production units. The performance of all production and sales activities will be monitored and their profitability regularly evaluated.

4. Proposed Budgets and Financing Plan

One of the goals of the present restructuring process of IRZ is to propose a budget which can be supported by the Government on a long-term basis.

The approved budget for 1989/90 amounts to 2,777.7 million FCFA. This is made up from a Government subvention of 1,350.0 million FCFA, the majority of the remainder coming from a World Bank loan of 1,141.8 million FCFA for the National Agricultural Research Project. In the course of the following five years the proposed IRZ budget will be reduced to 2,449.9 million FCFA by 1994/95. The increased Government subvention of 2,480.8 million FCFA requested for 1990/91 reflects the fall off in the World Bank loan. From 1991/92 onwards the Government subvention stabilizes at about 2,400 million FCFA.

The proposed budgets are based on the estimated costs of the proposals made in this document for personnel, administration, maintenance, training, research operations and investments. The main changes from previous budgets are the inclusion of realistic figures for maintenance and the inclusion of a budget line for replacement investments, and to finance the reinforced training plan.

In the past there was practically no provision for maintenance. To ensure adequate maintenance of IRZ's existing assets of 7000 million FCFA as a basic objective of the restructuring plan, and to increase the life span of buildings, research infrastructure and equipment, a realistic estimate for maintenance is 255.0 million FCFA in 1990/91 which will increase to 286.4 in 1994/95 with the addition of necessary new investments.

The training programme to enhance the quality of personnel and to gain needed skills for IRZ will be financed partly by scholarships from donors, partly by IRZ from the World Bank loan, with a small amount coming from the normal Government subvention.

From the beginning of the financial year 1990/91 onwards the operating funds for the research programme will be included in the recurrent budget instead of the investment budget. This change is related to the dispersement procedures necessary for a normal functioning of livestock research. The overall research operating budget of 324.0 million FCFA in 1990/91 is based on an annual average of 3.6 million FCFA per researcher. This will rise to an average of 4.0 million FCFA per research by 1994/95 giving a total of 392.0 million FCFA.

The IRZ budget will consist of two elements, the core budget and the special project budget. The core budget is the budget which strictly reflects the principles of the restructuring plan and ensures that the Institute can effectively carry out its mandate, according to rationally defined priorities. The core budget must be financed 100% by the Government. Research needs that do not fall within these strict priorities, but which are important to the country's long-term economic, social and environmental improvement suggested and financed by foreign and international research institutions and external donors will become part of the special project budget.

ACTION PLAN FOR RESTRUCTURING, REPROGRAMMING AND REHABILITATING THE INSTITUTE OF ANIMAL RESEARCH (IRZ)

1. IRZ's MANDATE AND GOALS, AND THE NEED FOR RESEARCH

The mandate of IRZ is to plan, program and carry out research and related activities with a view to improving livestock and fisheries production and wildlife conservation in Cameroon.

In order to achieve the objective of its mandate in the framework of the national livestock and fisheries development goals set by the Government, IRZ has to translate the sector objectives and sector targets into research objectives, targets, programmes and projects. Therefore, IRZ's research programmes should indicate what contribution their proposed outputs will make to meeting the development objectives of the livestock and fisheries sector, and also estimate the benefits for the livestock farmers and fishermen.

The first goal of IRZ's research for development is to assist in elaborating development packages for the livestock and fisheries sector. In so doing, it will back up the development efforts of extension services for beef and dairy cattle, sheep and goats, pigs, poultry, fisheries, rabbits, bees and horses, as well as the efforts in the development of forages, wildlife management and conservation, and in improving the health of domestic animals.

The introduction of new technologies into existing farming systems will attempt to resolve:

- technological problems, such as suitable breeds, animal health, herd and pasture management and feed;
- social problems, such as farmers objectives and the change towards a market orientated behaviour;
- economic problems, such as individual profitability and marketing;
- ecological problems, such as overgrazing and erosion.

A systematic and field orientated multidisciplinary approach is therefore needed. This requires IRZ to redefine the relationship between on-farm and on-station research, and to overcome the isolation of individual disciplines involved in animal research.

A second, not less important, goal is to indicate to decision makers trends and bottlenecks to livestock development due to the macro-economic environment, national policies and strategies, and to make recommendations on how to overcome these constraints. A related goal is to help the Government, parastatals and the private sector to formulate development strategies.

A third goal of IRZ is to engage itself in service functions for the rural and urban communities, notably:

- quality control of feed and feedstuffs, thereby making farmers and the general public aware of the importance of feed quality;
- identification of toxic substances, and setting guidelines for maximum levels, to protect the health of animals and consumers;
- feasibility studies for small and medium-sized livestock projects;
- macro-economic studies and participation in planning of donor-funded projects.

By carrying out these services, IRZ will act as an interface between farmers, support services and the Government.
IRZ's mandate and goals mentioned above are closely linked to the economic importance of the livestock and fisheries sector in Cameroon. For several decades the Governments major objective has been the increase in animal production. However the strategy to achieve this has recently been altered. While in the past efforts concentrated on the public (ranching) sector, the present strategies focus on the gradual modernization of the traditional sector.

Cameroon's agricultural sector is the backbone of the economy. Before the advent of oil production agriculture accounted for 30% of the GDP and 80% of total exports. The share has declined to about 25% of GDP in 1987/88. But the sector still contributes to about half the total exports and generates employment for about 75% of the total working population. With the oil reserves and revenues projected to decline in the mid 1990's the economy will again have to depend on agriculture to provide the major impetus for economic growth. The discussion point is whether agriculture will be able to resume its role as the prime engine for growth in the economy.

Livestock production accounts for 16% of agricultural production and provides a source of income for 30% of the rural population. Off take rates for animals are currently about 10% for cattle, 20% for sheep and goats, 60% for pigs and 100% for poultry. The resulting increase in meat production can be seen from Table 1.

Table 1: Meat production in Cameroon (1969 and 1988)

Type of meat	Quantity (x 1000 tons) 1969	1988	Total growth (%)
Beef	42	65	55%
Sheep and goats	11	20	83%
Poultry	8	14	79%
Pigs	11	11	0%
Total	72	110	53%
Per Capita (Kg)	11.8	11.0	-7%

Source : Staff appraisal report. Republic of Cameroon livestock sector development project. World Bank, 15th November 1988.

Per capita consumption of meat per year is about 15kg per year resulting in a demand for roughly 150,000 tons, of which only 110,000 tons are domestically produced. Total demand is expected to increase to 240,000 tons by the year 2000.

Imports of beef and poultry have increased from 4% to 12% of local consumption during the last five years. Every year, Cameroon imports about 110,000 heads of cattle (about 20,000 tons) on the hoof from neighbouring Central African Republic and Chad, and about 20,000 tons of meat from overseas. In value terms meat imports are second only to cereals and cereal production. Thus meat represents an immediate possibility for important savings in foreign exchange through import substitution, and a medium term possibility for export earnings which will contribute to the compensation of the predicted decrease of oil production and the decrease in prices paid for the traditional export crops.
Though development in production has lagged behind the development in demand, beef prices have greatly declined due to subsidised exports from EEC countries, as can be seen in Table 2. Consequently market prospects might be less favourable than they first appear in the light of comparison between domestic production and domestic demand. However, they remain favourable considering the growing demand. The demand potential for the Cameroonian meat market is further strengthened by the Nigerian market, which has an annual deficit of 200,000 tons of meat. The Cameroon meat market is therefore likely to remain a sellers market, if the Government succeeds in protecting production from the effect of subsidised European exports.

Table 2: Meat imports into Cameroon, 1981/82 to 1986/87 (tons and FCFA/Kg)

	1981/82		1984/85		1986/87	
Meat type	Volume	Price	Volume	Price	Volume	Price
Beef	150	1220	650	600	10,400	280
Pork	35	660	300	520	2,300	250
Mutton	60	940	290	810	65	1,030
Poultry	240	410	2,780	270	6,650	230

Source : Staff appraisal report. Republic of Cameroon livestock sector development project. World Bank, 15th November 1988.

Rightly the Government is concerned for medium term food security, taking into consideration:

- the continuous growth in population;
- the expansion in food production mainly by extending uncultivated areas, to the detriment of the rain forest and pastoral land;
- that the carrying capacity of the land has been reached or surpassed in strategic regions of the country causing serious erosion and overgrazing problems.

The efforts to increase animal production in the small holder sector will therefore have to focus on sustainable intensification of the use of land and animals.

The operational implication of this strategy would be to improve basic supply services such as extension and research, timely delivery of inputs such as veterinary drugs and fertilizer, improving road links between surplus and deficit areas, especially between the Northern regions and Yaoundé.

Research has to realise that knowledge about basic technologies is already available in principle due to intensive research either in Cameroon or in other countries with similar conditions. However, research results are frequently only known to the institute that produced them, or have not been tested at the farm level.

In conclusion, the need for research is fourfold. Firstly, in order to sustain the desired growth in production and per capita consumption, and to spread these more evenly, there is a need for both technical and economic research. Secondly, as animal research has neglected the needs of the large majority of the rural population, the research of the future must be directed towards a different set of objectives and be conducted by different methods, with far greater emphasis on livestock systems research and an interdisciplinary approach. Thirdly, without environmental research, farm animals within traditional production systems might cause considerable ecological damage instead of contributing to the sustainability of agriculture as they should. Signs of such damage endangering production, are appearing in all parts of the country where livestock is important. Fourthly, long term trends suggest that the relative importance given to research on the different animal species needs to be reviewed, with greater weight accorded to small farm animals and aquaculture.

2. GOAL OF REHABILITATION AND REORIENTATION OF IRZ

The present plan for rehabilitating IRZ aims at strengthening the Institute's focus on research for the traditional livestock and fisheries sector. Only high-priority research programmes and connected service functions and training activities will be expected to be financed from the national budget. At the same time the plan aims at attracting funds from the international research community for complementary research work.

A pre-condition is to regain the normal functioning of IRZ with respect to its research infrastructure. The current situation does not allow for the payment of salaries, electricity and water bills, and feed and drugs for the animals. It has led to a deterioration in the state of buildings, grounds and equipment, and has caused an almost complete halt in research activities. If allowed to persist, this situation will destroy the results of many long-term experiments and jeopardize the national capacity for animal research which has been built up over more than thirty years.

In order to achieve this goal, the objectives and actions outlined below, concentrate on increasing research efficiency and effectiveness by streamlining research programming and management, priority setting procedures, and decentralizing responsibilities and tasks within IRZ.

3. STRATEGIC OBJECTIVES OF IRZ

To meet the above goals in the light of the rehabilitation plan, the new strategic objectives of IRZ research are as follows:

1. reorientate research approaches by deriving the research objectives, targets and programmes/projects strictly from national goals and sector objectives set by the Government and by identifying research needs at grass roots level;

2. set priorities for research programmes on different animal species, according to the expected economic impact of these programmes in the various agro-ecological zones;

3. emphasize on-farm research through expanding the livestock systems research programme to all agro-ecological zones, and by setting up multidisciplinary research teams with the technical services for extension;

4. integrate research into development projects and missions;

5. give each station a research area for specialization;

6. carry out strategic economic studies for livestock and fisheries development to be used by decision makers;

7. reinforce links with IRA, the University Centres of Dschang and Ngaoundere, other national agricultural research entities, as well as international agricultural research centres;

8. change the institute's legal status to a more autonomous one with a board of administrators, in order to shorten administrative procedures and allow internal responsibilities to be decentralized for greater efficiency;

9. provide an improved regional coverage for animal research through the establishment of new units;

10. introduce an effective research and administrative management organization;

11. regain the good functioning of IRZ through repairs and completion of the research infrastructure;

12. attain an acceptable ratio between researchers, technicians and administrative personnel;

13. strengthen human resource development by implementing a comprehensive training programme to improve specialized skills and leadership qualities;

14. enhance the productivity of IRZ's personnel;

15. reinforce IRZ's service functions, notably (i) quality control of animal feeds, (ii) disease diagnosis for farmers, and (iii) quality control for eggs, dairy and meat products in order to assure quality standards for the consumer;

16. generate revenues from products of research, such as genetically improved animals and forage seeds, meat, dairy and egg products.

4. ACTIONS TO MEET IRZ's STRATEGIC OBJECTIVES

4.1 Orientating research to national development goals and objectives

IRZ will reorientate its research approach by deriving its objectives, targets and research programmes/projects strictly from national goals and sector objectives set by the Government. At the same time the Institute will identify research and development needs from the grass roots level and integrate these into its research projects, and bring them to the attention of the Government.

By attempting to derive its research objectives, targets and programmes for livestock and fisheries development in this way, animal research faces the following problems:

1. The national and sector development goals and objectives are very general and in the past concentrated on the modern sector of production, and few national development targets have been set to overcome local, provincial or regional constraints.

2. The global nature of the development goals and objectives, such as national self-sufficiency or the earning of foreign exchange, while implying an increase in production as a livestock sector objective, do not take into consideration the diverse potential of natural, human and institutional resources in the various provinces.

As a consequence, IRZ will take into account the grass root problems identified by the various research stations around the country, for example the need for better use of local resources such as pasture, by-products or local breeds. In this bottom up approach, the aggregation of research outputs from sectors, provinces and agro-ecological zones, in terms of economic value as a contribution to national livestock and fisheries development will be compiled by IRZ and made available to the Government.

Taking these points into consideration, IRZ is now adopting a dual approach to research.

Firstly, it is reformulating its commodity research programmes in such a way that they are more directly derived from and linked to the development objectives set by the Government. These programmes are complemented by supporting non-commodity programmes, notably livestock systems, agrostology (forages, feeds and feeding) and animal health. This reorientation has required a major planning study and workshop, the results of which are exemplified in Tables 3a and 3b for the livestock systems and beef programmes, and will be extended as part of IRZ's research reorientation for all of its research programmes.

Secondly, IRZ will continue to follow the bottom-up approach, by including research projects identified at grass roots level, which contribute to development objectives not yet recognized and formulated by the Government. To strengthen this component of IRZ's dual approach, the institute has formally introduced livestock systems research as its thirteenth programme, because only in this way is it possible to adequately penetrate into the socio-economic realities and cultural traditions of the rural areas.

The challenge to IRZ is now to further develop these conceptual guidelines and test them against the economic, social and cultural realities in the field in the different agro-ecological zones. IRZ also faces the task of gradually matching its on-going research projects to these guidelines.

In its concern to serve development, IRZ believes that by the end of 1994/95 there should be a master plan not just for research, but a fully integrated master plan for research, extension and development policy, incorporating achievement indicators for all parties concerned. This should be a combined task of IRZ, the other relevant research and academic institutions (IRA, CUDS, ISH) and the technical ministries (MINEPIA, MINAGRI). Clearly, success of the reorientation of IRZ will in the end depend largely on joint work in this direction.

Tables 3a and 3b show IRZ's planning logic. The top left hand corner summarizes the national goals as pertaining to each programme, as well as the national targets for each commodity.

From these national goals and targets the national development objectives have been derived as specified in the sixth national five year plan and other Government planning documents (column 1). Column 2 lists major constraints to the achievement of these development objectives. These constraints are partly identified in the same planning documents, partly by IRZ on the basis of its own insights. For the commodity programmes an attempt is made, in a separate column, to also quantify the effects of these constraints on the achievement of the development objectives.

These constraints are of different kinds: technical, infrastructural, organizational (including weaknesses in extension), policy-related, and economical. Research can only address part of these. The others fall within the mandates of the technical ministries or are related to the overall economic context.

In so far as research can help overcome these constraints, appropriate research objectives as well as corresponding research projects have been identified in the tables. These tables also indicate the agro-ecological zones in which the respective research projects are of importance.

Indicators for assessing the performance of the different research projects are also stated in the tables. These indicators show what kind of outputs the research itself should produce, who are the potential beneficiaries, and what are the expected benefits in money or in kind. When the corresponding research protocols have been prepared, as a further stage in the research reorientation, (which will include the detailed allocation of human and financial resources), it will be possible to add more precise time frames for the achievement of these outputs.

It should be realized that successful research creates only a potential for new benefits, and that many other factors intervene in determining whether, and to what extent, this potential will be realized: extension services, input supply, market outlets and price levels, etc.

Thus, impact evaluation at the farmer level tends to confound the influences of research, extension, and the economic and policy environment. Furthermore, such impact evaluation is always difficult and has big time lags. With this reservation, several objectively verifiable indicators are available to assess the farmer's awareness,

interest and demands for research products. These can be verified by periodic sample surveys. Examples of such indicators are:

- demand for improved genetic animal material from the research stations;
- hectares of improved forages cultivated;
- demand for production inputs;
- demand for technical information, training programmes, demonstrations and field days;
- demand for improved technical packages.

The final test of success of research, extension and Government policies combined lies in the adoption of improved development packages, and the estimation of economic benefits.

In addition to the above, further indicators that show the performance of researchers and the extent to which messages and packages have been extended are:

- research projects completed;
- technical leaflets and scientific publications compiled;
- success in getting research projects financed by research councils or foundations.

Table 3a: Planning matrix for research programmes, programme 1 of 13
Livestock Systems Research, Development Monitoring, and Pre-extension Programme

DEVELOPMENT		RESEARCH		Agro-ecological Zones[1]						RESEARCH IMPACT	
Goal/Objectives	Constraints	Objectives	Projects	I	II	III	IV	V	VI	Impact Indicators	Assumptions
Goal: Increase livestock production through sustainable integrated livestock systems	Objectives for sustainable production systems are not shared by all parties: Development, Research, Extension, and Farmers	Direct research towards the development of adaptive technologies for sustainable livestock and crop/livestock systems	Coordinate commodity research and test results for adoption by farmers and economic and environmental sustainability	♦	♦	♦	♦	♦	♦	Research components for extension packages based on agro-ecological zones are elaborated and tested for sustainability	Regional Research Structures of IRZ are operational
Objectives: 1. Optimize use and conservation of natural resources	Consistent development planning is hampered by the number of and variations in natural and socio-economic conditions	Develop sustainable land-use systems for livestock farmers according to agro-ecological conditions	Monitor and evaluate improved production technologies in the use of land and animals	♦	♦	♦	♦			Natural and socio-economic indicators for guiding development planning are available	Research units at the Directorate are operational
- Reduce desertification and the soil erosion process	- Farmers' exploitation of land resources is at a maximum - Land-use codes not enforced	- Develop environmental impact indicators	- Establish a database for environmental degradation - Elaborate critical models for sustainability of production systems	♦	♦	♦				- Major parameters for environmental land degradation by livestock are established	- Livestock systems research programmes must be operational in all regions
- Conserve natural pastures by improved range management and forage production - Integrate livestock production with crop farming	- Crop and livestock farmers conflict over land tenure - Inappropriate production techniques	- Develop sustainable grazing schemes and forage production practices - Develop models for livestock/crop integration	- Transfer commodity and strategic research results (pasture science) into extendable packages and test in development projects	♦	♦	♦	♦			- Extendable packages are available for the four agro-ecological zones	- IRZ research is associated with development projects
- Increase livestock productivity	- Farmers lack commercial orientation to livestock production - Inter-regional marketing barriers	- Develop socio-economic impact indicators for different production systems	- Establish a database for socio-cultural and economic husbandry practices	♦	♦	♦	♦			- Major parameters for socio-cultural and economic indicators are established	- Research units are operational: "Rural sociology unit" "Extension and liaison unit" "Livestock economics unit"
2. Stimulate farmers' participation in their development	Adoption rate of modern sustainable production techniques hampered by socio-economic, input supply, and marketing obstacles - Research lacks tools for estimating the scope of improvements	Establish farm budgets and assess self-help development potential	Identify problems for the farmers' own development - Identify necessary public promotion programmes - Monitor farm inputs and outputs - Estimate production potential	♦	♦	♦	♦	♦	♦	- Database for cost-benefit estimations of different livestock systems is established	Pre-extension part of livestock systems research programme is operational
- Initiate and promote livestock farmers' organisations	- Traditional family and ethnic links limit modern community development	- Develop organisational models for livestock farmers	- Monitor livestock technologies in farmers' organisations on community level	♦	♦	♦	♦	♦	♦	- Livestock packages for farmers' organisations are available	- IRZ establishes livestock liaison units on village level
- Initiate production innovations	- Deterioration of economic framework conditions - Farmers oriented towards short-term benefits - Improvement packages for traditional sector are not sufficiently available - Research result transfer has only been for modern livestock sector	- Elaborate means to introduce modern techniques into traditional livestock sector	- Assess existing methods of transferring technologies - Compile research results and join them to packages - Test innovative packages for adoption - Predict scope of innovations and adoption rates	♦	♦	♦	♦	♦	♦	- Cost-benefit parameters for target groups and target areas are available - Feasibility studies for production techniques are available (economy of scale) - Data on socio-economic impact and information for land-use planning are available	- Economic environmental conditions are favourable for livestock intensification
- Initiate and promote programmes for tse-tse fly control	- Communal land tenure systems - Livestock movement	- Elaborate tse-tse fly control packages - Preserve and improve trypanotolerant animal species	- Adapt on-station tse-tse fly control results to farmers' needs - Consolidate trypanotolerant breeds on-station	♦	♦	♦	♦	♦	♦	- Packages are available to provide basis for small-scale livestock farming	- Research budgets for on-station experiments are available

Table 3a Cont.: Planning matrix for research programmes, programme 1 of 13
Livestock Systems Research, Development Monitoring, and Pre-extension Programme

DEVELOPMENT		RESEARCH		Agro-ecological Zones[1]						RESEARCH IMPACT	
Goal/Objectives	Constraints	Objectives	Projects	I	II	III	IV	V	VI	Impact Indicators	Assumptions
3. Improve production infrastructure	Production infrastructure is based mainly on public institutions or private monopolies	Define requirements of livestock farmers	Carry out studies on basic needs - Propose improvements on regional basis	♦	♦	♦	♦	♦	♦	Information on basic organisational needs is available	Budget for studies is available
- Improve interregional marketing outlets	- Insufficient marketing structure	- Develop marketing information system	- Establish marketing information database - Propose improved communications systems	♦	♦	♦	♦			- Information on marketing bottlenecks and solutions is available	- Budget for studies is available - Communication systems are operational
- Monitor input supply - Support input supply in remote areas	- Long distances between supply and demand areas - Supply in large quantities does not match needs of small farmers	- Propose supply systems	- Carry out regional studies of supply systems	♦	♦	♦	♦	♦	♦	- Regional input supply recommendations are available	- Budget for studies is available
- Improve and make reliable the livestock sector data bank	- Financial limits to improve coverage of sector data	- Establish reliable production parameters for all livestock species	- Monitor livestock production patterns	♦	♦	♦	♦	♦	♦	- Regional production data are available	- Budget for studies is available
4. Organise an appropriate extension service	Financial limitations to improve the functioning of the extension service - Livestock extension concentrates on health aspects - Livestock extension officers are all veterinarians	Establish pre-extension livestock programmes with the extension service	Study regional extension structures and propose linkages - Train farmers and extension services in selected areas - Carry out pre-extension programmes	♦	♦	♦	♦	♦	♦	Working links on provincial level are established	Extension services are operational and cooperate with researchers
- Coordinate development efforts for sustainable intensification of land use and animal production	- Regional development is based on donors' interest and individual projects	- Provide feedback for extension and development projects	- Carry out research in the framework of development projects and participate in development appraisal missions	♦	♦	♦	♦	♦	♦	- Regular information on development status is available	- Research units at Directorate and regional centres are operational
- Update development targets and objectives	- Development potential for traditional livestock sector by region and species is not known	- Provide production and consumption trend analysis	- Study production and consumption development and predict trends	♦	♦	♦	♦	♦	♦	- Trend analyses made available on a regular basis	- Research units at Directorate and regional centres are operational
- Develop an integrated research, extension and development plan	- Insufficient links between farmers, extension and research - Livestock development plan for traditional sector not yet available - Integrated research and development not yet practised - Linkages between research programmes and development targets are insufficient	- Coordinate research plans based on commodity and agro-ecological zones - Integrate research results on regional and national levels into development plans	- Prioritize all commodity research programmes - Match research programmes with development targets by region - Coordinate on-station and livestock systems research - Elaborate a national research plan	♦	♦	♦	♦	♦	♦	- Livestock systems research programme must function as the coordinating umbrella research programme - Research innovations are accepted by extension service and farmers - On-station research services field research	- Concept for on-station and livestock systems research is operational

1. Agro-ecological zones: I Sahel zone, II Savanna zone, III High and mid-altitude zone, IV Humid forest zone, V Sub-humid forest zone, VI Sub-humid savanna/forest zone (see figure 1 and table 4).

Table 3b: ***Planning matrix for research programmes, programme 2 of 13***
Commodity Research Programme: Beef

DEVELOPMENT		RESEARCH		Agro-ecological Zones[1]						RESEARCH IMPACT	
Goal/Objectives	Constraints	Objectives	Projects	I	II	III	IV	V	VI	Impact Indicators	Assumptions
Goal: Increase beef production to achieve a local production of 9.74 kg per capita per year by 1990/91, which is 102,728 tons of meat with a cattle production of 4,690,800 head	Low off-take rate of 10% in highly utilized ranges – Under-utilized pastures due to tse-tse infestation and lack of infrastructure in remote areas	Assess present and potential beef production according to agro-ecological zones	Analyse the present status of beef production – Identify production constraints – Estimate the scope of production	♦	♦	♦	♦	♦	♦	Production estimates are available on a regular basis	Development of a pre-extension programme as a research component – LLUs of IRZ/MINEPIA/MINAGRI operational
Objectives: Increase beef cattle population by 2.5% and off-take rate to 11%, i.e., 4,808,070 head with 115,826 tons	Declining carrying capacity of mature pastures to below 250 kg/ha and declining cattle population in over-stocked regions	Elaborate methods to adapt land use to sustained exploitation of natural pastures and beef cattle	Carry out land-use surveys in beef cattle areas – Select pilot areas for implementing controlled land-use systems	♦	♦	♦	♦	♦	♦	Land-use maps in pilot areas with MINEPIA/MINAGRI elaborated	Working mechanism with research operational
– Pasture improvement and improved pasture management	– Mismanagement of communal grazing lands leading to degradation of pastures and invasion by weeds	– Develop sustainable grazing schemes with integrated fodder banks	– Field research to assess livestock-related biomass and carrying capacity – Elaborate grazing techniques for communal range lands – Field trials to demonstrate weed control and soil-conservation techniques – Improve natural pastures with fodder banks of local and exotic forage species – Estimate comparative feeding value and pasture productivity – On-station and on-farm cultivation of drought-resistant forage species	♦	♦	♦				– Natural potential for beef production estimated – Pamphlets on grazing techniques to reduce pasture degradation, weed invasion and erosion	– Packages economically feasible for livestock farmers – Grazing rules are respected
– Improve dry-season feeding practices	– Severe food shortages and low feed quality in the dry season contribute to • Weight loss in the dry season of up to 30% and late age of first calving of 4 years • Low calving rate of 44% • Long calving interval of 18 months	– Development of cost-effective feeding packages for the traditional cattle sector	– On-station and on-farm feeding trials – Formulation of cost-efficient diets containing agro-industrial by-products and crop residues – Elaborate means of handling and processing agro-industrial by-products and crop residues – Recycling of waste products	♦	♦	♦			♦	– Data on quantity and quality of crop residues and their use in relation to transport costs and estimates in weight gain are available – Pamphlets on feed packages distributed to extension services and farmers	– Feed packages for traditional farmers are economically feasible
– Reduce animal losses through more efficient health control	– Prevalence of infectious, parasitical and metabolic diseases and reproductive wastage	– Develop low-cost health management packages for traditional cattle farmers	– Study traditional treatment of cattle diseases and medicinal plants of veterinary importance – Elaborate disease maps – Field trials to produce preventive health, hygiene calendar – Field trials to combine modern & traditional health control methods – Field research into reproductive wastage	♦	♦	♦			♦	– Pamphlets on preventative disease measures completed – Disease maps compiled	– Drugs and facilities available at regional level

Table 3b Cont.: Planning matrix for research programmes, programme 2 of 13
Commodity Research Programme: Beef

DEVELOPMENT		RESEARCH		Agro-ecological Zones[1]						RESEARCH IMPACT	
Goal/Objectives	Constraints	Objectives	Projects	I	II	III	IV	V	VI	Impact Indicators	Assumptions
- Improve production techniques towards a commercial enterprise	- Inadequate husbandry practices - Low productivity of existing cattle production systems - Inadequate marketing infrastructure and nonexistant cost-benefit analyses	- Formulate herd management packages for reduced mortality, improved fertility and off-take rate - Demonstrate profitability of intensified production - Formulate ruminant marketing strategies	- Field research in herd composition, selection, intensity, culling and replacement policy - Field demonstration trials in husbandry practices - Finishing of store cattle - Feasibility studies on • Cost-benefit analyses • Stratification of beef production • Marketing infrastructure, demand and supply	♦	♦	♦				- Production and selection parameters established - Cost-benefit budgets for beef herds calculated	- Intensified production techniques allow equivalent production on less land - Extension service extends improved management techniques - Farmers accept changes in herd composition and reduced herd size
- Development and multiplication of improved breeds - Conserve local genetic resources - Intensify breeding of trypanotolerant local breeds	- Low productivity of local cattle breeds - Local species are endangered	- Improve productivity in traditional herds and for individual animals - Develop and preserve desirable genetic material	- Exploitation of potential of local breeds - On-station and on-farm cross-breeding for improved growth rate and adaptability to climatic and disease conditions - Creation of genetic pool of trypanotolerant cattle	♦	♦	♦				- Improved nucleus beef herds developed at IRZ stations and on pilot farms - Trypanotolerant cattle herds in on-station experiments selected	- Multiplication units for nucleus herds operational - Funds to operate pool of genetic resources available
- Eradication of glossines	- Major local breeds are not trypanotolerant	- Develop biological packages to control glossines	- Field and on-farm trials with different control methods		♦		♦	♦	♦	- Results serve as basis for adapted tse-tse fly control campaigns	- Combined effort of MINEPIA and IRZ
- Crop-livestock integration	- No enforced land rights, leading to increasing land pressure and conflicting land use	- Elaborate models for crop-livestock integration to reduce land required for production	- On-station and on-farm trials for crop-livestock farms	♦	♦	♦				- Data on technical solutions to provide information for land-use planning - Feasibility studies on crop-livestock integration available	- Research models integrated into development projects
- Introduce adapted mechanization	- Production limited by available manpower										
- Organize traditional farmers into production groups	- Long distances and herd movements	- Develop models with increased labour productivity	- On-station and on-farm demonstration trials	♦		♦			♦	- Extendable packages available	
		- Develop workable group approaches on village level	- Field demonstration trials on pilot village level	♦	♦	♦				- Group models tested	- Farmers cooperate in production group approaches

1. Agro-ecological zones: I Sahel zone, II Savanna zone, III High- and mid-altitude zone, IV Humid forest zone, V Sub-humid forest zone, VI Sub-humid savanna/forest zone (see figure 1 and table 4).

4.2 Setting priorities for research programmes by agro-ecological zones

The bottom-up approach of identifying research needs at grass roots level emphasizes the need to organize research by agro-ecological zones. This allows research to support livestock and fisheries development in the different regions in relation to:

- natural conditions and adaptability of domestic animals, wildlife and fish;
- population density, social and agricultural structure, and land tenure;
- development of infrastructure and the economy;
- level of technological development in the livestock sector.

To take these basic factors into account in defining its research, IRZ will:

1. emphasize within each of the different agro-ecological zones those animal species that can generate the most wealth in that zone;

2. set priorities between the various agro-ecological zones according to population density, economic strength, existing infrastructure, and environmental hazards such as problems of erosion, soil degradation and desertification.

For IRZ's research purposes, Cameroon is divided into six agro-ecological zones, (see Figure 1) defined by rainfall and vegetation, altitude and topography, endemic diseases, population density and consequently land use. Both natural and socio-economic factors are thus taken into account.

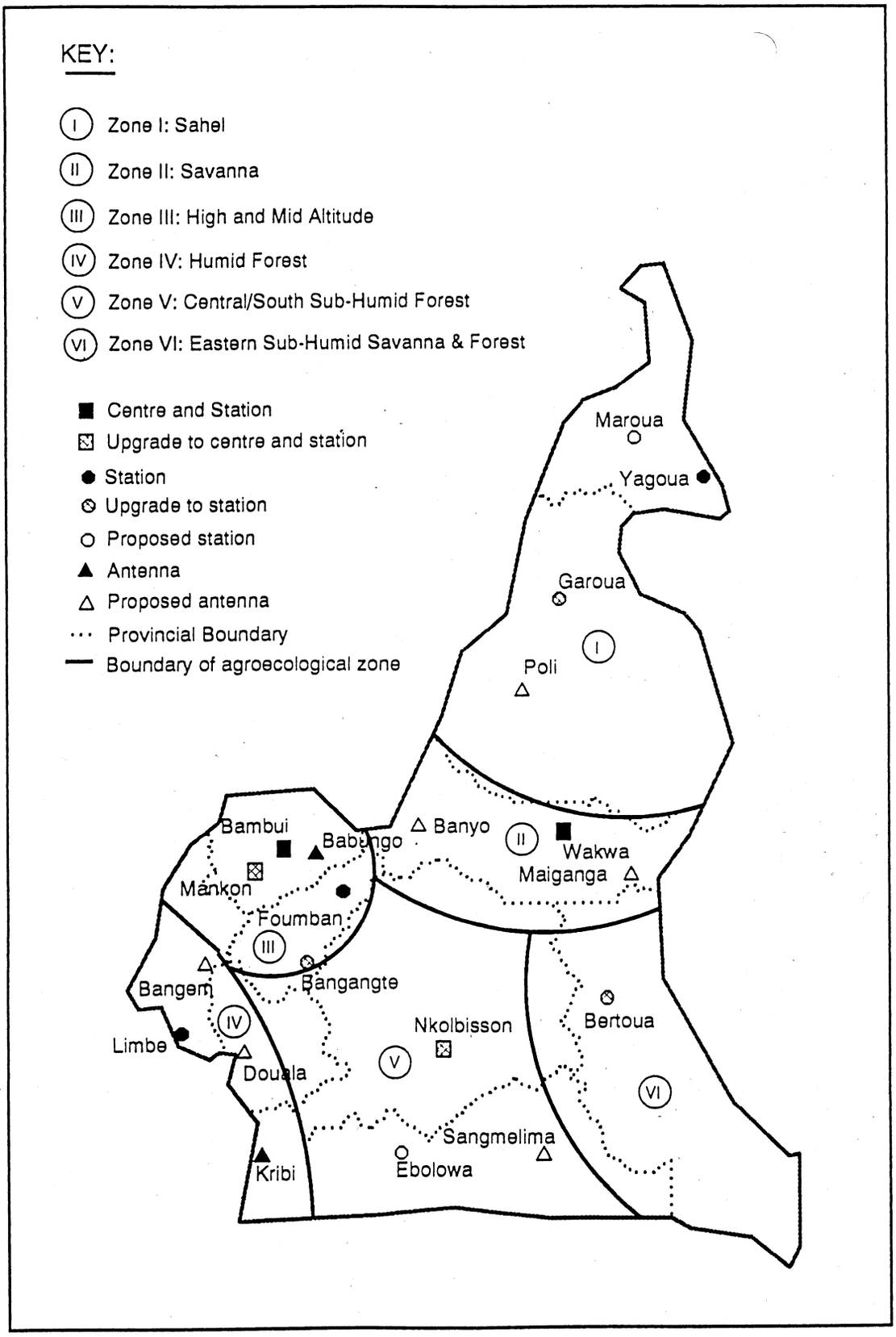
The research priorities of IRZ, set for the various zones, with reference to commodities (major animal species) and to the essential complementary research programmes livestock systems research, agrostology and animal health are shown in Table 4.

It should be emphasized that this approach of setting research priorities by agro-ecological zones takes into account that research cannot cover all animal species and reach all categories of livestock farmers in all six zones simultaneously. However, the regional coverage of the research network is such that there will be a spill-over of research results between zones, and that their adaptation to varied conditions will be tested through scheduled pre-extension programmes and on-farm trials.

In Table 4, the needs for research on commodities and in non-commodity programmes are scored for their level of priority (3 = highest, 2 = medium, 1 = lowest) in each of the six agro-ecological zones, according to:

- the relative importance and suitability of the various animal species in the respective zones;
- the importance of research on the basic requirements of these animals in health control, pasture, feeds and feeding (agrostology);
- the importance in each case of livestock systems research; and
- the amount of problem solving research that has already been carried out for the different species.

Figure 1: **Map of Cameroon showing agro-ecological zones, and IRZ's centres, stations and antennas**



As can be seen from Table 4, Livestock Systems research is the only programme that scores highest priority (3) in all zones. This reflects the emphasis which IRZ is putting on orientating its research towards production patterns and well defined target groups. IRZ considers this as the key programme in pinpointing the needs of livestock farmers and ensuring that there is maximum transfer of the research results into the field for the benefit of the farmers. The Beef and Small Ruminant programmes also score high (total 14 and 15 points, respectively) followed by the Pig and Agrostology programmes (13 points). The Poultry programme follows with 12 points. These six programmes receive the highest overall priority (A).

The pattern of scores for the Beef programme reflects the fact that beef cattle have the largest share in the livestock sector. The great potential of feed resources in the Humid Forest Zone has been largely under-utilized because of tse-tse infestation, but it could be exploited in future by trypano-tolerant cattle. One such animal is the indigenous cattle breed Muturu, which is about to vanish unless measures are taken for its conservation and research.

The high priority for the Agrostology programme is justified by the fact that lack of feeds is still among the major obstacles to a higher output in animal production. Furthermore, specialized studies have identified this field of research as being very important for the control of soil degradation by weeds (e.g., Bokassa grass), and of soil erosion which accelerates desertification, endangering not only the Far North but also certain areas of Adamaoua and the North-West.

The Small Ruminant programme, and to a slightly lesser extent the Pig and Poultry programmes, rank high in most of the six agro-ecological zones, not only because they play an important role in diversifying agriculture in these zones, but also because research on these species in the past was neglected by comparison with cattle.

As can also be seen from Table 4, IRZ's research priorities set for the different agro-ecological zones overall rank as follows :

1. High and Mid Altitude zone (North West, West);
2. Sahel zone (Far North, North);
3. Humid Forest zone (Littoral, South West, high pop.);
4. Wooded Savanna zone (Adamaoua);
5. Central/South Sub-humid Forest zone (medium population);
6. Eastern Sub-humid Savanna and Forest zone (low population).

Conceptually, IRZ research tries to take into account economic, social and environmental factors for the different zones, with reference to indicators as given in Table 5. Emphasis is on the following factors:

- the regional demand and supply situation for given animal products, paying due attention to the possibilities of inter-regional market complementarities;
- the natural resource base and the opportunities to exploit these over time;
- the urgency of environmental protection;
- the need to develop sustainable production systems to safeguard and increase income levels; and
- the potential for adoption of results and the diffusion of benefits.

Table 4: Priorities[1] of research programmes according to agro-ecological zones

	I	II	III	IV	V	VI		
Agro-ecological zones	Sahel	Savanna	High & Mid Altitude	Humid Forest	Sub-humid Forest	Sub-humid Savanna & Forest		
Provinces	Far North /North	Adamaoua Plateau	North West / West	South West / Littoral	Central / South	East		
Altitude (m)	400-800	> 1000	700-1900	0-800	< 800	300-800		
Population density	Medium	Low	High	High	Medium	Low		
Rainfall (mm)	400-1000	1000-1500	1500-2500	> 2500	1500-2500	1500-2500	Total	Overall Priority
Programme								
Beef	2	3	2	2	2	3	14	A
Dairy	2	3	3	0	0	0	8	B
Small Ruminants	3	1	3	3	2	3	15	A
Pigs	2	0	3	3	3	2	13	A
Poultry	3	0	3	3	2	1	12	A
Rabbits	0	0	3	1	1	0	5	C
Fisheries	1	0	2	3	3	1	10	B
Apiculture	2	3	2	1	0	0	8	B
Horses	2	2	0	0	0	0	4	C
Wildlife	2	0	0	0	1	2	5	C
Livestock systems research	3	3	3	3	3	3	18	A
Agrostology	3	3	3	2	1	1	13	A
Animal Health	1	3	1	2	2	1	10	B
Total	26	21	28	23	20	17		

1 Highest priority = 3, medium = 2, lowest = 1. Overall : A = highest (18-12), B = second (11-6), C = third priority (5-0).

In defining the research priorities, important cultural and social factors cannot be ignored. In particular, one must take into account that, in many livestock systems, animals are not regarded by their owners as purely a commodity. They play an important role in cultural events, serve as an investment and as a savings account, and minimize the impacts of risk factors such as disease outbreaks or droughts.

Existing models for setting priorities in research are mainly commodity based, and to a varying degree rely on economic criteria. Methods of different complexity at the intermediate and micro planning levels (research projects and operations) are based on checklists, scoring or weighted criteria models, and benefit/cost analysis.

The high priority for the Agrostology programme is justified by the fact that lack of feeds is still among the major obstacles to a higher output in animal production. Furthermore, specialized studies have identified this field of research as being very important for the control of soil degradation by weeds (e.g., Bokassa grass), and of soil erosion which accelerates desertification, endangering not only the Far North but also certain areas of Adamaoua and the North-West.

Table 5: Economic and environmental indicators in the agro-ecological zones

Criteria	Sahel zone I	Savanna zone II	High & Mid Altitude zone III	Humid Forest zone IV	Central/South sub-humid Forest zone V	Eastern sub-humid Savanna & Forest zone VI	Total
Land area km²	101,603	61,992	31,190	45,130	116,132	108,540	464,587
Land area %	21.9	13.3	6.7	9.7	25.0	23.4	100.0
National parks and equivalent reserves Ha.	909,000	-	5,970	290,000	303,000	843,000	2,350,970
Climatic risks to agriculture	very high	low	medium	medium	low	very low	
Erosion/land degradation	very high	medium	high	medium	medium	low	
Population	2,335,000	423,000	2,552,000	2,502,000	2,159,000	476,000	10,447,000
Population density /km²	23.0[1]	6.8	81.8	55.4	18.6	4.4	22.5
Urbanization rate	14.0%	22.6%	22.4%	60.8%	37.9%	24.0%	30.3%
Average gross income per farm (FCFA)	159,000	167,000	356,000	813,000	424,000	253,000	180,000
from:							
export crops	43.1%	13.0%	40.4%	66.2%	67.3%	57.6%	51.2%
food crops	27.1%	68.3%	49.9%	32.2%	31.0%	40.5%	40.3%
livestock	29.8%	18.7%	9.7%	1.6%	1.7%	1.9%	8.5%
Estimated Numbers of livestock 1986/87							
Cattle	1,657,400	1,587,500	777,300	16,500	46,300	276,500	4,361,500
Sheep	1,362,600	139,000	406,000	34,200	166,300	250,000	2,358,100
Goats	1,507,300	84,900	695,000	56,000	307,100	267,200	2,917,500
Pigs	53,000	2,000	400,000	190,000	95,000	60,000	800,000
Poultry	1,867,000	194,000	3,054,000	2,393,000	6,014,000	478,000	14,000,000

1 Far North: population density 95.1 /km², North: population density 8.8 /km².
Source: Cameroon Agricultural Sector Review, March 1989.

IRZ will apply the benefit/cost model elaborated by ISNAR for estimating Net Present Value, Benefit/Cost Ratio, and Internal Rate of Return, linked with sensitivity tests to evaluate the consequences of inaccurate estimates and to develop and study different scenarios. Using the information thus obtained to help improve the definition of priorities, the rank order of projects and operations might then be modified according to weights reflecting social values (still to be elaborated), including those attached to livestock by different categories of farmers.

4.3 Emphasizing on-farm research by expanding the livestock systems research programme and by setting up multidisciplinary research teams

Equally important for a higher research output is the reorientation of research, by transferring emphasis to on-farm research and to multidisciplinary research in order to establish strong ties between research bodies on the one hand and extension services and farmers on the other. The multidisciplinary research teams will be set up in collaboration with the technical ministries and development missions comprising not only the discipline of animal husbandry but also agrostology, animal health, economics and rural sociology. This approach will facilitate the elaboration of practical, economically sound, technological packages acceptable to farmers, the training of farmers (training by doing), the dissemination of extension messages and therefore the extension of research results.

For this, IRZ will follow three research approaches; on-station research, on-farm research, and field research which are complementary in their different tasks.

The task of on-station research is primarily to develop advanced technological packages such as genetically improved animals and high-yielding forages. This type of work is complex and exact, it requires centralized facilities and a relatively good control of environmental factors, and should not be carried out at a risk to the farmers. This kind of research has always to be at least one step ahead in terms of technological standards.

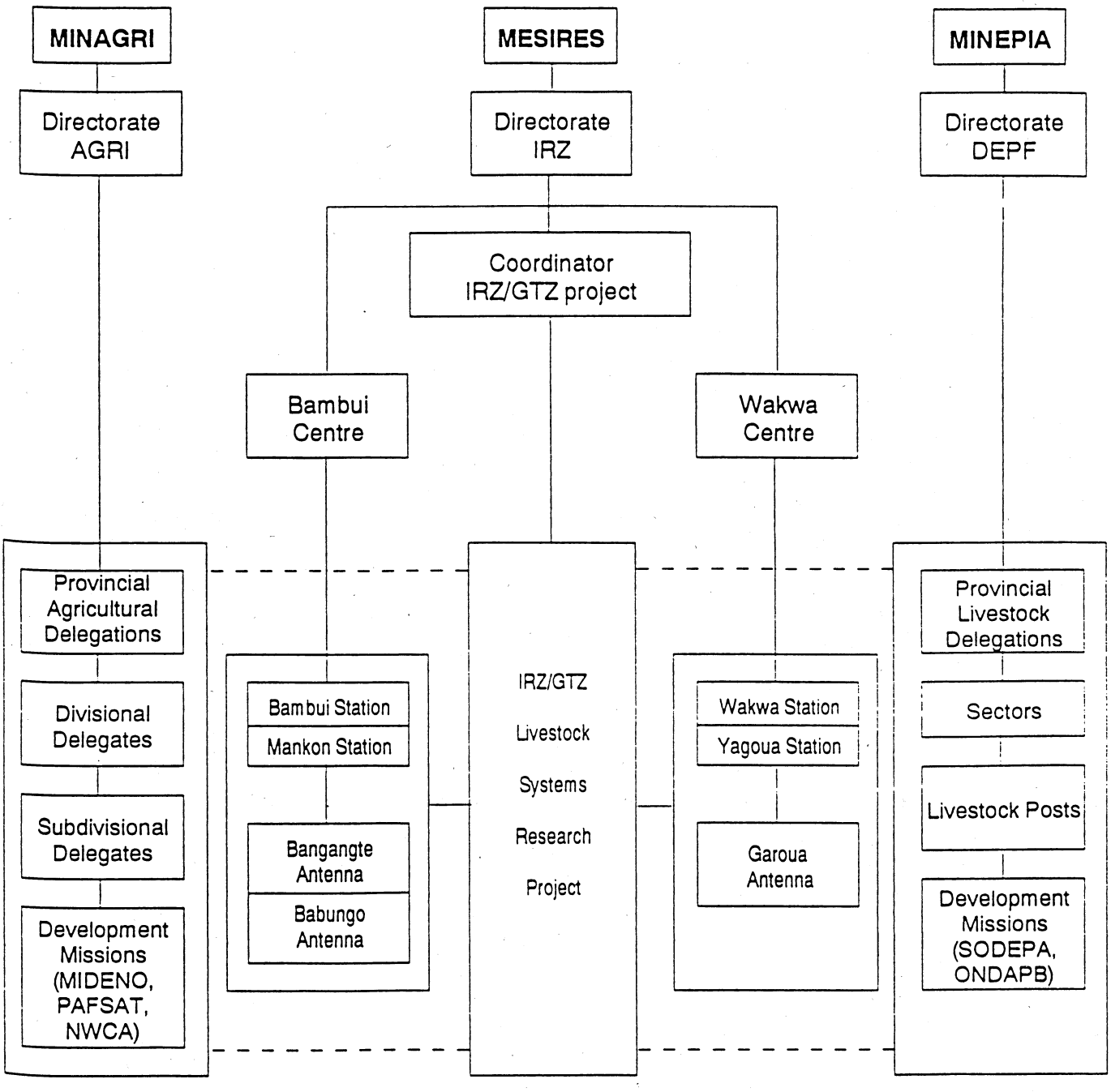
On-farm research deals with (i) the analysis of on-farm problems and how farming practices are influenced by social structure and economic factors, and (ii) the testing of technologies elaborated on-station.

Where livestock production is not confined to individual farms, as in the exploitation of communal areas, field research is carried out, involving analysis of existing resources, trends (e.g. degradation through erosion or fertility decline) and potentials.

So far there have been three such multi-faceted research projects. The first, combining all three methods is the "IRZ/GTZ Livestock Systems Research Project" (see Diagram 1), which is carried out by an inter-institutional research team with MINEPIA (Provincial Delegations, SODEPA, Tse-tse Project, ONDAPB) and MINAGRI (MIDENO, PAFSAT, NWCA). The second is the Benoue Basin Integrated Farming Systems team whose members come from IRA, IRZ, IRAT and IEMVT (see Table 9). The third is a specialized poultry team for the Centre, Littoral and South provinces.

The IRZ research stations form the basis for carrying out on-farm and field research, they serve as sources of progress for advanced production techniques, as sites for demonstrations of model farming methods, as centres for the organization of pre-extension activities and multi-locational trials, for training of extension agents, and as nuclei of genetically improved animals and seeds.

Diagram 1: Operating framework of the IRZ/GTZ livestock systems research project



4.4 Integrating research programmes into development projects

IRZ will carry out research in association with development projects. Linking adaptive research to development projects, funded by national organizations or international donors, will contribute to achieving better project results, and also enable IRZ to carry out on-farm and field research as defined in section 4.3. This is not possible without certain pre-extension and liaison infrastructure. One way of assuring this is through contracts under which IRZ performs specific research, pre-extension or demonstration activities for, and using the infrastructure of, these projects involved in development.

The first instance of such a contract is the participation of Mankon station in MIDENO's agricultural development project. Mankon station will carry out pre-extension research for the raising of goats, pigs, rabbits and poultry. A technical package developed at the station will be tested for the farmers at MIDENO's trial and demonstration units, against an agreed financial contribution.

4.5 Giving each station a research area for specialization

In addition to structuring research programmes on the basis of agro-ecological zones, each research unit of IRZ will also be assigned an important research field as an area of specialization. This will entail building up a nucleus of research results at an IRZ station for the animal species important in the surrounding region. These results will then be extended to other IRZ stations, as multiplication, demonstration and training packages. An example would be breeding improved genetic material in pigs at Mankon station which could then be transferred to Yagoua station where pigs also play an important role in the surrounding area.

This strengthens the scientific base for research, avoids duplications, and economizes on infrastructure. The distribution of the various research units of IRZ is shown on the map (Figure 1) and their specializations are presented in Table 6.

The criteria for these specializations are, (i) the existing research infrastructure of IRZ, (ii) the importance of the animal species in the surrounding regions, (iii) the vicinity to, or remoteness from, urban areas with regard to consumption and supplies, and (iv) the suitability of the locality in relation to specific natural resources, such as for fisheries, wildlife and apiculture.

4.6 Carrying out strategic economic studies for decision makers

As mentioned in chapter 1, an important objective of IRZ is to carry out strategic economic studies that will help indicate to decision makers trends, opportunities, and shortcomings in livestock development. These studies will be commodity orientated. They will deal particularly with internal and external factors that influence the national and regional markets for livestock and fisheries products. Results from these studies would then be used by Government planners to help them set national development policies and strategies.

Table 6: Specialized research areas of IRZ units

Controlling unit	Unit	Province	Specialized research areas
Maroua	Maroua	Far North	- Livestock and range management in semi-arid areas; - Soil conservation; - Wildlife conservation and management.
	Garoua	North	- Breeding and management of sheep and goats; - Semi-arid browse forage plants.
	Poli	North	- Observation and conservation unit for endangered cattle breed, Namtchi.
	Yagoua	Far North	- Livestock management in semi-arid areas; - Conservation of endangered genetic resources with regard to cattle, sheep and goats.
	Mokolo	Far North	- Integrated livestock crop production; - Pre-extension and demonstration unit for small ruminants.
Wakwa	Wakwa	Adamaoua	- Diseases and pests; - Beef cattle genetics and management; - Savanna range management.
	Banyo	Adamaoua	- Forage seed multiplication; - pre-extension and demonstration unit for cattle.
	Maiganga	Adamaoua	- Pre-extension and demonstration unit for cattle.
Mankon	Mankon	North West	- Pig, poultry and rabbit genetics; - Multiplication of small animals, poultry, pigs, rabbits.
	Bambui	North West	- Dairy cattle genetics, dairy technology; - Highland range management.
	Babungo	North West	- Forage seed multiplication.
	Foumban	West	- Aquaculture.
	Bangangte	West	- Observation and trial unit for red and white fulani cattle, sheep, goats; - Range management.
	Bangem	South West	- Observation and conservation unit for endangered cattle breed Muturu.
Nkolbisson	Nkolbisson	Central	- Forest browse forage plants; - Livestock economics, marketing demand and supply.
	Ebolowa	South	- Integrated small livestock systems into tree crop agriculture; - Aquaculture pre-extension.
	Sangmelima	South	- Observation unit for integrated animal/fish/crop production and wildlife.
	Bertoua	East	- Trypano-tolerant ruminants (cattle, sheep and goats) genetics and management; - Forest wildlife.
Directorate	Limbe	South West	- Marine fisheries.
	Kribi	South	- Prawn fisheries.
	Douala	Littoral	- Fish statistics, supply and demand.

4.7 Reinforcing links with national and international research and training institutions

An increase in IRZ's research effectiveness can be achieved by reinforcing its links with IRA, the University Centres of Dschang and Ngaoundere, other national research entities, international research institutions, foreign universities, and technical assistance organizations interested in research. Cooperation will not only serve farmers and researchers better, but also politicians, civil servants, development agents, teachers, students, and indeed the foreign and international research institutions and universities. This cooperation will include :

- joint multidisciplinary research teams;
- joint research reviews, programming and coordination;
- joint workshops and seminars;
- sharing research infrastructures with IRA and CUDS, at Ebolowa/Nkoemvone and Maroua, and elsewhere;
- joint service centres between IRZ and IRA (Library and Documentation centre, Computer centre);
- joining with university centres (CUDS, Ngaoundere) in training and research programmes for students;
- joint publications (Journal 'Science and Technology').

IRZ's cooperation with IRA is already underway and can be enhanced by:

- participation of the Directors in each other's programme committees;
- joint library and documentation facilities at Nkolbisson, which will be extended to regional centres;
- sharing land at stations, for example at Bambui: using steep slopes for grazing (IRZ) and gentle slopes for cropping (IRA);
- joint IRZ/IRA research interests, for example collaboration in surveys and trials, TLU activities and secondment of specialists to each other's research teams (e.g. on animal traction for the work of IRA in the Far North);
- assisting each other's research: IRA in studying soil erosion of pastures, or in seed production of forages; IRZ in research on organic manure for crops, use of surplus crops for livestock feeds.

A similar cooperation is proposed by setting up joint technical working groups with CUDS and the University Centre of Ngaoundere. In this context, it should be mentioned that CUDS is represented on the IRZ Board and on its Programme Committees, though IRZ is not represented on the CUDS Board and committees. It is felt CUDS should reciprocate.

There is a laboratory at CUDS similar to the feed analysis laboratory at Mankon. It is intended that the two laboratories will work together closely in the future to prevent duplication of services and to try to provide a service that covers the whole country.

Cooperation in training and teaching of students is already well established. IRZ researchers are teaching at Ngaoundere University Centre. Students from various institutions including foreign institutions are trained at IRZ research units, as Table 7 shows for the five year period 1983-1988. It can be seen that IRZ provides two types of training. Most participants are attached to IRZ research activities and receive their

training in this context. Others, notably farmers and foreign volunteers, receive special short term training courses and demonstrations in production techniques.

Unfortunately, this training could not continue during 1988/89 due to lack of funds. Given the national importance of such training, ways and means should be found in cooperation with CUDS to continue and strengthen this function. Given the predominantly research-related nature of the training, IRZ will continue to finance this from the research operating funds.

A further increase in research effectiveness can be achieved by collaborating with international research organizations and universities like the Institut d'Elevage et Médecine Vétérinaire des Pays Tropicaux in Paris (IEMVT), the Institute of Tropical Veterinary Medicine in Edinburgh, the Plum Island Disease Centre in the U.S.A., and the Technical University of Berlin.

Table 7: Training of farmers, research students and extension agents at Mankon, Bambui, Wakwa, Nkolbisson and Limbe stations, 1983/84 - 1987/88

Institution	1983/84	1984/85	1985/86	1986/87	1987/88
Veterinary School (Jakiri)	-	4	10	-	-
Dschang University Centre (ENSA)	4	5	15	5	9
Regional College and Technical College of Agriculture (Bambili)	7	6	9	2	3
University of Yaounde	-	4	11	9	2
Cooperative College (Bambui)	1	2	4	2	-
Nursing School (Yaounde)	10	-	8	-	-
Cameroon Development Corporation (CDC) and Douala University Centre	3	2	2	-	2
Farmers and Peace Corps volunteers	17	51	10	2	6
University of Ibadan (Nigeria)	2	2	7	6	5
Ahmadou Bello University and others in Nigeria	-	1	4	4	3
Veterinary School Dakar and Wye College UK	-	2	2	4	3
IEMVT and Université de Paris XI (France)	2	2	2	1	1
Total	46	81	84	35	34

Research training projects have been designed by IRZ researchers in cooperation with researchers from these various institutions, as shown in Table 8, aimed at simultaneously achieving two objectives:

- to solve a national problem in livestock research;
- to train the IRZ researchers in the execution of specialised research with the assistance of experienced researchers in the discipline concerned.

These research training projects are of varying duration. In most cases they lead to a higher degree. The research under these training agreements is being carried out as on-station and on-farm research in Cameroon. The preparation of the final research protocols is now carried out by the researchers and their supervisors at the participating institution abroad. Funding for these projects comes both from IRZ (staff salaries and research operating costs from the normal budget, air fares, tuition costs and overseas living expenses from the World Bank loan) and the overseas institutions, as well as from third party research donors such as the IDRC, EEC, IFS, the German Research Council, the British Council, GTZ, CIRAD, and ILCA. Contacts with additional partners are being pursued: DSE, ODA.

Table 8: Research training projects designed with international institutions and universities

Research Project	Research Objectives	Collaborating Institution
Diagnostic virology	To upgrade the diagnostic capability of the IRZ veterinary laboratory. To acquire technology for the local production of diagnostic reagents.	Cornell University, Plum Island, U.S.A.
Poultry management and biometrics	To evaluate poultry production techniques in highland and lowland areas of Cameroon. To standardize poultry housing systems and appliances using local materials suitable for efficient broiler and layer production.	University of Arkansas, U.S.A.
Plankton productivity in fisheries	Evaluation of the contribution of micro phytoplankton to the productivity of marine coastal ecosystems (relative to the Cameroon shelf).	University of Buckingham, England.
Fish technology and preservation	To evaluate the quality level of traditionally smoked and stored fish with the aim of improving conservation methods.	Rivers State University, Nigeria.
Increase pig productivity through better balanced feed rations	To increase efficiency of pig production in Cameroon by the use of local by-products as feed.	University of Reading, England.
Increase beef productivity through better pastures	Analysis of the nutritional values of natural pastures and the possibilities of improvement at village level.	University of Montpellier / IEMVT, France.
Improve sheep production in the humid forest	Evaluation of the local dwarf sheep population in Cameroon : Selection, breeding, feeding, management.	Technical University of Berlin (T.U.B.), W. Germany.
Develop dual purpose poultry	Evaluation and development of the potential of indigenous fowl in Cameroon for egg and meat production using tropical relevant major genes.	Technical University of Berlin (T.U.B.), W. Germany.
Improve local cheese production	Elaboration of simple semi-hard cheese making techniques.	University of Reading, England.

This international cooperation is extremely important to IRZ. Not only does it improve research standards and qualifications, it also builds up permanent external contacts, and attracts funding from international agencies.

In addition to this form of cooperation which combines research execution with training, IRZ also carries out long term research projects with the bilateral technical cooperation agencies of France, Germany, Canada, Holland, and Japan, and with international organizations such as the Food and Agriculture Organization (FAO) and the International Union for the Conservation of Nature and Natural Resources (IUCN). ILCA coordinates important research networks for Africa of which IRZ is a member; benefits include the mutual discussion and improvement of research protocols, avoidance of duplication, and help from ILCA in establishing international contacts. ISNAR is collaborating with IRZ and IRA in methodological developments concerning the definition of research priorities, and in various aspects of research management. Projects already in progress and those currently being planned are shown in Table 9.

Table 9: Long term research projects funded by bilateral and multilateral development agencies

Research Project	Research Objectives	Collaborating Agency
Conservation and development of the Waza, Logone region of Cameroon	Rehabilitation of the Logone flood plain ecosystem and sustaining its use by the local people and wildlife. Preservation of wildlife in zones outside the Waza national park and improvement of the socio-economical situation of villages around the park.	University of Leiden, Netherlands, IUCN.
Young ruminant mortality	To determine young ruminant mortality rates and diagnose the main causes of death.	IEMVT, France.
Dry season feeding	To determine the scope of dry season feeding for economical use by small farmers. Improvement of livestock management to minimize the need for feed supplements. To evaluate the effect of dry season feeding on animal health.	IEMVT, France.
Improvement of soil fertility	Technology and management for the large scale production of good quality manure. Erosion control by introduction of legumes.	IEMVT, France.
Livestock systems research	To describe the livestock production systems of Cameroon and identify their constraints and potentials for development in an effort to elaborate a relevant national livestock research plan.	GTZ, Germany.
Rabbit production in bamboo systems	To introduce the use of local materials in the construction of rabbit cages and equipment.	IFS
Climatic adaptation in laying hens and thyroid metabolism	To gain accurate information on the nutritional requirements of laying hens under varying climatic conditions and the effect of thyroid hormones on climatic adaptation.	IFS
Protein requirements in poultry farming	To establish correct protein nutrition standards for traditional poultry farming.	FAC, France.
By-products	To characterize and quantify all by-products used in livestock farming in Cameroon. To determine optimum feeding levels of by-products in sheep and goats.	IDRC, Canada.
West African research networks on meat and milk from cattle, and on small ruminants	To coordinate and exchange research results between West African countries.	ILCA
Primate census and population studies	To study primate numbers and population dynamics, and elaborate survival strategies under shrinking natural resources.	Japan
Priority setting in livestock research	To study the most appropriate methods and tools of priority setting at the level of research projects in IRZ	ISNAR

4.8 Changing the legal status of IRZ

One of the main bottlenecks preventing IRZ from increasing its efficiency is its organizational structure. Therefore it is crucial to change IRZ's legal status from that of an institute with a Board of Directors ("Conseil de Direction") to that of a public organization with a Board of Administrators ("Conseil d'Administration").

The present system of administration and financial management through the public services is time consuming and costly. The proposed new status will give IRZ the necessary autonomy to introduce a management system that follows the rules of privately organized enterprises. This will allow IRZ to tailor its rules to the specific requirements of its research operations, while remaining a public institution. Such partial autonomy is considered a pre-requisite to fulfilling a performance contract.

The additional authority which this new status will give the Director, will then be delegated in a decentralized manner throughout the structures of IRZ. This will allow the various organizational levels of the Institute to efficiently handle external contacts and manage their personnel. In particular, it will enable the Institute to deal much more effectively and directly with appointments, incentives, sanctions and termination.

The recommended composition of this new Board is as shown in Table 10.

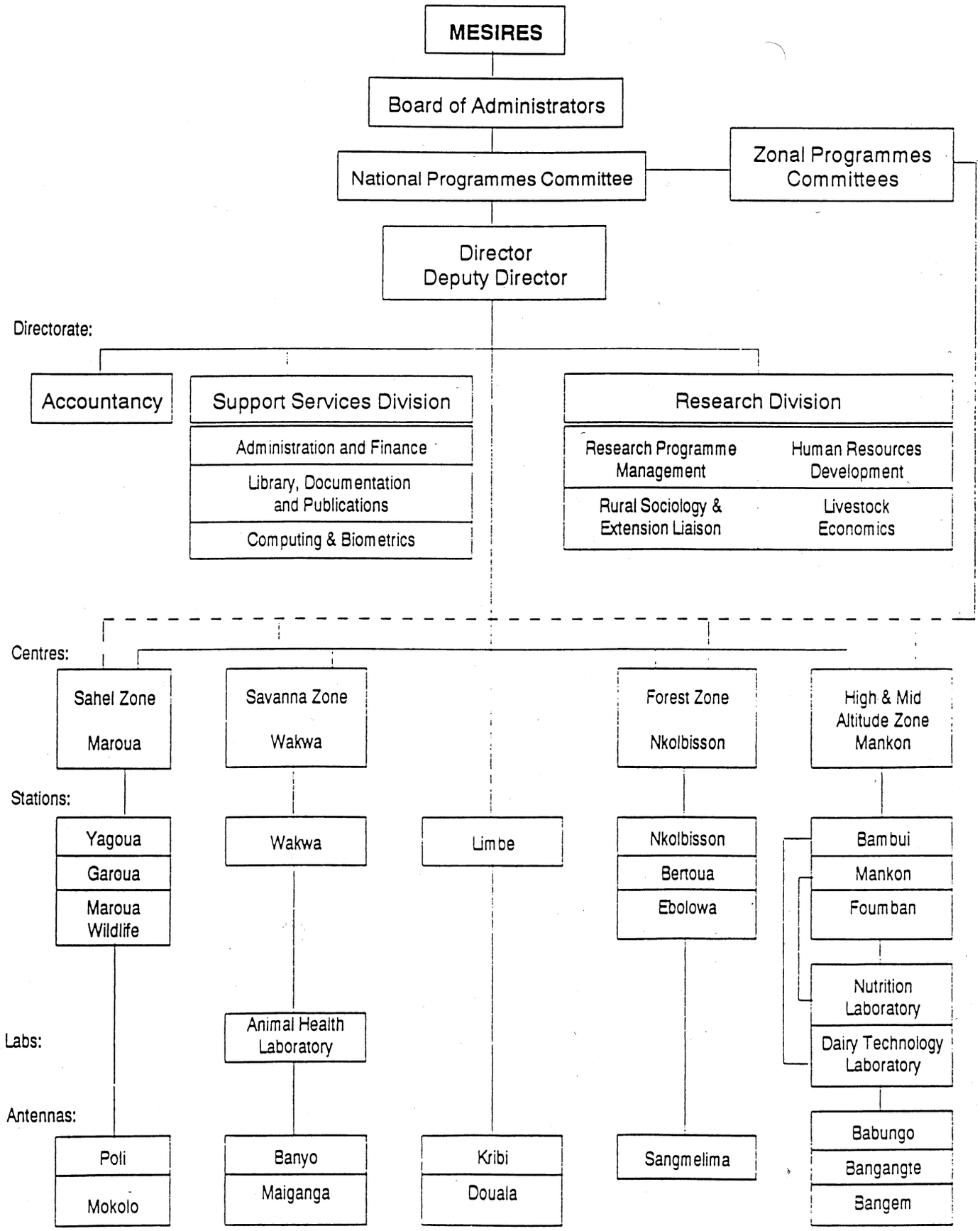
4.9 Improving the regional coverage of IRZ through revising its structure and establishing new units

With regard to its operating structure and infrastructure, IRZ will function, as in the past, from research centres, stations and antennas. In the framework of the planned decentralization of responsibilities in IRZ it is proposed, as shown in Diagram 2, to upgrade Nkolbisson and Mankon to centres, the antennas Garoua and Bertoua to stations, and to add Maroua as a new centre and Ebolowa and Maroua as new stations, and Sangmelima, Douala, Bangem, Poli, Mokolo, Banyo and Maiganga as new antennas. Upgrading stations to centres and antennas to stations will not involve significant extra costs beyond what would be needed in any case for these units to adequately fulfil their regional and national roles.

Table 10: Proposed Board of Administrators of IRZ

Chairman:	The Minister of Higher Education, Computer Services and Scientific Research (MESIRES)
Vice-Chairman:	The Minister of Livestock, Fisheries and Animal Industries (MINEPIA)
Members:	- A Representative of the Ministry of Agriculture (MINAGRI) - A Representative of the Presidency of the Republic - A Representative of the Ministry of Finance - A Representative of the Ministry of Planning and Regional Development - Two livestock farmers proposed by IRZ - Two Members of Parliament - The Director of Scientific and Technical Research, MESIRES - The Director of IRZ
Co-opted Members:	- The Director General of the University Centre of Dschang - The Director of IRA.

Diagram 2: Structure of the Institute of Animal Research



In particular, upgrading Nkolbisson and Mankon from stations to centres will not require new investments in administrative infrastructure. In the case of Garoua, the infrastructure and personnel are in place. Bertoua will need substantial expansion irrespective of whether or not it becomes a station. The costs of new IRZ units at Ebolowa/Nkoemvone and Maroua (the latter consisting of a few offices only), can be kept low if the existing infrastructures belonging to other organizations (IRA, CUDS...) can be shared. The antennas are observation and trial posts requiring little infrastructure.

In future, IRZ will operate from four centres:

1. The IRZ Sahel Zone Research Centre: overseeing the stations of Maroua, Garoua and Yagoua, and the Poli and Mokolo antennas.

2. The IRZ Savanna Zone Research Centre: overseeing the station of Wakwa and the antennas of Banyo and Maiganga.

3. The IRZ Forest Zone Research Centre: overseeing the stations of Nkolbisson, Bertoua and Ebolowa, and Sangmelima antenna.

4. The IRZ High and Mid Altitude Zone Research Centre: overseeing the stations of Mankon, Bambui and Foumban, the nutrition and biochemistry laboratory at Mankon, and the Babungo, Bangangte and Bangem antennas.

The four centres, based at Maroua, Wakwa, Nkolbisson, and Mankon respectively, are zonal research centres. The Sahel Zone Research Centre corresponds to the area of the Far North and North provinces. The Savanna Zone Research Centre corresponds to the area of the Adamaoua province. The Forest Zone Research Centre serves the forest areas of the South West, Littoral, Centre, South and East provinces. The High and Mid Altitude Zone Research Centre caters for the areas between 700 and 1900 meters high in the North West, West and the South West provinces, and up to the transitional forest areas of the Central province. IRZ activities in fisheries research are under the direct control of the IRZ Directorate. The Centre at Maroua is also the centre for wildlife research.

The primary function of these centres is to develop regional research strategies, to introduce and organize on-farm and field research (as defined in section 4.3) and a pre-extension network, in collaboration with all services concerned with development, and to coordinate the IRZ research in their respective zones. These important tasks of the regional centres are reflected in the job description for the chief of centre which will be elaborated as part of the restructuring process.

The chiefs of centre will be assisted and advised by six Zonal Programme Committees (one per agro-ecological zone as defined in Table 4). The reason to have zonal committees rather than committees organized by province, is that this will enable committee members to discuss and resolve common problems of the livestock farmers in a relatively homogeneous environment.

Whereas the centres identify research and development needs in their regions, IRZ's stations form the operational basis for carrying out this research. To interface between the stations and the farming community the antennas will operate as observatory and trial posts. They will perform pre-extension work, gather information and transfer

research results to farmers. For such, Livestock Liaison Units at Bambui, Mankon, Wakwa and Maroua will be operational in the first five-year period of the performance contract.

The location of research stations and antennas are based on two major determining factors:

- ecological diversity: six agro-ecological zones influence the kinds and breeds of animals that are kept on farms, as well as the husbandry practices;
- facilitating transfer of information: the distribution of human and physical resources of IRZ takes account of the need to reach the animal farming communities in the different parts of the country.

To improve its regional coverage, IRZ will establish a new station for research at Ebolowa, to respond to the expressed needs of the population and the importance of various small farm animal species in the area. If IRZ were to share the existing IRA infrastructure at nearby Nkoemvone, the IRZ research would be restricted to poultry, pigs and fish ponds in view of the limited space available. Alternatively, a new Ebolowa station could accommodate a more diverse research programme of both IRZ and IRA.

A new Sahel research centre and wildlife station at Maroua will coordinate all field research for conserving and exploiting wildlife in Cameroon. This work will be mostly carried out in national parks, reserves, and surrounding areas, where researchers will be posted: Waza, Mount Cameroon, Campo, Buffle Noir, Dja & Lobo, Korup and Kimbi. The Sahel research centre and wildlife station will only need a few offices which it will seek to acquire at the CUDS antenna or the IRA centre at Maroua.

As can be seen from Diagram 2, IRZ also will establish regional antennas at Sangmelima, Bangem, Poli, Mokolo, Banyo, and Maiganga. A new antenna in the port area of Douala will be established to collect fisheries statistics.

The three IRZ laboratories (the animal health laboratory in Wakwa, the nutritional standards and biochemistry laboratory in Mankon, and the dairy technology laboratory in Bambui), important both on a regional and a national basis, are attached to the research stations where they are located in order to economize on the management of their infrastructure. However, they have complete autonomy to carry out their daily functions and services.

4.10 Introducing an effective research and administrative management organization

In addition to the proposed change in the legal status of the Institute, its internal organization would be modified as shown in Diagram 2.

4.10.1 The Directorate

It is proposed to reorganize the Directorate of IRZ in the following way:

- The Research Service would be upgraded to a Division and will be headed by a Chief of Division, assisted by a team of four "Chargés d'Etudes Assistants". This team will together be responsible for four distinct areas of management and study:

    - research programme management,
    - human resource development,
    - rural sociology & extension liaison, and
    - livestock economics.

- A Support Services Division should be created. It will be headed by a Chief of Division and should comprise the Administrative and Financial service, the Library, Documentation and Publications service and the Computing and Biometrics service.

- An "Attaché de Direction" should be appointed to assist the Director in confidential matters and duties that do not fall under research or pure administration. This will leave the Director more time for conception, planning, search for funds and international research cooperation.

4.10.2 The Research Division

To strengthen the Directorate the expanded Research Division will have a strategic role in reinforcing the research management and in improving IRZ's capabilities in livestock economics, human resource development and liaise with the technical services.

It will be the task of research programme management to determine the research objectives and priorities, then to plan concrete research projects, and carry out proper resource allocation. These plans have to be based on realistic data and projections of manpower, station and field research facilities, Government budgets and external funding. The planning and programming process will be improved by the installation of a permanent monitoring and evaluation system as part of the National Agricultural Research Project (NARP), and the setting up of a management information system with assistance from ISNAR.

Human resource development and management are very important functions, requiring specialised attention. In addition to various non-administrative aspects of management of research personnel (recruitment, supervision, evaluation, advancement...), the planning, organization and scheduling of training for researchers and technicians, as well as the promoting of research leadership and cooperative attitudes, are critically important tasks of human resource development.

The principal role of rural sociology and extension liaison will be to design and organize pre-extension work, demonstrations and other ways to communicate with the farmers, the extension agents and other target groups. It will also have a special responsibility for integrating research into development projects. These activities will require considerable understanding of and sensitivity for the social and cultural particularities of the different categories of livestock farmers.

Livestock economics will deal with trends in production and consumption and with internal and external factors that influence the national and regional markets for livestock and fisheries products. It will also play an important part in the analysis of research projects for the purposes of priority setting and evaluation.

The Institute's striving to become more efficient and effective in research for development will be further supported by the existing National Programme Committee as well as the newly proposed Zonal Programme Committees. Whereas the National Programme Committee is responsible for setting national priorities taking into consideration zonal goals, the Zonal Programme Committees will set zonal strategies for animal research, and will be involved in the follow-up of agreed programmes and strategies. The composition of these committees is listed in Tables 11a and 11b.

Table 11a: Composition of the National Programme Committee for animal research

Chairman:	The Director of Scientific and Technical Research (MESIRES)
Members:	The Director of IRZ (Secretary) The Director of Studies, Projects and Training (MINEPIA) The Director of Livestock and Animal Industries The Director of Fisheries The Director of Veterinary Services A Representative of the Minister of Agriculture The Chief of the Zootechnical Department of ENSA, CUDS The Director of IRA The Director of CAC The Director of SODEPA The Director of LANAVET The Secretary General of the Chamber of Agriculture The Chief of the Research Division, IRZ The Chiefs of Centres, IRZ

Table 11b: Composition of Zonal Programme Committees for animal research [1]

Chairman :	The Chief of Centre concerned, IRZ [2]
Members :	The Chief of the IRZ Research Division The Chief of Centre concerned, IRA The Provincial Delegate(s) of MINEPIA One Chief of Sector, MINEPIA The Provincial Delegate(s) of Agriculture, MINAGRI The Provincial Delegate(s) of the Ministry of Planning One Mayor of a Rural Council Two Presidents of Livestock Co-operatives The Representative of CUDS from the province(s)

1 The Director of the University Centre Ngaoundere is a member of the Savanna Zonal Programme Committee.
2 The chairman may co-opt persons qualified to make contributions to participate in the work of the committee.

4.10.3 The Support Services Division

The Support Services Division comprises three distinct services:

- Administration and Finance;
- Library, Documentation and Publications;
- Computing and Biometrics.

At IRZ headquarters, the posts of responsibility in the Administrative and Financial Service remain unchanged, except for the addition of a Chief Clerk for Materials. This addition is absolutely necessary in view of the Institute's large amount of specialized equipment which needs special care and maintenance.

With this addition, the Administrative and Financial Service includes the following posts:

- 1 Chief of Service for Administration and Finance;
- 1 Assistant Chief of Service for Administration and Finance;
- 1 Chief Clerk (Chef de Bureau) for Administration;
- 1 Chief Clerk (Chef de Bureau) for Finance;
- 1 Chief Clerk (Chef de Bureau) for Materials;
- 1 "Comptable Matières".

At each station the following posts of responsibility will exist:

- 1 Chief of Section for Administration and Finance;
- 1 "Comptable Matières".

No specific administrative personnel will be posted at the antennas; they will be administered through the stations.

The Library, Documentation and Publications service will develop further as a joint service of IRZ and IRA, administered by IRA. It will incorporate the relevant staff of the two institutes.

The Computing and Biometrics service is a new service of IRZ, which will also accommodate the joint IRZ/IRA computing centre which is administered by IRZ. Additional staff are needed with specialized skills in computer management and biometrics. They will be obtained through training and/or recruitment.

4.10.4 The Accountancy

There will be no change in the special place and composition of the accountancy personnel. In addition to the Accountant at IRZ headquarters there will be a "Comptable Délégué" at each station under the supervision of the accountant.

4.11 Investments to regain the good functioning of IRZ

The good functioning of IRZ has been severely affected by lack of a normal budget. Not only are the results of long term research in jeopardy through lack of maintenance on equipment and buildings, and through the deteriorating health of research animals.

To halt this deterioration, to bring the Institute back to a basic level of functioning, and to enable IRZ to improve its geographical coverage, the following measures have to be taken:

- repair/renovation and improvement of buildings and research infrastructure;
- replenishment of breeding stock;
- repair and purchase of vehicles, machinery, equipment and furniture;
- repair and improvement of communications facilities;
- completion of construction projects and establishment of new units;
- installation of joint IRZ/IRA facilities under the NARP.

The estimated investment costs of these measures are summarized in Tables 12a and 12b. The total is 1,342.9 million FCFA. One third of this amount will be needed for repairs and essential improvements (Table 12a), the other two thirds will go mainly to the completion of construction projects, the acquisition of vehicles, machinery and equipment, and the development of the proposed new stations and antennas to service hitherto neglected zones and commodities (Table 12b). Given the fact that IRZ signed a performance contract with the Government on 4th January 1990, it is of the greatest importance that rehabilitation of the Institute be taken in hand and completed as soon as possible. This is all the more so because several stations have deteriorated to the point where a performance contract could not be applied without special transitional provisions.

In spite of the urgency of the above measures, both logistic and budgetary considerations probably dictate that the investments be spread over a period of five years. This is reflected in Tables 12a (footnote 1) and 12b. The investments in year one, 1990/91, cover the bulk of the necessary repairs and improvements (Table 12a), as well as some urgently needed constructions, farm machinery, vehicles and equipment (Table 12b), all at existing stations.

The investments planned for year two, 1991/92, mostly concern IRZ's principal stations (Wakwa, Bambui and Mankon) but also include provision for the improvement of Bertoua, Garoua and Foumban. With the exceptions of Maroua and Bangem, where activities are almost ready to start, all investments in new sites are scheduled for years three, four and five, 1992/93 to 1994/95, except for Mokolo, Banyo and Maiganga which are programmed to be established in the second phase of the performance contract.

4.11.1 Repairs and essential improvements

Due to the lack of proper maintenance in the past, buildings, research infrastructure, breeding herds, vehicles and machinery, equipment and communications facilities have seriously deteriorated. Often damage to one item has caused further damage to other items. For instance, failure of an air conditioner, by not being repaired immediately,

has caused further damage to costly research equipment; lack of dry-season feed has caused depletion of herds.

Necessary repairs include: buildings in Mankon, Bangangte, Bambui, Wakwa, Yagoua, Garoua, Limbe and the Directorate (56.5 million FCFA), roads, fences, water and electricity facilities, deticking dips and other research infrastructure (216.7 million FCFA) as well as the essential renovation of pastures and fish ponds (82.4 million FCFA).

About 54.1 million FCFA are required to replenish the stocks of animals to an acceptable level, as the size of herds has diminished over recent years due to outbreaks of disease and lack of dry season feed. Most purchases will be in genetically important local breeds; their prompt replenishment is important to restrict the damage to the long term prospects of livestock in Cameroon by neglecting research into their preservation.

Repairs are also necessary to the fishing boats at Limbe station (5.3 million FCFA), to vehicles and farm machinery at four stations (1.9 million FCFA), and to equipment and furniture (6.0 million FCFA).

The isolated position of IRZ stations means that a strong communications network is required for effective management. Communications equipment needs to be repaired or renovated at seven stations (10.6 million FCFA).

These investments for repairs and essential improvements total 433.5 million FCFA. Of this total, not less than 389.5 million FCFA should be available during the budget year 1990/91. Investment of the balance of 44.0 million FCFA could be postponed by one year (Table 12a).

4.11.2 Completion of construction projects, purchase of vehicles/ machinery/equipment, and establishment of new units

Lack of funds has halted the construction of several buildings and research infrastructure. Some that were completed have been left without furnishings and equipment. These projects should be completed as they fulfil an important role in the strategic plan of IRZ. They include: completion and equipment of the IRZ office building and the joint IRZ/IRA computer and documentation centre in Bambui; equipment of the virology laboratory in Wakwa; construction of fish ponds at Foumban; extension of water and electricity supplies at Bertoua; completion of staff housing and offices at Garoua, Bertoua and Wakwa.

The introduction of on-farm research and field research (as defined in section 4.3), surveys, and participation in livestock extension projects are all essential parts of IRZ research with its enhanced development focus. Research projects following these approaches are financially demanding. The IRZ budget must inescapably include provision for an investment in vehicles, and the increased running costs must be reflected in the research operating funds.

Table 12 a : Estimated costs of repairs and essential improvements to regain the good functioning of IRZ (millions FCFA)[1]

Category	Nkolbisson	Bertoua	Mankon	Bangangte	Bambui	Foumban	Babungo	Wakwa	Yagoua	Garoua	Directorate	Limbe	Kribi	Total IRZ
Buildings														
Offices				0.1	2.0				2.3	1.5	15.0			20.9
Houses			2.8	0.1	10.0			8.0	1.0	4.5		1.5		27.9
Farm buildings			6.8	0.4					0.5					7.7
Research Infrastructure														
Roads	3.0*	3.0	3.2		15.0	0.4		10.0	0.3	4.0				38.9
Fences	6.5*	10.0	1.8	2.5	14.1	0.2		20.0	3.1	24.0*				82.2
Water supply	1.5*	30.0	3.6	2.0	20.0	0.5		7.0	5.0	3.0		5.0		77.6
Electricity supply		4.0	0.8	4.0		0.2			4.0	5.0				18.0
Pastures	7.3*	11.0			21.0			15.0	3.1	5.0				62.4
Fish ponds						20.0								20.0
Breeding Stock	7.5		19.0*	0.3	20.0*	0.1			6.7*	0.5				54.1
Vehicles and Machinery														
Pickups/cars			0.7	0.1					0.5			0.6		1.9
Trucks/tractors														0.0
Farm machinery														0.0
Boats												5.3		5.3
Equipment and Furniture														
Scientific equipment			4.8						1.0					5.8
Office equip./ furniture			0.2											0.2
Computers														0.0
Communications		1.0		0.1				0.5	1.0	1.0	5.0	2.0		10.6
Total	25.8	59.0	43.7	9.6	102.1	21.4	0.0	60.5	28.5	48.5	20.0	14.4	0.0	433.5

[1] These investments are essential in year one (1990/91) of the financial plan except for the amounts marked with an asterisk (*), of which 44.0 million could be deferred to the second year (1991/92).

Table 12b : Estimated costs[1] of completion of construction projects, purchase of vehicles/machinery/equipment, and establishment of new units[2] (millions FCFA)

Category	Nkolbisson[a]	Bertoua	Ebolowa[c]	Sangmelima[d]	Mankon	Bangangte[a]	Bangem[b]	Bambui[b]	Foumban	Babungo[a]	Wakwa	Yagoua[a]	Garoua	Poli[e]	Directorate[a]	Limbe[a]	Kribi[c]	Douala[d]	Maroua[b]	Total IRZ
Buildings																				
Offices				30.0													30.0			60.0
Houses	8.5	25.0[b]	25.0	25.0								11.0	12.0[b]	25.0	50.0		25.0	50.0	25.0	281.5
Farm buildings	5.0		30.0											5.0						40.0
Research Infrastructure																				
Roads				2.0																2.0
Fences				3.0																3.0
Water supply																				0.0
Electricity supply																				0.0
Pastures				5.0																5.0
Fish ponds									50.0[b]											50.0
Breeding Stock			5.0	2.0																7.0
Vehicles and Machinery																				
Pickups/cars	7.0	7.0[b]	7.0	7.0	7.0[a]		7.0	14.0	7.0[a]	7.0	7.0[a]	7.0	7.0[a]	7.0	7.0	7.0	7.0		7.0	126.0
Trucks/tractors	12.0							30.0			15.0[c]									57.0
Farm machinery	4.0	3.0[c]						10.0			37.0[b]									54.0
Boats/accessor.																3.5				3.5
Equipment and Furniture																				
Scientific equipment			2.0		6.6[b]			50.0			50.0[b]					5.0	1.0			114.6
Office eqp./furniture/computers	2.0	5.0[c]	1.0	1.0	7.0b	0.2		5.0			32.0[a]	3.0	6.0[b]		26.0	2.6	5.0	2.0	2.0	99.8
Books & Journals															4.0					4.0
Communications	2.0																			2.0
Total	40.5	40.0	70.0	75.0	20.6	0.2	7.0	109.0	57.0	7.0	141.0	21.0	25.0	37.0	87.0	18.1	68.0	52.0	34.0	909.4

Investment Schedule:

[a] Year 1 (1990/91)	40.5				7.0	0.2			7.0	7.0	23.0	21.0	7.0		87.0	18.1				217.8
[b] Year 2 (1991/92)		32.0			13.6		7.0	109.0	50.0		103 0		18.0						34.0	366.6
[c] Year 3 (1992/93)		8.0	70.0								15.0						68.0			161.0
[d] Year 4 (1993/94)				75.0														52 0		127.0
[e] Year 5 (1994/95)														37.0						37.0
Total	40.5	40.0	70.0	75.0	20.6	0.2	7.0	109.0	57.0	7.0	141.0	21.0	25.0	37.0	87.0	18.1	68.0	52.0	34.0	909.4

[1] These investments are scheduled for year 1 (a), year 2 (b), year 3 (c), year 4 (d), and year 5 (e) of the financial plan except for those marked with an asterisk (*), of which 50% should be available in year 1, and the other 50% in year 2.

[2] New units are Douala, Ebolowa, Sangmelima, Bangem, Poli, and Maroua.

To improve the efficiency of both research analysis and administration, a joint IRZ/IRA computer centre will be set up under the National Agricultural Research Project. This will consist of a network of microcomputers at the IRA and IRZ headquarters, with accommodation at IRZ for training and advice. Microcomputers will also be installed at the IRZ stations, to facilitate research as well as accounting, budgeting and personnel administration.

A joint IRA/IRZ library and documentation centre is being installed at Nkolbisson. To function effectively it will need to be equipped with up to date books, journal subscriptions, and with microfiche and reprographic equipment.

Construction of offices, houses and farm buildings at eleven sites will require an amount of 381.5 million FCFA. New roads, fences, fish ponds and pastures account for 60.0 million FCFA. Breeding stock for two new sites (Ebolowa and Sangmelima) will cost 7.0 million FCFA. Additional and replacement pick-ups and a truck, tractors, and farm machinery total 240.5 million FCFA. Scientific and office equipment, furniture, computers and communications equipment need a further sum of 220.4 million FCFA.

These investments total 909.4 million FCFA. Of this total, 217.8 million FCFA are project for year one (1990/91), 366.6 million FCFA for year two, 161.0 million FCFA for the third year, 127.0 million FCFA for year four, and 37.0 million FCFA for year five.

4.12 Attaining an acceptable ratio between researchers, technicians and administrative personnel

Due to past recruitment procedures, and a strong centralization of functions and responsibilities, the Institute has become overstaffed and is operating at a low level of efficiency. To achieve an acceptable level of efficiency and productivity the following measures will be taken:

- explicit emphasis on efficiency and output in programming research, with regard to the research objectives set by the Institute and agreed upon by the Government;
- with increased efficiency, immediate reduction in personnel without loss in productivity;
- recruitment of researchers and supporting staff by a technical committee of IRZ, on the basis of reliable information and references, and of meaningful job descriptions;
- decentralization of tasks and responsibilities, and of corresponding authority, notably in the application of disciplinary measures.

The structure of IRZ personnel by category, and corresponding personnel costs, is shown in Table 13. In 1988/89 IRZ employed a total of 840 persons, of whom 615 were technical and 225 were administrative personnel.

Table 13: Proposed number of personnel and corresponding personnel costs [1] (millions FCFA), IRZ 1990/91 - 1994/95, with the preceding years for comparison

	1988/89		1989/90		1990/91		1991/92		1992/93		1993/94		1994/95	
	No.	Costs	No.	Costs	No.	Costs	No.	Costs	No.	Costs	No.	Costs	No.	Costs
Researchers:														
Nationals	91	441.1	76	368.4	80	393.5	82	408.6	84	423.8	86	439.0	88	454.2
Expatriates	11	0.0	11	0.0	10	0.0	10	0.0	10	0.0	10	0.0	10	0.0
Total Researchers	102	441.1	87	368.4	90	393.5	92	408.6	94	423.8	96	439.0	98	454.2
Technicians: [2]														
Category A	46	117.8	42	107.6	46	117.8	47	120.3	48	122.9	49	125.4	50	128.0
Category B	59	113.4	56	107.6	60	113.4	61	115.3	62	117.2	64	121.0	65	122.8
Category C	37	37.1	34	34.0	38	37.6	39	38.6	40	39.6	41	40.6	42	41.6
Total Technicians	142	268.3	132	249.2	144	268.8	147	274.6	150	279.7	154	287.0	157	292.4
Labourers:														
Category D	371	195.6	357	188.2	360	189.7	368	193.9	376	198.2	384	202.4	392	206.6
Administrators: [2]														
Category A	19	56.6	12	35.8	12	35.8	12	35.8	12	35.8	12	35.8	12	35.8
Category B	36	69.1	31	53.5	32	55.2	33	57.0	34	58.7	35	60.4	35	60.4
Category C	34	38.4	45	50.8	45	50.8	46	51.9	47	53.0	48	54.1	49	55.3
Category D	136	79.7	51	27.8	52	28.3	53	28.9	54	29.4	55	30.0	56	30.5
Total Admin.	225	243.8	139	167.9	141	170.1	144	173.6	147	176.9	150	180.3	152	182.0
Total Personnel (Nationals & Expatriates)	840	1,148.8	715	973.7	735	1,022.1	751	1,050.3	767	1,078.6	784	1,108.7	799	1,135.2
Ratio Researchers/ Technicians	1:1.4		1:1.5		1:1.6		1:1.6		1:1.6		1:1.6		1:1.6	
Ratio Researchers/ All supporting staff	1:7.2		1:7.2		1:7.2		1:7.2		1:7.2		1:7.2		1:7.2	
Percentage of administrators to all personnel	26.8%		19.4%		19.2%		19.2%		19.2%		19.1%		19.0%	

1 Costs assume no increase in salaries or other personnel costs over the time period, except for the provisions of section 4.14 pertaining to researchers. The supporting personnel costs include those currently paid by MINFI, and include all costs attributed to personnel (CNPS, duty allowance, advancements, etc).

2 Cat. A also cat. 10 - 12, cat. B also cat. 7 - 9, cat. C also cat. 5 - 6, cat. D also cat. 1 - 4.

An initial reduction in most categories is planned for 1989/90, aimed at substantially improving the ratio between different personnel categories, reducing costs, and enhancing efficiency. In the five year period 1990/91 to 1994/95 there will be a small and gradual increase in some personnel categories, to strengthen existing units and staff new ones. In 1994/95 the total personnel will still be 5% below the 1988/89 level.

IRZ wishes to reduce the number of researchers immediately from 102 to 87 during 1989/90. This reduction will concern persons holding researcher positions but who are not specialized in research fields needed by IRZ and would be more suited to technical field work. This immediate reduction of researchers is pertinent to the requirements of the performance contract.

The small increase in numbers of researchers over the subsequent five years will mainly be in areas of research where IRZ is still lacking specialized expertise, such as reproductive physiology, apiculture, animal health, and aquaculture, and in areas such as biometrics, where additional expertise will help improve the overall effectiveness of the research programmes.

The number of technicians, 142 in 1988/89, will decrease to 132 during 1989/90, for reasons of inadaptation to IRZ's future requirements similar to those stated for the decrease in researchers. In 1990/91, their number should increase to improve the ratio of researchers to technicians from the present 1:1.4 to a recommended ratio of 1:1.6. This ratio will be maintained throughout the five year period beyond which it might rise to 1:1.7. The number of technicians should reach 157 in 1994/95.

The total number of labourers in IRZ will increase slightly: from 371 in 1988/89 to 392 in 1994/95. This category of personnel comprises all those who perform a variety of subordinate non-administrative jobs in the IRZ units, including livestock attendants, herdsmen, nightwatchmen, and tractor and truck drivers. A reallocation of duties will take place during the restructuring. A number of these personnel will be redeployed in the proposed new units.

The number of administrative personnel (all categories) employed by IRZ in 1988/89 was 225. This represented 26.8% of the total 1988/89 workforce, a figure far too high for any research institution. IRZ wishes to effect an initial reduction of 86 persons in this category during 1989/90, as shown in Table 13, to attain a new total of 139. This number represents the minimum complement of administrative personnel needed to administer IRZ after reorganization. It will amount to 19.4% of the total workforce. The proposed reduction will diminish the costs of administrative personnel by approximately 76 million FCFA. A slight increase in the administrative personnel to 152 by 1994/95 is projected, however, in subsequent years, contingent upon the opening up of the proposed new units. With enhanced efficiency over time, partly linked to computerization of certain administrative routines in the IRZ centres, the percentage of administrators to total IRZ personnel will decrease to 19.0% by 1994/95, but is expected to eventually stabilize at 17%.

Several methods will be employed to achieve the intended initial reduction in personnel:

- Retirement; but this is unlikely to account for many departures at IRZ, due to the low average age of its employees.

- Transfer of personnel back to their ministries of origin or other ministries. In some instances this option will be chosen as it will allow the people concerned to use their talents to greater effect than in their present environment. It is assumed that 5% of personnel (6 out of 136: Table 14) will be transferred to their ministry of origin.

- Termination of contracts, for staff on contract to IRZ. This solution, inevitable in many cases, will lead to severance costs being incurred. Table 14 gives the estimates of the lay-off costs associated with the proposed changes in personnel; these costs total approximately 95 million FCFA. The estimates are based on an employee with a wife and three children, an average of 10 years of service, and the mean salary in the various personnel categories.

Table 14: Estimated costs of redundancies (x 1000 FCFA) 1989/90

	No. of transfers[1] (a)	No. of redundancies (b)	Unit Cost[2] (c)	Total Costs (d)
Researchers	2	13	2,150	27,950
Technicians [3]:				
Category A	1	3	2,066	6,198
Category B	1	2	1,273	2,546
Category C	0	3	566	1,698
Total Technicians	2	8		10,442
Labourers:				
Category D	0	14	394	5,516
Administrative [3] personnel:				
Category A	1	6	2,066	12,396
Category B	1	4	1,273	5,092
Category C [4]	0	0	0	0
Category D	0	85	394	33,490
Total Admin.pers.	2	95		50,978
Total all categories	6	130		94,886

1 It is assumed that 5% of total personnel reduction (i.e. the total of column (a) expressed as a percentage of the sum of (a) and (b), or 6 out of 136), will be taken up by transfer to the ministry of origin.

2 The unit cost in each category is based on an average of 10 years of service, using the mean annual salary in that category, for an employee with a wife and three children travelling 300 km back to their village.

3 Category A = 10 -12; Category B = 7 - 9; Category C = 5 - 6; Category D = 1 - 4.

4 This table, which deals with transfers and redundancies, does not of course show the 16 additional administrative personnel needed in Category C (see Table 13).

4.13 Strengthening human resource development by implementing a comprehensive training programme

Training will be a very important component of the new personnel strategy. This is especially so because:

- a large number of researchers at IRZ lack adequate research experience and will require further training;
- there is a shortage of researchers in several specialized fields, such as animal health and genetic resources, or who are specialized in the study and husbandry practice of certain animals: pigs, rabbits, bees, horses, and aquaculture;
- the number of specialized technicians at IRZ is inadequate;
- there is a need to train administrative staff so that their skills can be upgraded to more advanced administrative systems.

In order to raise the research competence and experience of young researchers in IRZ, training emphasis will be placed on doctorate programmes. This is justified, as the basis of any doctorate training is the execution of a very substantial research project. But contrary to past training courses, most of these programmes will be carried out on a 'sandwich' basis. This involves an arrangement whereby the research is carried out at IRZ, while the preparation, part of the data analysis, any necessary course work, and the writing up of the thesis will take place at the university of registration, either within Cameroon (Dschang) or abroad (Africa, Europe or USA).

This will ensure that the researchers carry out their research on a topic relevant to Cameroon's needs, while at the same time enabling them to receive expert advice on research protocols and research methods to international standards.

Tables 15a, 15b and 15c summarize the proposed training programme of IRZ for 1989/90 to 1994/95. This programme must be viewed against the numbers of researchers shown at the top of Table 15a. There are three training components: long term training, mostly abroad (Table 15a); short term (1 to 6 months) training abroad (Table 15b); and local courses of one week duration (Table 15c). The last two types of training are also pertinent to technicians and administrative personnel.

Table 15a: Plan of higher degree training of IRZ researchers

	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	Total
Cameroonian researchers [1]	91	76	80	82	84	86	88	
Of whom:								
Starting M.Sc./DEA [2]	2	4	2	2	1	1	1	13
Finishing M.Sc./DEA	4	3	3	1	2	2	1	16
Starting Doctorate [3]	2	8	4	3	2	1	1	21
Finishing Doctorate	1	3	3	4	8	4	3	26
In M.Sc./DEA training	3	4	3	4	3	2	2	
In Doctorate training	10	15	16	15	9	6	4	
Total in training at end of year	13	19	19	19	12	8	6	
Of whom:								
Funded by IRZ:								
Number	-	8	14	17	9	6	4	
Cost (million FCFA)	-	32.8	41.4	69.3	33.0	22.3	15.7	
Funded from grants:								
Number	-	11	5	2	3	2	2	
Cost (million FCFA)	-	65.0	25.3	10.6	15.9	10.6	10.6	

1 See Table 13.
2 Duration and average cost: DEA 1 year, 5.3 million FCFA; M.Sc. 2 years, 5.3 million per year.
3 Most doctorate training follows a 'sandwich' formula whereby the research is carried out in Cameroon. Average assumptions:
- duration 3 years; start year 1 with 3 months university residence followed by return to IRZ to carry out research project; 14 day visit of supervisor in second half of year 1 and similar visit towards end of year 2; return to university residence for last 9 months of year 3.
- average cost: 1st year 4.1 million FCFA, 2nd year 1.6 million FCFA, 3rd year 5.0 million FCFA.

For full time residential doctorate programmes: duration 3 years, costs 7.0 million FCFA per year including research costs.

Table 15a indicates that over the seven year period 1988/89 to 1994/95, a number of 16 IRZ staff will have finished a M.Sc. or a DEA, and that 26 will have acquired a doctorate to bring the total Cameroonian staff with a doctorate to about the desirable 50%.

Over the same period, 63 researchers and technicians, and 20 administrative personnel (Table 15b) will have had an opportunity to participate in job related short term training courses abroad.

Table 15b: Short term individual non-diploma training (1 - 6 months) [1]

	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	Total
Researchers	2	4	4	4	4	4	22
Technicians	6	7	7	7	7	7	41
Admin. personnel	4	4	4	3	3	2	20
Total	12	15	15	14	14	13	83
Of whom:							
Funded by IRZ:							
Researchers	1	2	2	2	2	2	11
Technicians	4	4	4	4	4	4	24
Admin. personnel	4	4	4	3	3	2	20
Cost (million FCFA)	21.3	23.8	23.8	21.2	21.2	18.6	
Funded from grants:							
Researchers	1	2	2	2	2	2	11
Technicians	2	3	3	3	3	3	17
Admin. personnel	0	0	0	0	0	0	0
Cost (million FCFA)	6.7	11.3	11.3	11.3	11.3	11.3	

1 Assumptions: average duration 3 months for researchers and technicians, 2 months for administrative personnel; training mostly abroad (Africa and overseas), some at national institutions; budget figures based on training abroad; average cost per researcher 2.5 million FCFA, per technician 2.1 million FCFA, for administrative personnel 2.6 million FCFA. Differences in unit costs mostly related to differences in tuition/practical/research costs.

Table 15c shows IRZ's plan for intensive 2 - 6 day in-service training workshops and courses. They will cover a variety of subjects of intimate concern to research managers, researchers and administrators for the execution of their tasks, in topics such as computing, biometrics, research planning and priority setting, and various aspects of efficient job performance.

In order to give IRZ's researchers the opportunity to gain experience in presenting papers at conferences and at the same time to present IRZ's research results to the public the Institute will organize a national conference each year. An African regional conference to be held in Cameroon is planned for 1993/94. Its aim being to exchange research experiences and coordinate common research interests. It is also intended that at least four researchers per year will be given the opportunity to participate in international conferences. The costs involved for these conferences funded by IRZ as well as by donors are shown in Table 15d.

In view of budgetary constraints the Institute will investigate all possible sources of external funding to provide this training. Many international and bilateral assistance organizations, such as CIRAD and FAC, ILCA, the British Council and ODA, USAID, GTZ and DSE, IFS, IDRC (Canada) and the Rockefeller Foundation are being

approached with the training proposals of IRZ, and most of these have already supported training of IRZ staff.

Table 15e gives estimates of the training costs to be met from the IRZ budget and the expected contribution from donors over the period 1989/90 to 1994/95.

Table 15c: In service training workshops and courses held at IRZ (in person days)

	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	Total
For researchers:							
Programme-related workshops [1,3]	160	160	160	160	160	160	960
Cross-programme workshops [1,4]	148	148	148	148	148	148	888
Biometrics workshops [1,5]	180	180	180	180	180	180	1080
Sub-total [1]	488	488	488	488	488	488	2928
Funded by IRZ [2]	6.1	6.1	6.1	6.1	6.1	6.1	
Funded from grants [2]	6.2	6.2	6.2	6.2	6.2	6.2	
Sub-total [2]	12.3	12.3	12.3	12.3	12.3	12.3	
For technicians:							
Skills training courses [1,6]	90	90	90	90	90	90	540
All costs funded by IRZ[2]	1.1	1.1	1.1	1.1	1.1	1.1	
For admin. personnel:							
Computing courses [1,7]	270	270	270	270	270	270	1620
All costs funded by IRZ[2]	3.4	3.4	3.4	3.4	3.4	3.4	
Total costs [2]	16.8	16.8	16.8	16.8	16.8	16.8	

1 Numbers expressed in person-days (meaning the sum of all the days each person spends on this training; for example, a course of 6 days for 21 persons totals 126 person-days).

2 In millions FCFA.

3 Each workshop is concerned with one of the thirteen IRZ research programmes. Over the six year period, each programme will conduct one such workshop (twelve days), intended for all researchers in the programme.

4 These workshops, one per year for five days, address topics of basic common interest such as farmer/extension/research linkages, livestock economics, research priority setting. Each researcher will, on average, be able to attend such a workshop once every 3 years.

5 Assumed are 2 five-day biometrics courses per year each for 15 researchers.

6 This training is especially for laboratory technicians and will be tailored to their specific job requirements. Assumed is 1 five-day course per year for 15 participants.

7 The strong emphasis on computer training reflects the importance IRZ attaches to gradual computerisation of many of its administrative and financial operations in order to increase efficiency and to reduce administration costs. Assumed are 3 five-day courses per year (1 database, 1 spreadsheet, 1 wordprocessing), each for 15 participants.

Table 15d: Costs of conferences and participation therein (millions FCFA)

	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95
National conferences [1]						
All costs funded by IRZ	2.5	2.5	2.5	2.5	2.5	2.5
Regional conference [2]						
All costs funded by donors	-	-	-	-	12.9	-
Participation in international conferences [3]						
All costs funded by IRZ	4.6	4.6	4.6	4.6	4.6	4.6
Total costs	7.1	7.1	7.1	7.1	20.0	7.1

1 One per year, 3 days, at IRZ, 20 researchers participating, together with staff of IRA and CUDS, officers of MINEPIA, MINAGRI, MESIRES, MINPAT and development missions, and donor representatives. The purpose of these conferences is to present IRZ research results to the public. A highlights brochure will be published.

2 To be held in Yaoundé in 1993/94, 5 days, 15 participants from Cameroon, 20 from other African countries. This conference is intended to exchange research experiences and to coordinate common research interests.

3 Four IRZ researchers per year.

Table 15e: Summary of training and conference costs (millions FCFA)

	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95
IRZ funded:						
Table 15a	32.8	41.4	69.3	33.0	22.3	15.7
Table 15b	21.3	23.8	23.8	21.2	21.2	18.8
Table 15c	10.6	10.6	10.6	10.6	10.6	10.6
Table 15d	7.1	7.1	7.1	7.1	7.1	7.1
Sub-total	71.8	82.9	110.8	71.9	61.2	52.2
Grant funded:						
Table 15a	65.0	25.3	10.6	15.9	10.6	10.6
Table 15b	6.7	11.3	11.3	11.3	11.3	11.3
Table 15c	6.2	6.2	6.2	6.2	6.2	6.2
Table 15d	-	-	-	-	12.9	-
Sub-total	77.9	42.8	28.1	33.4	41.0	28.1
Total	149.7	125.7	138.9	105.3	102.2	80.3

4.14 Enhancing the productivity of IRZ's personnel

A permanent system for closely supervising, monitoring and evaluating the researchers will be implemented. This will ensure an improvement in productivity, provided the Institute is given the autonomy it needs for an effective personnel policy.

For greater effectiveness and productivity in research, promotion in the grade of researchers will be carried out according to criteria to be developed in the course of the restructuting procedure. Exceptional promotion can be granted to outstanding researchers who have shown exceptional ability in research through important scientific discoveries or outstanding practical innovations. This could take the form of advancement in incremental promotion or promotion to the grade immediately above the researchers present grade.

The rules of discipline applicable to IRZ personnel will be enforced according to the change in status of the Institute which will be governed in future by a Board of Administrators. It is proposed that these rules be enforced by a Disciplinary Council at the level of the Board of Administrators. The Disciplinary Council will meet upon the recommendation of the Director of IRZ, so that disciplinary action can be taken immediately if the need arises. Under present conditions, it can take several years before any disciplinary action is taken, so that an offender can meanwhile continue at his post without any sanction, often affecting the efficiency of the personnel around him.

4.15 Strengthening service functions

The following service functions will be undertaken by IRZ:

- quality control of imported and locally produced animal feeds at Mankon;
- quality control of locally produced and imported dairy products at Bambui;
- quality control of meat products at Mankon;
- pathological analysis for disease diagnosis at Bambui and Wakwa.

The only laboratory in IRZ for feed analysis of local or imported animal feeds is situated at Mankon station. Dry matter and feed analyses are carried out as a service for feed compounders and livestock farmers. The numbers of analyses performed at Mankon during the last six years are listed in Table 16a. The table shows that during 1988/89 feed analysis has almost come to a halt. This drastic drop in feed analyses is partly due to a declining demand caused by financial problems on the clients side, but mainly due to the lack of operating funds for the laboratory which hampers the purchase of chemicals and other supplies. As can be seen from the estimated costs and revenues of this service for 1989/90 in Table 16b, feed analysis is charged to the clients at a price which on average gives a very small profit if only direct operating costs are taken into account.

However, if salary costs are included, this service operates at a deficit of more than 1.9 million FCFA. Against the obvious burden to IRZ must be set the importance of having this type of service provided within Cameroon. Relying on services overseas is not an attractive proposition in the long term and constitutes a loss of foreign exchange. To improve the economics of this service, IRZ will do a proper cost/benefit analysis and will in future include the labour costs in the price charged to feed compounders

and institutions, although it will endeavour to keep the costs to farmers for simple feed analyses (dry matter, crude protein, energy) to a minimum.

The Bambui dairy technology laboratory has provided quality control of milk to farmers of the Bamenda Dairy Cooperative Society on a small scale and free of charge. Individual tests for the chemical composition and the microbiological quality of the milk are carried out and the results are made available in monthly statements to the farmers. A practical quality test of milk, which can be provided at a reasonable cost to individual farmers is currently being introduced. Services for the quality control of meat products are planned at Mankon but have not yet become operational. To meet the demand for these services in Mankon and Bambui, investments in laboratory equipment and chemicals are necessary, included in Table 12b.

It is important to add that IRZ has requested the Ministry of Commerce and Industry to designate IRZ as official agent for the quality control analysis of milk and the issuing of certificates for the whole country.

The pathological analysis for disease diagnosis at the new virology laboratory in Wakwa will commence once this laboratory has been fully equipped. Although disease diagnosis for research purposes is currently taking place in the existing animal health laboratories at Wakwa and Bambui, services to third parties are not yet provided due to lack of funds. For these services to become operational the following actions need to be taken:

- equipment of the Wakwa laboratory;
- purchase of chemicals and expendable laboratory equipment for Bambui and Wakwa;
- publicity of these facilities to the extension services and farmers.

It should be noted that for all the services other than the feed analysis laboratory at Mankon very little information is available on unit costs and likely demand, and hence on costs and revenues that may be expected. IRZ is planning an economic feasibility study in the course of 1990.

Table 16a: Number of feed analyses performed each year at Mankon station, 1983/84 - 1988/89

1983/84	1984/85	1985/86	1986/87	1987/88	1988/89
791	691	876	631	236	109

Table 16b: Estimated costs and revenues in FCFA from the feed analysis laboratory Mankon, 1989/90

Type of analysis	Number of samples	Expected Total costs	Expected Total revenues	Expected Net profit
Proximate	300	1,935,000	2,001,000	66,000
Amino acid	50	880,000	850,000	(30,000)[1]
Micro minerals	100	110,000	200,000	90,000
Biochemistry	100	100,000	100,000	0
Total direct costs		3,025,000	3,151,000	126,000
Salary costs		2,040,000		
Total cost to IRZ		5,065,000	3,151,000	(1,914,000)

[1] Brackets indicate negative values.

4.16 Generating revenue from the sale of produce

By conducting research with farm animals, one always generates animal produce from which revenue can be derived. The main sources of revenue are from dairy cattle (sale of milk), poultry (eggs and meat), small ruminants, pigs and rabbits (meat). One reason why the revenues from small animals are attractive is the short reproduction interval of all these animals. A second reason lies in the fact that the research carried out with these animals mostly involves large numbers and covers relatively short periods of time. In contrast, revenues from the meat of beef cattle are irregular and relatively small as most research on these animals is long term, with results being achieved only after 10 or 15 years.

It must also be pointed out that certain research manipulations, especially those with regard to animal health research, do not allow the consumption of carcasses or any part of them by humans. This inevitably lowers the total value of marketable products considerably.

Furthermore, the types of research activities and corresponding rate of turnover of animals at the IRZ stations vary considerably. Some units produce very few saleable products from research activities. The main stations producing revenue are Mankon, Wakwa, Nkolbisson, and Bambui.

Finally, it must be made clear that, in general, research units are not suitable for producing milk, eggs or meat economically; their sale of produce is only a sideline from the output of research. Reasons lie both in the structure of IRZ personnel and in Governmental regulations. Firstly, a research unit contains many graduates, researchers and technicians, with relatively high salaries, compared with a commercial production unit. Secondly, due to unworkable Governmental regulations, the units have no power to discipline workers who do not perform their work correctly and by doing so cause loss of production.

Table 17: **Evolution of revenues from sales of produce from research and production units, 1982/83 - 1988/89 (x 1000 FCFA)**

Financial year	Research Operating Budget [1] Approved (1)	Received (2)	Revenues Predicted (3)	Realised (4)	(4) as a % of (2)
1982/83	145,135	119,135	20,000	25,000	21%
1983/84	220,455	193,455	24,000	17,921	9%
1984/85	284,120	220,120	27,000	36,059	16%
1985/86	306,639	245,639	50,000	34,155	14%
1986/87	300,372	243,000	101,000	39,107	16%
1987/88	243,000	0[2]	96,000	42,664	-
1988/89	150,000	0[2]	115,000	52,648	-
Total	1,649,721	1,021,349	433,000	247,554	24%

[1] See Table 20.

[2] Some money was borrowed in these years for the initial capital necessary to raise revenues.

As can be seen from Table 17, IRZ's total revenue over the period 1982/83 - 1988/89 has amounted to about 24% of the total annual research operating funds received over the same period. This percentage however is artificially high. On the one hand, IRZ has not received any research budget in the last two years. On the other hand, as a result of this, research activities were sharply reduced in these years, while at the same time the Institute has generated additional revenues by intensifying production. This diversion of effort from research to revenue generation does not, of course, correspond to the principal mission of a research institution, which is to support development with new technology.

Taking all these aspects into account, a realistic figure of revenues in relation to the research operating budget in the long term will be about 15%.

To achieve this level of revenue from the produce of research on a regular basis, the following actions will be taken:

- completion of work on infrastructures still outstanding, to make it possible to provide better herd management; the associated investment costs are included in Tables 12a and 12b;
- where possible without violating the research mandate of IRZ and the outcome of the planned priority setting exercise, to emphasize research programmes with higher revenues.

At stations where facilities and infrastructure exist in excess to those required to serve a full research programme, IRZ will conduct feasibility studies into setting up production operations. Two experimental production units already exist at Mankon station, for the production of pigs and poultry. Tables 18a and 18b give their estimated costs and revenues over the next five years. Past revenues are included in the figures of Table 17.

The expected net profit for the pig unit is about 2.5 million FCFA in 1989/90. Due to an estimated increase in production costs this profit will fall to 1.4 million FCFA in 1993/94. This represents a return of only 4.2% of investment in that year (Table 18a).

The net profit of the poultry production unit is about 13.9 million FCFA in 1989/90 (a favourable 39.7% of production costs), but this will also fall during the next four years due to increased production costs, especially those of feeds which account for 70 - 80% of the total costs. Thus, in 1993/94 net profits are estimated at 8.9 million FCFA, which represents 17.6% of total production costs. One also has to keep in mind that for the infrastructure only maintenance costs are included in these calculations. The basic structures were originally built for research a long time ago and would eventually need to be replaced.

In conclusion, the anticipated returns on investment of the pig production unit are acceptable in 1989/90 but are likely to become less attractive over time, if indeed the increase in selling price lags behind the increase in costs. The returns on investment in the poultry unit are attractive in 1989/90 and will still be quite acceptable by 1993/94, even if the expected increase in production costs far outstrips the increase in the selling price. IRZ will monitor the evolution of costs and benefits, partly to review the profitability of the undertakings, partly to follow price trends of inputs and products.

Table 18a: Estimated costs and revenues at the Mankon pig production unit, 1989/90 - 1993/94 (x 1000 FCFA) [1]

	1989/90	1990/91	1991/92	1992/93	1993/94
Costs [2]					
Feed[3]: piglets	13,650	16,216	19,040	22,144	25,560
sows & boars	2,146	2,530	2,951	3,415	3,926
Drugs[4]: piglets	195	231	272	316	365
sows & boars	17	20	23	27	31
Other costs (maintenance, equipment, water)	1,000	1,100	1,210	1,331	1,464
Personnel:					
1/3 researchers	1,350	1,350	1,350	1,350	1,493
3 attendants	1,050	1,050	1,050	1,050	1,050
Total costs	19,408	22,497	25,896	29,633	33,746
Revenues [5]					
Number of pigs sold[1]	325	351	377	403	429
Unit price (assuming 90kg per pig)	67.5	70.9	74.4	78.1	82.0
Total revenues	21,938	24,886	28,049	31,474	35,178
Net profit	2,530	2,389	2,153	1,841	1,432
As % of cost	13.0	10.6	8.3	6.2	4.2

1 1989/90 estimates based on 3 boars, 25 sows, each sow weaning on average 13 piglets per annum. In subsequent years 2 sows are added each year thus gaining 26 more piglets per year. Present infrastructure regarded as sunk costs, no provision made for replacement.

2 10% is added each year to the costs of feeds and drugs, labour costs are kept constant.

3 Feed: 300kg to bring 1 piglet to market weight; 550kg for each boar and sow per year; cost of feed 140 FCFA/kg.

4 Drugs: for each animal 600 FCFA a year are spent on drugs.

5 5% is added each year to the unit selling price.

Table 18b: Estimated costs and revenues at the Mankon poultry production unit, 1989/90 - 1993/94 [1]

	1989/90	1990/91	1991/92	1992/93	1993/94
Costs (x 1000 FCFA) [2]					
Feed: ISA layers	8,713	9,585	10,543	11,597	12,757
vedette layers	8,868	9,754	10,730	11,803	12,983
broilers	10,483	11,532	12,685	13,953	15,348
Processing of broilers	1,440	1,584	1,742	1,917	2,108
Drugs	1,666	1,833	2,016	2,217	2,439
Electricity	834	917	1,009	1,110	1,221
Other costs (maintenance, equipment, water)	1,000	1,100	1,210	1,331	1,464
Personnel:					
1/3 researcher	1,350	1,350	1,350	1,350	1,350
2 attendants	720	720	720	720	720
Total costs	35,074	38,375	42,005	45,998	50,390
Revenues (FCFA) [3]					
No. of ISA layers	1,600	1,600	1,600	1,600	1,600
Unit price	1,500	1,575	1,650	1,740	1,820
Total revenue	2,400,000	2,520,000	2,640,000	2,784,000	2,912,000
No. of vedette layers	1,600	1,600	1,600	1,600	1,600
Unit price	2,000	2,100	2,205	2,315	2,430
Total revenue	3,200,000	3,360,000	3,528,000	3,704,000	3,888,000
No. of D.O.C. layers	77,300	77,300	77,300	77,300	77,300
Unit price	170	180	187	197	206
Total revenue	13,141,000	13,914,000	14,455,100	15,228,100	15,923,800
No. of D.O.C.	28,200	28,200	28,200	28,200	28,200
Unit price	50	53	55	57	60
Total revenue	1,410,000	1,494,600	1,551,000	1,607,400	1,692,000
No. processed birds	18,700	18,700	18,700	18,700	18,700
Unit price	1,120	1,170	1,230	1,290	1,355
Total revenue	20,944,000	21,879,000	23,001,000	24,123,000	25,338,500
No. processed legs & heads	2,020	2,020	2,020	2,020	2,020
Unit price	250	260	275	290	305
Total revenue	505,000	525,200	555,500	585,800	616,100
No. table eggs	247,000	247,000	247,000	247,000	247,000
Unit price	30	32	33	35	36
Total revenue	7,410,000	7,904,000	8,151,000	8,645,000	8,892,000
Total revenues (FCFA)	49,010,000	51,596,800	53,881,600	56,677,300	59,262,400
Net profit	13,936,000	13,221,800	11,876,600	10,679,300	8,872,400
As % of cost	39.7%	34.4%	28.3%	23.2%	17.6%

1 1989/90 estimates based on 1600 ISA layers producing 235,200 eggs a year, and 1600 vedette layers producing 211,680 eggs a year.

2 10% is added each year to all production costs, except labour which is kept constant.

3 5% is added each year to the unit selling price.

5. PROPOSED BUDGETING SYSTEM AND BUDGETS

5.1 Budgeting procedures

One of the goals of the present restructuring process of IRZ is to recommend a budgeting system for its research which is acceptable to and will be supported by the Government on a long term basis.

It is proposed that the overall IRZ budget will consist of two distinct parts:

1. the core budget;
2. the special project budget.

The core budget is the budget which strictly reflects the principles of the rehabilitation plan and ensures that the Institute can effectively address the essence of its mandate. Defining the research programme within this mandate, keeping in mind the broad (macro level) national and regional priorities set out in Table 4, includes a planning exercise on the lines of Table 3, and a priority setting exercise which ranks both current and contemplated research activities on the basis of estimations of a set of benefit and cost components. The core budget must be financed 100% by the Government.

However, in the context of this research programme formulation activity, there will be certain research operations that are relevant to priority subjects but which might not be financed from the Government budget due to overall budget limitations. This could happen for instance with research in important complementary fields which might yield practical breakthroughs in the longer term but not necessarily in the short run. Notably, some lines of research suggested by international research institutions or foreign advisers could be found to be important to the country's long term economic, social, or environmental improvement. For these research programmes, IRZ will create a special project budget.

Such research activities, which must always meet the criteria of relevance to national, zonal or provincial development interests, will be partly paid for by from external funds. To stimulate the relationship between IRZ and its clientele, it also seems possible to encourage private companies or farmers organizations to assist in funding specific research projects.

While IRZ will continue to try generating supplementary funds for research from the sale of produce and services, it must be recognized that the possibilities are limited and that revenue generation should not be at the expense of the Institute's primary mission, research. Consequently, there is no substitute for an agreed, stable and assured basic Government subvention for a core programme.

Budgets will be prepared by programmes and operations, as before, but researchers will be required to pay more conscientious attention to the resource implications of their research proposals. Furthermore, budget control procedures at the headquarters level will be tightened with the proposed new structure of the IRZ Directorate. Unit costs will be determined to guide the budgeting process in the stations.

5.2 Budget evolution, shortfall and resulting debts from 1982/83 to 1988/89

IRZ has relied almost totally on the budget given by the Government to finance its research. This includes the operating costs of its stations and the cost of its research programmes.

Over the last four years, due to disbursements by Government well below the approved budgets, IRZ has found it increasingly difficult to remain fully operational. In section 4.11 reference has already been made to the deterioration of buildings, grounds and equipment, and to the fact that research has been severely impaired. The situation becomes quite clear when one looks at the evolution of, and shortfalls in, both the investment budget (Table 19) and the research operating budget (Table 20).

Table 19: Investment budget evolution, shortfall and debt (x 1000 FCFA)

Financial year[1]	Approved investment budget	Amount received or engaged [2] by MINFI	Amount actually disbursed by MINFI	Amount unpaid by MINFI[3]
1982/83	1,463,000	600,000	600,000	0
1983/84	1,759,000	977,000	977,000	0
1984/85	1,353,000	1,041,000	1,041,000	0
1985/86	1,824,325	1,215,394	1,130,884	84,510
1986/87	950,000	650,378	79,940	570,438
1987/88 [4]	300,000	42,614	2,137	40,477
1988/89 [4]	300,000	33,335	11,385	21,950
Total	7,949,325	4,559,721	3,842,346	717,375

1 The approved budget for 1989/90 totals 500 million FCFA including 250 million FCFA for research operating costs.

2 This column represents the amounts physically transferred to IRZ plus those which IRZ was given specific authority to spend by MINFI and for which MINFI would effect payments directly.

3 In 1989/90, IRZ has paid 35.5 million FCFA out of World Bank loan funds to reduce these debts.

4 In these years, as well as 1989/90, the research operating funds were included in the investment budget.

Table 20: Research operating budget evolution and shortfall (x 1000 FCFA)

Financial year[1]	Approved research operating budget [2]	Amount received [2]	Amount spent	Amount withheld by MINFI
1982/83	145,135	119,135	119,135	26,000
1983/84	220,455	193,455	193,455	27,000
1984/85	284,120	220,120	220,120	64,000
1985/86	306,639	245,639	245,639	62,000
1986/87	300,372	243,000	243,000	57,372
1987/88 [3]	243,000	0	0	243,000
1988/89 [3]	150,000	0	0	150,000
Total	1,649,721	1,021,349	1,021,349	629,372

1 The approved research operating budget for 1989/90 is 250 million FCFA.
2 See Table 17.
3 In these years, as well as 1989/90, the research operating funds were included in the investment budget.

The sharp reductions in the approved investment budget since 1986/87 and, worse, the serious non-disbursement of approved amounts (Table 19), coupled with the fact that for the last two years IRZ has not received any research operating budget at all, despite approved amounts totalling 393 million FCFA (Table 20), has caused IRZ to run up debts totalling 717,375,000 FCFA against the investment budget since 1985/86. These are the only debts incurred by IRZ and all of them are to local constructors and suppliers for work carried out and equipment purchased under officially authorized and signed contracts.

It must be emphasized that the Directorate of IRZ at no time exceeded its approved budget in any fiscal year.

The nature of these debts must classify them as immediate debts. For a normal functioning of IRZ the debts have to be brought down to zero as soon as possible, since local contractors and suppliers have stopped dealing with the Institute.

Revenues from sales have been used towards supporting operating costs. In 1988/89 they amounted to a total of 52,648,000 FCFA as shown in Table 17.

Funds from external sources for operating expenses in 1987/88 amounted to 10 million FCFA. This money came from international organizations (IDRC, IFS, FAO, and ILCA). If one considers these external operating funds as constituting the special project budget, referred to above, it is clear that this budget is very limited at present, particularly in comparison with the core budget. It is also important to note that these external grants were, and are likely to remain, for very specific projects, usually of short duration.

5.3 Proposed budget

The projected overall budgets of IRZ for the next five years, 1990/91 to 1994/95, are presented in the budget summary of Table 22. For comparison, the last three approved budgets, for 1987/88 to 1989/90, are also shown.

The proposed budgets are based on the estimated costs of the proposals discussed in the previous sections with regard to costs of personnel (Table 13), administration, training (Tables 15a, 15b, 15c, 15d and 15e), research operations, repairs/renovations (Table 12a), and investments (Table 12b).

Dealing with financial restructuring and budgets, it is proposed to include the budget category for research programme costs in the recurrent budget ("budget de fonctionnement"), and no longer in the investment budget as has been the case. This recommendation is related to the disbursement procedures necessary for a normal functioning of livestock research. The fact is that these require cash rather than credit transactions, because 80% of the research expenditures on non-ruminants and 70% on ruminants in any given research programme are for animal feeds. These must be procured at frequent intervals and with cash, not on a credit basis as is inevitably the case with funds in the investment budget. Furthermore, the more flexible availability of research funds through their inclusion in the recurrent budget will even help to cut the total costs of animal research, since it makes it possible to buy feeds at moments when they are less costly, by reacting promptly to price changes in the market. The presentation of Table 22 reflects this, even if for the years 1987/88 to 1989/90 this was not the case.

The estimates of personnel costs are explained in section 4.12, they include the costs currently paid by MINFI.

Maintenance has been a serious problem for IRZ over the last few years. The amount of 5 million FCFA approved under this heading for 1989/90 (though augmented by the World Bank loan to 50.2 million FCFA) clearly is more or less symbolic for an institute whose assets have a replacement value in excess of 7000 million FCFA. These low allocations were understandable in light of severe budget restrictions and because no soundly justified estimates were ever presented by the various research units. However, they are inconsistent with one of the basic premises of the national restructuring plan, which is to ensure adequate maintenance of the country's existing assets. IRZ has now started a complete inventory of all its property. Provisional estimates of its assets are shown in Table 21, together with provisions that must be made annually for maintenance insurance and repair. The second column expresses these needs as percentages of each asset's replacement value. While a range is given in each case, the amounts given in column three are calculated on the basis of the lowest, very restrained, percentage. The total of this column, 255 million FCFA, thus represents a modest but realistic estimate for maintenance in 1990/91, with some increase in subsequent years, calculated on the basis of anticipated new investments (Table 22).

The 1989/90 budget for administration is 40 million FCFA, a fraction of previous allocations (though supplemented to 90 million FCFA from the World Bank loan). So far this budget line was supposed to cover all expenses of office supplies, maintenance

and repair of office equipment and furniture, maintenance and fuel for all vehicles assigned to the administration, insurance and taxes for all vehicles, all other insurances, electricity and water at all stations, upkeep of houses, and several other items of expenditure. In the new presentation of maintenance/repairs/insurance (Table 21), several of these items are covered. Even so, an increase in the budget for administration, to a stable 90 million FCFA a year, is necessary for the efficient functioning of the Institute.

Table 21: **IRZ assets (provisional estimates June 1990), annual maintenance costs, and average annual replacement investments**

	Replacement value of IRZ assets (millions FCFA) (1)	Annual maintenance/ repairs/insurance		Estimated average life of assets (years)	Average investment per year	
		% of (1) (2)	Amount (millions FCFA) (3)	(4)	% of (1) (5)	Amount (millions FCFA) (6)
Offices/labs/houses	3000	1.0 - 1.5	30.0	50	2.0	60.0
Farm buildings/garages/other structures	1000	1.3 - 2.0	13.0	30	3.3	33.0
Roads	50	8.0 - 12.0	4.0	-	-	-
Fences	500	4.0 - 6.0	20.0	10	10.0	50.0
Water/electricity supply	100	8.0 - 12.0	8.0	30	3.3	3.3
Sown/planted pastures	20	7.0 - 10.0	1.4	6	16.7	3.3
Improved natural pastures	180.[1]	3.0 - 5.0	5.4	50	2.0	10.8
Livestock [2]	350	14.0 - 17.0	49.0	-	3.0	10.5
Fish ponds	50	5.0 - 6.0	2.0	25	4.0	2.0
Trucks/tractors	150	8.0 - 13.0	12.0	8	12.5	18.8
Pick-ups/cars	400	8.0 - 13.0	32.0	6	16.7	66.7
Farm machinery	200	5.0 - 7.0	10.0	15	6.6	13.2
Boats	200	7.5 - 9.0	15.0	20	5.0	10.0
Scientific equipment	400	7.0 - 10.0	28.0	20	5.0	35.0
Office equipment	100	14.0 - 18.0	14.0	10	10.0	10.0
Computers	50	10.0 - 13.0	5.0	6	16.7	8.3
Furniture	300	1.0 - 2.0	3.0	20	5.0	15.0
Communications equipment	40	8.0 - 10.0	3.2	15	6.7	2.7
Total	7090	3.6%	255.0	-	4.5%	352.6

1 This represents the value of only one third of the total area of IRZ natural pastures; the other two thirds will not be improved by regular maintenance.

2 Breeding livestock not included, as their maintenance and replacement are covered in the budget for research operations.

The budget estimates for long term training, short term training abroad, local courses and conferences are summarized in Table 15e, and appear in the training/conference line of the budget, Table 22.

In 1989/90, 250 million FCFA were allocated for research programme operating costs. With the Institute's enhanced orientation to on-farm and field research and pre-extension, operating costs will inevitably increase, due mainly to higher expenses for transport and travel allowances. The budget estimates in Table 22 are based on an average of 3.6 million FCFA per researcher in 1990/91, increasing to a ceiling of 4.0 million FCFA by year 1993/94.

Table 22: Proposed IRZ budgets for 1990/91 to 1994/95, with approved budgets for the three preceding years for comparison, in constant 1989 FCFA (millions FCFA)

	1987/88[1]	1988/89[1]	1989/90[1,9]	1990/91	1991/92	1992/93	1993/94	1994/95
Personnel Cost [2,3]								
Salaries and other personnel costs	1,123.4	993.7	1,043.6	1,022.1	1,050.3	1,078.6	1,108.7	1,135.2
Consultancies			90.0	120.0	120.0	60.0	15.0	15.0
Other Operating Costs								
Administration	91.5	113.4	90.0	90.0	90.0	90.0	90.0	90.0
Maintenance/insur. [4]	6.0	19.2	50.2	255.0	262.6	276.0	281.8	286.4
Training/conference[5]	30.0	10.0	149.7	125.7	138.9	105.3	102.2	80.3
Research operating costs [6]	243.0	150.0	250.0	324.0	349.6	376.0	384.0	392.0
Sub-Total	1,493.9	1,286.3	1,596.0	1,936.8	2,011.4	1,985.9	1,981.7	1,998.9
Investment Costs								
Investments against approved budget	57.0	100.0	19.5 [7]					
Counterpart costs		50.0	100.0	200.0	200.0	200.0	200.0	200.0
Repairs & Improvements[8]								
Buildings			95.2	56.5	-			
Res. Infrastructure			38.7	278.0	21.1			
Breeding Stock			-	31.2	22.9			
Vehicles & Machinery			-	7.2	-			
Equipment/Furniture			33.8	6.0	-			
Communications			-	10.6	-			
Constr.plans/eqpt. [10]								
Buildings			220.6	74.5	62.0	110.0	105.0	30.0
Res. Infrastructure			-	-	50.0	-	10.0	-
Breeding Stock			-	-	-	5.0	2.0	-
Vehicles & Machinery			135.0	82.5	112.0	32.0	7.0	7.0
Equipment/Furniture			241.0	58.8	142.6	14.0	3.0	-
Communications			-	2.0	-	-	-	-
IRZ/IRA Comp. centre			90.0	75.0	-	-	-	-
Replacement investment [11]				74.0	109.0	144.0	179.0	214.0
Sub-Total	57.0	150.0	973.8	956.3	719.6	505.0	506.0	451.0
Payment of debts [12]			35.5	681.9				
Severance payments			94.9					
TOTAL	1,550.9	1,436.3	2,777.7	3,575.0	2,731.0	2,490.9	2,487.7	2,449.9

1 Although they are shown under 'Other Operating Costs' the research operating costs are actually included in the Government investment budget in 1987/88, 1988/89 and 1989/90.

2 The approved amounts for personnel expenditures in 1988/89 are lower than the amount required to pay all personnel (Table 13), with the result that all workers on temporary contract were discontinued. The approved amounts for 1989/90 did not take all redundacies into account.

3 See Table 13.

4 See Table 21, columns 2 and 3, and corresponding text in section 5.3.

5 See Table 15e.

6 Based on number of researchers x 3.6 million FCFA in 1990/91 increasing to 4.0 million FCFA by 1993/94.

7 This represents 150.0 million FCFA allocated to investment in the approved Government budget for 1989/90, minus 130.5 million FCFA of overestimated revenues (130.5=166.1-35.6 million FCFA, see Table 23 footnote 2).

8 Necessary investments due to inadequate previous maintenance; for 1990/91 and later years see Table 12a.

9 This column includes major needs covered by the World Bank loan (NARP) added to the appropriate budget line.

10 High priority new investments; for 1990/91 and subsequent years see Table 12b.

11 See Table 21, columns 4 to 6, and corresponding text in section 5.3.

12 35.5 million FCFA of outstanding bills were paid by IRZ from World Bank loan funds.

In section 4.11.1 the urgent needs for repair/renovation and essential improvements have already been discussed, and their budgetary implications shown in Table 12a, and summarized in Table 22. Although these repairs and improvements should be made as soon as possible, especially as an enabling condition for a performance contract, several items have been deferred until 1991/92 in order to limit the extra load on the first year's budget as much as possible.

The needs for completion of construction projects, purchase of vehicles, machinery, and equipment and establishment of new units have also been discussed in section 4.11.2, . and the investments scheduled over five years (Table 12b). These data are summarized by category in Table 22. The investments have been spread substantially, not only in order to even out the budgetary requirements, but also to facilitate thorough planning.

Finally, it is necessary to establish a rational basis for future investments, notably for the replacement of existing assets at the end of their normal life. This has been done provisionally in columns 4 - 6 of Table 21, using the current replacement value of IRZ's assets as the basis for calculation. The estimates of average life span (column 4) are conservative: they assume good maintenance and responsible utilization. The average annual amounts needed for 'replacement investment', derived from current assets and average life span, are shown in column 6. They total 352.6 million FCFA on the basis of these current assets, and would reach 397.8 million FCFA when all new investments up to and including 1994/95 have been made. Clearly, this last figure merely indicates the overall yearly investment level one must anticipate over the longer term to maintain the institute in a good condition. For the immediate future, this figure may be reduced, to take account of those investments that are relatively young. This explains the low figure of 74.0 million FCFA for 1990/91 and the modest increases over the entire five year period.

The last line of Table 22 shows the proposed total annual budgets for 1990/91 to 1994/95. After two transition years of very substantial requirements to get the Institute to a condition where it can respond to stringent research output criteria in a performance contract, a stable medium term budget level of around 2200 million FCFA is attained from 1992/93 onwards.

6. FINANCING PLAN

Table 23 summarizes IRZ's budgetary requirements and its revenues from sales of produce and services. It also shows major sources of funding.

The projected funds from sources other than the Government subvention consist mainly of a World Bank loan of 1800 million FCFA over 5 years (1987/88 to 1991/92). The allocation of this loan according to the various categories laid out in the loan agreement NARP 2766 CM are shown in the table. IRZ considers these funds as Government funds. As such they will be used to help finance the IRZ core budget within the specified categories.

Table 23: IRZ financing plan (millions FCFA)

	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95
EXPENDITURES: [1]						
IRZ budget (Table 22)	2777.7	3,575.0	2731.0	2490.9	2487.7	2449.9
FINANCIAL RESOURCES:						
Produce & Services						
Sale of produce [2]	37.5	48.6	52.4	56.4	57.6	58.8
Sale of services [3]	-	-	-	-	-	-
Feed analysis Mankon	(1.9)	(1.7)	(1.5)	(1.3)	(1.1)	(0.9)
Milk/meat/eggs quality control	-	(3.0)	(2.7)	(2.4)	(2.1)	(1.8)
Pathological analysis Wakwa	-	(4.3)	(8.6)	(8.6)	(8.6)	(8.6)
Pathological analysis Bambui	-	(4.3)	(8.6)	(8.6)	(8.6)	(8.6)
Total produce & services	35.6	35.3	31.0	35.5	37.2	38.9
World Bank loan [4]						
Cat. 6B civil works IRZ [5]	285.0	-	-			
Cat. 6C civil works IRZ/IRA [5,6]	90.0	75.0	-			
Cat. 7B eqpt/vehicles/furn. IRZ	300.0	-	-			
Cat. 7C eqpt/veh./furn. IRZ/IRA [6]	30.0	-	-			
Cat. 8 consultancies	90.0	120.0	120.0	60.0 [7]		
Cat. 9 training	46.0	80.0	99.0	25.0 [8]	20.0 [8]	
Cat.10 operating costs [5]	120.0	-	-			
Cat.11 unallocated:						
reallocated to Cat. 6B [5]	90.8	29.2 [9]				
reallocated to Cat. 7B	90.0	30.0 [9]				
Total World Bank loan (1800.0)	1141.8	334.2	219.0	85.0	20.0	
Training grants	77.9	42.8	28.1	33.4	41.0	28.1
Payment of debts by MINFI		681.9				
Severance payments by MINFI	94.9					
Personnel costs paid by MINFI	77.5					
Government subvention [1]	1350.0	2480.8	2452.9	2337.0	2389.5	2382.9

1 Except for 1989/90, the Government subvention includes the personnel costs currently paid by MINFI.

2 A realistic figure for sales of produce from research activities and production units combined, is 37.5 million FCFA. The approved budget for 1989/90 gives an amount of 166.1 million FCFA for total revenue from produce and services, but this figure resulted from unrealistic expectations. For all subsequent years the net revenue from sales of produce is estimated at 15% of research operating costs (see section 4.16).

3 For feed analyses, the fees charged essentially cover the direct costs, but personnel costs are borne by IRZ at 100% in 1989/90; in subsequent years a gradually increasing percentage of these personnel costs will be added to the fees. The same applies to the analyses of milk/meat/eggs except that this service only starts in 1990/91. Pathological analyses for disease diagnosis in Wakwa and Bambui constitute a service of such national importance to animal health that every encouragement must be given to farmers to submit samples for analysis; therefore, only direct costs will be charged for the foreseeable future, leaving the personnel charges to IRZ throughout the period 1990/91 to 1994/95 (see section 4.15). (Negative values are in brackets).

4 The World Bank loan for the National Agricultural Research Project (NARP) includes US$ 6.0 million = 1800 million FCFA for IRZ (all amounts converted at US$ 1 = 300 FCFA); the project covers the period 1987/88 to 1991/92 even though no expenditures were incurred in year 1 and hardly any in year 2.

5 Under the Cameroon/World Bank loan agreement, as amended in March 1988, the amounts shown for civil works represent 80% of total expenditures in Categories 6B and 6C and, for 1989/90, the same applies to Category 10 (operating costs). This means that the other 20% of the bills, i.e. 71.25 + 41.25 + 30.0 + 30 million FCFA = 172.5 million FCFA will have to be paid by the Government.

6 Categories 6C and 7C pertain to the construction and equipment of the joint IRZ/IRA computer centre.

7 Expenditures for consultancies in 1992/93 will be from funds committed in 1990/91 and 1991/92.

8 Training expenditures shown under 1992/93 and 1993/94 are from funds committed in 1990/91 and 1991/92.

9 These amounts 59.2 million FCFA contribute towards meeting the costs of construction plans and equipment in Table 22.

Any funds for individual research projects granted to IRZ by research institutions would belong to the special project budget. Their nature is uncertain and short term.

During 1989/90 and to a much lesser extend in 1990/91, the World Bank loan will assist in the rehabilitation process of IRZ by increasing available funds to an acceptable level. It will be principally used for essential repairs and improvements, general operating costs and financing the training programme. For Cat. 8 (consultancies) and Cat. 9 (training) a small amount committed in previous years will available in 1992/93 and 1993/94.

From 1990/91 the Government is requested to increase its subvention so that IRZ can maintain its overall budget at an adequate level when it no longer has the assistance of the world bank loan. The increased subvention will be used by IRZ to better maintain its existing research infrastructure, to improve its regional research coverage, and to improve the quality of its human resource base through a comprehensive training programme. The total IRZ budget will decrease from 3575.0 million FCFA in 1990/91 to 2449.9 million FCFA in 1994/95, and the corresponding Government subvention will decrease from 2480.8 million FCFA in 1990/91 to 2382.9 million FCFA in 1994/95.

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