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INTERAFRICAN BUREAU FOR ANIMAL RESOURCES

***

BACKSTOPPING MISSION FOR THE STUDY OF A PROGRAM FOR THE PAN-AFRICAN CONTROL OF EPIZOOTICS (PACE)

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FINAL REPORT

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ANNEX 13

COMMUNICATION UNIT[1]

Justification

Communication, as a deliberate intervention can play a decisive role to promote human development in today's new climate of social change. Greater democracy, decentralisation, and free market economies are high on the agenda. In so many places, at an amazingly rapid pace, the conditions are arising for the direction of changes to be steered by the people themselves. It is vital to help engender people's awareness, consensus, participation, and skills in order to reach a positive outcome. Communication is central to this task, but by no means does it automatically occur. Policies which support communication, and effective planning and implementation of communication programmes, are needed.

The new development context

Governments in developing countries can no longer fulfil all social and regulatory services by themselves, especially in rural areas. Many economies are overwhelmed by the cost of servicing foreign debt, and governments are under the stringent requirement to reduce spending. In their quest for greater cost-effectiveness in all their operations, governments must have the active support and greater financial contribution of the people. Governments are thus obliged to seek unfamiliar partners, ranging from local leaders to people in a variety of non-governmental organisations. These people are accordingly obliged to shoulder new and perhaps unfamiliar responsibilities.

Background

Following OUA/IBAR/PARC's successes, it is imperative to continue efforts to provide efficient animal health services on the African continent. Whereas OAU/IBAR has been able to initiate reforms and address pressing problems (e.g. rinderpest) in the animal health sector, more innovative and flexible approaches are necessary to cope with unprecedented challenges due to the fast changing financial, socio-cultural and political developments in Africa. True co-operation between animal health services and its beneficiaries is still lacking, impeaching the viability of a progressive sector.

The population explosion in Africa will continue to endanger the food security. Access to donor funding and export markets will become more difficult. The permanent accumulation of 'short-term' and emergency problems risks to jeopardise solutions for the 'long-term' ones such as desertification, pollution, etc. New scientific developments (cloning, etc.) in the western hemisphere may increase the lead of the western countries in animal health production and related fields, and leave Africa alone.

Problems to be addressed

A careful study of the situation in Africa, points a number of impediments to a successful animal health sector. Major areas requesting intervention can be distinguished.

Rural Poverty. The **problem will continue to develop and the existing structures will not be able to face it.** The coming population explosion in Africa will endanger food security. It will be more and more difficult to access to donor funding, while export markets will be increasingly unreachable. Given the existing problems within the development process, the situation will worsen, **jeopardising** a number of solutions to **fundamental problems such as desertification, pollution, etc**. Planners need to take the issue of food security and poverty into account, as the first step of any planning exercise. For this, and for all development activities, communication between local communities and the national planners and policy-makers is of vital importance, but unfortunately in rural areas, it is the weakest.

The Communication dilemma: for rural communities, the challenge is to increase the quantity of, and access to information, to ensure its exchange in appropriate ways, and to elicit more information from rural people themselves in order to guide development planning. A dialogue among the livestock stakeholders has been marginalised over the years. While the number of problems seems to increase as well as number of concerned 'parties', the rate of communication has substantially dwindled. Who will explain alternatives and new policies to the rural people ? Whether we come to see village learning centres equipped with centrally-linked computer terminal, or a more systematic use of traditional media for human development, the use of communication no longer depends on the availability of technology: it depends on the will and decisions of policy-makers to exploit its potential. Already communication has been highly exploited for political and commercial aims. Now is the time for 'communication for development' to have more widespread impact to benefit people.

The Environment, and its relation to sustainable agricultural development presents an enormous challenge. A prime consideration is the proper use and conservation of natural resources. However, this will have to be made acceptable to local people, who will also need considerable encouragement and training in new skills. The provisions of Agenda 21, which emerged from the UN Conference on the Environment and Development held in Rio de Janeiro, will only become reality through large-scale changes in attitude and behaviour in societies world-wide.

New scientific developments in the western hemisphere (A.I., cloning, etc.) will increase the lead of the western countries in animal health production and related fields. African animal health services, because of their lack of communication, co-ordination and report, will stay behind and remain dependant. **The development of technologies** of communication in the western world will increase the speed of their development. The gap will widen between the elite 'information-haves' and the many 'information-have-nots', leaving the African continent even further behind and totally dependant, while the modern telecommunication channels have the power to cut across social and geographical distance and serve as a precious development communication tool.

Intervention

The interventions are based on a Communication strategy which was developed over several years, based on the Lomé IV Convention which encourages the use of communication in development projects, on general expertise in "Communication for Development" gained from FAO projects, and practical experiences gained during the PARC Campaigns. The Commission supports "the use of communication servicing development projects: literacy campaigns, the fight against AIDS, increasing awareness of ecological problems, etc."[2]

Animal health issues problems need to be addressed and tackled on a regional and national basis. However, the present existing structures are not adequate and flexible enough to cope with the new challenges. Among these challenges, **new policies (e.g. OIE-pathway) have to be introduced, new laws (e.g. privatisation) will have to be explained, the importance of sero-surveillance to be accepted, cattle owners and their associations to be trained, while the rapid changing context of the veterinary practice - with official and private veterinarians performing new roles - has to be introduced** to the various stakeholders. No sustainable 'structure' to facilitate this sensitisation process is yet in place. A 'dialogue' with the project beneficiaries, especially the farmers, has been initiated[3] but needs, in view of its potentialities, to be fully integrated in future animal health interventions.

Moreover governments, EU, other funders and professional organizations have to be informed on a regular basis about the project, its progress and problems. The project needs for a good understanding of its concerns a diffusion of information broader than presently.

To respond the existing and developing problems studied above, the following intervention ought to be considered:

Overall Objective

To improve communication and co-ordination among all stakeholders in the animal health sector, contributing to the final eradication of Rinderpest, as established under the Lagos Plan of Action and the Fourth Convention of ACP-EEC countries at Lomé.

This objective relies on people's participation, but also on the involvement, on a regional and national basis, of various private and official veterinary professionals, the

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[2] 'Information and Documentation' . The Courier NR. 156, page 44, Mark Leysen, Unit of Development D.G. July 1996

African veterinary schools, researchers and experts in animal health care and related subjects (epidemio-surveillance, community-based methodologies, participative 'communication', etc.). Its includes the information of European and African countries and their politic and technic organization.

Project Purpose

1. **Establish an Animal Health Centre of Excellence through the exchange of up-to-date animal health data throughout the Pan African region.**

2. **Diploma Courses in "Communication for Development" at selected veterinary schools to broaden the professional capacity of young veterinary professionals in modern management and communication techniques.**

3. **Strengthen the national capacity to conduct communication activities to both create public awareness and build participation of the people in the new national animal health activities.**

4. **To integrate all animal health stakeholders in a dialogue regarding the implementation of the national animal health interventions.**

5. **To support the policies of the regional Coordination Units regarding the quality of provided animal health services, use of counterfeit drugs, vaccine control, legal consequences of the privatisation, etc.**

Results

1. Complete and up-to-**date animal-health related information will be available and rapidly accessible**, using latest technologies. OAU/IBAR and member states are provided with reliable epidemio, financial and social data, facilitating improved research work and better implementation of services in the field.

→Decision makers, livestock services, all stakeholders of the animal health sector communicate and exchange information. They can co-ordinate policies. They form a widespread network ensuring a progressive sector.

→National private and official high level officers, decision makers, African veterinary schools, animal health care and livestock services, researchers and experts will be in permanent link with the Centre, therefore with each other. They will have permanent access to the information available, thanks to the use of new technologies. 'Participatory research' strategies will be achieved, enabling all the stakeholders' participation to developments.

→Monitoring and routine assessments of impacts of all animal disease control programmes are conducted, enabling improved planning and implementation of future programmes by OAU/IBAR, any desirous member country, institution or individual.

2. **The Communication Unit** facilitates guest-colleges at selected veterinary schools to introduce up-to-date and innovative approaches in the existing curricula through: the identification of needs, formulation of pedagogic training package(s), identification and fielding of international and local 'guest'-lecturers with administrative and pedagogic follow-up. Training materials are produced and distributed.

→Curriculum of veterinary students will have inputs introducing concepts going beyond traditional curricula and tailored to new emerging situations. Those inputs will be based on reports from national and regional research institutes, requests by the school themselves and missions by experts. Veterinary students are equipped with e.g. communication skills.

3. The National Communication-liaison officers assist local communication interventions in the animal health sector for an improved 'dialogue' with stakeholders. Training and materials are provided and distributed.

4. →Local initiatives and problems are reported by national liaison officers. They are shared and assisted creatively and pedagogically by experts in communication from the centre.

5. →Regional specialised training courses and workshops will be organised and ran by the experts at the Centre(s) addressing regional and sub-regional demands.

6. **Animal Health Stakeholders, in particular livestock owners, have been integrated in the decision-making process** through participatory methodologies used by the national Communication staff within the various existing structures (associations, government services, etc.).

→'Participatory research' strategies will be achieved, enabling all the stakeholders' participation to new developments.

Activities

1. Creation of one Centre of Excellence:

Establishment of 'rapid accessible' Communication centre, using latest technologies. It is a two-way communication centre, receiving and distributing knowledge. It has relevant data regarding animal health care, immediately available to any interested person. **It is a regional databank and agora** ran by a Co-ordination Unit strongly skilled in management, pedagogy, human resources, marketing and co-ordination areas:

- Recruitment of Technical Assistance for regional Co-ordination unit.
- Assess and upgrade present resource centre at Nairobi.
- Establish e-mail links, home page access.

- Establish linkages with national Communication-liaison officers and others programme stakeholders which feed the resource centre with national data, while creative and pedagogical staff at the centre help to supervise the quality - and quantity - of incoming and outgoing data from East, Central and West Africa.
- Institutionalise national communication units in African countries.
- Identify national communication counterparts to assist the regional Co-ordination centres – after 3 years of Technical Assistance – on a rotating basis.

2. Guest colleges at veterinary schools

Formal Inputs in curriculum of veterinary students:

They introduce concepts going beyond traditional curricula and tailored to new emerging situations. Those inputs will be based on reports from national and regional research institutes, requests by the veterinary school themselves and missions by experts. Core inputs, through local and international lecturers, will deal with involvement of and communication with the population and specially traditional cattle owners, management of livestock profession, report and exchange of information, newly discovered progressive remedies, latest innovations regarding the major cattle diseases in Africa, etc.

- Review existing curricula at Pan African veterinary schools;
- Identify training needs of Pan African veterinary schools in communication fields;
- Formulate new curricula for Pan African veterinary schools;
- Identify and field content-specialists/lecturers;
- Determine production plan;
- Produce, duplicate and disseminate training packages with materials;
- Guest colleges and diploma courses;
- Gather feedback on usage of training materials.

3. Strengthen national capacity:

They are facilitated by the experts at the regional Centre and address regional and sub-regional needs in order to assume the sustainability of inputs at national levels.

- Identify national capacities in Communication (i.e. national Communication liaison officers);
- Identify training needs;
- Identify training locations;
- Identify and field content-specialists/lecturers;
- Produce, duplicate and disseminate training packages with materials;
- Training workshops over East, West and Central Africa of communication staff, active in animal health and livestock sector;
- Review Workshops sites to train local trainers (TOT).

⇒ They will also ensure the **training of animal health stakeholders** on involving the population in development programmes, as well as on co-ordination and exchanging experiences, on reporting initiatives as well as problems, introducing them to key communication tools;

⇒ They will ensure the **training of trainers, future 'guest' lecturers at veterinary schools**. They will share skills concerning 'communication' with the rural populations, exchange and co-ordination with livestock related services;

⇒ **Training materials** in relevant fields are produced (manuals, reports, flipcharts, slide presentations, video programmes).

4. Participation of all national animal-health stakeholders in animal-health interventions

These stakeholders (governments, projects, individuals, sub-regional organisations,...) could be helped by the programme for:

- Reviewing national communication components and strategies;
- Formulation of Animal-Health Communication Strategy;
- 'Participatory' research through the national network;
- Training in 'Participatory Communication' for interested parties;
- Utilisation of communication techniques and materials at grass roots level, in community visits;
- Collection of feedback of rural communities;
- National-level analysis of feedback and reporting, recommendations;
- Monitoring and assistance of projects from regional co-ordination centre (of Excellence);

Participatory research is enabled, through the network. Researchers can work with and learn from all stakeholders. Responsible parties: national liaison officers, regional communication advisers, consultants and national project livestock co-ordinators.

7. National and regional awareness and promotion campaigns

Major communication interventions will promote quality of the services to and from the livestock holders and report diseases and health organization in the field as well. The communication materials will be produced by the UC, and can be used on their own or adapted to the local socio-cultural environment.

The UC will produce two supports for the information of outside stakeholders in the PACE: EU, other funders,...

Terms of Reference

Communication Counterpart (60 months)

Qualifications: A Communication person with a Masters Degree in (Mass) Communication. Experience in 'Communication for Development' and 'Participatory' methodologies in Africa would be an advantage. Fluency in written and oral English and French is required. In view of the sustainability-factor the counterpart should be originating from the African continent.

Posts: in Nairobi, at the Communication Unit at OAU/IBAR headquarters.

Definition: The Communication counterpart will be based in the OAU/IBAR PACE Co-ordination Unit in Nairobi and will be responsible to manage the communication unit (NBI) in collaboration with the Technical Adviser and under the direction of the PACE-Co-ordination Unit. It is expected the counterpart will, after three five years, be absorbed by the OAU/IBAR.

In particular the TA will:

1. Ensure the follow-up of the daily implementation of the workplan of the Communication Unit;

2. Liaise with the OAU/IBAR staff for the identification of capacities and pooling/utilisation of resources;

3. Liaise with local private companies for the identification of capacities and resources and sub-contracting;

4. Co-ordinate the local resources for the production of audio-visual materials;

5. Monitor the use and effects of audio-visual materials, as part of a feedback mechanism for the PACE Co-ordination Unit;

6. Assist the PACE-Kenya Core Communication Team in their rinderpest eradication campaign(s);

7. Plan the logistics for the training workshops of the Communication Unit;

8. Update the inventory and storage of audio-visual materials at the Nairobi-based Communication Unit;

9. Gradually assume full responsibility for the advice to the PACE member countries;

10. Produce regular reports with recommendations in English;

11. Perform related duties as required by the PACE Coordination Unit.

Terms Of Reference

Communication Adviser (36 months)

Qualifications: A Communication expert with a Masters Degree in a Communication-related specialty. Experience in 'Communication for Development' and 'Participatory' methodologies in Africa would be an advantage. Fluency in French and English or both posts would be desired. In view of the available equipment the Adviser in Nairobi should be familiar with video recording equipment (e.g. video camera).

Posts: One adviser in Nairobi at the OAU/IBAR headquarters, and one in Bamako, Mali.

Definition: The Technical Advisers will be directly responsible for managing the Communication Unit(s), in collaboration with a OAU/IBAR counterpart for the Nairobi-post under the direction of the PACE Coordination Unit. As a member of the PACE Co-ordination Unit, the TA will advise both the OAU/IBAR and PACE Member countries on Development Communication including policy, strategy, media, audiences, media materials production and evaluation. Special emphasis should be given to 'market' the new PACE-programme among the key stakeholders.

In particular, the TA will:

1. Provide overall technical supervision to the Communication Unit, and the related Data Management Unit, and technical support through the management, operation, implementation and monitoring of its activities;

2. Prepare a detailed work programme for the unit; research and write a strategy paper on the specific role and detailed aims of Development Communication in PACE;

3. Advise the PACE-Coordination Unit on the policies (strategies, budget, workplan) for improved internal and external communication, and implement a communication strategy likewise;

4. Coordinate the production of the PACE newsletter, Web-page, regular publications and reports;

5. Undertake video-recordings of PACE-related activities with the available professional equipment, and finalise post-production and duplications through sub-contracting;

6. Supervise the consolidation of a package of communication guidelines and media materials examples for use by the Core Communication Teams of national PACE-personnel;

7. Produce, with the help of staff and national consultants, various media materials for dissemination of information to national decision-makers, Core Communication

Teams, international organizations and others, including video, radio, print, photographic and exhibition media materials;

8. Be responsible for the capacity-building of the national Core Communication Teams (CCTs) in 'Communication for Development' approaches and specialised areas as low-cost media, participatory methodologies (PRCA), community viewing and listeningmedia;

9. Research and write a strategy paper/guidelines for communication work in or around the existing Rinderpest Zone (E. Africa), in close collaboration with the Community-based Animal Health delivery-Unit;

10. Supervise the purchase and installation of PACE (tele-) communication equipment;

11. Gather feedback on the materials, as possible, to make continuing production more effective; advise PACE Member countries and international meetings, conferences and workshops about Development Communication and PACE;

12. Oversee the collection and storage of media materials produced by the project and PACE Member countries for reference during the project and after;

13. Establish links, exchange information, materials and experience with Communication Units of other regional animal health programs;

14. Prepare regular progress reports, other technical documents as required and the Terminal Report.

The TA will undertake duty travel within the PACE region.

ANNEX 14

ECONOMY UNIT

BACKGROUND AND PROBLEM[1]

OUA/IBAR is increasingly assuming a coordinating role in the control and eradication of certain animal diseases in Africa so as to improve the well-being of livestock producers and consumers, enhance agricultural productivity and promote trade in livestock and livestock products. In 1986 the Pan African Rinderpest Campaign (PARC) programme was established to control and ultimately eradicate rinderpest from the African continent, to restructure livestock services to make them economically self-sustainable and to provide appropriate improvements in animal husbandry methods. Suprisingly, ten years after the PARC was established, very little was known about the economic impacts of the programme. It became apparent that there was a need to evaluate the returns from investments into the programmes in order to evaluate the impact that PARC has had and to assess in economical basis future needs and priorities in the control and eradication of other animal diseases in the continent. Because the PARC programme lacked the capacity for economic analyses, an Economic Support Unit (ESU) was created within PARC through an institutional linkage between the International Livestock Research Institute (ILRI) and the OAU/IBAR/PARC.

The initial terms of reference of the ESU were to evaluate the economic impacts of rinderpest control and prevention in Africa and that of the PARC program itself. So far, the ESU has developed a methodology to assess the economic impacts of rinderpest control, and has applied it in three countries- Ethiopia, Ghana and Mali. The ESU has also made an evaluation of the impacts of private delivery of veterinary services in Kenya. Preliminary results indicate that the control of rinderpest by the PARC program is economically viable with benefit-cost ratios (BCR) and internal rates of return method. Privatization of veterinary services has also been shown to be profitable, particularly in areas of high agricultural protential. But the lack of basic data and the bad knowledge of technical parameter and diseases and incidence make such as assessments very difficult and results vary a lot due to the value of parameter finally used. Another study by the ESU has also shown the need for increased trade in livestock and livestock products as animal diseases are controlled and eradicated in Africa and has proposed an increased role for OUA/IBAR in fostering livestock trade and marketing.

So far, the impact assessment of disease control and eradication programmes has focused exclusively on rinderpest. However, it will be important to OAU/IBAR and African countries to have the capacity to evaluate the impacts of other animal diseases constraining livestock productivity and trade in the continent and the economical merits of alternative strategies to control them. Furthermore, as OAU/IBAR assumes a greater role in livestock development in Africa, there is a need to institutionalize an economic impact assessment capacity at OAU/IBAR and at natural levels to strengthen their ability for better informed decisions on disease control and policy reform.

Justification

Currently, OAU/IBAR/PARC is negotiating the funding of a follow-up of the PARC project, which is expected to concentrate on setting up and strengthening the epidemio-surveillance networks for animal diseases and particularly rinderpest. Also, OAU/IBAR is in the process of implementing other disease control programs particularly against trypanosomiasis and contagious bovine pleuropneumonia. Recently, the Fifth OAU Conference of Ministers resolved that OAU/IBAR should take a leading role in fostering livestock trade and marketing, and the effective control and surveillance of infectious diseases is critical to such a mission. Policy reforms on cost-recovery, privatization of veterinary services, livestock development funds and livestock farmers' associations have been introduced by the PARC program in a number of African countries. Evaluations of the efficacy of policy reforms as alternative means of service delivery relative to the public sector is of utmost importance. The economic and social impacts of these policy reforms require assessment to determine their successes and/or shortcomings. Lessons derived from such assessments can be used in shaping future policy reforms.

Establishing viable and sustainable livestock services through cost recovery in public programmes, encouraging privatization of veterinary services, establishing livestock development funds and livestock farmers' associations where feasible, can help prevent infectious diseases. Presently, however, the capacity to evaluate the effectiveness of these policy reforms is limited. This capacity needs to be expanded and strengthened through institutionalizing the existing economic impact assessment unit at OAU/IBAR.

As contagious diseases such as rinderpest come under control, livestock productivity and numbers are expected to increase. This implies that off-take rates will have to increase taking into account the existing land carrying capacities. This will require *inter alia*, increased livestock trade and marketing activities. Information generated from such activities will need to be compiled and analyzed through a database on the movement and marketing of animals in Africa. Such analysis should guide informed trade and marketing decisions. In setting up such a database, collaboration with sub-regional organizations dealing with trade issues e.g. Inter-Governmental Authority on Development (IGAD), Common Market for Eastern and Southern Africa (COMESA) and the Economic Community for West African States (ECOWAS) will be imperative.

To accomplish the above as well as carry out other economic analyses that may be needed in the future, the project needs reliable and up-to-date data bases on key biophysical and socio-economic parameters on priority animal diseases in Africa. Data required for economic analyses could be incorporated into the existing data reporting system so that program evaluation and other economic analyses could be carried out on a continuing basis.

All the African countries are facing such problems. The funds available for livestock sub-sector and animal health are limited and choices of allocations must be done, so it became very important to have a transfer of economic assessment habilities for animals health at national levels

Objectives

Overall objectives of the proposed socio-economics support unit will be to:

- Transfer at national and sub-regional levels the capacity and model to carry out economic impact assessment of animal diseases.
- Develop and institutionalize a sustainable capacity to carry out economic impact assessment in OAU/IBAR.
- Broaden the capacity of economic impact assessment in the OAU/IBAR to include other animal diseases.

The specific objectives are to:

- Build in each country a capacity for economic assessment of animal health and diseases control programmes.
- Extend the economic impact assessment of disease control to include the social aspects.
- Develop further the rinderpest economic impact model and extend it to other animal diseases.

Expected outputs

- Economic impact assessments of animal diseases in Africa and in each african country with its specificity (e.g. rinderpest, CBPP, Trypanosomiasis, etc.).
- Trained staffs in economic analysis of animal diseases at national and sub-regional levels.
- Databases of priority animal diseases and livestock policies.
- Technical reports and publication.

Terms of reference of the agricultural economist

The agricultural economist working in the economic support unit will be expected to strengthen national capacities in economic impact analyses of livestock diseases. The economist will be expected to:

- Transfer the economic methodologies to the national components and ensure that economic data bases are set within the national components.
- Organize workshops and seminars and train national counterparts on economic impact assessment of epizootics and their control.
- Develop a system for the efficient exchange of economic information among the national components and between the national components and the co-ordination unit.
- Compile and provide economic information to donors and governments on the economics of epizootic disease control.
- Prepare semestrally and annual administrative reports.

In order to support the OAU/IBAR/PACE coordination unit or at the request of individual countries in collaboration with the national experts:

- Carry out economic impact assessments of past and future epizootic diseases control programs; develop appropriate methodologies for analyses of epizootic diseases and their control.
- Evaluate the cost effectiveness of epizootic diseases control programs including that of past (and future) policy reforms implemented (to be implemented) to ensure prevention of disease outbreaks.
- Help the cell for support to privatization scheme for efficient privatization of livestock services and cost recovery mechanisms.
- Establish an economic data base on epizootic diseases in Africa and link it up with the epidemiology and communication data bases such that economic analyses can be carried out using the data base.
- Develop a livestock trade and marketing information system and link it up with national components.

Qualifications and experience

The agricultural economist will be required to have:

A Ph.D. in agricultural economics and five years of progressively responsible professional experience in economic analyses of livestock diseases in Africa.

Knowledge of quantitative methods in economic analyses of epizootic diseases and ability to plan and undertake impact assessment studies of disease control programs.

Ability to establish and maintain effective working relationships with national and international organizations dealing with livestock.

Ability to work closely with a multidisciplinary team of epidemiologists, veterinarians, animal production and communication specialists.

Ability to use word-processing and office technology equipment.

Working knowledge of English and French.

ANNEX 15

RINDERPEST CONTROL IN UNDER-SERVED AREAS

OF PASTORAL AFRICA

An integrated regional proposal for extending the range of effective rinderpest vaccination[1]

Purpose of Activity:

This proposal outlines a private-sector community-based rinderpest vaccination and animal disease control program for the pastoral regions of Africa where public-sector top down approaches using techniques of mass vaccination campaigns have failed to result in sufficiently high sero-conversion rates to effectively remove and prevent any spread of this disease.

The programme will build on the successes and experiences of PARC to date in *veterinarian-supervised* community-based rinderpest vaccination and health-care delivery.

Background and Justification

Despite persistent efforts of national governments in the Greater Horn of Africa (GHA), rinderpest (RP) continues to threatens pastoral food security and the relative peace in the region. While traditional approaches of mass vaccination is an effective means of containing RP and reducing its spread, experience has shown that in the more remote and insecure areas, these methods are sometimes impossible to implement.

Eastern Chad and the Central African Republic, the Karamoja region of Uganda, North Western and North Eastern Kenya, South western Somalia, southern Sudan and the « transition » Zone in Sudan all represent areas where public-sector mass vaccination campaigns have failed to establish sero-conversion rates consistent with those that can prevent further outbreaks and the spread of disease.

Low vaccination rates in these areas are not only of academic interest. Until now, the strategy of PARC has been to use Eastern Chad and the CAR as a key part of a *cordon sanitaire* to prevent the spread of the disease to Central and Western Africa. The risk due a large-scale cattle movement from the greater horn of Africa, to supply the meat markets of W. Africa and Asia is significant. There is a likelihood that these animals could carry RP. Significant energy has been invested in getting the countries of W. Africa to declare a provisionally free RP status and halt their vaccination programmes. Niger was the most recent Sahelian nation to join these ranks. This step has been accomplished with the inferred assurance on the part of PARC that the risk of spread from the GHA was indeed minimal. Laboratory serology and anecdotal ethnoveterinary evidence from the field do not support this notion.

In North Eastern Kenya and (possibly) South Western Somalia, chronically low vaccination rates have apparently been important contributors to the recent spread of lineage 2 RP in southern Kenya and northern Tanzania. As in Chad and the CAR, seroconversion and information from pastoralists of the region did not support the Government of Kenya's assurance that there was no rinderpest in the area and that there was no risk of spread. Several years before this recent outbreak, limited blood sampling of cattle along the border of Somalia and Kenya indicated higher rates than was likely to have been due to vaccination alone.

Recently the development and approval of a thermo-stable Plowright rinderpest vaccine has led to a re-thinking of RP control strategies for those areas where governments have been unable to administer effective animal disease control programs. Taking advantage of the extensive knowledge disease among pastoralists and the fact that lack of sustained and accessible animal disease control was always reported as a constraint of high priority, a system was developed whereby pastoralists themselves could provide vaccinations and treatments to lessen animal disease. This system had the elements of true sustainability because it relied on community-level empowerment and principles of cost-recovery. Through the training and provision of community-based animal health workers CAHWs), animal health care would be available to pastoralists wherever they were, throughout the year – not just for a few days when a vaccination campaign might pass through their area.

A notable example of this approach is southern Sudan where rinderpest was endemic with frequent epidemic foci of the disease. Public sector mass vaccination campaigns were difficult, if not impossible to undertake for reasons of insecurity and lack of infrastructure. By combining the use of Thermovax with a market-oriented community-based (CB) approach to animal health-care delivery the number of RP vaccinations administered increased 10 fold within 2 years. More importantly, in areas where the community-based approach has been introduced, RP outbreaks have ceased. This collaborative program between Unicef and Tufts University, (with coordinating input from PARC-VAC) in southern Sudan has resulted in wide-scale implementation that has reduced rinderpest outbreaks from 11 in 1993 to suspicion and only two clinical confirmed outbreaks during the past 24 months. A similar program initiated under the PARC-VAC antecedent project in the Afar region of Ethiopia has resulted in cessation of RP outbreaks for over two years.

The CB approach in pastoral regions can play an important role in disease surveillance. For example, in Turkana, Kenya during the summer of 1997, community dialogue as part of PARC-VAC's program to introduced a CAHW program of decentralized animal health care and RP vaccination, revealed the presence of clinical rinderpest among herds of cattle which had not been adequately vaccinated by the government teams. Prior to this date, the government was steadfast in its conviction that there was no rinderpest in this region of Kenya. However, these pastoralists had avoided government « campaign style » mass vaccinations for over 9 years. Because the same herders who avoid vaccination are likely to avoid sero-monitoring efforts (and vice-a-versa), it is likely that sero-surveillance records of the region would have reflected the (limited) success of the public-sector mass vaccination campaign. The true sero-positive rate that included those who avoid mass vaccination campaigns would likely have been considerably lower.

Using a methodology learned through experience in a dozen countries, PARC-VAC's community dialogue facilitated a decision by herders to vaccinate using Thermo-stable rinderpest vaccine during the dry season. Because of the perceived stress to the animals, particularly lactating cows, pastoralists do not normally allow their animals to be vaccinated during the dry season.

However, the rinderpest dilemma cannot be solved only through technological fixes and large-scale

to permit a cost effective rinderpest control and eradication program to be effective. This can be best achieved by facillitory efforts with pastoral communities, the private sector, NGOs, national and regional research facilities, national, regional and international organizations, and governments.

- Animal production and marketing offtake will increase contributing to an increased robustness of the pastoral economy.
- Pastoral food security and conflict prevention and mitigation within and across borders will improve.
- Rinderpest will be controlled in the marginalised pastoral regions in which it has, until now proved to be impossible to achieve sustained protection against rinderpest.

Animal health care delivery systems will become more market oriented through the introduction of a community-based approach on a regional basis. Government veterinary and pharmaceutical policy and legislation will sometimes change to reflect this approach. the livestock services will adopt an increased surveillance, monitoring and quality assurance role in an effort to protect the integrity of the region's livestock and wildlife resources.

Expected Outputs:

- Rinderpest sero-conversion rates will exceed 70% of target animals
- Rinderpest outbreaks will not occur in target areas
- Capacity at PACE national levels will be supported
- Rinderpest control over the mid to long term will be assured on a regional basis by the implementation of *veterinarian supervised* community-based approaches.
- Rinderpest surveillance and monitoring capabilities will be enhanced through community-based epidemiology.
- The capacity of private, NGO, governmental and regional institutions will be increased through increased pastoral community dialogue and involvement. Pastoral food security and peace will be increased through community involvement and integration into these institutions.
- Similar policies and legislation relating to animal health care delivery and veterinary pharmaceuticals will be adopted regionally in the region. This will increase cross border harmonization and decrease disparities between nations that in the past have contributed to the development of conflict and black-market trade in pharmaceuticals.

Key assumptions that must be valid to achieve the stated purpose :

Nations, National PACE Projects, pastoral communities, NGOs, research facilities, Regional and International Organizations and collaborating donors must see rinderpest control and eradication as a priority and, as a means to promote an increase in cross border trade, regional food security, and peaceful cooperation.

Through policy-level initiatives and a low-cost and sustainable CB approach, PACE proposes to work under the auspices of OAU/IBAR/PARC in Chad, the CAR, Sudan, North Eastern Uganda and Northern Kenya to introduce CB RP vaccination and a sustainable *veterinary-supervised* animal health-care delivery systems. All field activities will be monitored through public-sector supported ELISA sero-monitoring techniques. All activities shall be coordinated through national PACE projects.

Duration of Activity: 5 years

Conditions which will exist at the end of the programme:

- Increased protection against the introduction and spread of rinderpest as verified through sero-conversion rates of 70% or higher in target communities will be achieved.
- Animal health-care delivery systems will be greatly improved in the serviced regions.

That the PACE coordination unit will strengthen its epidemiology capabilities so that the cell can work in close coordination and cooperation with their activities and advice. That the PACE coordination becomes more involved in the legislative side of national government veterinary and pharmaceutical policy development – thus allowing PARC-VAC to contribute field experience and advice to proposed changes in legislation.

Project Description:

Goal:
Principle goal: To decrease risk of spread and occurrence of rinderpest in the remote and insecure pastoral areas where public-sector « campaign-style » approaches have been unable to establish sufficiently immune status to prevent the spread of RP.
Secondary goal: To establish *veterinarian-supervised and government-monitored* community-based animal disease control programs that are built on the pillars of profit, cost-recovery, and quality and therefore inherently sustainable (these include contract vaccination against RP).

Purpose:
The immediate purpose is to increase vaccination rates, disease surveillance and more appropriate sero-surveillance in high-risk pastoral areas of the Greater Horn of Africa.
The mid-term purpose is to accelerate, standardize, and rationalize the regional approach to community-based and privatized vaccination and animal health care delivery.

Activities:

1) Community Based Rinderpest Vaccine Delivery

a) Field Activities will be implemented through PACE National Components with NGOs, the private sector and participating communities. Activities will be coordinated and facilitated by OAU/IBAR/PACE personnel.
Veterinarians will supervise CAHWs and act as a training, monitoring and veterinary pharmaceutical supply interface. A national CAHW trainer will fill a position in each of 5 countries (Chad, CAR, Sudan, Uganda, and Kenya).

b) Specific Activities will include:

i) Initial contacts with local livestock owners, tribal authorities and appropriate local government agencies.
ii) Advertisement and selection of private veterinarians to supervise the CAHW program and provide support to NGOs working with community based animal health delivery systems.

iv) CAHW training and refresher courses.
v) CAHW monitoring and supervision.
vi) Promotion and quality control of private-sector veterinary pharmaceutical delivery.
vii) Community-level epidemiological monitoring.
viii) Coordination with government livestock services and promotion and involvement of private veterinarians.

The veterinary supervision of the animal health-care RP vaccination and delivery system is an integral part to the programme. It is well known that practicing veterinarians cannot support themselves in pastoral comminutes in Africa. First of all, vehicle-based practice is impractical in a pastoral setting with few roads and no telephones, it is next to impossible for the veterinarian to know where sick animals are, which ones require urgent care. Follow-up is likewise a logistical nightmare. From an economic sense, herders cannot afford to pay vehicle costs, fuel, drug costs and profit for a private veterinarian.

A veterinarian however can be the central spoke in a the wheel of decentralized health care practice for pastoral areas. In this model, herders trained as a CAHWs provide the primary animal health care as they move with the herds of their associated cattle camps. Animal health care is always available for pastoralists for a fraction of the costs that the veterinarian could provide it directly for.
The private veterinarian is central to a quality system as trainer, supplier and supervisor of the CAHWs. The Government's role in this scenario is one of quality assurance, overall supervision, epidemiological surveillance and response in the event of an outbreak or epidemic that cannot be handled by the CAHW-Veterinarian team.

PARC-VAC is aware that there are other models of community based animal health care delivery.
PACE will work with all models and the NGOs facilitating them to improve their sustainability and to provide advice on options available and improvement in the efficiency of the delivery system.

The following countries will be involved in this effort:

a) Chad

(1) Building on the experiences of the PARC-VAC antecedent project, TRVTT, target areas will be Eastern Chad, along the border with Sudan, and the Central African Republic. This will be a private sector approach with private veterinarians under Government contract training and supervising community-based vaccinators and animal health care providers. PACE Coordination Unit staff will provide technical support and advice to the government.

b) Central African Republic

(1) The target areas will be North and Eastern CAR, along the border with Chad and Sudan. This will be a private sector approach under Government contract training and supervising community-based vaccinators and animal health care providers. PACE-CU staff will provide technical support and advice to the

c) Kenya

(1) Turkana, W. Pokot activities recently begun will be strengthened.
(2) Collaborators will be the GK Livestock Services, the Kenyan Veterinary Association, private veterinarians and pharmaceutical supply firms, and NGOs.
(3) Once the CB approach has proved successful in NW Kenya PACE will facilitate the start of the approach in NE Kenya, with the same collaborators.

d) Uganda

(1) Karamoja region including the border with Kenya and southern Sudan.
(2) Collaborators will be the Ugandan Livestock Services, the Ugandan Veterinary Association, private veterinarians and pharmaceutical supply firms, and NGOs.
(3) Once Karamoja region delivery systems has been established PACE will work with the same collaborators in neighboring Teso, Lira and Kigum Districts.

e) Sudan

(1) Southern Sudan and the Transition Zone areas to the West of the Nile River will be emphasized. Emphasis will be placed on privatizing the already established and operational CB Vaccinator and CAHW system.
Distance training and remote monitoring of CB vaccinators will be attempted for those areas judged to be too unstable for direct on site community dialogue and local training.

f) Somalia

(1) The epidemiology of rinderpest in Somalia is still unclear. OAU/IBAR is working closely with the EC and the NGO Terra Nouva to improve understanding of the situation there. PACE-CU would have a role to play in providing technical advice on the privatization of veterinary services and incorporation of community based delivery systems into those services for both NGOs and private Somali vets.

g) Tanzania

(1) Develop community based delivery systems in the pastoral areas of the Maasai ecosystem
(2) Collaborators as for Uganda

h) Eritrea

(1) The Eritrean government plans to train 300 CAHWs. PACE-CU would provide technical advice for this undertaking.

i) Ethiopia

(1) [illegible]

TRVTT. PARC-VAC and PACE-CU are still available to provide technical support to the PARC Ethiopia team and NGOs working in this sector as required.

2) Regional Coordination and Policy-level Activities

Regional coordination and policy-level activities will be directed towards local and national governments, research organizations NGOs, private sector animal health concerns, national veterinary associations, and the donor community at large.
Activities in this component will be run principally through IBAR/PACE to assist in the general rationalization and sustainability of animal health-care delivery for Arid and semi-arid land areas of the Greater Horn of Africa. Two advisor positions will be filled. In addition, a short-term consultant shall be engaged.

Efforts will be directed at facilitating engagement of all concerned parties to develop locally and regionally adapted structures that produce an environment where rinderpest can be controlled and eradicated. Through the use of full cost-recovery principles and profit-motives the program will be self-sufficient after initial investment. Government recurrent costs for monitoring and quality assurance will be greatly reduced compared to previous allocations that intended to cover the costs of therapeutic and preventive care.

Finally, these policy-level facilitation and coordination efforts will also engage concerned parties in some of the larger cross border issues that if resolved could contribute to greater regional (and local) stabilization and economic growth. These include conflict resolution and cross-border trade. Conflict resolution will be encouraged between different groups within countries and in addition, between countries. Animal health has already proved to be a popular and effective entry point for contracting pastoral communities involved in livestock raiding and banditry.
Where necessary, cross border representatives and administrative authorities from each side will constructively engaged to identify issues and work towards near- and long-term solutions.

a) Policy-level workshops member governments and host country veterinary associations (Kenya Veterinary Association, Uganda Veterinary Association, Tanzanian Veterinary Association, etc.) will be held to engage decision-makers responsible for animal health. Topics will include:

   i) Models of animal health care delivery for arid and semi-arid lands (ASAL).
   ii) Privatization and private practice models.
   iii) The use and advantages of CAHWs in ASAL regions

      1) CAHW field visits will be arranged for government representatives and others to regions where PARC-VAC has introduced the CAHW approach.

   iv) Linking CAHWs with private practitioners, veterinary pharmaceutical delivery and government disease surveillance activities.

b) Policy-level assistance will be provided to

i) Standardize, comparing and draft of legislation for

(1) Veterinary privatization.
(2) CAHW/veterinarian integration.
(3) Veterinary pharmaceutical importation, production, distribution, use, and quality assurance.

c) Standardization of Approach for Community-based Animal Health Care Delivery. This will be done as part of the policy dialogue on decentralized animal health care delivery.

(1) Produce a CAHW in collaboration with OXFAM-UK&I

(a) This will be to catalogue and publish a standard approach that can be used (with appropriate local modifications) in all GHA member nations for animal health service delivery and rinderpest control.

(2) Promote the recognition and standardization of CAHW training levels with countries.

Terms of reference for OAU/IBAR-based
Field Advisor for Community-based Programs in Anglophone areas of Africa

Tasks

1. Assist national "community-based animal health worker project field officers" on the development and coordination of community-based animal health projects, the expansion of on-going community-based animal health projects, issues related to the sustainable and secure delivery of community-based animal health systems with particular emphasis on anglophone countries. Sudan, Kenya, Uganda, Tanzania, Somalia, Ethiopia, Eritrea.
2. Work in close cooperation with the OAU/IBAR/PACE epidemiology section's "Regional and East Africa Epidemiologist" and the OAU/IBAR/PACE technical officer.
3. Provide technical assistance regarding appropriate veterinary service delivery and the rinderpest epidemiological surveillance of on-going programs.
4. Provide policy advice and coordination for community-based animal health initiatives which assist OAU/IBAR rinderpest control and eradication activities in Sudan, Kenya, Uganda, Democratic Republic of Congo, Tanzania, Rwanda, Burundi, Somalia, Ethiopia, Eritrea, Chad CAR.
5. Pay particular attention in providing services to areas where rinderpest is still endemic or under severe threat of rinderpest outbreak.
6. Respond to requests for assistance in the development of community-based delivery systems by other national programs.
7. Provide technical assistance to any projects using heat stable rinderpest vaccine.
8. Work with OAU/IBAR and national programs to hold regional and international cross-border harmonisation meetings to discuss coordination of rinderpest eradication efforts, emergency preparedness, livestock movement monitoring and vaccination contingency plans.
9. Encourage active donor observation and participation in harmonisation and coordination meetings.
10. Liaise with organisations working with or interested in community-based animal health projects including existing livestock or pastoral networks, NGOs, NARS, ASARECA, FEWS, ILRI and FAO, to develop and promote effective working relationships.
11. Liase with the OAU/IBAR/PACE Coordination Officer on any research activities or other activities concerning technical assistance on the modification of current technologies or the field testing of tools, drugs and new vaccines appropriate for use by community-based delivery systems.
12. Using models developed in national programmes facilitate increased donor assistance, coordination and participation in community-initiated famine prevention, preparedness and mitigation in pastoral communities at risk in Africa.
13. Investigate and advise on roles played by women in pastoral communities and how gender information can be used to promote greater participation by women in community-based livestock projects, such that, their positions in society are improved.

14. Investigate and develop the use of ethno-veterinary practices and treatments in community-based animal health delivery systems.
15. Document methodology and processes used to create livestock health delivery models being used in national programmes.
16. Perform other related duties as may be assigned by the PACE Coordinator and the Director of OAU/IBAR.
17. Respond to requests from organisations outside OAU/IBAR on issues connected with community-based livestock projects, conflict resolution and disaster mitigation / prevention in the livestock sector.
18. Encourage specific and organised donor support of project and related activities in national programs and to OAU/IBAR.
19. Receive reports from, provide technical backstopping, coordinate and liaise closely with the OAU/IBAR-based Field Advisor for Community-based Programs in francophone areas of Africa based in Abeche.
20. Manage and advise all the PACE technical field staff in their work including OAU/IBAR staff working in Sudan.
21. Manage support staff, driver, administrator, accountant and secretary as required.

Reporting relationships

The Field Advisor for Community-based Programs in Anglophone areas of Africa based in Nairobi will report directly to the PACE Coordination officer of OAU/IBAR.

The Field Advisor for Community-based Programs for francophone areas of Africa based in Ndjamena, Eastern Chad will report through the Field Advisor for Community-based Programs based in the OAU/IBAR office Nairobi to the PACE Coordination Officer of OAU/IBAR.

Qualifications

Degree in Veterinary medicine with an M.Sc. in livestock production or health.

At least 10 years experience of implementing and co-ordinating the development of sustainable community-based animal health delivery systems.

Good understanding of issues surrounding privatisation of clinical and vaccination veterinary services in pastoral areas and the linking community-based animal health delivery systems with conflict resolution and general development in pastoralist areas.

Working experience in the Greater Horn of Africa particularly Sudan, Kenya, Uganda, Somalia, Ethiopia and Tanzania.

Fluency in English with some knowledge of French.

Terms of reference for OAU/IBAR-based Field Advisor for Community-based Programs in Francophone areas of Africa

Tasks

22. Assist national "community-based animal health worker project field officers" in the development and coordination of community-based animal health projects, the expansion of on-going community-based animal health projects, issues related to the sustainable and secure delivery of community-based animal health systems with particular emphasis on francophone countries. Democratic Republic of Congo, Rwanda, Burundi, Chad and CAR.
23. Work in close cooperation with the OAU/IBAR/PACE epidemiology section's "Central Africa Epidemiologist" and the OAU/IBAR West and Central Africa PACE coordination officer.
24. Provide technical assistance regarding appropriate veterinary service delivery and the rinderpest epidemiological surveillance of on-going programs.
25. Provide policy advice and coordination for community-based animal health initiatives that assist OAU/IBAR rinderpest control and eradication activities in Chad, CAR, Sudan, Democratic Republic of Congo, Rwanda, Burundi.
26. Pay particular to strengthening the community-based delivery of rinderpest vaccination services to the cordon sanitaire areas of CHAD, CAR and SUDAN, that is those areas where rinderpest is still endemic or under severe threat of rinderpest outbreak.
27. Respond to requests for assistance in the development of community-based delivery systems by francophone national programs.
28. Provide technical assistance to any projects using heat stable rinderpest vaccine.
29. Work with OAU/IBAR and national programs to hold regional and international cross-border harmonisation meetings to discuss coordination of rinderpest eradication efforts, emergency preparedness, livestock movement monitoring and vaccination contingency plans.
30. Encourage active donor observation and participation in harmonisation and coordination meetings
31. Liaise with organisations working with or interested in community-based animal health projects including existing livestock or pastoral networks, NGOs, NARS, ASARECA, FEWS, ILRI and FAO, to develop and promote effective working relationships. Particular attention should be paid to the French Cooperation and GTZ livestock projects based in Eastern Chad.
32. Liaise with the OAU/IBAR/PACE Coordination Officer on any research activities or other activities concerning technical assistance on the modification of current technologies or the field testing of tools, drugs and new vaccines appropriate for use by community-based delivery systems.
33. Using models developed in national programmes facilitate increased donor assistance, coordination and participation in community-initiated famine prevention, preparedness and mitigation in pastoral communities at risk in francophone Africa.
34. Investigate and advise on roles played by women in pastoral communities and how gender information can be used to promote greater participation by women in community-based livestock projects, such that, their positions in society are improved.

35. Investigate and develop the use of ethno-veterinary practices and treatments in community-based animal health delivery systems.
36. Document methodology and processes used to create livestock health delivery models being used in national programmes.
37. Perform other related duties as may be assigned by the PACE Coordinator and the Director of OAU/IBAR.
38. Respond to requests from organisations outside OAU/IBAR on issues connected with community-based livestock projects, conflict resolution and disaster mitigation / prevention in the livestock sector.
39. Encourage specific and organised donor support of project and related activities in francophone national programs and to OAU/IBAR.
40. Manage and advise all the PARC-VAC technical field staff, working in francophone countries, in their work.
41. Manage support staff, driver, administrator, accountant and secretary as required.

Reporting relationships

The Field Advisor for Community-based Programs for francophone areas of Africa based in Chad will report through the Field Advisor for Community-based Programs based in the OAU/IBAR office Nairobi to the PACE Coordination Officer of OAU/IBAR.

The Field Advisor for Community-based Programs for francophone areas of Africa will copy all reports to the OAU/IBAR West and Central Africa PACE coordination officer

Qualifications

Degree in Veterinary medicine with an M.Sc. in livestock production or health.

At least 5 years experience of implementing and co-ordinating the development of sustainable community-based animal health delivery systems.

Good understanding of issues surrounding privatisation of clinical and vaccination veterinary services in pastoral areas and the linking community-based animal health delivery systems with conflict resolution and general development in pastoralist areas.

Working experience in Chad and CAR.

Fluency in French with some knowledge of English.

Terms of reference for
National Community-based animal health worker project field officer

Tasks

1) To carry out all the field work necessary to establish a community based animal health delivery systems which provide rinderpest vaccination for specified areas of ...{state country}...

   Note: OAU/IBAR PACE Project field advisors will be available to assist with these tasks as is deemed necessary or as requested.

   Note: All activities should be carried with the ultimate aim of leaving a sustainable delivery system in place at the end of the project.

   This field work will include the following:

   a) Feasibility studies
   b) Community dialogue
      i) Establishment of a community action plan or social contract with specific communities.
   c) Training of supervisors (Mid-level veterinary workers) of CAHWs
   d) Training of CAHWs (Community-based animal health workers)
      i) Incorporation of local EVK into training courses
      ii) Development of training curricula and training aids
      iii) Refresher training of CAHWs
      iv) Equipping of CAHWs
   e) Post training community dialogue
   f) Monitoring of CAHW activities
   g) Management of drug revolving funds and vaccination revenue
   h) Coordination of CAHW vaccination activities
      i) In cooperation the PACE National coordinator and the District Veterinary Officers (DVOs).
      ii) Management of cold chain and vaccination equipment as required
   i) Be responsible for the use of ethical medicines by CAHWs and Mid-level veterinary workers in the field.

2) Provide technical advice to NGOs working with or wanting to establish, community based animal health projects in ...{state country}...
   a) on all of the tasks mentioned in 1
   b) on donor funding proposal submission.

3) To assist communities, NGOs and the Department of Veterinary Services to coordinate activities being carried out with community based animal health projects in ...{state country}...

4) Liaise closely and regularly with the Department of Veterinary Services DVOs.

5) Report regularly to the PACE National coordinator.

6) Provide technical assistance regarding appropriate veterinary service delivery and the rinderpest epidemiological surveillance of on-going programs to the national PACE epidemiologist.

7) Liaise closely with the OAU/IBAR PACE Project field advisors.

8) Cooperate with project assessors and evaluators as required.

9) Facilitate visits to project sites by donor representatives, evaluators and other interested parties as requested.

10) Facilitate with the PACE Project field advisor, workshops and conferences on provision of community-based animal health services to ...{state country}...

11) Organising other field conferences and workshops in cooperation with PACE Project field advisors as required.

12) Manage mid level veterinary workers assigned to the community-based animal health component, as detailed in the budget.

13) Manage the project field driver, as required.

14) Liaise closely with PACE National coordinator to ensure timely procurement of supplies and equipment for project activities.

15) Facilitate servicing of project vehicles when they are in the field.

16) Facilitate procurement of field supplies, as required.

17) Facilitate payment of bills incurred during field work and salaries of field staff as required.

18) Facilitate preparation of community-based animal health component accounts on a monthly basis in cooperation with the PACE National coordinator.

19) Preparation of any special project accounts as required.

20) Copying and distributing field reports, responding to routine inquiries whilst in the field, operating project computer and printer, maintaining field records.

21) Investigating and recording ethno-veterinary and gender issues affecting the delivery of community-based animal health projects in cooperation with the PACE National **Coordinator** and the PACE Project field advisors.

Reporting relationships

The National Community-based animal health worker project field officer will report directly to the PACE National Coordinator.

The National Community-based animal health worker project field officer will work very closely with the OAU/IBAR PACE Project field advisor covering his/her country (anglophone advisor or francophone advisor). All reports will be copied to the OAU/IBAR PACE field advisor covering his/her country.

Qualifications

Degree in Veterinary medicine.
At least 2 years experience of implementing sustainable community-based animal health delivery systems.

Extensive working experience in provision of veterinary services to pastoralist areas
Ideally raised by a pastoralist ethnic group.

ANNEX 16

PAN AFRICAN VACCINE CENTRE - PANVAC
(1999-2004)

I. THE CONTEXT

1.1 *Background*

The origin of the PANVAC project goes back to 1986 when FAO allocated to the National Veterinary Institute of Ethiopia funding of $10 000 to strengthen its vaccine quality control service. In 1987, FAO established two vaccine quality control and training centres through two technical cooperation programmes (TCP), TCP/RAF/6766 in Dakar and TCP/RAF/6767 in Debré Zeit, respectively. These two centres concentrated on the promotion of improved methods for the production of vaccines and the formulation of minimum quality standards. They developed a certification system for validating vaccine lots satisfying those standards.

From 1989 until 1993, the PNUD assumed responsibility for funding the centres under the project for the production and quality control of veterinary vaccines in Africa (RAF/88/050 in an amount of $3 784 760). The purpose of the project was to strengthen the centres and provide support to PARC. To ensure the project's continuation, responsibility for the centres was transferred to the OAU IBAR (BIRA). Thus, PANVAC, created in support of the PARC programme, with the technical assistance of FAO, was assigned the following missions:

- provide vaccine quality control at the international level;
- promote standardization of biological products and quality control in Africa;
- promote the transfer to Africa of appropriate technologies for vaccine preparation, including their development and adaptation on the basis of African conditions;
- ensure training and support services for vaccine production laboratories.

In 1993, it appeared necessary to combine the two centres into one and to perform all PANVAC functions at a single site, at Debré Zeit in Ethiopia. The reason for this was not only the lack of immediately available funds but also, and especially, the need to concentrate the existing resources in a permanent structure after the first phase of the project.

In 1994, with the assistance of PNUD and FAO coming to an end, PANVAC activities were allowed to continue through interim funding of the European Commission (GCP/RAF/305/EC) and two FAO TCPs (TCP/RAF/2265 and TCP/RAF/4565).

In 1995, PANVAC was closed, however, after the exhaustion of these funds, adversely affecting PARC which was no longer able to obtain certified vaccines. At the end of the year, the Commission of the European Union awarded PARC a grant of ECU 700 000 to support PANVAC quality control services (PANVAC component A, project GCP/RAF/318/EC). Before the implementation of the funding, the FAO Director General allocated $125 000 to PANVAC to ensure the resumption of activities until the middle of 1996 (TCP/RAF/4565) and the establishment of a system of cost recovery that could allow

PANVAC to continue after that. The European Union funds became effective in July 1996 for an initial period of 18 months during which PANVAC was to put in place the arrangement for the recovery of costs and to set aside from its receipts an initial fund for the next phase when FAO technical assistance and EEC financial support were to cease.

In April 1997, PANVAC component B began, funded by the government of Japan (Reinforcement of Veterinary Vaccine Production and Quality Control by PANVAC, GCP/RAF/377/JPN). This funding, in an amount of $1.5 million is to be spread over five years and has as its main objectives to:

- promote standardization and control of veterinary vaccines in Africa;
- ensure the transfer of appropriate vaccine production technologies under African conditions;
- provide training and support services to vaccine producers in Africa.

1.2. Conditions of PANVAC Intervention

The producers of vaccines in developing countries do not always operate under conditions which ensure the safety, titration and effectiveness required for such products because of frequent financial, technical and management inadequacies. Vaccines of mediocre quality entail costly and ineffective control programmes.

In addition, national quality control laboratories do not exist in the majority of countries and the role of an international centre such as PANVAC is thus to ensure that only quality vaccines are employed in the PARC campaign. The role of the centre is not therefore in conflict with the objectives of any existing institution whatsoever.

1.3. Main Beneficiaries and Actors

The immediate beneficiaries of PANVAC are national vaccine production laboratories which can obtain biological material of certified quality and technical assistance in vaccine production and quality control. Thereafter, the veterinary services can obtain certified quality vaccines for their campaigns to combat rinderpest and contagious bovine pleuropneumonia.

The final beneficiaries are the breeders of the rural African communities who will be able to improve the health of their animals and thus their food and financial resources through the utilization of safe and effective vaccines.

1.4. Outstanding Problems

The outstanding problems all relate to the permanence of the institution created through the various funding grants, which require the recognition of its continental status, operating conditions accepted by the host country and adequate financial resources to permit the continuity of the services provided by PANVAC. The main problems are therefore to:

- ensure the continuation of the vaccine quality control activities of PANVAC and extend to them the certification of the other veterinary vaccines;
- extend the PANVAC mission to other services linked to the quality control of biological products and their certification;
- ensure the recognition and the autonomy of the institution in such a way as to facilitate its continuity.

1.5. ***PANVAC Activities***

From its establishment until today, the standards of quality required of PANVAC have been placed at a very high level by virtue of the technical standard assigned to it as an objective. Its level of technicality and effectiveness is today broadly recognized and the Conference of African Ministers responsible for animal resources accepted, in the beginning of 1998, its institutionalization as a technical institution of the OAU.

The functions assigned to PANVAC have progressively developed to today include four main activities which cover the international quality control of priority vaccines, the establishment of a collection of reference materials for the manufacture of vaccines, the development of internationally recognized quality control criteria and the promotion of principles for sound vaccine manufacture.

1.5.1. Quality Control of Priority Vaccines

The number of vaccines against rinderpest received over the past four years has not evolved significantly (63 in 1994, 83 in 1996, and 76 in 1997). The lots of vaccines against CBPP submitted for control have, on the other hand, been more variable (52, 81 and 39 for the same years, respectively). PANVAC has also received some lots of dual Plague-CBPP vaccines (21, 9 and 4, respectively) and some other vaccines utilized against Newcastle disease, nodular dermatosis, caprine variola and ovine variola. These quantities are much below PANVAC capacities inasmuch as, of the nine producing laboratories, four do not have their vaccines controlled by PANVAC, three submit only a part of their production and only two have all their production controlled. The progress achieved in terms of success in certification tests shows, however, a substantial improvement in the conditions of production in the most reliable laboratories. From an average certification of 77% of the lots in 1995, which fell to 60% in 1996 at the time of PANVAC's closure, the rates of success have risen to 75% in 1997 and to 100% during the initial months of 1998.

1.5.2. Standardization and Control of Veterinary Vaccines

PANVAC has recently developed, with the assistance of PARC partner reference laboratories, a collection of biological materials for the manufacture of vaccines which today includes a cell bank for cell cultures (lamb and calf kidney cells, chicken fibroblasts and smallpox ["vero"] cells), reference antigens for rinderpest and CBPP, but also, recently, small ruminant variola, nodular disease, Rift Valley fever, Newcastle disease and small ruminant plague and, lastly, a reference serum bank (Rinderpest and CBPP) and a bank of reference CP and CBPP reference vaccines. These materials have undergone in-

depth quality control tests at PANVAC before being certified and distributed to the laboratories concerned.

1.5.3. Information and Training

PANVAC has also undertaken activities seeking to establish internationally recognized quality control criteria. These activities include the formulation and/or standardization of quality control procedures and the development of standard manufacturing procedures for quality control of the main vaccines produced in Africa. These efforts are currently being pursued with respect to caprine variola and small ruminant plague.

PANVAC's communication programme, which is to undertake to advise the directors and major staff members of the vaccine production laboratories with respect to standard quality control procedures, has not yet begun, however. On the other hand, PANVAC has provided technical assistance to laboratories, seeking to help them improve the quality of their vaccines (training of quality control officials, local technical assistance).

1.5.4. Research and Development

PANVAC is involved in the research of CIRAD-EMVT on the comparison of CBPP, TISR and R144 strains and is also working on the standardization and control of new viral multiplication media.

1.5.5. Implementation of Cost Recovery

Measures have been taken following recommendations for a FAO mission to implement a plan for the recovery of costs for PANVAC quality control services. The institution thus issued invoices for services in an amount of $178 000 since 1996, but recoveries on these claims are still on the order of only 40%, since many laboratories remit payments due to PANVAC for various reasons. Invoice follow-up is also hindered by the fact that PANVAC, which has not been authorized to open an account in Addis Ababa, has its account in Nairobi.

1.6. Available Documents

The documents available are the various financing agreements entered into during the life of PANVAC, the report on the cost recovery function and report on the August 1997 evaluation mission, as well as progress reports and memoranda concerning the future of the institution.

II. THE OUTLOOK FOR PANVAC

2.1. *The Concept*

The main proposals on providing long-term security to PANVAC activities at the Pan-African level were taken over by the 1997 evaluation mission.

The expectations for the project to achieve its immediate objectives remain consistent with what they have been until now, i.e.:

- For quality control of priority vaccines, standardization of quality control for such vaccines;
- For the promotion and standardization of quality control, establishment of a bank of reference products, formulation of internationally recognized quality control criteria and acceptance by vaccine production laboratories of principles of sound manufacturing practises;
- For the permanence of the institution, the institutionalization within the OAU, a suitable status in the host country and cost reduction measures endeavouring to cover costs from foreseeable receipts.

2.2. *PACE Support for PANVAC*

PACE is to provide support for PANVAC for a period of five years in order to ensure the continuity of its vaccine control and standardization activities, and to assist the institution in preparing for its institutionalization within the OAU. PANVAC funding will therefore be regressive so that the institution's operating costs adapt to its credible receipts prospects. This support will include:

- Continuation for the period of a year of the international CBPP specialist and recruitment of a national expert to be trained by him as his replacement during that time.
- Recruitment by the OAU and assumption of responsibility for, as from the second year, of an international expert designated to become the director of the centre. The current director will be continued for three years to ensure a smooth transition and to train his replacement.
- Funding of the centre's operating costs to form, at the end of the period, a revolving fund sufficient to cover any future fluctuations in receipts.
- Supplementary equipment (freezer at -80°C) for the centre to enable it to perform its current functions properly and to undertake quality control activities for medicines in conjunction with authorization to market them.

2.3. *Main Objective*

The primary objective of the assistance provided by PACE to PANVAC, in conformity with its own objectives, is to improve the quality of the vaccines and medicines placed at

the disposal of African growers to ensure better animal health and to increase the productivity of their livestock.

2.4. Specific Objectives

The specific objectives are the following:

- Continuing to make available to the OAU IBAR (BIRA) the services of a laboratory responsible for independent quality control of veterinary vaccines - in the first instance, vaccines against rinderpest and contagious bovine pleuropneumonia.
- Promotion of standardization and quality control of veterinary vaccines and medicines in Africa.

2.5. Results

Expected results flow from the present and future activities of PANVAC and relate to the need to ensure the continuity of its services, to maintain or improve the quality of those services, and to extend its activities. They can be summarized as follows:

- PANVAC's status as a specialized OAU institution, agreed by the OAU Conference of Ministers, has been ratified, and the OAU has assumed responsibility, as from the year 2000, for the salary of a specialist who is to become head of the institution as from 2002.
- The Ethiopian Government has granted PANVAC, in a headquarters agreement, the diplomatic privileges and other facilities necessary to its operation and this agreement formalizes the placement at the disposal of the institution of adequate space and offices and counterpart personnel.
- The PANVAC operating costs structure has been rebalanced.
- All PANVAC services - vaccine and medicine control, biological reference products, on-site audits and training - are invoiced in advance at reasonable prices and certificates are issued upon payment.
- The OAU encourages African countries to systematize certification by PANVAC for all vaccines used in regional or sub-regional vaccination campaigns, and the aid organizations subject their financial assistance to the countries under PACE to certification of the entirety of the vaccines used in such countries, especially for CP and CBPP.
- Activities carried out under PACE are coordinated with those of the programme funded by Japan and this coordination makes it possible to effect substantial economies.
- All PANVAC activities are and remain under the strictest quality assurance.

2.6. Activities

The activities to be implemented concern primarily the continuation and the extension of the current activities of PANVAC, i.e.:

- Increase in the number of priority vaccine lots (CP and CBPP) processed annually by a greater participation by African producer laboratories in the programme.

- More systematic quality control of other vaccines manufactured in Africa and control of imported vaccines with a view to authorizing their sale.

- Diversification, conservation and distribution of vaccine strains, cells, reference serums and vaccines with a view to the standardization and improvement of vaccines produced in Africa.

- Continuation of research and development activities in partnership with the reference laboratories associated with PACE.

- Continuation of training and technical assistance activities to African vaccine and biological product manufacturing laboratories.

- Development, with the assistance of PACE, of information and awareness activities with a view to better participation by producer laboratories in the programme.

- Adaptation of PANVAC equipment to the increase in its missions.

- Implementation of an independent management system and establishment, for the duration of the project, of an emergency revolving fund to lessen the impact of any subsequent variations in receipts and facilitate continuity of activities.

III. ASSUMPTIONS, RISKS AND FLEXIBILITY OF THE PROGRAMME

3.1. *Assumptions*

3.1.1. Statutorily

- The OAU has confirmed the decision of the Conference of Ministers and assumed responsibility for the salary of the future director of the institution.
- The Ethiopian Government has granted PANVAC the privileges necessary for its operation and allocated the necessary space and offices, or another OAU country will have offered to provide all such facilities.

3.1.2. Technically

- PANVAC has maintained and developed its role as centre of excellence and as a reference centre.
- The production laboratories have been made aware of the need for better standardization of vaccines and regularly call upon PANVAC for quality control and the provision of reference biological products.
- The countries are gradually instituting regulations for authorizing sales and marketing, and are calling upon PANVAC to ensure quality control.

3.1.3. Financially

- PANVAC has made its salary scales uniform and has achieved a satisfactory balance between its operating costs and salary costs.
- Requests for quality control and for reference biological products are increasing steadily and invoice follow-up is strengthening so that receipts cover all operating expenditures, thereby ensuring the institution's survival.

3.2. *Risks and Flexibility*

Interim financing in the amount of $250 000 remains necessary to make it possible to fund PANVAC until the start-up of PACE. It is therefore necessary for the EU to be able to place at its disposal that amount to ensure the continuity of current services.

Finalization of PANVAC's status is a condition sine qua non of its survival. The OAU's financial commitment, as well as the agreement of the host country as to privileges which are essential to it and the allocation of adequate space and offices are important factors for stability.

The technical quality of the work carried out within PANVAC depends in the first instance on the specialists who bear the responsibility for it. They must therefore be able to work in a calm environment under clearly written contracts of adequate duration.

The support of the associated institutions, world reference laboratories, FAO and IOE is a decisive factor for the international recognition of the centre.

The flexibility necessary to the project is provided in particular by the establishment of a cash fund for the duration of the PACE assistance. The funds accumulated during that period should make it possible to lessen the impact of any variation in the volume of orders and thereby contribute to the institution's survival.

IV. COSTS OF ASSISTANCE TO PANVAC

The total cost of the assistance to PANVAC over the period of five years under consideration is ECU 992 300, not including the OAU participation of ECU 220 000 which represents the assumption of responsibility for the specialist designated to take charge of the centre. The cost of running the centre in its normal operations is expected to amount to approximately ECU 135 000 annually, 60% of which is expected to come from the centre's own receipts.

ANNEX 17

PROVISIONNAL BUDGET

	UNITS	QUANTITIES	UNIT COSTS	TOTAL	YEAR 1	YEAR 2	REPARTITION YEAR 3	YEAR 4	YEAR 5	%
MON SERVICES										
lemiology Unit										
ntral Unit										
nnel										
Technical Adviser (3)	man year	5	150.000	750.000	150.000	150.000	150.000	150.000	150.000	
ratory specialist (18)	man month	6	17.000	102.000	34.000	34.000	34.000			
terpart Main Epidemiologist (11)	man year	5	55.000	275.000	55.000	55.000	55.000	55.000	55.000	
tary (2)	man year	pm		pm						
r (2)	man year	pm		pm						
ician	man year	5	6.500	32.500	6.500	6.500	6.500	6.500	6.500	
ltancies	man month	8	15.000	120.000	30.000	30.000	30.000	15.000	15.000	
ort to sub-regional laboratories	man month	2.5	15.000	37.500	7.500	7.500	7.500	7.500	7.500	
nment										
uters/printers	unit	2	5.000	10.000	5.000			5.000		
ng costs										
l MTA (120 days/year)	year	5	23.000	115.000	23.000	23.000	23.000	23.000	23.000	
l counterpart (90 days/year)	year	5	20.600	103.000	20.600	20.600	20.600	20.600	20.600	
miology network/formation annual meeting (9)	year	10	15.000	150.000	30.000	30.000	30.000	30.000	30.000	
ostic reagents	year	50.000	2	100.000	100.000					
atories testing and follow up	year	5	6.000	30.000	6.000	6.000	6.000	6.000	6.000	
nunications (phone, fax,...) (2)	year	pm		pm						
ting cost (stationery,...)	year	5	5.000	25.000	5.000	5.000	5.000	5.000	5.000	
Sub total				1.850.000	472.600	367.600	367.600	323.600	318.600	**2,25%**
regional Units										
ako (Western and Central Africa)										
nel										
cal assistant (3)	man year	5	150.000	750.000	150.000	150.000	150.000	150.000	150.000	
ary (2)	man year	pm		pm						
(2)	man year	pm		pm						

	UNITS	QUANTITIES	UNIT COSTS	TOTAL	REPARTITION					
					YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	%
quipment										
ffice equipment (4)	unit	pm		pm						
omputer/printer (10)	unit	1	5.000	5.000	5.000					
unning costs										
ffice renting (5)	year	pm		pm						
ehicule running costs (4) (10)	year	5	5.700	28.500	5.700	5.700	5.700	5.700	5.700	
ommunications (phone, fax,...) (2)	year	pm		pm						
ravel (200 days/year) (10)	year	5	42.000	210.000	42.000	42.000	42.000	42.000	42.000	
perating costs (stationery,...)	year	5	5.000	25.000	5.000	5.000	5.000	5.000	5.000	
Sub total				1.018.500	207.700	202.700	202.700	202.700	202.700	**1,24%**
Nairobi (Eastern Africa)										
ersonnel										
echnical Assistant(3)	man year	5	150.000	750.000	150.000	150.000	150.000	150.000	150.000	
ecretary (2)	man year	pm		pm						
river (2)	man year	pm		pm						
quipment										
ffice Equipement	unit	1	5.000	5.000	5.000					
omputer/printer	unit	1	5.000	5.000	5.000					
unning costs										
ffice renting (6)	year	pm		pm						
ommunications (phone, fax,...) (2)	year	pm	3.000	pm						
ravel (120 days/year)	year	5	21.000	105.000	21.000	21.000	21.000	21.000	21.000	
perating costs	year	5	5.000	25.000	5.000	5.000	5.000	5.000	5.000	
Sub total				890.000	186.000	176.000	176.000	176.000	176.000	**1,08%**
Ndjamena (Western cordon sanitaire)										
ersonnel										
echnical Assistant (3)	man year	5	150.000	750.000	150.000	150.000	150.000	150.000	150.000	
ecretary (14)	man year	5	3.000	15.000	3.000	3.000	3.000	3.000	3.000	
rivers (7)	man year	10	4.000	40.000	8.000	8.000	8.000	8.000	8.000	
ield staff (14)	man year	10	6.000	60.000	12.000	12.000	12.000	12.000	12.000	

	UNITS	QUANTITIES	UNIT COSTS	TOTAL	REPARTITION					
					YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	%
pment										
cle purchase (4x4) (7)	unit	2	20.000	40.000	40.000					
e equipment	unit	1	1.500	1.500	1.500					
puter/printer	unit	1	5.000	5.000	5.000					
os (14)	unit	4	1.900	7.600	7.600					
(14)	unit	2	800	1.600	1.600					
modation equipment (14)	unit	1	4.608	5.000	5.000					
e equipement field base (14)	unit	1	4.608	5.000	5.000					
(14)	unit	2	1.500	3.000	1.500			1.500		
oing equipment (14)	unit	10	200	2.000	1.000		1.000			
ing costs										
l (30 days/year)	year	5	5.000	25.000	5.000	5.000	5.000	5.000	5.000	
accomodation (150 days/year)	year	5	6.000	30.000	6.000	6.000	6.000	6.000	6.000	
ating costs	year	5	8.000	40.000	8.000	8.000	8.000	8.000	8.000	
cule running costs (7)	year	10	7.000	70.000	14.000	14.000	14.000	14.000	14.000	
modation field base (+water+elec.+watcher)(14)	month	60	650	39.000	7.800	7.800	7.800	7.800	7.800	
aft renting (14)	hours	120	550	66.000	13.200	13.200	13.200	13.200	13.200	
running costs (7) (14)	month	60	1.000	60.000	12.000	12.000	12.000	12.000	12.000	
Sub total				1.265.700	307.200	239.000	240.000	240.500	239.000	**1,54%**
ildlife Unit										
nnel										
nical Assistants (12)	man year	4	140.000	560.000	140.000	280.000	140.000			
ultancies	man month	5	15.000	75.000				45.000	30.000	
taries (2)		pm		pm						
rs (2)		pm		pm						
ment										
ule (13)		pm		pm						
puters (13)		pm		pm						
nunication material (13)		pm		pm						
storage material (13)		pm		pm						
s equipment (13)		pm		pm						
equipment (13)		pm		pm						
re equipment (13)		pm		pm						
lement of capture equipment (darts, drugs,...)		1	30.000	30.000	5.000	15.000	10.000			

	UNITS	QUANTITIES	UNIT COSTS	TOTAL	YEAR 1	YEAR 2	REPARTITION YEAR 3	YEAR 4	YEAR 5	%
Running costs										
Office renting (6)		pm		pm						
Communication (phone, fax,...) (2)		pm		pm						
Travel (200 days/year)	year	2	42.000	84.000	21.000	42.000	21.000			
Meetings (9)	unit	4	15.000	60.000		15.000	15.000	15.000	15.000	
Sampling and analysis	piece	250	390	97.500	97.500					
Operating costs	year	2	5.000	10.000	2.500	5.000	2.500			
Sub total				916.500	266.000	357.000	188.500	60.000	45.000	**1,11%**
Sub total Epidemiology				5.940.700	1.439.500	1.342.300	1.174.800	1.002.800	981.300	**7,22%**
Communication Unit										
Personnel										
Technical assistants (8) (12)	man year	6	140.000	840.000	280.000	280.000	280.000			
Communication expert	man year	5	30.000	150.000	30.000	30.000	30.000	30.000	30.000	
Drivers (Nairobi and Bamako) (2)	man year	Pm		pm						
Secretaries (Nairobi and Bamako) (2)	man year	pm		pm						
Casual labour	unit	5	3.000	15.000	3.000	3.000	3.000	3.000	3.000	
Training consultant	man month	2	15.000	30.000	15.000	15.000				
Equipment										
Vehicle (Nairobi and Bamako) (1)	unit	2	17.000	34.000	34.000					
media storage	unit	2	5.500	11.000	5.500	5.500				
Computers/printers	set	1	15.000	15.000		15.000				
Presentation set	unit	2	5.500	11.000	5.500	5.500				
Software	unit	3	1.500	4.500	3.000	1.500				
Running costs										
Travel advisers (200 days/year)	year	3	42.000	126.000	42.000	42.000	42.000			
Travel expert (60-90 days/year)	days	360	210	75.600	12.600	12.600	12.600	18.900	18.900	
Vehicle (Bamako and Nairobi) (1)	year	6	5.700	34.200	11.400	11.400	11.400			
Communication (2)	year	pm		pm						
Production of promotion materials, ...				280.000	100.000	100.000	50.000	30.000		
In country training	session	34	7.000	238.000	56.000	56.000	56.000	35.000	35.000	
Review/training workshops (coordination)	session	10	8.000	80.000	16.000	16.000	16.000	16.000	16.000	
Video, DTP, Photo (supplies)		1	21.000	21.000	5.000	5.000	4.000	4.000	3.000	
Operating costs	yearx sub-reg.	8	5.000	40.000	10.000	10.000	10.000	5.000	5.000	
Printing matters (Coordination Nairobi)	year	5	10.000	50.000	10.000	10.000	10.000	10.000	10.000	
Vet. Faculties Deans workshop	sesion	1	8.000	8.000	8.000					
Sub total				2.063.300	647.000	618.500	525.000	151.900	120.900	**2,51%**

	UNITS	QUANTITIES	UNIT COSTS	TOTAL	YEAR 1	YEAR 2	REPARTITION YEAR 3	YEAR 4	YEAR 5	%
onomics Unit										
sonnel										
ıior economist (11)	man year	5	55.000	275.000	55.000	55.000	55.000	55.000	55.000	
owledges transert assistant	man year	3	40.000	120.000	40.000	40.000	40.000			
ingual secretary (2)	man year	pm		pm						
ver (2)	man year	pm		pm						
nsultancies	man month	3	15.000	45.000		15.000	15.000	15.000		
ıipment										
tocopier (2)	unit	pm		pm						
nputers	unit	2	4.000	8.000	8.000					
icle (2)	unit	pm	20.000	pm						
ning costs										
vel (150-60 days/year)	year	5	35-15000	135.000	35.000	35.000	35.000	15.000	15.000	
rating costs/consumables	year	5	5.000	25.000	5.000	5.000	5.000	5.000	5.000	
Sub total				608.000	143.000	150.000	150.000	90.000	75.000	**0,74%**
vatisation scheme Unit										
onnel										
hnical adviser (bussines lawyer) (8) (12)	year	3	140.000	420.000	140.000	140.000	140.000			
sultancies	man-month	4	15.000	60.000	15.000	30.000	15.000			
etary		pm		pm						
pment										
ce equipment/computer-printer	unit	1	15.000	15.000	15.000					
icle (1)	unit	1	20.000	20.000	20.000					
ning costs										
rating costs	year	3	5.000	15.000	5.000	5.000	5.000			
el (120 days/year)	year	3	23.000	69.000	23.000	23.000	23.000			
Sub total				599.000	218.000	198.000	183.000	0	0	**0,73%**

	UNITS	QUANTITIES	UNIT COSTS	TOTAL	YEAR 1	YEAR 2	REPARTITION YEAR 3	YEAR 4	YEAR 5	%
BAHWs Unit										
sonnel										
n technical adviser (3)	year	4,5	140.000	630.000	70.000	140.000	140.000	140.000	140.000	
l technical advisers (3)	year	7,5	140.000	1.050.000	210.000	280.000	280.000	280.000		
etary (14)	man year	pm		pm						
ers (15)	man year	7,5	4.000	30.000	6.000	8.000	8.000	8.000		
l staffs	man year	7,5	12000/3000	54.000	9.000	15.000	15.000	15.000		
sultancies	man-month	1,5	15.000	22.500		7.500	7.500	7.500		
ipment										
icle purchase (4x4) (15) (17)	unit	3	20.000	60.000	40.000		20.000			
ce equipment (15) (16)	unit	1	1.500	1.500	1.500					
nputer/printer (15) (16)	unit	1	5.000	5.000		5.000				
ios (14) (16)	unit	2	1.900	3.800	3.800					
omodation equipment (14)	unit	pm		pm						
ce equipement field base (14)	unit	1		5.000	5.000					
gnosis field kits (16)	unit	4	200	800		400	400			
ping equipment (14)	unit	10	200	2.000	1.000		1.000			
ning costs										
el Field officers (30 days/year)	year	7,5	5.000	37.500	7.500	10.000	10.000	10.000		
l accomodation for field officers(180 days/year)	year	7,5	40	27.000	5.400	7.200	7.200	7.200		
rating costs	year	12,0	5.000	60.000	10.000	15.000	15.000	15.000	5.000	
icule running costs (15)	year	7,5	7.000	52.500	10.500	14.000	14.000	14.000		
omodation field base (+water+elec.+watcher)(14)	month	pm		pm						
raft renting (14)	hours	pm		pm						
l workshops	unit	18	4.000	72.000	16.000	24.000	24.000	8.000		
Sub total				2.113.600	395.700	526.100	542.100	504.700	145.000	**2,57%**
ancial Unit										
onnel										
nical adviser (3)	man-year	5	150.000	750.000	150.000	150.000	150.000	150.000	150.000	
nterpart accountant/administrative assistant (11)	man-year	5	45.000	225.000	45.000	45.000	45.000	45.000	45.000	
pment										
e equipment	unit	1	5.000	5.000	5.000					
puter (4)	unit	1	5.000	5.000	5.000					
ning costs										
el (60 days)	year	5	16.000	80.000	16.000	16.000	16.000	16.000	16.000	
ating costs	year	5	5.000	25.000	5.000	5.000	5.000	5.000	5.000	
Sub total				1.090.000	226.000	216.000	216.000	216.000	216.000	**1,32%**

	UNITS	QUANTITIES	UNIT COSTS	TOTAL	YEAR 1	YEAR 2	REPARTITION YEAR 3	YEAR 4	YEAR 5	%
her common services										
)ata management service										
onnel										
stician/informatician	man year	5	50.000	250.000	50.000	50.000	50.000	50.000	50.000	
: top staff	man year	5	12.000	60.000	12.000	12.000	12.000	12.000	12.000	
pment										
puter	unit	2	6.000	12.000	12.000					
vare	unit	4	2.000	8.000	4.000	2.000		2.000		
:e equipment	unit	1	3.000	3.000	3.000					
ning costs										
ating costs	year	5	5.000	25.000	5.000	5.000	5.000	5.000	5.000	
Sub total				358.000	86.000	69.000	67.000	69.000	67.000	**0,43%**
'ANVAC										
sonnel										
nnical adviser (vaccine specialist) (8) (12)	man year	3	140.000	420.000	140.000	140.000	140.000			
nnical adviser (CBPP specialist) (8) (12)	man year	1	140.000	140.000	140.000					
sultancies	manmotnh	3	15.000	45.000		15.000		15.000	15.000	
nistrative staff	man year	5	3.500	17.500	3.500	3.500	3.500	3.500	3.500	
oratory assistant	man year	5	3.000	15.000	3.000	3.000	3.000	3.000	3.000	
ners	man year	10	2.000	20.000	4.000	4.000	4.000	4.000	4.000	
onal Expert	man year	5	12.000	60.000	12.000	12.000	12.000	12.000	12.000	
pment										
sts and renewals (21)				120.000	40.000	25.000	40.000		15.000	
ning costs										
rials and supplies	year	5	18.000	90.000	18.000	18.000	18.000	18.000	18.000	
ning	month	4	3.700	14.800		3.700	3.700	3.700	3.700	
ating costs	year	5	10.000	50.000	10.000	10.000	10.000	10.000	10.000	
Sub total				992.300	370.500	234.200	234.200	69.200	84.200	**1,21%**

	UNITS	QUANTITIES	UNIT COST	TOTAL	REPARTITION					
					YEAR 1	YEAR 2	YEAR 3	YEAR	YEAR 5	%
searchs										
PPr vaccine to protect ruminants against rinderpest										
narian	year	1	60.000	60.000	60.000					
ician	year	2	40.000	80.000	40.000	40.000				
nent	unit	1	6.000	6.000	6.000					
ls	heads	68cattle/140 goats		185.000	185.000					
mmable	year	2	15.000	30.000	15.000	15.000				
, meetings and conferences	year	2	4.000	8.000	4.000	4.000				
Sub total				369.000	310.000	59.000	0	0	0	
of cellular immune responseinduced by RP and PPR vaccines										
ıologist	year	3	60.000	180.000	60.000	60.000	60.000			
uarian	year Europ	1	60.000	60.000		60.000				
	year Afric	0.5	140.000	70.000			70.000			
nent	unit	1	27.300	27.300	27.300					
mmable	year	3	45.000	135.000	45.000	45.000	45.000			
, meetings and conferences	year	3	8.000	24.000	8.000	8.000	8.000			
Sub total				496.300	140.300	173.000	183.000	0	0	
of RP mild strain in cattle, sheep and goats										
ls		49 cattle, 12 sheep, 12 goats		17.000	17.000					
ls accomodation				17.400	17.400					
nel, consummable,...(22)		pm		pm						
Sub total				34.400	34.400	0	0	0	0	
ation of pen-side test										
em		28	130	3.640	3.640					
l		2	600	1.200	1.200					
costs				1.700	1.700					
Sub total				6.540	6.540	0	0	0	0	

	UNITS	QUANTITIES	UNIT COSTS	TOTAL	YEAR 1	YEAR 2	REPARTITION YEAR 3	YEAR 4	YEAR 5	%
- Research on PPCB										
Technician	month	30	3.400	102.000	17.000	17.000	34.000	34.000		
Equipment	unit			100.000	40.000		60.000			
Animals in hight secure confinment				30.000	15.000	15.000				
Animals in Africa				90.000			30.000	30.000	30.000	
Consummable				205.000	50.000	50.000	35.000	35.000	35.000	
Travel	unit	12	1.000	12.000			4.000	4.000	4.000	
Sub total				539.000	122.000	82.000	163.000	103.000	69.000	
Sub total research				1.445.240	613.240	314.000	346.000	103.000	69.000	**1,76%**
1.7.4. Advisory committee										
- Personnel										
Per diem (19)	day	280	105	29.400	5.880	5.880	5.880	5.880	5.880	
Consultancies	man month	10	15.000	150.000	30.000	30.000	30.000	30.000	30.000	
- Running costs										
Travel (19)	unit	40	900	36.000	7.200	7.200	7.200	7.200	7.200	
Session	session	10	5.000	50.000	10.000	10.000	10.000	10.000	10.000	
Sub total				265.400	53.080	53.080	53.080	53.080	53.080	**0,32%**
1.7.5. Other monitoring										
Ministerial meeting	session	2	60.000	120.000		60.000		60.000		
Policy committee	session	2	40.000	80.000		40.000		40.000		
Sub total				200.000	0	100.000	0	100.000	0	**0,24%**
1.7.6. Veterinary medicine schools support										
- Personnel										
International lecturer	man month	16	15.000	240.000		60.000	60.000	60.000	60.000	
Local lecturer	man month	16	3.000	48.000		12.000	12.000	12.000	12.000	
Sub total				288.000	0	72.000	72.000	72.000	72.000	**0,35%**
1.7.7. Revues and evaluations										
- Mid term and final evaluations of common services	man month	6	15.000	90.000			45.000		45.000	
- Environemental surveys										
Initial surveys: international experts	man month	4x3	15.000	180.000	180.000					
national experts	man month	4x2	4.000	32.000	32.000					
Regular surveys by national institutions	man month	4x2x2	4.000	64.000		32.000		32.000		
Mid term end final surveys	man month	4x2x2	15.000	240.000			120.000		120.000	
Remote sensing analysis	site	4	25.000	100.000				50.000	50.000	
Backstopping form the leading institution (15%)				105.900	31.800	4.800	24.750	12.300	32.250	
Sub total				811.900	243.800	36.800	189.750	94.300	247.250	**0,99%**
Sub total other common costs				4.360.840	1.366.620	879.080	962.030	560.580	592.530	**5,30%**
SUB TOTAL COMMON SERVICES				16.775.440	4.435.820	3.929.980	3.752.930	2.525.980	2.130.730	**20,38%**

	UNITS	QUANTITIES	UNIT COSTS	TOTAL	YEAR 1	YEAR 2	REPARTITION YEAR 3	YEAR 4	YEAR 5	%
ion and managment										
el										
ant for East Africa sub-regional coordinator (20)	man year	5	12.000	60.000	12.000	12.000	12.000	12.000	12.000	
gual secretary (East Africa sub-regional Coord.) (20)	man year	5	10.000	50.000	10.000	10.000	10.000	10.000	10.000	
l secretaries (20) (23)	man year	15	12.000	180.000	36.000	36.000	36.000	36.000	36.000	
(20) (23)	man year	15	6.500	97.500	19.500	19.500	19.500	19.500	19.500	
or (20) (23)	man year	5	20.000	100.000	20.000	20.000	20.000	20.000	20.000	
trative assistant (24)	man year	pm		pm						
hnical adviser	man year	5	150.000	750.000	150.000	150.000	150.000	150.000	150.000	
nts										
(4) (25)	piece	pm		pm						
rs (4)	piece	3	5.000	15.000	15.000					
costs				0						
irector (120 days/year)	year	5	23.000	115.000	23.000	23.000	23.000	23.000	23.000	
oject Coordinator(90 days/year)	year	5	20.600	103.000	20.600	20.600	20.600	20.600	20.600	
st Africa Coordinator (120 days/year)	year	5	21.000	105.000	21.000	21.000	21.000	21.000	21.000	
in technical adviser (120 days/year)	year	5	23.000	115.000	23.000	23.000	23.000	23.000	23.000	
	year	15	4.800	72.000	14.400	14.400	14.400	14.400	14.400	
ications and public utilities	year	5	50.000	250.000	50.000	50.000	50.000	50.000	50.000	
ning cost	year	5	20.000	100.000	20.000	20.000	20.000	20.000	20.000	
ca coordination meetings	session	5	15.000	75.000	15.000	15.000	15.000	15.000	15.000	
total				2.187.500	449.500	434.500	434.500	434.500	434.500	**2,66%**
nal Coordinator	man year	5	72.000	360.000	72.000	72.000	72.000	72.000	72.000	
secretary (20)	man year	10	9.900	99.000	19.800	19.800	19.800	19.800	19.800	
20)	man year	5	3.400	17.000	3.400	3.400	3.400	3.400	3.400	
nt (20)	man year	5	9.900	49.500	9.900	9.900	9.900	9.900	9.900	
0)	man year	5	2.100	10.500	2.100	2.100	2.100	2.100	2.100	
20)	man year	5	2.100	10.500	2.100	2.100	2.100	2.100	2.100	
osts										

	UNITS	QUANTITIES	UNIT COSTS	TOTAL	YEAR 1	YEAR 2	REPARTITION YEAR 3	YEAR 4	YEAR 5	%
Representation: veterinarian	year	3	50.000	150.000	50.000	50.000	50.000			
secretary	year	3	9.900	29.700	9.900	9.900	9.900			
office equipment	unit	1	10.000	10.000	10.000					
communication	year	3	15.000	45.000	15.000	15.000	15.000			
travel (120 days/year)	year	3	23.000	69.000	23.000	23.000	23.000			
l coordinator (90 days/year)	year	5	28.000	140.000	28.000	28.000	28.000	28.000	28.000	
accountant (50 days/year)	year	5	11.000	55.000	11.000	11.000	11.000	11.000	11.000	
Africa Coordination meeting	year	5	15.000	75.000	15.000	15.000	15.000	15.000	15.000	
ules	year	10	11.460	114.600	22.920	22.920	22.920	22.920	22.920	
unications	year	5	8.000	40.000	8.000	8.000	8.000	8.000	8.000	
mables	year	5	6.200	31.000	6.200	6.200	6.200	6.200	6.200	
nent										
ule (berline) (21) (26)	unit	pm		pm						
uter (22)	unit	3	5.000	15.000	10.000		5.000			
Sub total				1.320.800	318.320	298.320	303.320	200.420	200.420	**1,60%**
Sub total coordination				3.508.300	767.820	732.820	737.820	634.920	634.920	**4,26%**
TOTAL AT IBAR LEVEL				20.283.740	5.203.640	4.662.800	4.490.750	3.160.900	2.765.650	**24,64%**
Contingencies on common components (10%)				2.028.374	520.364	466.280	449.075	316.090	276.565	**2,46%**
OVERALL TOTAL AT IBAR LEVEL				22.312.114	5.724.004	5.129.080	4.939.825	3.476.990	3.042.215	**27,11%**
NAL COMPONENTS (27)				60.000.000	9.000.000	19.700.000	15.650.000	9.900.000	5.750.000	**72,89%**
LL TOTAL				***82.312.114***	***14.724.004***	***24.829.080***	***20.589.825***	***13.376.990***	***8.792.215***	**100,00%**

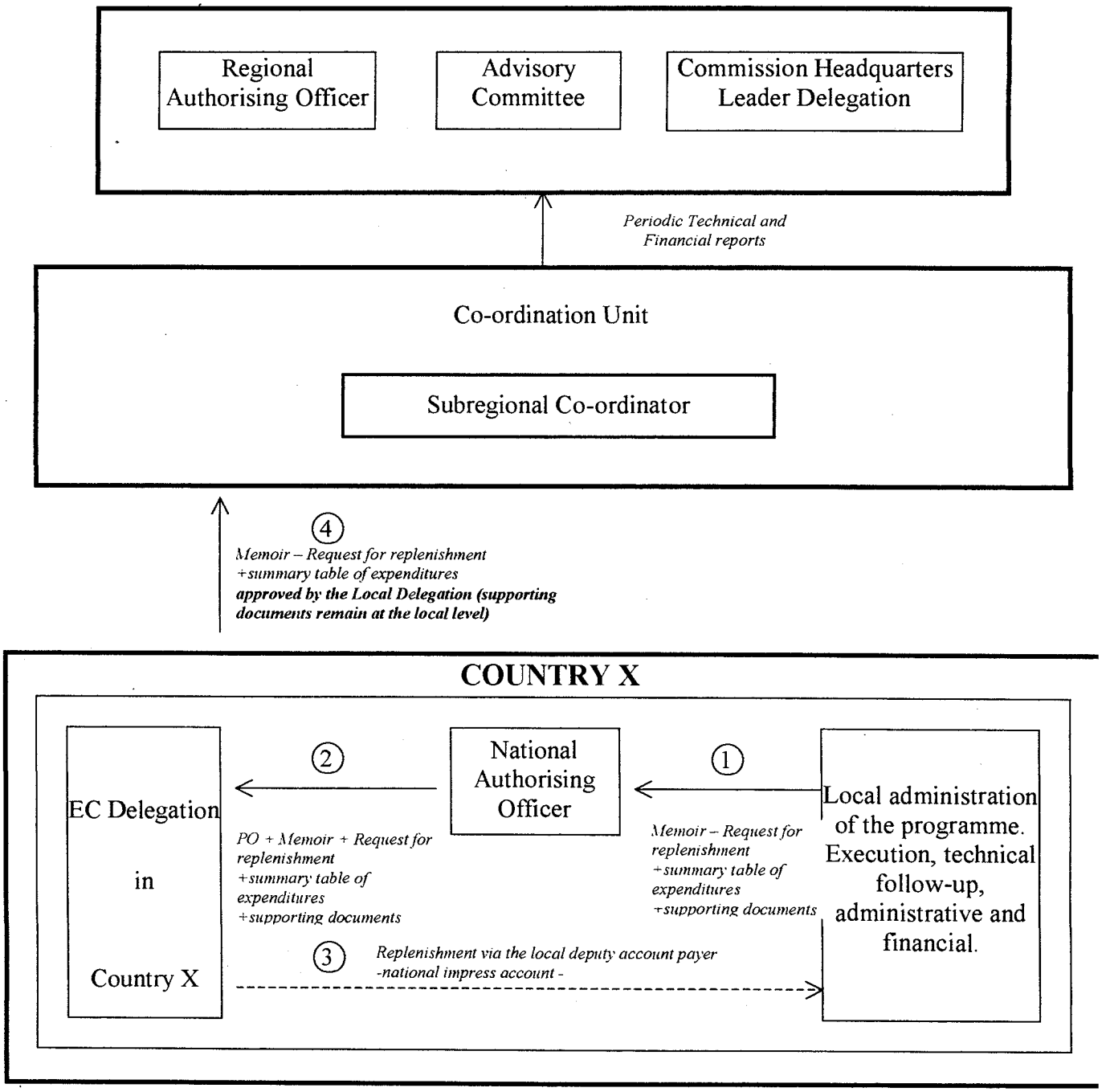
years the adviser's vehicule are switched on the Coordination Unit (Nairobi or Bamako)
ed in pools with coordination units at Bamako and at Nairobi
s and wages, vehicules and their running costs, accomodation, lugage, annual travel included
ment; (partly) done by the present PARC programm
'ree of charge by Government of Mali
'ree of charge by Government of Kenya
d base in Abeche and a staff based in CAR or Sudan
s and wages, accomodation, luggage, running costs of vehicule, annual travel included
›ants costs included into national components
ing costs of an other technical assistant, provided by french cooperation, included
maintained into IBAR structure after project
le provided by the project
by the first wildlife project
spare between the epidemiology and the CBAHWs technical advisers,specialy for Abeche Base
elping CBAHWs field officers
nt PARC-VAC imputs included.
'ehicule provided by present PARC-VAC
African travel included
s/session for FAO, OIE, Reference laboratories representatives
orary personnels found on the local market
ial of present project (FAO contribution included) supposed to be used by the project
arge of the precedent protocol
ged in pool for all the coordination units
in account in the Fianancial Unit
and 1 2x4 Vehicles bought in 1997 for CU and TA supposed to be available for PACE;2 project new vehicles (communication and privatisation Units) supposed to return to CU in year 4
ect new vehicle (Communication unit) suppose to return to CU in year 4
schedule estimated following national components studied

ANNEX 18

STRUCTURE OF MANAGEMENT FOR THE PACE PROGRAMME

- WP for Country X –

replenishment of the impress account



----- monetary flow

——— "paper"/admin. flow

ANNEX V

Terms of reference of the Policy Committee and the Advisory Committee

The **Policy committee**, formerly the Technical Committee, will meet once every two years on the initiative of the Director of IBAR. It will include all the donors interested in livestock development, the subregional authorities and all the participants involved in animal health at a subregional or continental level. It will have a dual function: firstly it will provide information and secondly it will have a function of a political nature.

- It will to define the main guidelines of the project on the basis of those set out by the various donors for the livestock development in general.
- It will also be responsible for briefing the various donors on the functioning of PACE, and the IBAR will present a report at each meeting covering its operations.
- It will be a forum for the exchange of technical information between external technicians, all the institutions involved in African livestock and the IBAR.

It will be chaired by the Director General of IBAR, the implementing agency, and will include representatives of the various donors, including those of the directorates-general of the European Union likely to be involved, in order to avoid duplication. The subregional organisations, whose main role in this area is to define policies, should be closely associated with the Committee as should the various specialised research institutions.

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The **Advisory committee**, must verify as frequently as is necessary that activities are perfectly consistent both at a national and regional level with the objectives and principles accepted by PACE. It will also verify that these objectives and principles are included in the framework of larger organisations such as the OIE, and that the efforts of PACE are consistent with other European Union funding and with its members and the GREP/FAO interventions. It will also serve as technical and financial guarantor for the donor(s), which should make it possible for IBAR to be a privileged interlocutor of the African States in accordance with their wishes. The

Committee's meetings will take place every 6 months and its independent budget will be included in the procedures of the Co-ordination Unit.

It will operate as a non-decision-making advisory body to the European Union and OAU/IBAR, the co-signatories of the financing agreement. For this purpose it will produce a report of its debates and recommendations every six months.

Its specific tasks will be the following:

- To examine the overall state of project advancement on the basis of reporting by the Director of IBAR, general technical reports, specific reports on issues of major concern, management control reports.

- To agree with the IBAR Directorate, or on the basis of its suggestions, on specific points to be investigated by the permanent technical teams co-financed by the project (economics, epidemiology, communications, support for privatisation, assistance in the employment of livestock and financial management assistants): technical work programme.

- To ascertain that activities both at the level of the CU and the national components meet the objectives and strategies put forward for the PACE programme and the more general frameworks of animal health (OIE, GREP, recommendations of the Political Committee). To this end the Advisory Committee will examine and express an opinion on all the overall Work Plans (and their additional clauses, if any) of the national components and all the biennial Programme Estimates of the Co-ordination Unit.

- To undertake, on its own budget, independent complementary investigations of overall or regional interest for the coherence of activities as a whole: survey on the status of certain diseases, the reliability of certain data, overall or partial evaluation of national components or regional units, etc.

- To act both for the European Union and for OAU/IBAR or for any other donor interested in this sector, as a permanent monitoring-evaluation body.

- To express its opinion on the technical coherence and management capacity of animal health programmes that might be referred to the European Union for financing.

ANNEX VI

Terms of reference of the Chief Technical Assistant and the Technical Assistant of the Unit for Financial Control

1. Chief Technical Assistant

The Chief Technical Assistant will act a chief advisor to the Director of OAU/IBAR and the person in charge of the programme within OAU/IBAR on any issues connected with the implementation of the "Pan-African System for Epizootic Control" (PACE).

The post will be based in Nairobi within the Co-ordination Unit (CU) of PACE, the unit located in the OAU/IBAR offices, which the incumbent will manage together with the person responsible for PACE appointed by the OAU/IBAR. In implementing PACE, the OAU/IBAR will play a leading role in the following areas:

- the setting-up of co-ordinated national and regional systems for the surveillance of major epizootics;
- the reinforcement and sustainability of national capacities for the effective control and/or eradication of major sanitary constraints to the development of the livestock sector on the continent ;
- the eradication of African rinderpest;
- assistance to African countries in entering the OIE procedure to be declared "free of rinderpest" and to fulfil the requirements of this procedure;
- setting-up and implementing permanent monitoring of the economic and social incidence of epizootics and other important animal diseases ;
- setting-up of a permanent information and reference centre on the status of animal diseases and the characteristics of the livestock sector in Africa, in particular its economic incidence.

To this end the main duties the chief technical assistant under the authority of the Director of IBAR will be the following:

- to carry out the overall technical and administrative supervision of the PACE Programme by managing the CU (including joint administrative management, invitations to tender, etc.), operations on the ground, and their monitoring in accordance with biennial Work Plans;
- to prepare the overall and biennial Work Plans of the CU in close co-operation with the technical units and to organise the examination of the overall and annual Work Plans of the national components;

- to co-ordinate the technical work of the other experts and consultants on the programme to facilitate synergies and maximum efficiency of the whole programme;
- to provide supervision of the national components, to make sure that their operations are consistent with the objectives of PACE and that support provided to them by the CU is effective and that they participate in OAU/IBAR activities (reports, databases, etc.);
- to prepare with other members of the CU the various national components while conforming to the overall strategy of the project;
- to plan, organise and participate in the various meetings, workshops, committees and seminars organised to promote co-ordination;
- to assure project liaison with the various research institutions, financing bodies and lead laboratories ;
- to establish the periodic CU reports and the overall project reports;
- to develop good relations between the project, and more generally between OAU/IBAR and the livestock development partners, and in particular the European Union for preparing specific programmes.

Qualifications required:

The successful candidate will be a veterinary doctor with a minimum of 15 years' experience, 10 of which in heading or monitoring large-scale livestock development projects. This person will have a strong technical background, especially in epidemiology, and sound management experience, especially in enterprise management.

The successful candidate will be bilingual English/French and will have previous work experience with the EU and the OAU/IBAR, if possible in the context of the PARC programme.

2. Technical Assistant to the Unit for financial control

2.1. CONTEXT

Based on the preparatory mission of the PACE Programme, a management structure was proposed to forestall various administrative and financial management problems, both at CEC and OAU/IBAR headquarters and in the countries involved. These problems were brought up during the general assessment of the PARC Programme, which was entitled "Pre-evaluation mission of the Pan-African Rinderpest Campaign", 1997.

2.2. OBJECTIVES OF THE TECHNICAL ASSISTANT'S MISSION

As a result of the above-mentioned evaluation, the Technical Assistant's objectives include:

- ensuring the proper financial management of the PACE Programme;
- ensuring openness in the financial and administrative management of the Programme,
- enabling real-time analysis to be made of the financial parameters on spending, results and activities,
- preparing a framework for simplified administrative and financial management so that the regional and national structures may, upon completion of the Programme, pursue related activities using their own means.

3. TASKS TO BE CARRIED OUT – REPORTS TO BE PROVIDED

Initially the expert's task will be to look after the implementation of the administrative procedures defined under the PACE Programme.

The expert's daily duties will include:

- monitoring of the financial and administrative implementation of the programme in accordance with EDF procedures, in particular those recommended in the preparatory document of the PACE programme,
- analysis and (administrative) preparation of the proposals for annual plans put forward by the national components in the framework and within the limits of the indicative funds allocated to these components,
- analysis of the relevance of expenditure, in the framework of these proposals, based on the drawing up and utilisation of reference tables. These tables will progressively take shape and will be completed and up-dated whenever new data appear (analysis of price and cost opportunities based on standard costs, record of budget status, etc.),
- analysis and (administrative) preparation of biennial plans of the Co-ordination Unit in accordance with the principles underlying national plans,

- giving support to the Programme's Chief Technical Assistant in preparing various administrative documents such as invitations to tender when purchasing material, resorting to T.A., etc.
- producing six-monthly financial reports to summarise the programme's financial record at the regional, subregional and national level. The expert will also be expected to produce simplified regular statements on project advancement at the various levels,
- finalising the draft Programme Estimates so that they are ready to be submitted to the Regional Authorising Officer for approval and endorsement by the European Commission (the Delegation of the E.C. in Kenya),
- preparing and processing payment files relating to regional, subregional and national components or during conclusion of contracts with third parties (contracts not included in the Programme Estimates),
- seeing to the proper financial implementation of the national programmes and transfer of CU funds to the national components,
- assisting the Lead Delegation and the relevant financial departments at EU headquarters in Brussels within the framework of the programme's financial management and identifying, within the programme, the contracts that have expired, so that they can be closed.

The Technical Assistant will also be called upon to take responsibility as "Accountant" for the management of regional and national Programme Estimates and to provide assistance to the European Commission in the Programme's Lead Delegation or in technical and financial departments at its headquarters, as the need arises.

4. QUALIFICATIONS REQUIRED

The expert will be a bilingual English-French economist with in-depth experience of EDF financial and administrative procedures and accounting. Ideally this person will have acquired experience of these procedures during the PARC project.

The DGVIII and the Lead Delegation for this programme will make sure that the Technical Assistant has access to accounting data and in particular to the relevant data in its computer system, which are necessary to carry out these tasks properly.

ANNEX 19

FINANCIAL AND ECONOMIC IMPACTS

1. PROBLEMS INVOLVED

The economic analysis of animal health remains a problematical area where relatively little work has been done. This is particularly true for Africa and the main epizootics that entail a high rate of mortality, such as rinderpest.

An economic analysis unit has been set up by ILRI within OAU/IBAR under the PARC project. Its approach to rinderpest control is limited to classical methods : internal rate return, cost/benefit analysis, sharing out of economic benefits. The unit has developed and tested a computer model establishing these parameters and adapted to animal health programmes in general. The unit has, however, encountered enormous difficulties in finding the necessary basic data and in establishing the present or potential livestock production parameters. This is because rough estimates of such parameters often continue to be made based on former estimates, a situation which gives rise to lengthy discussions between experts: actual livestock figures, use of animals, animal production parameters, present and future stocking rates, off-take rate, prices to producers, etc. The same goes for determining the effects of illness and the programmes of disease control: it is difficult enough to have a precise idea of the initial situation in a country or a region, but anticipating and measuring such effects is even more difficult. In Africa, previous experience only provides very limited reference material because it has often been determined by animal health "emergencies" which left little room for "ex-ante" and "ex-post" economic evaluation. The reliability of financial evaluation parameters therefore depends mainly on the assessment of initial technical data: that is why the classical approach leaves analysts with a wide margin but it loses much of its relevance on account of the imprecise nature of the data. However, the mission and the OAU/IBAR/PARC economic unit reviewed some of the analyses undertaken by the latter, revising the estimates for these parameters in order to establish some of the rates under consideration in this report.

Although the objective points put forward in the financial and economic analysis are the same as in classical projects, their interpretation is more difficult since the effects of prevention measures depend on the health risk that is being faced. The reasoning should thus include a notion of risk probability in addition to the estimates of cost and the effects of disease, as explained previously. But it is often difficult or even impossible to establish or make a scientific estimate of such probabilities.

In addition to the classical analysis based on the internal rate of profitability, the appraisal should come closer to an "analysis based on unpredictability", taking into account the health risk rather than limiting itself to the effects of the disease. Epidemiosurveillance and PACE would then be seen as an insurance taken out in favour of the livestock sector.

The fact that many technical elements are missing means that at this stage it is not reasonably possible to conduct this type of analysis to the extent that is desirable, but in order to help decision-makers the mission has adopted a simple supplementary approach based on risk, starting with rinderpest risk.

It is obvious that this approach, which is solely due to the specificity of the problems, constitutes a novelty for development projects. The mission is of the opinion that it would have been worth developing such an approach in relevant research programmes, such as those undertaken by the OAU/IBAR/PARC economics unit. The fact that little work has been done on the economics of the control of epizootics in Africa points to the difficulties and the inadequacy of the traditional approach. This was not, however, the main purpose of this consultation and there are still many imperfections and inaccuracies at this stage.

Another difficulty involved in the economic and financial analysis of PACE is related to the main area of activity, i.e. epidemiology. Epidemiological surveillance does not in itself produce anything. It is the control and prevention activities induced by surveillance that generate production. However, the extent, and the cost and benefits of such control programmes vary considerably, depending on the health risk, the conditions and modes of stock raising, the political will to respond, the species, etc. One of the purposes of PACE is to produce such programmes of disease control by providing the countries, subregional organisations and IBAR with the means to carry out a preliminary technical and economic assessment of such programmes.

Traditionally, in addition to direct gains in productivity, such disease control programmes also make it possible to reduce production costs and/or develop trade in animal products.

By reassuring the recipients or the forwarding agents of animal products, epidemiosurveillance makes it possible to open or develop markets and thus to increase the profits made from stock raising. However, although this approach is of real benefit, in the case of Africa the health situation is such that the most lucrative intercontinental markets often remain inaccessible to its operators. Moreover, control of herd and trade movements often remains too fragmented for the setting up of an epidemiological alarm system to be enough to lift restrictions. It is therefore a long term process which involves rules, policies and implementation of these measures as well as health check activities, of which PACE represents one element only, which is certainly crucial but does not suffice on its own. In view of the uncertainties, which beset these trade flows in the short and medium term, such effects will not be considered here, even if they are far from negligible, for instance in the case of Botswana, which is mentioned hereafter.

Finally, the transboundary characteristics of some epizootic diseases means that only an overall analysis is relevant, covering all areas of risk that transcend national borders, whereas the activities and spending essentially take place on a national basis. In the case of rinderpest in particular, matters can only be envisaged on a continental scale inasmuch as eradication on this scale is the only sustainable alternative. Thus, for example, the efforts in regard to rinderpest undertaken in the western *cordon sanitaire* are as essential in Senegal and Mauritania as they are in Chad and the Central African Republic, i.e. the components that have to implement

them. Or, as another example, action undertaken against rinderpest in Tanzania only makes sense if a co-ordinated programme is developed in Kenya. The problem is the same for epizootic diseases other than rinderpest. Senegal vaccinates against CBPP although officially the disease has no longer existed since 1977, but that is because there are only partial checks on movements from neighbouring countries. Or take the African swine fever epidemic, which caused devastation in Ivory Coast and subsequently moved on to the neighbouring countries. The cross-border nature of such problems means that an analysis on the basis of national components only is not very relevant. Although such components may provide factors for assessment, it is at the regional level that appraisal of PACE must take place. Equally, it is difficult to divide up the analysis of the joint services components, because they represent a certain number of interdependent elements enabling health surveillance and response to take place. Assessment and economic and financial decisions must therefore be made on an overall level.

2. ANALYSIS

2.1. *Traditional Approach: determining PACE's internal financial rate of return*

Only activities that have a direct effect on production have been taken into consideration in this report, which represents a minimum agenda: eradication of rinderpest and improvement of services to livestock farmers. Reinforcing public services, particularly as regards epidemiosurveillance, and control of CBPP and other epizootics will, in fact, require additional control activities in order to affect production.

The eradication of rinderpest should produce two types of return: on the one hand it would avoid disease-induced animal losses; on the other hand, eradicating the danger throughout the continent would allow the various States to put an end to annual vaccination campaigns. The assumption is that if eradication does not take place and there is no concerted project against rinderpest, the various countries will, as in the past, undertake vaccination campaigns using their own funds (or recovering costs from the livestock farmers) with results similar to those they obtained in the past.

Before the PARC programme, most States did in fact fund such campaigns, which led to a reduction in the number of outbreak sites and losses, without managing to eradicate the disease. Such vaccinations were sometimes more frequent and less expensive than under the PARC programme (the case of Ethiopia), but this project had the advantage of organising disease control and above all of covering the country's entire territory in a systematic fashion, which is how it was possible to achieve eradication of the disease.

As for the losses, the assumption made is based on the high-risk endemic zones and on the situation prevailing in Ethiopia before PARC; and this assumption was extended to Sudan in the west, to Uganda, Kenya, Eritrea, Somalia and the northern half of Tanzania, i.e. to approximately 80 million head of cattle with a growth rate of 1%. The work undertaken by the economics unit and reviewed by the mission made it possible to estimate that the average loss due to rinderpest over 10 years, despite public vaccinations, would have been approximately 0.88 ECU per head (0.09 ECU per head/per year), mainly in meat (66.0%), manure (25.8%), milk (17.3%) and a slight percentage in draught power (0.1%). The mission estimated that based on the present situation where there are hardly any losses, this average rate would be reached in 5 years despite the public vaccination campaigns, and that it would then be stabilised at that level.

In the case of West and Central Africa, a 2% growth of herd is usually allowed for and this is the figure that was used. Past experience of rinderpest shows a lower rate of incidence than in East Africa, probably on account of lower livestock density and improved access to pastoral areas, which are less insecure. Thus in Mali the 147 outbreak sites reported despite the public vaccination campaigns between 1980 and 1986, i.e. before PARC, concerned 4260 head of livestock, of which 2374 either

the same time, and with the same type of prevention, in Burkina Faso, 75 sites and 1283 deaths were registered; in Ivory Coast, 8 sites affected 7165 head of cattle of which 3130 (43.6%) died. This therefore represents direct losses that amount to a few hundred deaths per country and per year. The mission decided to retain a conservative figure of an incidence of 0.075%, with a death rate of 50%, and test them in a model developed by IBAR's economics unit. In this case the loss would be 0.007 ECU per head and per year. In view of the time required for the infection to return, it was assumed that this rate would only be reached progressively over 5 years with a 2-year lag period.

Based on the above assumption, total direct loss from rinderpest over 10 years would be of the order of 64.3 million ECU. However, such a low figure assumes continued maintenance of vaccination campaigns, whereas eradication of the disease would mean cutting down on this expense.

The PARC economics unit has made an estimate of the cost price of vaccinations throughout the project in 8 countries,[1] i.e. over 110 million vaccinations and including costs to governments and those covered by EU financing of national components. The weighted average of this cost amounts to a per unit value of 0.347 ECU per vaccination. To this cost a figure of 0.015 ECU should be added per head and per year, representing a proportion of joint PARC costs. These costs will not however be taken into account here as it is assumed that vaccinations will take place on a purely national basis (which, incidentally, is sometimes cheaper). The average annual rate of vaccination has been estimated at 35.6% of total cattle population, based on a weighted average of PARC results in the survey previously mentioned. This "saving" on vaccinations is presumed to be effective as from the beginning and the cost of the proposed campaigns are budgeted in the project.

Under these conditions, the savings on vaccination campaigns represent 187 million ECU over 10 years and the overall savings due to the eradication of rinderpest amount to 251.3 million ECU.

With regard to services to livestock producers, it was initially assumed that there would be modest growth in the numbers of sheep (2%), goats (2%) and pigs (3%); these rates, to be on the safe side, remain below those usually assumed.

Improving the distribution of veterinary services and drugs to stock producers, mainly through the privatisation process, should lead to increased productivity of livestock populations. These increases would be the result of an overall improvement in animal health and an increase in the consumption of inputs and veterinary services. It is on this assumption that the economic calculations for this type of programme are based, both in Africa (various preliminary studies on the privatisation aspect in the PARC national components) and in Asia (projects to strengthen the veterinary services, supported by the EU). Thus relative increases in production (off-take rate) rising progressively to 9-15% for cattle, 7-14% for small ruminants and 25-30% for pigs (in relative value) are generally applied in this type of document.[2] The

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1 Benin (1992-95); Burkina Faso (1989-97); Ivory Coast (1989-97); Ethiopia (1989-96); Ghana (1992-96); Mali (1988-96); Senegal (1989-97), Uganda (1991-97).

2 Poultry and camels and products such as milk, leather and hides have not been included here because they are

fact remains, however, as explained in §1, that there are insufficient figures to support these assumptions. To be on the safe side, the mission will reckon with relative productivity increases of 5% for cattle, 7% for small ruminants and 15% for pigs. It is presumed that these results will evolve progressively over the 10 years under consideration and valuation will be based on a world market carcass price,[3] i.e. respectively 1.11ECU/carcass kg for cattle, 4.26 ECU/carcass kg for small ruminants and 2.23 ECU/carcass kg for pigs.

These assumptions are included among the figures in the table hereunder. They mean that PACE has a financial internal rate of return of **16.3% over 10 years.** This can be taken to be very conservative, in view of the caution used in selecting working assumptions. In such a context it would be meaningless to undertake sensitivity tests. However, if eradication of rinderpest were viewed as the sole result against all project costs, the internal rate of profitability would still be 15.6%

Years	1	2	3	4	5	6	7	8	9	10	sommes
ıttle population in thousands of head (1)	142,195	144,159	146,153	148,178	150.235	152.323	154.445	156.599	158.788	161.010	
:luding:											
'estock with an "Ethiopian" type risk	88,020	88,900	89,789	90,687	91.594	92.510	93.435	94.369	95.313	96.266	
'estock with other risks	54,175	55,259	56,364	57,491	58.641	59.814	61.010	62.230	63.475	64.744	
sses with Ethiopian risk (x1000 ECU)	0	1.956	3.951	5,985	8.060	8.141	8.222	8.305	8.388	8.471	61.479
sses with other risks (x1000 ECU)	0	0	169	230	293	359	427	436	444	453	2.811
tal losses	0	1.956	4.120	6,215	8.353	8.500	8.649	8.740	8.832	8.925	64.290
st of vaccination campaigns (x1000ECU)	0	0	0	0	0	18.817	19.079	19.345	19.615	19.890	96.746
ins following eradication of rinderpest (x1000ECU)	**0**	**1.956**	**4.120**	**6,215**	**8.353**	**27.317**	**27.728**	**28.085**	**28.447**	**28.815**	**161.036**
eep population in thousands of head	126.000	128.520	131.090	133,712	136.386	139.114	141.896	144.734	147.629	150.582	
at population in thousands of head	142.976	145.836	148.752	151,727	154.762	157.857	161.014	164.234	167.519	170.870	
population in thousands of head	19.255	19.833	20.428	21,040	21.672	22.322	22.991	23.681	24.392	25.123	
ins in production of cattle (x1000 ECU)	0	10	19	30	40	51	62	73	85	97	465
ins in production of sheep (x1000 ECU)	0	16	34	51	70	89	109	129	151	154	803
ins in production of goats (X1000 ECU)	0	19	38	58	79	101	123	147	171	175	911
ns in production of pigs (x1000 ECU)	0	40	82	127	174	224	277	309	367	429	2.028
al gains through improved productivity (x1000 ECU)	**0**	**84**	**173**	**266**	**363**	**464**	**571**	**658**	**774**	**854**	**4.207**
al gains due to PACE (x1000 ECU)	**0**	**2,040**	**4,293**	**6,481**	**8.716**	**27.781**	**28.299**	**28.743**	**29.221**	**29.668**	**165.244**
st of the programme (x1000 ECU)	**14,724**	**24,829**	**20,590**	**13,377**	**8.792**						**81.388**
ances (x1000 ECU)	**-14,724**	**-22,789**	**-16,297**	**-6,896**	**-76**	**27.781**	**28.299**	**28.743**	**29.221**	**29.668**	**83.855**

Out of 32 countries, excluding Zambia and Malawi, ich belong to the SADC

2.2. *Supplementary analysis: the risk-based approach*

In the face of a major epizootic emergency such as rinderpest three types of situation have been considered in judging not only the suitability of actions to combat the disease but above all the epidemiology activities that PACE wishes to set up:

1. Unprotected livestock (unvaccinated) where the disease entails considerable losses, as was the case when rinderpest was introduced at the beginning of the century or after JP15 was stopped.

2. Livestock that enjoys relatively strong protection and where disease results in slight, or even marginal, losses. The presence of the disease does however require continued action to protect livestock (vaccination campaigns) if the situation is to be maintained. This was the situation prevailing in most countries with regard to rinderpest at the outset of PARC in 1986.

3. Livestock threatened by a pathogen that in terms of loss merely represents a potential risk. This is the case for the hypovirulent strain that has no doubt been present in East Africa for several decades.

These risk-based situations evolve over time, space and project life, and this clearly shows the need to view PACE in an overall context. West African countries, for instance, that are obliged to stop vaccinating to ensure proper surveillance ("OIE pathway") will in a few years' time again be very disease prone and will, in case of reintroduction of the disease, find themselves in above situation n°1. Likewise, some countries or parts of countries can be expected to move during the course of the project to situation n°1 from the situation n°2 (Ethiopia) or situation n°3 (Kenya, Tanzania).

2.2.1. Unprotected livestock

In this case, the suitability of epidemiosurveillance and control activities it generates will be assessed on the basis of the costs involved, but above all according to the losses that the disease may induce and that could be avoided if action were taken.

In terms of rinderpest, the catastrophic effects when it was reintroduced at the beginning of the century (loss of 80% of the continent's cattle) or when it returned after JP15 (loss of several hundreds of thousands of animals) easily provides financial justification for the efforts undertaken to date to eradicate the disease (approximately 115 million ECU for PARC and 80 million ECU for PACE). In addition to the direct losses mentioned above, it is necessary to take into account the loss of livestock production that would have been generated by these animals, i.e. 2.5 to 4 times the number of animals lost (based on an annual off-take rate of 8 to 13%) over the 30 year-period, without taking into account the cumulative production in terms of livestock growth. Inasmuch as a vaccination stop and epidemiosurveillance constitute essential elements for the eradication of the illness in accordance with the "OIE pathway", which is "probably" the only way to avoid a return to the above state

of affairs, the combination of epidemiosurveillance-control programmes, is therefore certainly justified from a financial point of view.
However, there are other epizootic diseases in Africa, which produce clinical situations that are just as dramatic and where technical tools for eradication or effective prevention are missing. In such cases, which represent a real and probably increasingly frequent threat to all African countries, setting up co-ordinated regional epidemiosurveillance networks also appears to be economically justified, in view of the preventive action this would allow, even when the risk probability is slight. Two recent examples involving diseases for which satisfactory therapeutic tools and vaccinations are unsatisfactory serve to illustrate this point.

- In Botswana, a country that obtains 5% of its export revenue from livestock, the recent introduction of CBPP from Namibia and Angola and its extension to the north of the country represent a definite threat to the maintenance of the export quota to Europe and the corresponding source of income. In 1995 and 1996 the government was obliged to undertake an extensive health and prevention programme involving the culling of several hundred thousand animals to eradicate the disease. The cost of this operation has been estimated at 400 million US$, i.e. 4.5 times the cost of PACE for 32 countries. An effective epidemiosurveillance network such as that which PACE hopes to set up would probably have made it possible to avoid such a disaster through early and selective measures, which would have been far less costly (a few million $).

- In Ivory Coast losses following a recent outbreak of African swine fever (1996-1997) have been estimated at between 12 and 30 million ECU, the government having had to agree straight away to devote over 7.5 million ECU to compensate producers for measures involving the slaughter of their animals. After this accident, a study on a specific epidemiosurveillance network, which would also cover Benin, Mali, Ghana, Burkina Faso, Guinea, Liberia and Togo, i.e. 5 times more pigs than in Ivory Coast, put the cost of infrastracture for this network at approximately 270.000 ECU, under external financing, and the recurrent costs at 120.000 ECU per year. It has been estimated that thanks to this network the proper use of health enforcement measures would make it possible to limit losses (including slaughtering for health reasons) to approximately 10% of the pig population.

In these cases, in view of the sums involved, there is obviously a financial justification for epidemiosurveillance networks, even if there is only a slight chance of the disease being introduced.

In fact the health situation in Africa is such that this type of risk can be viewed as very considerable in many countries. There is no doubt that PACE therefore seems to be a choice that is justified in view the persistence of these epizootic scourges.

2.2.2. The case of persisting endemic diseases of limited incidence

In such cases, as has been seen in the overall analysis concerning rinderpest, financial profitability of eradication is easily ensured simply by the fact that campaigns can be stopped. Inasmuch as eradication is certain to occur in this case,

the question arises as to the suitability of implementing more expensive campaigns based on concurrent epidemiological research rather than continuing the previous campaigns, which enabled disease-induced losses to be limited to a few tenths of a percent. In this case the risk is low as it corresponds to reduced incidence. Ethiopia is a point in case: it can in this connection be considered to be a success for the PARC approach which associates active research on the disease with vaccinations, Before the PARC, massive public health campaigns did in fact make possible more vaccinations and at a lower cost per unit. The PARC programme introduced a strategy of selective vaccinations that were limited and based on intensive epidemiological monitoring. The following table shows the main parameters for the financial evaluation of the two types of operation over 10 years, based on the model proposed by IBAR's economics unit, but using technical parameters revised by the mission.

Financial analysis of vaccination campaigns in Ethiopia

	Previous campaigns	**PARC campaigns**
Financial internal rate of return (%)	9.89	28.64
Cost/benefit ratio	0.75	1.45
Sharing out of the benefits generated (in ECU/person) : - for producers - for consumers :	 6 6	 15 12

It is clearly shown that the approach put forward by the PARC and based on epidemiosurveillance is by far the most economical because it allows for a rapid reduction in the number of vaccinations and thus in the cost of control. Conversely, over a long period (10 years) continuing with costly vaccination campaigns proves to be uneconomical (cost benefit ratio < 1) as the risk is progressively reduced. In this case also epidemiosurveillance is therefore fully justified.

Once again, the value of these figures is only relative for the purpose of comparing methods, and they must not be taken to be final.[4].

2.2.3. The case of countries exposed to hypovirulent strains

In this case cattle losses are negligible, as long as the virus does not revert to a form that is pathogenic for cattle. The advantages evidenced in the two other situations should therefore be affected by the probability of seeing this virus revert to pathogenic status for cattle. In fact, this probability tends to decrease progressively as evidence comes to light showing the prolonged presence of the virus among the

[4] In fact they depend to a large degree on the estimates based on technical data as explained under § 1. Using the same model and the same other points of analysis (duration, cost, etc.) IBAR's economics unit therefore

wildlife. It is thus legitimate to wonder whether from a strictly economic point of view, after the research planned at Pirbright may have further reduced this probability, it is appropriate to continue efforts and spending on eradication, or whether it is better to let matters take their course and envisage emergency intervention in the now unlikely event that the virus again turns into a pathology that poses a serious threat to cattle.

However, this viral strain is extremely pathogenic for large wild ruminants and it has recently severely affected these animal populations. Thus, in Kenya, in the area where the virus was finally shown to exist in 1993-1994, the number of wild animals prone to the disease has greatly diminished over the last 15 years. In Tsavo and Meru, for instance, these decreases varied from 50 to 85% between 1991 and 1997, depending on the species (60% for buffaloes). The virus is likely to be the main reason for this decline on account of what is probably a cyclical effect on animal populations over the century.

These animal populations represent a major tourist attraction for Kenya (and other countries within the region), the reduction in wild animal populations probably being the main reason for the decrease in tourism in the country since 1990, as evidenced in the following table[5].

YEAR	Numbers of Tourists (thousands)	Index 100 = 1990
1986	476.6	65.3
1987	529.1	72.6
1988	555.9	76.3
1989	642.1	88.1
1990	728.9	100
1991	673.3	92.4
1992	606.7	83.2
1993	679.8	92.3
1994	679.2	93.2
1995	537.9	73.8
1996	558.2	76.6
1997	390.0	53.5

The disease is probably not the only reason for this decline, but it undoubtedly represents the main reason. Virus control, for which epidemiosurveillance and a specific wildlife component are essential, is in this case justified above all by this contribution to the income from tourism. In Kenya this income represents 9.2% of GNP, 18% of foreign exchange, 11.2% of public revenue and 12.5% of official employment figures. In 1996 Kenya's income from tourism was approximately 22.1 million ECU, which is out of all proportion to PACE spending on virus eradication, estimated at less than 1.5 million ECU/year over 3 years.

[5] The previous increase, during the 80s, is mainly attributed to improved organisation of the management of

In this case, as in the previous situations, apart from any ecological considerations, the fight to eradicate the rinderpest virus and the use of epidemiosurveillance are thus fully justified from a financial and economic point of view.

ANNEX 20

PROPOSAL:

USE OF PPR VACCINE TO PROTECT RUMINANTS AGAINST RINDERPEST

I) AIM:

The EMPRESS expert consultation which was held in Roma in July 1997 has recommended the use of PPRV vaccine instead of the rinderpest one to vaccinate animals against rinderpest in endemic areas. The intention for the use of this heterologous vaccine is to ease the detection of serological traces of rinderpest virus in susceptible animals. This is very important when facing mild rinderpest virus strain which might circulate in susceptible animal population without causing significant clinical signs. The important prerequisite for such strategy is the availability of data which prove that PPR vaccine is effective for the protection of animals, particularly cattle, against rinderpest. The aim of the present project is to provide the information when deciding to shift from homologous to heterologous vaccine in rinderpest eradication campaigns.

II) Background:

Because of its high mortality and high morbidity rates, at least in its classical form, rinderpest is one of the most dreaded animal diseases. Concerted international efforts have confined this disease to few foci in Africa, the Middle East and Asia. In this way, they have contributed to reduce losses due directly to rinderpest itself. However, in endemic areas, it still remains a serious cause of economic losses araising from:

- the exclusion of the infected country from international animal trade,
- the negative impact on tourism income when visits of natural parcs have to be restricted during rinderpest outbreaks in wildlife.
- the necessity, in some circumstances, to maintain vaccination campaigns to control the disease. If the cell culture attenuated vaccine currently used is not expensive itself, the logistics which are implemented during rinderpest vaccination is costly.

Because of this economic importance of rinderpest, efforts are being made to eradicate this disease from the world. For such endeavour, an OIE expert consultation meeting

(vaccination)" to "the provisional freedom from disease (cessation of vaccination)", "freedom from disease" and finally "freedom from infection". This last step implies that no rinderpest antibody should be detected in susceptible animals for at least two years of intensive epidemiosurveillance.

Following the rinderpest mass vaccination which has been conducted since 1980's, in many areas in Africa, the Middle East and Asia, no disease case has been recorded for years. The authorities of the concerned countries are ready to declare themselves provisionally free from the disease. Unfortunately, some rinderpest foci still exist in countries in which vaccination campaigns should be continued. The same status should be maintained in disease free areas which are at the borders of the infected ones in order to serve as a buffer to prevent rinderpest from escaping into large vulnerable zones. There is no possibility now to distinguish antibodies arisen by wild type of RPV from those obtained after vaccination with the attenuated RPV strain. Therefore, the use of this latter virus might overlook the presence of a mild RPV which is not causing serious clinical symptoms but which could be detected easily by a serosurveillance. Thus, there is a need to conciliate the necessity of controlling rinderpest in infected and buffer zones by vaccination with the objective to go very quickly to the situation of "NO RINDERPEST ANTIBODIES IN SUSCEPTIBLE ANIMALS". This conciliation can be obtained by the use of a vaccine distinguishable from wild types RPV. The PPR vaccine strain is a good candidate for such purpose because a test is available for the detection of PPR specific antibodies (Libeau et al., 1995). Peste des petits ruminants virus (PPRV) and rinderpest virus belong to the *Morbillivirus Genus* in the *Paramyxoviridae* family. This genus regroups closely related viruses and includes measles virus (MV), canine distemper (CDV), phocine distemper virus (PDV), dolphin and porpoise morbilliviruses (DMV and PMV). Mornet et al. (1956), Gibbs et al. (1979) have shown that cattle given virulent PPRV did not show an overt disease but are protected against a challenge rinderpest virus. In the same way, small ruminant given rinderpest virus are protected against PPR (Gibbs et al.; 1979). This crossprotection between RPV and PPRV has been exploited with success for many years to protect small ruminants against PPR by the use of live attenuated rinderpest virus as heterologous vaccine (Bourdin et al., 1970; Taylor W.P., 1979; Bonniwell M.A., 1980). In 1995, Couacy et al. have demonstrated that attenuated PPRV can be used to protect goats

weeks after vaccination. There is no report concerning a long term immunity provided in small ruminants by PPR vaccine against rinderpest. Neither is data relative to the use of this vaccine in cattle available. Morbilliviruses are epitheliotropic and lymphotropic viruses. Rossiter and Wardley (1985) have demonstrated that virulent RPV grows more readily in bovine than in small ruminants lymphocytes whereas virulent PPRV grows better in sheep and goats lymphocytes. However there is no significant difference in the infection rate of both types of lymphocytes by the attenuated rinderpest virus, a rate which is very low in comparison with those obtained with virulent viruses. Such experiment which can provide preliminary information on the mechanism of the immunity against PPR or rinderpest has not been carried out yet with the attenuated PPRV. Thus, preliminary investigations should be carried out to prove the efficacy and safety of this virus as a heterologous vaccine against rinderpest. The informations expected from these investigations are relative to:

-the minimum effective dose,

-the status of vaccinated animals subsequently infected by virulent rinderpest virus (are they asymptomatic RPV carriers and, thereby, sources of contamination?),

-the effect of vaccination during an outbreak,

-the duration of immunity.

The present project aims to undertake experiments in view to provide information on the above mentioned subjects. Another objective is to improve the thermostability of the attenuated PPRV vaccine by the same as done by Mariner et al. (1990) for tissue culture rinderpest vaccine.

PROTOCOLS

1) *Determination of the minimum infectious dose with the minimum effective dose of PPRV vaccine in cattle and goats.* In order to provide an easy means to assess vaccine potency of the tissue culture attenuated rinderpest virus, Plowright (1962) has carried out a comparative titration in parallel in primary BK cells and cattle. He found identical results in both systems. This suggested that cell culture can be a substitute for cattle in assessing the potency of attenuated rinderpest vaccine produced in BK cells. Taylor and Best (1977), with the objective of using rinderpest vaccine in goat for protection against PPR, undertook the same type of comparative titration and found that $10^{5.4}$ TCID50 of tissue culture rinderpest vaccine (TCRV)

the immune reponse to TCRV and the ability to withstand challenge by PPRV was not clearly established, they proposed to use BK cells for the prediction of immunising efficacy of this vaccine in goats against PPR. Martrenchar et al. (1997) found that at least $10^{0.6}$ TCID50 of attenuated PPRV are sufficient to protect goats against PPR challenge. Unfortunately, their experiment was incomplete since the minimum effective dose was not determined. Experiments to be carried out during the present project will fill in this gap. A virus stock will be titrated simultaneously on vero cells, goats and cattle. To establish a relationship between immunising dose 50 (ID50) and the vaccine efficacy, the inoculated animals will be challenged. A tenfold dilution series will be made from a virus stock and and four dilutions with estimated titres ranging from 100 TCID50 to 0 will be titrated on vero cells. The same virus dilutions will be inoculated to cattle and goats: 5 cattle/dilution but 10 goats/dilution. The animals will be followed clinically with serum collection at 0, 7, 14 and 21 days post-vaccination. After the last bleeding, the animals will be challenged with virulent RPV (all cattle and half the number of goats/dilution) and with virulent PPRV for the other half of goats (see table 1). The challenge is carried out by subcutaneous route. Each group of animals is in individual loose box and is handled in such a way to avoid transporting possible excreted virus from one group to another. From day 0 of challenge to day 14, the animals are bled every two days for serum and lymphocyte collection. Nasal and ocular swabs are collected with the same frequency. Lymphocytes and swabs will be analysed by PCR for the presence of virulent virus (detection of challenge virus multiplication and excretion). The collected serums will be titrated against both PPRV and RPV.

OUTPUTS of this experiment:

-relation of TCID50 and immunising dose (ID50) for goats against PPR or against RP,

-relation of TCID50 and immunising dose (ID50) for cattle against RP,

-relationship between ID50 and minimum effective dose in cattle or goats against RP,

-recommendation of dose to be used for routine vaccination.

Table 1

animal species	*group n°*	*vaccine dose*	*challenge virus*
cattle	1	100	RPV
cattle	2	10	RPV
cattle	3	1	RPV
cattle	4	0	RPV
goats	5	100	RPV
goats	6	10	RPV
goats	7	1	RPV
goats	8	0	RPV
goats	9	100	PPRV
goats	10	10	PPRV
goats	11	1	PPRV
goats	12	0	PPRV

2) Status of PPRV vaccinated animals (goats and cattle) and challenged by intranasal route. 5 goats and 5 cattle will be vaccinated with recommended PPR vaccine dose. After 3 weeks, they will be challenged intranasally with virulent rinderpest virus (Saudi strain). The day following this challenge, each group of species is moved to new loose boxes. They are maintained with two in-contact susceptible cattle for each box (cattle are better than goat as sentinels for rinderpest, see couacy et al., 1995; Anderson et al., 1990). Animals are daily followed clinically. Swabs and blood (serum, lymphocytes) are collected every two days in view to detect, by PCR, challenge virus multiplication and excretion. Personel who handle vaccinated and challenged animals are different from those handling the control one in order to avoid crosscontamination by animal attendants. The animal surveillance is carried for 3 weeks if necessary.

OUTPUT OF THIS EXPERIMENT: determination whether or not PPRV vaccinated animals could be asymptomatic rinderpest carrier

3) Determination of delay between vaccination and effective protection against RP. The FAO experts would like to recommend the employment of the attenuated PPRV as heterologous vaccine in both infected and buffer zones. In case of its use in infected zones, some animals will be vaccinated while in rinderpest incubation or will be infected soo after the vaccination. The present experiments are designed to predict the outcome of the disease in such situations.

-Short term challenge.Four groups of vaccinated animals, each composed of 5 goats and 2 cattle, will be challenged by intranasal route with virulent RPV at 2, 5, 7 and 14 days post- vaccination. The day following the challenge, 2 sentinel cattle are introduced into each group. A fifth group, composed of non vaccinated susceptible animals (5 goats+2 cattle) will serve as control for the challenge. Each group is maintained separately in a loose box. The sentinel animals are never handled to avoid mechanical contamination. The other animals are followed clinically with the collection of blood and nasal-ocular swabs every two days post-challenge. The clinical survey is carried out for 2 weeks (the use of RPV Saudi usually leads to the death of control animals in one week).

-Prechallenge followed by vaccination. The scheme of this experiment is similar to the precedent but here the vaccination follows the challenge. Four groups of RPV challenged animals (by intranasal route), each composed of 5 goats and 2 cattle, will be vaccinated at 0, 2, 5, and 7 days post-challenge. The RPV strain to be used in the challenge should have an incubation period longer than 3 days (/RPV Nigeria Buffalo). This condition excludes the most virulent RPV strain: the RPV Saudi. The day following the vaccination, 2 sentinel cattle are introduced into each group. A fifth group, composed of non vaccinated susceptible animals (5 goats+2 cattle) will serve as control for the challenge. Each group is maintained separately in a loose box. The sentinel animals are never handled to avoid mechanical contamination. The other animals are followed clinically with the collection of blood and nasal-ocular swabs every two days post-challenge. The clinical survey is carried out for 2 weeks.

OUTPUTS OF THESE EXPERIMENTS: Information on the short term protection provided by the vaccine against rinderpest are provided.

4) Study of the cellular immune responses induced by the PPR vaccine and the duration of provided immunity. The immunity provided by morbilliviruses is related to both humoral and cellular mediation. Therefore in order to evaluate the effectiveness of the PPR vaccine, both types of immune responses will be studied in cattle and goats on a three year period. By comparing the responses obtained in goats and cattle, the antigens involved in each case and the persistence of the PPRV-specific memory T-cells, it should be possible to predict the effectiveness of a PPR vaccine in protecting ruminants from PPR and RP. To that effect, 30 cattle and 40 goats will be vaccinated and maintained in a disease-free condition until needed for the challenge experiment. Nevertheless, 10 PPR/RPV susceptible goats will be maintained with the vaccinated animals. They will serve as controls for an accidental introduction of PPRV (or RPV).The kinetics of the cellular immune responses induced by the PPR vaccine will first be studied during the first 3 months of the experimentation. Identification of the subsets of recruited lymphocytes and of the viral protein(s) involved will be achieved. To that effect, 5 cattle and 5 goats will be bled on a weekly basis for 3 months. Peripheral blood mononuclear cells (PBMC) will be purified by a Ficoll-Paque density gradient. PBMC will be phenotypically characterized using monoclonal antibodies specific for bovine or goat leukocyte differentiation antigens. The evolution of the various cell populations (B-cells; CD4 T-cells; CD8 T-cells; g/d T-cells and monocytes) and of their state of activation will then be studied by flow cytometry. The lymphotropism of the PPRV in cattle and goat PBMC will also be studied by the same technique. The responsiveness of the PPRV-primed T-cells will be checked by performing lymphoproliferation tests (LP). PBMC from cattle and goats will be stimulated *in vitro* with PPRV and RPV. Identification of the protein(s) involved in T-cell activation will be achieved using the whole virus and the various purified proteins. Since we are dealing with intracellular organisms, the cytotoxic T-cell (CD8) response should also be evaluated in terms of functionality. The function of the CD8 T-cells is to lyse autologous infected cells, presenting the recognized antigens on its surface. Therefore, for this test, autologous cells will be infected *in vitro* by PPRV or by RPV and labelled in order to follow the lysis. To avoid the use of radioactive component (^{51} Cr), which is the classical method, the target cells will be labelled with a fluorescent component (calcein). The CD8 cytolytic activity will be determined by the calcein-release, due to the lysis of the target cells after incubation *in vitro* with the CD8 T-

collection will be done every two months until the sixth month for each animal and at the day of every challenge.

The persistence of the PPRV-specific memory T-cells will be followed after each challenge during a 3-year study and their usefullness as protective against RP. 4-5 cattle and 5 goats will be withdrawn from the group and challenged with RPV Saudi at 6, 12, 18, 24, 30 and 36 months post-vaccination. The day following the challenge, they will be housed in new boxes with 2 cattle sentinels. Two other cattle, in a separate box, will serve as controls for the challenge. Clinical survey will be carried out for two weeks, with collection of nasal-ocular swabs every two days with blood collection for serum and lymphocytes. These latters will serve for the study of the persistence of the PPRV-specific memory T-cells. After slaughtering the animals, the lymph nodes will be collected too. Circulating (blood collected cells) and resident (lymph nodes cells) PPR-specific memory T-cells will be stimulated *in vitro* (LP tests) with PPRV, RPV and with the appropriate purified proteins. These cells will be phenotypically studied by flow cytometry and functional tests will be carried out for CD8 memory T-cells.

If the PPRV-primed T-cells respond similarly to PPRV and RPV and according to the clinical survey, this will demonstrate that the PPRV-specific memory T-cells can induce a cross-protection against RP.

The duration of immunity provided by the attenuated PPRV against rinderpest will be analysed for a 3 year period (a total of 6 challenge experiments at 6,12,18,24, 30 and 36 months post vaccination). However, if at the end of the first year, the results obtained are similar between PPRV and RPV in terms of subsets of lymphocytes recruited and protein(s) involved and since it is known from previous studies that the attenuated PPR vaccine can protect goats for at least 3 years, one might extrapolate that these PPRV-memory T-cells can also protect against RP for 3 years. Thus, cattle vaccination with PPRV vaccine could be recommended at the end of the first year of the project.

OUTPUTS OF THESE EXPERIMENTS:

-long term duration of immunity by PPR vaccine against RP;

-identification of the subset of lymphocytes stimulated by the PPR vaccine in small ruminants and cattle and responsible for the immunity.

5) Production of a thermostable PPR vaccine. PPRV, like all morbilliviruses, is thermolabile. The half-life of PPRV in liquid form as been estimated to be 2.2 mn, 3.3 hours, 9.9 days and 24.2 days at respectively 56, 37, 4 and -20 °c (Rossiter and Taylor,). There is no data available about the virus in the lyophilized state. However it could be assumed that the PPRV thermostability in that state will not be different from that of RPV. Even though the attenuated PPRV is effective, its use in RP/PPR vaccination campaign will require a constant maintenance of the cold chain in all steps of the process. This necessity will make the campaigns costly. Therefore, in order to eliminate the necessaty of the cold chain, it is intended to develop a thermostable PPR vaccine based in the same manufacturing techniques which were successfully used with tissue culture rinderpest vaccine (Mariner et al., 1990). The vaccine, once produced, will be stabilized in different mediums which were tested by Mariner et al. (1990): LS, BUGS, LGS. Then it will be freeze dried in a total cycle of 72 or 76 hours with vacuum regulated at 10 mTorr or 100mTorr. The stability of these products will be tested, in lyophilized form and also when reconstituted in diluent (physiological water), at the following temperatures: -20, +4, 37, 42 and 50 °c. The virus recolted at each point will be titrated on vero cells in microwells plate.

OUTPUTS OF THE EXPERIMENT: obtention of a thermostable PPR vaccine.

CONCLUSION

Different rinderpest vaccination campaigns are in a consolidation phase aiming at the eradication of this dreaded animal disease. The use of an effective vaccine which can be distinguished serologically from the wild type rinderpest virus will improve the confidence in the seroepidemiosurveillance and will speed up the steps leading to the eradication of the disease. The PPR vaccine, which has been proven to be safe in PPR control, might be used successfully as a heterelogous vaccine against rinderpest. Tests are available for this specific distinction from rinderpest viruses. This present project is expected to provide immunological and clinical tests data for an eventual use of PPRV vaccine in rinderpest eradication campaign. The experiments are designed to test the duration of immunity on a period of 3 years. However, if the one year immunity test is positive, it could be advised to employ this vaccine for routine use in rinderpest control campaign without waiting for the 3 year term immunity

3 years (Colas et al., unpublished data), and if the comparative analyses prove that there are identical immunological mechanisms in goats and cattle with PPRV vaccine, one can expect to have the same long term immunity in both species.

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Additional support staff :

Additional support staff in European laboratories are 2 scientists and 1 laboratory technician.

An immunologist and a veterinarian are needed for the 3 years of this project. The immunologist will be in charge of the study concerning the cellular immune responses induced by the PPR vaccine and the RP vaccine. He will stay at CIRAD-EMVT for the main part of his work and will go overseas to collect samples after every challenge.

The veterinarian will spend 1 year at the IAH-Pirbright laboratory to follow all the animal experimentations. The next 2 years, he will come to CIRAD-EMVT, as responsible for the development of the thermostable PPR vaccine and will be in charge of every field trials overseas.

The laboratory technician will be employed for two years by the IAH-Pirbright laboratory to perform all the serological assays corresponding to the animal experimentations.

Additional equipment :

* CIRAD-EMVT

- One cytofluorometre :

The aim of this project is to study the cellular immune response of intracellular organisms. In this contexte, the cytotoxic T-cell (CD8) response is mainly involved in the immune response. Therefore, the CD8 response has to be evaluated, not only phenotypically in terms of frequence and activation state but also in terms of functionality (lyse of autologous infected cells presenting the recognized antigens on its surface). In order to avoid the use of radioactive component (^{51} Cr), which is the classical method, the cytotoxic assays have to be performed with target cells labelled with a fluorescent component (calcein). The CD8 cytolytic activity will then be determined by the calcein-release which is measured by a cytofluorometre.

* IAH-Pirbright laboratory

- One -70°C freezer :

A -70°C freezer is needed to keep cells, viruses and samples taken from the animal

Project proposal for PACE related research.

AIM:

As the Pan African Rinderpest Campaign (PARC) progresses there are still some unresolved questions to be answered regarding the pathogenicity and epidemiology of the disease. There have been suggestions that "mild" strains may persist in wildlife but become more pathogenic after serial passage in cattle but there is very little evidence to support this. Recent technological advances such as the polymerase chain reaction (PCR) have increased the sensitivity of diagnostic assays and resulted in the detection of virus genome in a number of eye swabs from cattle in Kenya and Tanzania. Following nucleotide sequencing of the PCR products, some of the positive results may be due to the presence of vaccine virus RNA in the eye swabs. This was unexpected based on previous reports and deserves further investigation if we are to correctly interpret diagnostic results. Preliminary development of a rapid pen-side diagnostic assay shows great promise but the test requires further field trials. This project is designed to investigate these important issues which have a major bearing on the future strategy of PARC.

There are also other activities, which although not research projects are equally essential to the success of PARC. Molecular characterisation of rinderpest virus strains has offered the opportunity for tracing the origin of outbreaks and has led to a greater understanding of the epidemiology of the disease in East Africa and elsewhere. Continued funding is required to support this expensive service so essential to PARC, along with funds for large animal

experimentation to establish the pathogenicity of newly isolated strains of virus. Closely allied to all of these investigations is the need to train and continually update African scientists in the latest technical advances, especially those who are employed in the Regional Reference Centres. It would be highly appropriate if the projects and duties described below were carried out at the FAO World Reference Laboratory for Rinderpest (WRLR) by an African scientist actively involved in PARC. This could be accomplished in the form of a biennially renewed EU-PARC Fellowship which would not only increase our understanding of the disease but also provide invaluable specialist training leading to future self-sustainability.

.. Serial passage of "mild strain" of rinderpest virus in cattle

Introduction

Contrary to some reports, the rinderpest virus strain isolated from eland in Nairobi National Park, Kenya in 1996 does not result in a mild disease in all cattle. Following experimental infection of four cattle, three cattle showed mild clinical signs but one showed full clinical rinderpest and died at 18 days post infection (dpi). The question remains, whether serial passage of this virus in cattle will increase its virulence even further. The PARC epidemiologist, Paul Rossiter, in a personal communication reported that he had observed full clinical rinderpest with the three "D's" (death, discharge and diarrhoea) in cattle following the Nairobi Game Park outbreak, and suggested that the strain had become more virulent after passage in cattle. Since then there have been conflicting reports from the field and the hypothesis that wildlife strains can become increasingly virulent for cattle after serial

passage requires further investigation.

Following outbreaks in Kenya and Tanzania the main strategy has been mass vaccination of all cattle. This does not take into account any possible involvement of sheep and goats. Although not thought to be a major factor in the past, further work is required to establish the role of small ruminants with this particular strain. Studies are required to determine the susceptibility of sheep and goats to the current strain and establish if transmission takes place between cattle, sheep and goats. This should be linked to the experiments on passaging the eland strain through cattle and may have major implications on the eradication strategy used in this region.

Experimental design

A minimum of five cattle per passage will be required due to variation in animal susceptibility. Five cattle will be infected subcutaneously with a suspension of the original Kenya/eland/96 isolate. Cattle will be housed 2 or 3 to a box dependent on animal size and examined daily for clinical signs. Blood samples will be collected daily to monitor the humoral immune response. Duplicate eye swabs will be collected every two days for evaluation of the pen-side diagnostic test and also for PCR. Any PCR products will be nucleotide sequenced. Assuming that some animals develop clinical signs, material from the animal showing the most severe clinical signs will be collected and passaged into a further five cattle (if no animals develop clinical signs a further five cattle will be infected with the original material). This process will be repeated four times.

:he animals will be monitored for clinical signs and blood samples and eye swabs collected. f sheep or goats develop clinical signs the material will be passaged into a further 2 sheep nd 2 goats. If no clinical signs are evident, material from the cattle passage will be used.

:/when cattle show clinical signs susceptible sheep and goats will be introduced into the ıimal box for transmission studies. Similarly, if sheep and goats show clinical signs, or ıring the last passage in sheep and goats, susceptible cattle will be introduced for evidence f transmission.

utputs

) Establish if serial passage of "mild" strains increases their pathogenicity.

) Establish susceptibility of sheep and goats to Kenya/eland/96

Establish if transmission of Kenya/eland/96 virus takes place between cattle, sheep and ıats

Further our understanding of the role of sheep and goats in the epidemiology of rinderpest.

Transmission experiments and investigation into amounts of virus ccreted by animals infected with different strains.

troduction

ttle is known about the transmission rate of the "mild" strains of rinderpest virus. This has najor bearing on the size of the cattle population needed to maintain the virus in the field e. R_0 value). If an estimate of the transmission rate for different strains could be termined, these figures could be introduced into the computer model to give a more

meaningful analysis. If the Kenya/eland/96 strain shows increased virulence following passage in cattle (see experiment 1) then the transmission rates of the low and high passage viruses could be compared. These in turn could be compared to a more virulent strain. If the Kenyan strain shows no detectable increase in virulence, then it could be compared to two other strains of epidemiological interest. Eye and nasal swabs samples will be collected and titrated in tissue culture to estimate the amount of virus excreted at the various stages of infection by the various strains. This may give a correlation between the amount of virus excreted and the transmission rate.

Experimental design

One steer each will be infected with each of the three rinderpest virus strains and maintained in separate housing. Four susceptible steers will be introduced into each box to allow contact transmission. Ocular and nasal swabs will be collected daily. Blood samples will be collected for detection of the humoral antibody response and rectal temperatures will be recorded daily. The ocular and nasal swabs will be titrated in tissue culture to compare the amount of virus excreted for each strain of virus.

Outputs

1. Establish the duration of virus excretion in cattle following infection with three different virus strains.

2. Evaluate correlation between the level of virus excretion and the transmission rate.

3. Generate data for inclusion in the computer model to provide more meaningful analysis.

3. Detection of vaccine virus genome in eye swabs by PCR following vaccination

Introduction

During the recent outbreaks in Kenya and Tanzania eye swabs submitted for diagnosis have been positive by the "Clearview" pen-side test and also by PCR. Subsequent nucleotide sequencing has shown the virus to be similar to Kabete O, the vaccine strain. This could be explained by the animals being recently vaccinated in the face of an outbreak, but it has always been believed that the vaccine virus has lost its epitheliotropism and should not generalise sufficiently to reach the eye. Alternatively, a field strain may be circulating which has a similar nucleotide sequence to the vaccine strain. Because of the importance of PCR using eye swab material in the diagnosis of rinderpest, particularly that due to mild strains, experiments are required to determine if vaccine virus can be detected in eye swabs following vaccination and if so to establish when and for how long samples remain positive.

Experimental design

Ten cattle will be vaccinated using the RBOK attenuated vaccine. Duplicate eye swabs will be collected daily over one month and tested for RPV antigen and RNA using the pen-side diagnostic assay and PCR. All PCR products will be nucleotide sequenced.

Outputs

1) Establish if /how long rinderpest virus is present in the eye following vaccination.

2) Clarify the significance of finding virus with a nucleotide sequence similar to the vaccine strain in eye swabs collected in both Kenya and Tanzania.

4. Field trials of pen-side diagnostic tests

Prototypes of a pen-side diagnostic test based on Clearview technology have been field-trialed in Pakistan and to a limited extent in Tanzania. The results have been promising and devices have been used successfully in both countries to diagnose rinderpest. The test is currently being optimised and an alternative production company has been identified. Funds are required to undertake more extensive field trials. Once validated and adopted for use in PARC, funds should be allocated for purchase of the devices for national field services, particularly of those countries considered most at risk. The use of this technology would also provide support for government declarations to OIE for freedom from disease, by providing an efficient surveillance system.

It is envisaged that field trials will take place in a country in East Africa where disease is present at the appropriate time.

Outputs

1) Field validation of the pen-side diagnostic test

2) Enable rapid pen-side diagnosis and allow rapid implementation of control measures, hopefully resulting in a reduction in animal losses

5. Molecular characterisation of isolates and large animal pathogenesis studies

Introduction

Although not a research project, funding must be set aside for the molecular characterisation

of all rinderpest virus isolates. This provides the only means of tracing the source of outbreaks and has proved crucial in enhancing our understanding of the epidemiology of the disease in East Africa. There is an immense amount of work involved, particularly when the samples have to be cloned and many clones sequenced. Funding is currently supplied by FAO for the basic diagnostic service but does not cover the more expensive techniques such as molecular characterisation. Further funding is required to provide a full-time dedicated service for PARC.

Funding is also required for animal experimentation. This is particularly important when examining "mild" strains or strains isolated from game animals, to determine their virulence in cattle. Particularly isolates giving a similar nucleotide sequence to the vaccine virus strain. Until now the pathogenicity studies carried out at Pirbright have been at the Institute's expense. It is proposed that a sum of money should be set aside at the PARC Co-ordination Unit, Nairobi to cover animal experimentation costs as and when deemed necessary. The selection of strains and design of experiments would be by mutual consent between PARC and IAH as new outbreaks occurred or when strains are isolated. Funds would be disbursed to IAH to cover the animal costs on completion of a suitable report.

All these activities should be based at the WRLR and it would be highly appropriate if they were undertaken in the form of a Fellowship by a scientist from one of the countries involved in the PARC. The Research Fellow would also carry out the above research projects within the two year period under the supervision of staff at the IAH Pirbright. This would serve almost as an apprenticeship and would be ideal training for a scientist ultimately to be

with the post holder replaced biennially, ensuring a constant updating of relevant staff.

Outputs

1) Fast, sustainable service for the molecular characterisation of rinderpest virus isolates.

2) Better understanding of the epidemiology of rinderpest in Africa.

3) Increased understanding of the virulence of contemporary virus isolates.

4) Regular, updating and training of African scientists and creation of a pool of knowledge as a sustainable resource for the future.

Project Proposals for CBPP research

Now that RP is on the verge of eradication in Africa, CBPP is becoming the greatest threat to cattle raising.
The reasons for this predicted and seemingly unavoidable re-emergence are numerous. For many years, the vaccination campaigns against rinderpest had also contributed to the fight against CBPP as combined vaccines were used. Repeated vaccinations raised the immunity of the cattle populations significantly and CBPP was under control with few sporadic outbreaks. Still now, countries that do vaccinate against CBPP on a regular basis, whatever the vaccine used, do not suffer from many outbreaks. These outbreaks are very often caused by importation of sick animals from neighboring countries.
The abandon of mass vaccination against rinderpest will automatically induce a drop in the immune status against CBPP and favour dissemination of the disease. This is what happened in the horn of Africa in 1994-1995 with the re-establishment of CBPP in countries such as Kenya, Tanzania and Uganda, which had been CBPP-free for many years.
Sporadic vaccination campaigns against CBPP are not likely to induce a significant drop in the prevalence of the disease.
The best prophylactic approach for disease-free and infected areas should continue to be that of large scale and repeated vaccination. Good diagnosis tools need also to be available.

However, the currently used attenuated live vaccines suffer from some limitations: short-term protection (at best, vaccinated animals will be protected for one year), not all the animal are protected, use of live material with problems of stability of the strain, no vaccinal marker...Furthermore, even if the quality control has been improved by the establishment of PANVAC, only a limited number of batches are controlled and vaccination failures can then also be due to other factors including bad manufacturing process, improper storage and mishandling by the vaccinators.

Comparatively, recent research has dramatically improved the diagnostic procedures. Direct detection by the Polymerase Chain Reaction (PCR) now allows a specific and rapid identification of the CBPP agent. This technique has the advantage that it could be used on dried samples (i.e. loaded on paper filter) sent to regional reference center without the need of a cold chain. New serological tests, as the competitive ELISA were developed and should also permit to establish a reliable evaluation of the disease prevalence. Furthermore, molecular techniques also allow now the differenciation of strains coming from various regions.

Therefore, in order to achieve the eradication of CBPP, the major tool which is still missing is a good vaccine. For this purpose, the main goals which should be pursued are: all vaccinated animals should be protected, improvement of the duration of protection, it should last at least 2 years and improvement of the thermostability (vaccine efficacy should less depend on the cold chain).

Many approaches can be checked to develop new CBPP vaccine. The use of inactivated preparation certainly merits attention as new adjuvants, now available, may offer a better antigenic presentation and a better orientation of the immune responses. The development of recombinant vaccines could be very useful. By selecting the appropriate vector and protective protein(s), these type of vaccines could overcome the problems encountered with the classical ones, including the thermostability. Furthermore, the recombinant vaccines allow the introduction, in their genome, of a vaccinal marker.

However, whatever the approach selected, preliminary studies have to be developed since vaccine efficacy rely on the development of a protective immune response and on the long-lasting of this protection. Therefore, in order to select the appropriate adjuvant for an attenuated vaccine or the appropriate antigen(s) inducing the protective response, one must know before what characterizes a

immune response are responsibles for protection, which specific antigens confer protective immunity and also the duration of this immunity.

It is already known that whereas humoral immune responses play a major role in protection against systemic infections, protection against mycoplasma diseases of the mucosal surface appears to be accomplished via complex local and cell-mediated immune mechanisms.

Therefore, cellular immune responses of cattle facing CBPP have to be studied to identify the subpopulation of lymphocytes recruited during the infection and by which antigen and the cytokine released. Understanding the interaction between the multiple cells of the immune system and the role of regulatory factors produced by these cells will help to explain the immunopathology of the disease. A comparison of lymphocyte recruitment, antigen involved, cytokines factors released between infected, recovered and vaccinated animals will define the protective responses and the pathogenic ones.

According to these results, it will be possible, among the wide variety of adjuvants, to select the one which help to recruit the appropriate subpopulation of lymphocytes leading to the development of a protective immune response.

A long-lasting protection is based on the development of immunological memory which rely on the presence of pathogen-specific-memory cells having a long lifespan. This immunological memory, is defined by the acquired property of the immune system to respond more rapidly and more intensively to a second antigen stimulation. Therefore it is important, when selecting antigens to develop recombinant vaccines, to identify the ones which, not only induced a protective immune response but also long lasting memory cells. The memory cells have then to be used to screen the various mycoplasma antigens obtained by protein fractionation, in order to identify those eliciting an immune response which last over a long period after the vaccination.
Therefore, in order to develop new CBPP vaccine, the study of the cell-mediated immunity is the first step. The second step, to construct recombinant vaccine or subunit vaccine, will be the identification of the proteins involved in long-term protection, the selection of the genes coding for these proteins and their expression in appropriate vectors. The next steps will correspond to the selection of the right adjuvant and vaccinal marker and then to check the new CBPP vaccine efficacy in the field by performing challenge experiments.

OUTCOMES OF THESE EXPERIMENTS :

- Study of the cellular immune responses leading to disease or protection
  - identification of the subpopulation of lymphocytes recruited
  - identification of the cytokines released
  - study of the responsiveness of the memory cells to various mycoplasma antigens
- Identification of antigen(s) involved in protection
- Selection and clonage of the gene(s) coding for this (these) antigen(s)
- Selection of the appropriate vector and construction of a genetic recombinant expressing the protein(s) involved in protection
- Selection of the appropriate adjuvant
- Test of the vaccine efficacy by performing immunisation and challenge in the field

ANNEX 21

ABREVIATIONS AND ACRONYMS

ADB :	African Development Bank
ADCS :	Animal Disease Control Specialist
AGID :	Agar Gel Immunodiffusion test
AHA :	Animal Health Assistants
AHT :	Animal Health Technician
ANDIMAP :	Animal Disease Mapping System
ASAL :	Arid and Semi-Arid Lands
AT :	Assistant Technique
BAD :	Banque Africaine pour le Développement
BIRA :	Bureau Interafricain des Ressources Animales
BIRD :	Banque Internationale pour la Reconstruction et le Développement
BVD :	Bovine Viral Diarrhoea
CBAHW :	Community-Based Animal Health Workers
CBPP :	Contagious Bovine Pleuro-Pneumonia
CCPP :	Contagious Caprine Pleuro-Pneumonia
CFT :	Complement Fixation Test (CBPP)
CIRAD-EMVT :	Centre de Coopération International en Recherche Agronomique pour le Développement – Département d'Elevage et Médecine Vétérinaire Tropicaux
CLEARVIEW :	Rinderpest antigen detection test (Pirbright)
CVO :	Chief Veterinary Officer
DANIDA :	Danish International Development Agency
ECD :	European Commission Delegation
ECF :	East Cost Fever

ECU :	European Currency Unit
EDF :	European Development Fund
EISMV :	Ecole Inter-Etats des Sciences et Médecine Vétérinaires
ELISA :	Enzyme-Linked Immunosorbant Assay
EMPRES :	Emergency Prevention System for Transboundary animal and plant Pests and Diseases
ESAP :	Economic Structural Adjustment Program
EU :	European Union
FAO :	Food and Agriculture Organization of the United Nations
FIDE :	Fonds Interprofessionnel de Développement de l'Elevage
FMD :	Foot and Mouth Disease
GEWS :	Global Early Warning System (EMPRES)
GIS :	Geographic Information system
GNP :	Gross National Product
GPS :	Ground Positioning System
GREP :	Global Rinderpest Eradication Program
GTZ :	German Aid
HPA :	High Potential Areas
IAEA :	International Atomic Energy Agency
IBAR :	Inter-African Bureau for Animal Resources
IC-ELISA :	Immuno Capture ELISA
ICRC :	International Committee of the Red Cross
IDA :	International Development Association
IGADD :	Inter Governmental Agency for Desertification and Development
ILRI :	International Livestock Research Institute
ITDG :	Intermediate Technology Development Group

LDF :	Livestock Development Fund
LPA :	Low Potential Areas
LSD :	Lumpy Skin Disease
MI :	Meat Inspectors
MoA :	Ministry of Agriculture
MoH :	Ministry of Health
NAO :	National Authorising Officer
NGO :	Non Governmental Organisation
NSES :	National System for Epidemiological Surveillance
NIP :	National Indicative Program (EEC)
OAU :	Organisation of African Unity
ODA :	Overseas Development Agency (UK)
OIE :	Office International des Epizooties
OUA :	Organisation de l'Unité Africaine
PANVAC :	Pan-African Veterinary Vaccine Center
PARC :	Pan-African Rinderpest Campaign (Campagne de lutte contre la peste bovine)
PARC-VAC :	Participation Community - based Animal Health Vaccination Program
PB :	Peste Bovine
PCR :	Polimerase Chain Reaction
PIB :	Produit Intérieur Brut
PIP :	Project Implementation Program
PPCB :	Péripneumonie Contagieuse Bovine
PPCC :	Pleuropneumonie Contagieuse Caprine
PPR :	Peste des Petits Ruminants
PRA :	Participatory Rural Appraisal - interactive data gathering and planning tools

RAO :	Regional Authorising Officer
RIP :	Regional Indicative Program (EEC)
RP :	Rinderpest
RVF :	Rift Valley Fever
RVPMC :	Regional Veterinary Privatisation Management Committee
SADC :	South-African Development Community
SNSE :	Système National de Surveillance Epidémiologique
TA :	Technical Assistant
TADINFO :	Transboundary Animal Disease Information System
TB :	Tuberculosis
TCP :	Technical Cooperation Program (FAO)
TCRV :	Tissue Culture Rinderpest Vaccine
TFTS :	Tufts University, Boston, USA
TRVTTP :	Thermostable Rinderpest Vaccine Technology Transfer Project
UE :	Union Européenne
UNDP :	United Nations Development Program
UNICEF :	United Nations International Children Educational Fund
USAID :	United States Agency for International Development
VO :	Veterinary Officer
VSF :	Vétérinaires Sans Frontières
WB :	World Bank
WD :	Wildlife Department
WRLP :	World Reference Laboratory for CBPP (CIRAD-EMVT)
WRLR :	World Reference Laboratory for Rinderpest (Pirbright)
WVI :	World Vision International

BURKINA FASO

PSAE :	Programme Sectoriel d'Appui à l'Elevage

IVORY COAST

ANADER :	Agence Nationale d'Appui au Développement Rural
CAA :	Caisse Autonome d'Amortissement
DGRA :	Direction Générale des Ressources Animales
DPE :	Direction des Productions de l'Elevage
DPN :	Direction de la Protection de la Nature
DSV :	Direction des Services Vétérinaires
GDS :	Groupement de Défense Sanitaire
LANADA :	Laboratoire National de Diagnostic Animal de Bingerville
MINAGRA :	Ministère de l'Agriculture et des Ressources Animales
PNASAI :	Plan National d'Appui aux Services Agricoles
PVRH :	Programme de Valorisation des Ressources Humaines

ETHIOPIA

AHIS :	Animal Health Information System
ARO :	Agricultural Research Organisation
BCO :	Branch Co-ordination Officer, PARC

CBE :	Commercial Bank of Ethiopia
DBE :	Development Bank of Ethiopia
ETB :	Ethiopian Birr
EVA :	Ethiopian Veterinary Association
EWCO :	Ethiopian Wildlife Conservation Organisation
FDRE :	Federal Democratic Republic of Ethiopia
FLDP :	Fourth Livestock Development Project, World Bank., Ethiopia
GoE :	Government of Ethiopia
LMIS :	Livestock Marketing Information System
MEDAC :	Ministry of Economic Development And Cooperation
NAHRC :	National Animal Health Research Centre
NCO :	National Coordination Officer, PARC
NVI :	National Veterinary Institute
SC :	PARC Project Steering Committee
STC :	Sciences and Technology Commission
VEEU :	Veterinary Epidemiology and Economics Unit
VPPO :	Veterinary Privatisation Promotion Officer, PARC
VSD :	Veterinary Services Division
WEREDA :	District, subdivision of zone

KENYA

ASIP :	Agricultural Sector Investment Program
ASMP :	Agriculture Sector Management Project
CVFO :	Chief Veterinary Field Officer
DVO :	District Veterinary Officer
DVS :	Director of the Veterinary Service

EPERK :	Emergency Program for Eradication of Rinderpest in Kenya
GoK :	Government of Kenya
HSI :	Hides and Skins Inspector
KARI :	Kenya Agricultural Research Institute
KEVEVAPI :	Kenya Veterinary Vaccine Production Institute
KSh :	Kenya Shilling
KVAPS :	Kenya Veterinary Association Privatisation Program
KWS :	Kenya Wildlife Service
MALDM :	Ministry of Agriculture, Livestock Development and Marketing.
NVRC :	National Veterinary Research Centre
VIL :	Veterinary Investigation Laboratories

CAR

ANDE :	Agence Nationale de Développement de l'Elevage
FNEC :	Fédération Nationale des Eleveurs Centrafricains

SENEGAL

CNCA :	Caisse Nationale de Crédit Agricole
ISRA :	Institut Sénégalais de Recherche Agricole
PAPEL :	Projet d'Appui à l'Elevage
PRODEC :	Programme de Développement des Elevages à Cycle court
UPA :	Unité de Planification Agricole

SUDAN

GAA :	German Agro Action

SRRA :	Sudan Relief and Rehabilitation Authority

TANZANIA

ADRI :	Animal Disease Research Institute, Temeke
CRDB :	Cooperative and Rural Development Bank
CVL :	Central Veterinary Laboratory
DVO :	District Veterinary Officer
DVS :	Director of the Veterinary Service
LSDP :	Livestock Services Development Project
PSU :	Program Support Unit, Ministry of Finance
RALDO :	Regional Agriculture and Livestock Development Officer
RVO :	Regional Veterinary Officer
SEVP :	Self Employed Veterinarian Program
SEVS :	Self Employed Veterinarian Scheme
TANAPA :	Tanzanian National Parks
TAWICO :	Tanzania Wildlife Corporation
TLDP :	Tanzania Livestock Development Project (PARC)
TSh :	Tanzanian Shilling
TVA :	Tanzania Veterinary Association
TVB :	Tanzania Veterinary Board
TWCM :	Tanzanian Wildlife Conservation Monitoring Centre
VIC :	Veterinary Investigation Centre.

ANNEX 22

COMMISSION DES CE
SECRÉTARIAT GÉNÉRAL

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TEXTE F

EXPORTATIONS DE VIANDE BOVINE DE LA COMMUNAUTE EUROPEENNE EN AFRIQUE OCCIDENTALE

Communication de M. MARIN

Cette question est inscrite à l'ordre du jour de la 1200ème réunion de la Commission le mardi 03 mai 1994.

Résumé

Les exportations de viande bovine de la Communauté européenne en Afrique occidentale sont porté gravement atteinte à la production locale, au commerce régional et aux projets d'élevage de bétail finance par le FED dans la région. Il est dès dors impératif de prendre des mesures immédiates pour mettre un terme à l'incohérence qui existe entre les politiques agricoles et de développement de la Communauté.

Il est proposé à la Commission de décider, en tant que principe, d'ajuster les restitutions accordées aux exportations de viande bovine en Afrique occidentale de manière à éviter les incidences négatives sur la production et les projets de la région. Dans ce contexte, il paraît utile de mettre en place un mécanisme de consultation régulière et de coordination entre les services de la Commission responsables de la politique agricole et ceux qui sont responsables de la politique du développement.

Communication de M. le Vice-Président Marin
à la Commission

Objet: Exportations de viande bovine de la Communauté européenne en Afrique occidentale

Les exportations de viande bovine de la Communauté européenne en Afrique occidentale ont presque quadruplé entre 1980 et 1992. Durant la même période, les prix de ces exportations ont diminué de moitié, faisant ainsi chuter les prix sur place. La part du boeuf européen dans la consommation en Afrique occidentale s'est renforcée au détriment de celle du boeuf produit dans la région.

Cette situation est la conséquence des restitutions accordées aux exportations de viande bovine dans le cadre de la politique agricole commune. Elles ont permis aux exportateurs européens de vendre à des prix extrêmement bas des quantités croissantes de viande bovine sur les marchés d'Afrique occidentale.

Alors qu'elles allégeaient la situation du marché de la viande bovine de la Communauté, les exportations de viande bovine en Afrique occidentale ont porté gravement atteinte à la production locale et au commerce régional. Dans ces pays, elles ont sérieusement mis en péril le succès de projets d'élevage de bétail financés par le FED pour accroître l'autosuffisance et la sécurité alimentaire. Ainsi, le projet Marahoué en Côte d'Ivoire n'a pas atteint les résultats escomptés car le prix de la viande bovine est demeuré artificiellement bas sur le marché ivoirien. Alors que, pendant quinze ans, la Communauté a consacré 18,3 millions d'écus au projet pour renforcer la production de viande bovine en Côte d'Ivoire, elle a dépensé 33 millions d'écus au cours de la seule année 1990 au titre de subventions pour porter remède à la concurrence néfaste exercée à l'encontre de cette même production de viande bovine.

La production au Sahel où l'élevage de bétail constitue une partie importante de l'économie a aussi été touchée par l'accroissement des exportations communautaires. Les marchés de viande bovine des pays côtiers d'Afrique occidentale, qui étaient traditionnellement alimentés par la production du Sahel, ont été conquis par l'Europe sous l'effet de la concurrence subventionnée. La subsistance de plusieurs centaines de milliers d'agriculteurs du Sahel, qui dépend directement ou indirectement du bétail, a été gravement mise en péril. La lutte de la Communauté contre la pauvreté et l'émigration rurale ainsi que ses efforts pour stimuler le commerce régional en Afrique occidentale risquent d'être anéantis.

De plus, les exportations subventionnées de viande bovine empêchent les pays africains exportateurs de tirer des recettes de leurs exportations et incitent les pays importateurs nets à importer davantage de viande bovine européenne bon marché tout en négligeant leur propre production. Ainsi, les efforts
déployés par les pays africains pour améliorer leur balance des paiements dans le cadre de l'ajustement structurel ont été contrariés. Cette situation est d'autant plus regrettable que la Commission a affecté d'importantes ressources pour aider à la mise en oeuvre des programmes d'ajustement structurel en Afrique.

La crise du boeuf ne sera pas désamorcée à court terme par des mesures prises ou envisagées dans le cadre de la réforme de la PAC ou du GATT dont les négociations de l'Uruguay Round viennent de se conclure. Les effets en Afrique occidentale ne se feront sentir qu'à moyen ou long terme.

Il reste donc impératif de prendre des mesures pour mettre un terme à la grave incohérence qui existe entre les politiques agricoles et de développement de la Communauté. Ce besoin est d'autant plus urgent que cette harmonisation est imposée par le traité sur l'Union européenne (article 130v).

A la mi-juin 1993, la Commission a décidé de réduire de 15 % les taux de subvention applicables aux exportations en Afrique occidentale. Trois nouvelles réductions ont suivi, chacune de 5 %, faites en automne 1993 et au début 1994, appliquées à toutes les destinations.

Il est proposé à la Commission de décider, en tant que principe, d'ajuster les restitutions accordées aux exportations de viande bovine en Afrique occidentale de manière à éviter désormais les incidences négatives sur la production et les projets de la région. Dans ce contexte, il paraît utile de mettre en place un mécanisme de consultation régulière et de coordination entre les services de la Commission responsables de la politique agricole et ceux qui sont responsables de la politique du développement.

La Commission est dès lors invitée à enjoindre à ses services, dans l'objectif d'assurer la cohérence entre la PAC et la politique de coopération au développement, de:

1) mettre en place un réseau de collecte régulière de données sur les exportations de viande bovine de la Communauté et sur la situation des marchés de viande bovine d'Afrique occidentale;

2) réaliser une étude en vue de déterminer la fourchette dans laquelle le prix de la viande bovine devrait se tenir en Afrique occidentale compte tenu des objectifs poursuivis par les PVD concernés et des projets entrepris en matière de développement par la Commission dans la région. Cela dans le cadre d'une consultation avec les PVD concernés;

3) examiner les modalités d'ajustement des subventions à l'exportation et/ou du régime applicables aux exportation de viande de boeuf communautaire en vue de parvenir à la situation définie au point 2 et de la maintenir;

4) créer un mécanisme de consultation et de coordination entre les services agricoles et les services de développement portant sur toutes les mesures prises dans le cadre de la PAC ayant une incidence potentielle sur le secteur de la viande bovine d'Afrique occidentale.

ANNEXE A LA COMMUNICATION A LA COMMISSION

EXPORTATIONS DE VIANDE BOVINE DE LA COMMUNAUTE EUROPEENNE EN AFRIQUE OCCIDENTALE

Situation et proposition de solutions

1) Historique

L'an dernier, plusieurs ONG, essentiellement des Pays-Bas, du Royaume-Uni, du Danemark et de France, ont lancé une campagne contre les exportations communautaires de viande bovine en Afrique occidentale. Selon elles, des quantités croissantes de viande bovine extrêmement bon marché sont exportées dans la région à coup de fortes subventions, causant ainsi deux grands problèmes:

a) les producteurs locaux du Sahel qui alimentaient traditionnellement les marchés côtiers en sont évincés sous l'effet de la concurrence déloyale de l'Europe;

b) des projets d'élevage de bétail dans les pays côtiers - parfois financés ou cofinancés par le FED - sont mis en péril par les importations à prix extrêmement bas de viande bovine européenne.

Pour résoudre ces problèmes, les ONG ont proposé de supprimer les subventions accordées par la Communauté aux exportations de viande bovine en Afrique occidentale.

Sous la pression croissante des ONG, des média et des parlementaires, les services de la Commission ont envoyé une circulaire aux délégations d'Afrique occidentale leur demandant d'éclaircir la situation sur place. De qualités diverses, les réponses obtenues ne permettaient pas de se faire une idée claire de la situation. Néanmoins, celles reçues de certains pays, notamment des pays du Sahel, montraient clairement que la situation actuelle pose problème.

A la mi-juin 1993, la Commission a décidé de réduire de 15 % les taux de subvention applicables aux exportations en Afrique Occidentale. Trois nouvelles réductions ont suivie, chacune de 5 %, faites en octobre 1993 et début 1994, appliquées à toutes les destinations. Ces mesures ont eu pour effet de conduire à une diminution du tirage en certificats d'exportations vers l'Afrique de l'Ouest de 35 % au cours du deuxième semestre de 1993 (comparé au deuxième semestre de 1992); pour les premiers trois mois de 1994 cette diminution est de 60 % comparé au premiers trois mois de 1993. Ces données, à caractère indicatives, doivent toutefois être confirmées par la réalisation effective des exportations concernées.

De plus, les exportations de viande bovine européenne vers la région sont, logiquement devenues moins intéressantes suite à la récente dévaluation du Franc CFA du fait que cette dévaluation a quasiment doublée le prix des viandes européennes sur les marchés locaux.

Ces mesures paraissent avoir atténué la pression sur les marchés de l'Afrique occidentale.

2. La situation en Afrique occidentale

2.1. Importations

Au cours de la période 1980 à 1992, la structure des marchés de la viande bovine d'Afrique occidentale a subi de profondes modifications. Entre 1980 et 1990, les importations des pays côtiers destinées à la consommation locale sont passées de 4 à 14 % alors que la consommation de viande produit dans la région a baissé, passant de 96 à 86 %. Les importations de viande bovine en provenance de la Communauté ont quasiment quadruplé, passant d'environ 14 000 tonnes en 1980 à environ 55 000 tonnes en 1992 (voir annexe 1a).

La Côte d'Ivoire et le Togo figurent parmi les grands pays importateurs de viande bovine dans les années 1980. Le Bénin et le Sénégal ont également importé de la viande bovine d'Europe mais dans une moindre mesure (voir annexe 1b). Au début des années 1990, le Ghana est passé de la dernière à la première place parmi les pays importateurs d'Afrique occidentale (de plus ou moins 100 tonnes en 1988, ses importations grimpaient à 22 000 tonnes en 1992). Il est intéressant de relever qu'à cette époque les deux pays limitrophes, d'abord le Togo et ensuite la Côte d'Ivoire, ont mis en oeuvre des mesures protectrices pour mettre un coup d'arrêt aux importations européennes. Outre le Ghana, le Bénin a connu un accroissement spectaculaire de ses importations en provenance d'Europe au début des années 90 alors que les exportations de la Communauté vers la Côte d'Ivoire ont stagné.

Dans tous les grands pays importateurs d'Afrique occidentale, la Communauté est devenue de loin le grand sinon le seul fournisseur non-africain de boeuf puisqu'elle représente plus de 95 % du total. La Côte d'Ivoire illustre bien ce phénomène: l'Amérique latine, qui dominait le marché, a été quasi supplantée par la Communauté en tant que fournisseur non-africain de viande bovine.

Ces importations massives de boeuf européen se sont accompagnées d'une chute des prix (voir annexe 2) qui, à son tour, a influencé les prix au détail sur les marchés domestiques. La Côte d'Ivoire, où les chiffres sont les plus précis, a enregistré une baisse des prix au détail (voir annexe 3). Il semble que les prix des bovins payés aux producteurs du Sahel aient diminué de 20 à 30 % depuis 1983.

2.2. Développement du commerce régional

Pour des raisons climatiques et vétérinaires, la région du Sahel se prête mieux à l'élevage de bétail que la région côtière d'Afrique occidentale. Dès lors, traditionnellement, les pays du Sahel que sont le Mali, le Burkuna Faso, le Niger et le Tchad ont été d'importants fournisseurs d'animaux sur pied sur les marchés côtiers.

Il est difficile d'obtenir pour une longue période, des statistiques fiables des flux de commerce de bétail dans la région de l'Afrique occidentale, notamment en raison de fraudes. Il existe toutefois des signes qui témoignent d'une baisse des flux d'exportation de la région dans les années 80 par rapport aux années 70, au moins au Burkina Faso.

Une baisse du commerce régional d'Afrique occidentale est également observable si l'on regarde les statistiques des pays importateurs de la région. Ainsi, la part des importations de la Côte d'Ivoire en provenance du Sahel a baissé considérablement durant les années 80 alors que les fournisseurs non africains (CE) ont augmenté leur poids relatif (voir annexe 4).

Il est évident que le ralentissement du commerce régional pourrait être dû à une combinaison de facteurs divers. Les exportations régionales souffrent de contraintes domestiques, notamment et surtout des lourdeurs administratives aux frontières et des piètres infrastructures commerciales. De plus, les pays exportateurs ont été frappés par une grave sécheresse durant la première moitié des années 80. Enfin, l'accroissement de la population et de la consommation domestique au Sahel réduit les possibilités d'exportation vers les pays voisins.
Tous ces facteurs ont contribué au fléchissement des flux commerciaux dans la région. Par ailleurs, toutes les études disponibles en la matière

reconnaissent ces facteurs mais n'en soulignent pas moins l'influence de l'accroissement des exportations subventionnées de la Communauté vers la région côtière. La Commission n'a en main aucune étude donnant le poids relatif de chacun des facteurs en cause.

2.3. Production et consommation locales

La production de boeuf dans la région côtière a généralement augmenté au cours de ces deux dernières décennies (voir annexe 5). Cette évolution témoigne du souhait des pays côtiers d'augmenter la sécurité alimentaire et l'auto-suffisance en viande bovine. La Communauté a accordé une aide financière d'environ 30 millions d'écus à des projets d'élevage de bétail dans la région dans le cadre du 6e FED.

Comme il a été dit ci-avant, la production de viande bovine en Afrique occidentale se heurte à plusieurs grosses difficultés, notamment de mauvaises conditions climatiques, des lourdeurs administratives qui freinent le commerce, de piètres infrastructures et les importations à bon marché de l'étranger. L'accroissement de la production de viande bovine a dès lors été limitée et n'a pas pu suivre le rythme de la croissance démographique.

Si le taux d'autosuffisance dans la région côtière d'Afrique occidentale par rapport à la production animale dans son ensemble est resté stable durant les années 80, c'est essentiellement grâce à l'accroissement de la part du poisson qui représente deux tiers de la consommation moyenne. En réalité, la part de la viande produite dans la région dans la consommation totale a sensiblement baissé (voir annexe 6), cette baisse étant particulièrement sensible dans les zones urbaines d'Afrique où les importations de boeuf ne provenant pas du continent ont considérablement augmenté.

Beaucoup estiment que ce sont surtout les pauvres des villes qui bénéficient des importations à bon marché de boeuf ne provenant pas d'Afrique et que ce serait essentiellement eux qui seraient touchés si l'on réduisait ces importations. Par manque de statistiques fiables, on peut difficilement dire qui consomme réellement cette viande importée dans les différents pays d'Afrique occidentale en cause. Enfin et surtout, on ne sait pas dans quelle mesure le poisson, source traditionnelle de protéines pour les pauvres des villes, remplacerait le boeuf si le prix du boeuf augmentait.

3) Le rôle crucial des mécanismes de la PAC

3.1. La PAC et les restitutions à l'exportation

résulte essentiellement des mécanismes de la politique agricole commune (PAC) appliqués au secteur européen du boeuf. Les prix domestiques élevés garantis dans le cadre de la PAC ont encouragé la production au point que la Communauté a quitté son rang de grand importateur net de boeuf à la fin des années 70 pour devenir l'un des plus grands exportateurs nets du monde (environ 25 % des exportations mondiales). Il faut constater que la surproduction de boeuf dans la Communauté associée aux obligations d'importation traditionnelles a donné lieu à un amoncellement de stocks importants et à la nécessité de subventionner de façon permanente les ventes de boeuf aux pays tiers. Suite à des récentes mesures de gestion, ces stocks semblent montrer une tendance à la diminution.

Pour vendre les surplus européens de boeuf sur les marchés internationaux, une subvention appelée "restitution" doit être versée aux exportateurs. Cette subvention, selon l'article 8 du règlement (CEE) n° 805/68 du Conseil, est destinée à couvrir la différence entre les prix élevés sur le marché intérieur et les prix bas sur les marchés mondiaux. Elle doit permettre aux exportateurs de concurrencer les autres fournisseurs du marché mondial.

Le montant des restitutions à l'exportation varie selon les destinations géographiques et selon certaines catégories telles le boeuf surgelé, frais ou réfrigéré. Toutefois, pour des raisons de facilité, les restitutions sont les mêmes quelle que soit la qualité de boeuf.

Pour fixer le montant des restitutions, un comité de gestion composé de représentants de la Commission et des Etats membres se réunit au moins une fois tous les trimestres. Les critères concrets à suivre lors de la fixation des restitutions à l'exportation sont définis dans le règlement (CEE) n° 885/68. Ces critères ne stipulent pas de simplement comparer les prix du marché mondial et du marché intérieur, d'établir les différences et de calculer ainsi le montant des restitutions à l'importation à appliquer. En revanche, ils offrent au comité une large marge d'appréciation puisqu'ils parlent en termes généraux de "prendre en compte" la situation des marchés, les perspectives et les prix ainsi que les objectifs du la PAC et le besoin d'éviter les "perturbations" du marché.

Différentes raisons empêchent les restitutions de correspondre exactement à la différence entre les prix pratiqués dans la Communauté et le marché mondial :

1) Comme des restitutions à l'exportation identiques s'appliquent à différentes qualités de boeuf, il est évident que les exportateurs de la Communauté de boeuf de faible qualité se trouvent particulièrement bien placés pour soutenir la concurrence face à leurs rivaux éventuels. Comme il sera indiqué ci-après, les exportations vers l'Afrique sont en réalité largement dominées par du boeuf de très basse qualité.

2) Alors que les prix du boeuf sur le marché intérieur sont soumis à de fréquentes variations en raison des fluctuations du marché, les restitutions à l'exportation demeurent stables durant des périodes relativement longues. De ce fait, les prix communautaires fab fluctuent indépendamment des variations des prix du marché mondial et par conséquent des restitutions à l'exportation, qui souvent sont loin de constituer une compensation équitable de la différence entre le prix du marché intérieur et le prix du marché mondial.

3) Vu le coût extrêmement lourd du stockage de la viande bovine dans les entrepôts frigorifiques, la gestion des instruments d'exportation du boeuf est influencée par le besoin de vendre et pas seulement par des considérations arithmétiques sur les différences entre les prix du marché intérieur et du prix sur le marché mondial.

3.2. Le cas particulier du capa en Afrique occidentale

Si les considérations qui précèdent s'appliquent aux exportations de boeuf en général, force est de constater que l'Afrique occidentale constitue un cas particulier dans la mesure où le gros des exportations communautaires vers cette région consiste de ce que l'on appelle le capa. Il s'agit de l'abréviation du mot "carapaçon" qui désigne une coupe de viande de basse qualité très grasse.

La Communauté étant à l'heure actuelle le seul exportateur de capa, il n'existe en principe pas de prix mondial permettant de déterminer le montant d'une restitution "équitable". En avril 1993, la subvention versée pour les exportations de capa en Afrique correspondait à environ 70 % du prix communautaire de ce produit.

Il semble que les flux d'exportation de capa vers l'Afrique occidentale n'existent qu'en raison du montant extrêmement élevé des subventions à l'exportation par rapport aux prix pratiqués sur le marché communautaire. Les observateurs du marché estiment que les commerçants ne se soucient souvent pas d'être payés par leurs clients d'Afrique occidentale pourvu qu'ils aient une preuve écrite de l'arrivage de la viande est arrivée en Afrique, qui leur permettra de recevoir la restitution à l'exportation.

Il est aussi intéressant de noter que la structure des restitutions à l'exportation reflète un certain ciblage du marché africain. En effet, les subventions à l'exportation les plus élevées pour le capa sont versées à celles qui vont vers l'Afrique. Les statistiques d'Eurostat montrent dans ce contexte que les exportations vers l'Afrique occidentale se sont accrues - en termes de tonnes métriques - beaucoup plus vite que celles acheminées à d'autres destinations (voir annexe 7a). Parallèlement, les prix fab de boeuf communautaire exporté vers l'Afrique occidentale ont fortement baissé pour s'élever en 1992 à la moitié seulement de leur valeur de 1980. En revanche, les prix fab communautaires vers les autres destinations étaient en 1992 à peu près les mêmes que ceux de 1980 (voir annexe 7b).

4. Conclusions préliminaires

Compte tenu des considérations qui précèdent, force est de conclure que les exportations communautaires subventionnées de boeuf de faible qualité exercent une influence majeure sur l'évolution du marché du boeuf d'Afrique occidentale. Elles ont exercé un impact négatif sur la production et sur le commerce locaux ainsi que sur les projets de la Commission dans le secteur de la viande, minant de ce fait les efforts entrepris par la Communauté dans le cadre de sa politique d'aide au développement:

1) Les mesures financées par la Communauté pour accroître l'auto-suffisance alimentaire ainsi que la sécurité alimentaire dans le secteur de la viande ont perdu de leur efficacité sous l'effet d'importations de boeuf communautaire bon marché. Ainsi, le projet Marahoué en Côte d'Ivoire, dont l'objectif est d'accroître l'auto-suffisance en viande bovine, doit faire face à de graves difficultés dues essentiellement à la faiblesse des prix du boeuf dans le pays. La Commission a affecté 18,3 millions d'écus au projet entre 1975 et 1989 alors que les subventions de la Communauté aux exportations de boeuf à destination de la Côte d'Ivoire se sont élevées à 33 millions d'écus pour la seule année 1990.

2) La promotion du commerce régional basée sur les complémentarités régionales a toujours été une priorité dans la politique de coopération au développement de la Commission à l'égard des ACP. En subventionnant la concurrence des exportateurs communautaires, la Communauté va à l'encontre de cet objectif.

3) Les éleveurs du Sahel constituent des populations fragiles dont les sources de revenus alternatives sont peu nombreuses. Il est évident que les ventes à bon marché de boeuf européen ont privé ces populations de possibilités d'exportation, ce qui signifie par conséquent un échec des efforts de la Communauté dans la lutte contre la pauvreté et contre le dépeuplement rural en Afrique.

4) Les quatre considérations qui précèdent mettent en lumière une grave incohérence entre la politique d'exportation des produits agricoles et la politique d'aide au développement. Il ne fait aucun doute que cette incohérence est le résultat d'un manque de coordination entre deux champs d'activités de la Communauté. Trouver un remède à la situation actuelle équivaut par conséquent à harmoniser la politique agricole et la politique au développement. Ce besoin est d'autant plus urgent que l'harmonisation figure explicitement dans le traité sur l'Union européenne (article 130v).

5. Nécessité d'une action?

D'aucuns affirment parfois que c'est aux pays africains eux-mêmes à fixer les quantités et les prix de leurs importations au moyen d'une protection appropriée à leurs frontières. Certains estiment en outre que la réforme de la PAC et les résultats de l'Uruguay Round du GATT sont susceptibles de donner une solution au problème, rendant ainsi inutile une action de la Communauté.

5.1. Protection en Afrique occidentale contre les exportations de boeuf européen

La protection des marchés domestiques d'Afrique occidentale contre les importations subventionnées a été mise à l'essai dans plusieurs pays de la région. Jusqu'à présent, ces expériences ont eu des résultats mitigés.

Récemment, la Côte d'Ivoire a mis sur pied un système de prélèvements compensatoires. L'objectif de ce système est de contrôler les quantités importées et de maintenir un certain niveau de prix sur les marchés domestiques dans l'intérêt des producteurs locaux. La période d'application ayant été courte, les effets de ce régime protecteur ne peuvent être jugés de grande adéquate. Toutefois, son efficacité s'est déjà heurtée à diverses difficultés qui pourraient être typiques de celles qui existent dans les autres pays de la région.

Les mesures de protection aux frontières de la Côte d'Ivoire n'étant pas intégrées dans un système de protection régionale harmonisé, il semble que l'introduction en fraude de boeuf importé des pays limitrophes se fasse sur une large échelle. De plus, des lacunes dans la réglementation semblent avoir porté atteinte à l'efficacité du système. Enfin, comme les entreprises européennes et des politiciens influents de Côte d'Ivoire participent massivement au commerce d'importation du pays, il est permis de douter de la solidité de la conception et de la mise en oeuvre de ce système de protection.

Un groupe d'autres pays d'Afrique occidentale, tels que le Nigéria, le Togo et le Sénégal, ont mis en place des systèmes de protection beaucoup plus restrictifs contre les importations de boeuf qui équivalent à une interdiction complète des importations voire s'en rapprochent. Même si ces systèmes paraissent avoir maintenu les importations à un niveau comparativement bas, il est intéressant de noter que le Togo a récemment accepté de changer sa politique de protection à la demande de la Banque mondiale et du FMI.

On peut conclure que les systèmes de protection d'Afrique occidentale sont confrontés à différents types de difficultés pratiques en raison dues aux conditions géographiques et socio-économiques spécifiques de la région. En outre, l'introduction du système de protection n'est pas compatible avec la tendance générale à l'ajustement structurel et à la libéralisation en Afrique, qu'appuie activement la Communauté. Par ailleurs et de façon plus générale, on aurait du mal à soutenir que les distorsions sur le marché mondial causées par les exportations susmentionnées doivent être rectifiées par les pays importateurs plutôt qu'à leur lieu d'origine.

Pour tous ces motifs, il n'est pas acceptable de continuer à postposer l'harmonisation nécessaire des politiques de la Communauté sous prétexte que les pays importateurs autonomes d'Afrique occidentale sont libres de choisir le régime d'importation qui leur paraît le meilleur.

5.2. La réforme de la PAC

La réforme de la PAC vise à rétablir l'équilibre du marché tout en diminuant les dépenses budgétaires, redistribuant l'aide aux agriculteurs et encourageant l'utilisation rationnelle des terres agricoles.

Dans l'organisation du marché du boeuf, la réforme vise à réduire les prix d'intervention et certaines limitations progressives dans le mécanisme d'intervention. Il est difficile de prévoir l'incidence des mesures de réforme sur les marchés européens du boeuf et, en particulier, sur les exportations subventionnées.

Même si une réduction générale des exportations de boeuf devait avoir lieu dans le cadre de la réforme de la PAC, on peut se demander quelle serait son effet sur les exportations vers l'Afrique. En effet, la structure actuelle des restitutions à l'exportation paraît maintenue. De plus, le resserrement des marchés de l'Est pourrait provoquer un glissement des exportations vers les autres régions, notamment vers l'Afrique.

Il y a lieu d'évoquer aussi l'accroissement de la compétitivité de la viande dite blanche (porc et volaille) par rapport au boeuf sous l'effet de la réduction envisagée des prix des céréales. La demande de viande blanche pourrait augmenter en Europe au détriment de la consommation de viande de boeuf, ce qui intensifierait la pression à exporter le boeuf. Un accroissement de la production de viande blanche en Europe provoquerait d'ailleurs aussi un accroissement de la production des produits dérivés potentiellement envoyés en Afrique. Les exportations de viande blanche en Afrique occidentale s'élevaient au chiffre considérable de 13 000 tonnes en 1991.

5.3. L'Uruguay Round du GATT

Etroitement liés aux efforts de réforme de la PAC, les résultats des négociations de l'Uruguay Round du GATT récemment achevées visent directement à réduire les exportations subventionnées. L'accord dit de Blairhouse prévoit une diminution des exportations subventionnées de 21 % sur six ans s'accompagnant d'une diminution du montant des subventions budgétisées de 36 %. L'accord de Blairhouse contient en outre une clause concernant l'octroi d'un accès minimum aux importations agricoles de la Communauté.

Toutefois, une réduction globale de 21 % des exportations de viande bovine ne signifie pas nécessairement une réduction équivalente des exportations vers l'Afrique.

De plus, on notera que d'éventuelles réductions futures des quotas laitiers dans le cadre de nouvelles mesures de réforme pourraient provoquer une forte augmentation des ventes de viande bovine durant une période transitoire plus au moins longue. Enfin, le niveau actuel des stocks (environ à 300 000 tonnes) exercera une certaine pression sur les marchés d'exportation à court et à moyen terme.

En résumé, sous réserve d'une analyse plus approfondi par les services compétents de la Commission, il apparaît que ni la réforme de la PAC ni les mesures décidées dans le cadre de l'Uruguay Round sont susceptibles d'améliorer substantiellement la situation en Afrique occidentale dans un proche avenir.

6. Solutions envisageables

Pour résoudre le problème du boeuf, les ONG ont préconisé la suppression rapide des restitutions à l'exportation vers l'Afrique occidentale. Cette solution conduirait selon toute vraisemblance à un arrêt total des exportations de viande bovine européenne dans la région et dès lors, à un bouleversement grave et indésirable des marchés d'Afrique occidentale ainsi que d'Europe.

Cette approche, maximaliste, ne garantirerait cependant pas, en raison de phénomènes de substitution toujours possible entre les exportations communautaires et celles d'autre origines, la résolution du problème.

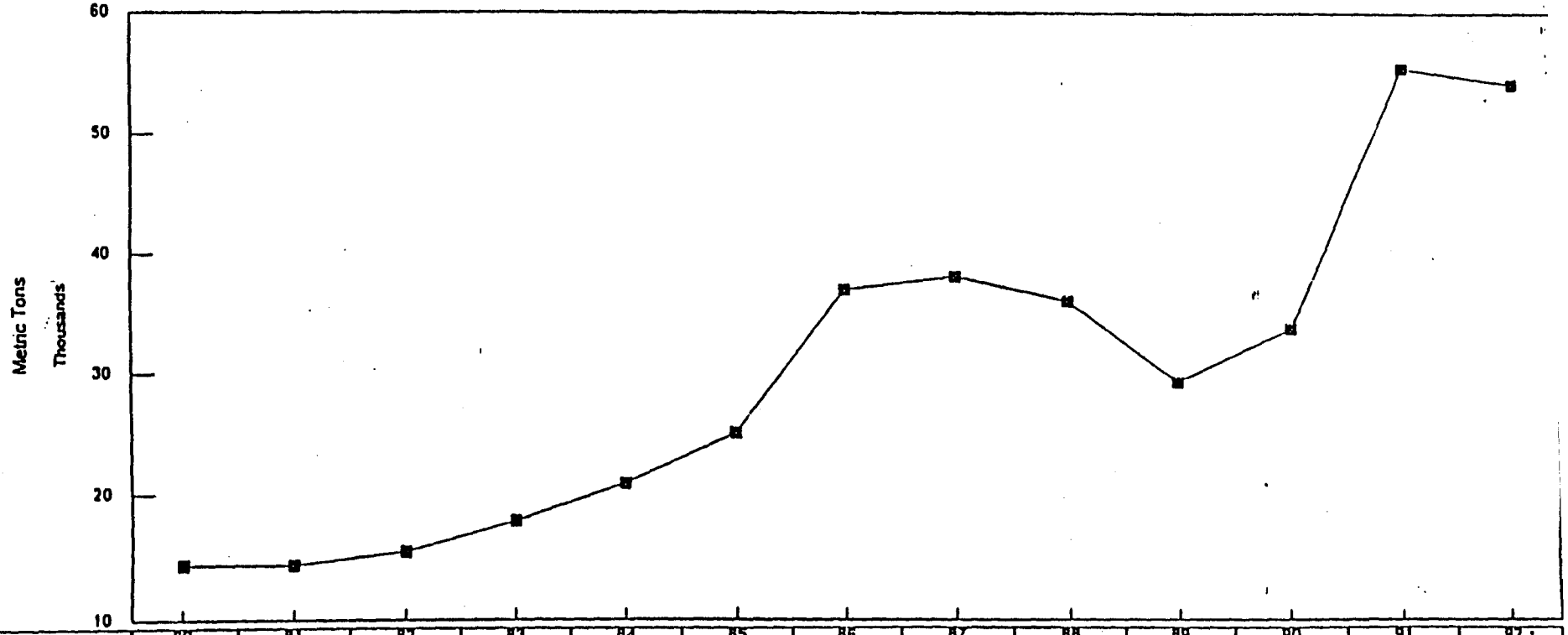
Il semble plus indiqué, dans une première approche, de viser à exercer un contrôle soigneux et conscient des restitutions à l'exportation et, par conséquent, des prix et exportations de viande bovine vers l'Afrique occidentale. Une première condition pour exercer un tel "contrôle des restitutions" résiderait dans le fait de savoir comment utiliser cet instrument pour obtenir les résultats souhaités. Il y aurait lieu de déterminer comment l'évolution des restitutions à l'exportation affecte les prix et les niveaux d'exportation de viande bovine (par exemple comment évoluent les exportations si les restitutions évoluent d'1 %) et les prix locaux en Afrique occidentale.
La seconde condition résiderait dans la définition d'une situation cible, par exemple une gamme cible de prix et de quantités que la Commission voudrait voir exister en Afrique occidentale compte tenu des objectifs de la politique de coopération au développement en Afrique de l'Ouest et des objectifs sectoriels de la PAC.

La réalisation de ces deux conditions nécessite des travaux préparatoires ainsi que des actions concrètes. Les travaux préparatoires comprendraient notamment une étude de l'incidence des restitutions sur les prix et quantités ainsi que la détermination des niveaux de prix et de quantité souhaités sur les marchés d'Afrique occidentale. Chacun sait que les statistiques en Afrique sont peu fiables, aussi il y a lieu de créer ou de renforcer les réseaux de collecte de données afin de suivre l'évolution des exportations de viande bovine de la Communauté et du secteur bovin d'Afrique occidentale. L'aide à la création d'unités statistiques au niveau régional pourrait être envisagée dans ce contexte.

Les actions concrètes porteraient directement sur une harmonisation renforcée de la mise en oeuvre des politiques, comme il a été conclu ci-avant. Ainsi, un mécanisme de coordination entre les services de la DG VIII et de la DG VI en la matière devrait être formalisé même si des contacts ont déjà été renforcés depuis fin 1993 . Il s'agirait en particulier que les deux DG intensifient les échanges d'informations et se consultent régulièrement sur toutes les questions liées au secteur bovin d'Afrique occidentale.

Annex 1a

Beef exports from the EC to West Africa

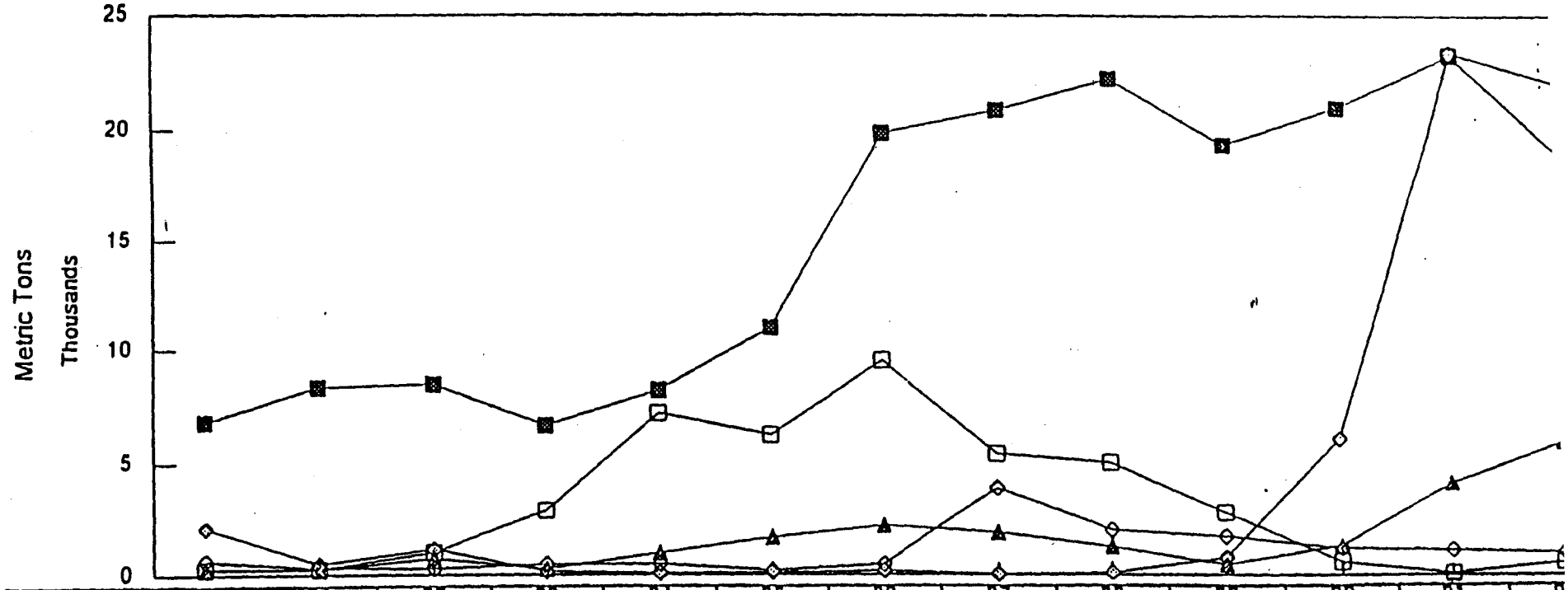


	80	81	82	83	84	85	86	87	88	89	90	91	92 *
to West Africa	14429	14431	15518	17880	20870	25018	36880	38020	35870	29198	33663	55372	54059

AT

Annex 1b

Evolution of imports of EC beef into selected West African countries

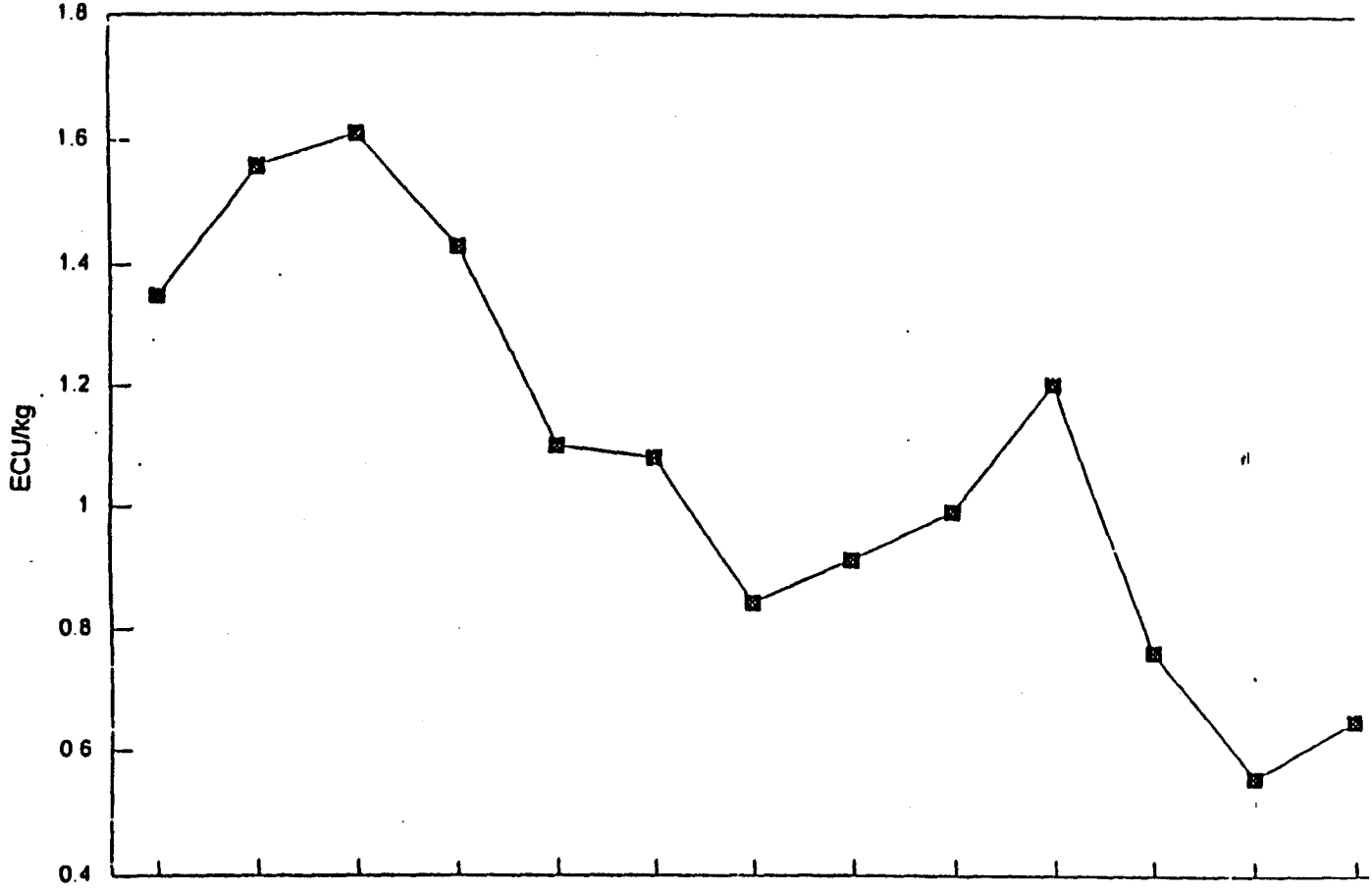


	80	81	82	83	84	85	86	87	88	89	90	91	9
oire	6843	8339	8602	8890	8214	10984	19872	20892	22285	19390	21007	23273	18
	2075	485	1127	165	90	101	175	37	116	791	6095	23401	21
	269	241	723	267	959	1660	2169	1875	1264	463	1334	4152	59
	250	258	974	2870	7218	6240	9512	5416	5015	2764	600	115	62
	612	298	286	467	467	202	482	3868	1985	1732	1199	1158	10

STAT

Annex 2

Evolution of unit values of EC beef exports to West Africa

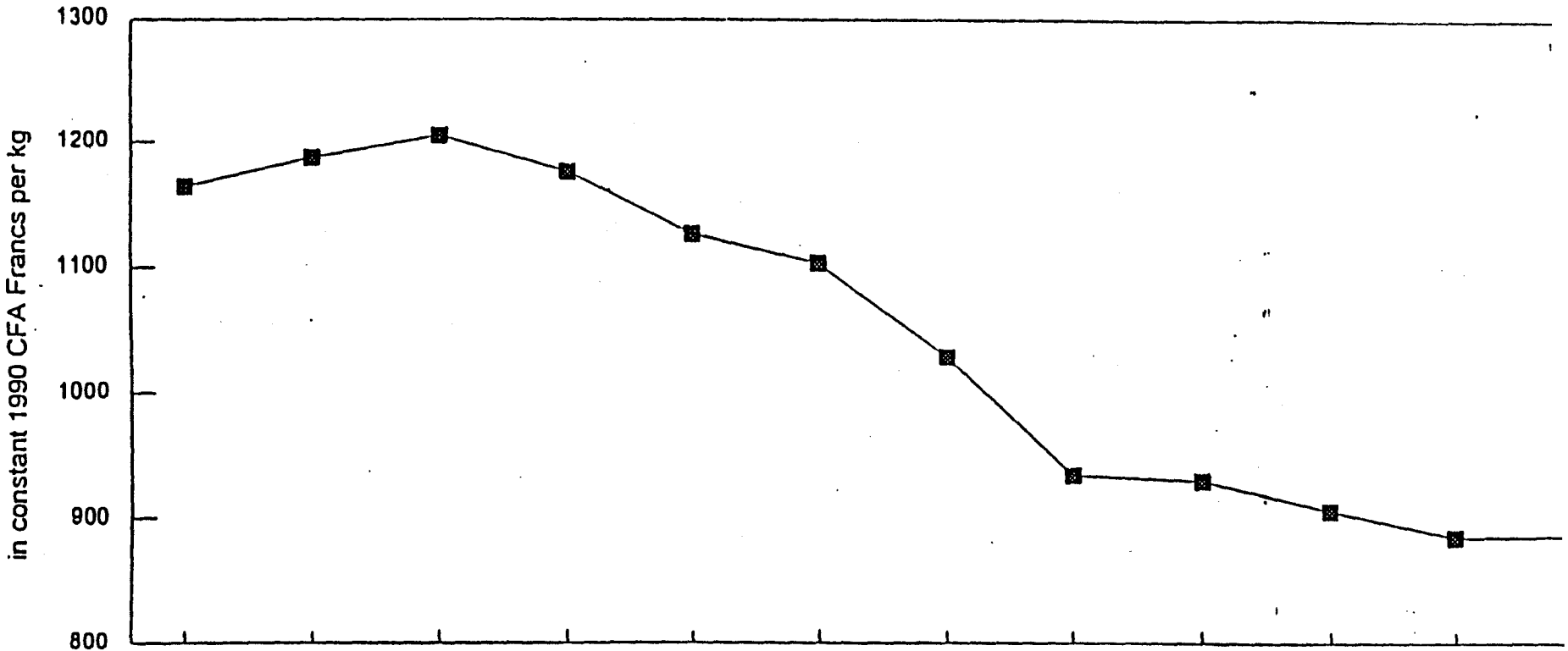


	80	81	82	83	84	85	86	87	88	89	90	91	92
unit values	1.35	1.56	1.61	1.43	1.1	1.08	0.84	0.91	0.99	1.2	0.76	0.56	0.6

Source: EUROSTAT

Annex 3

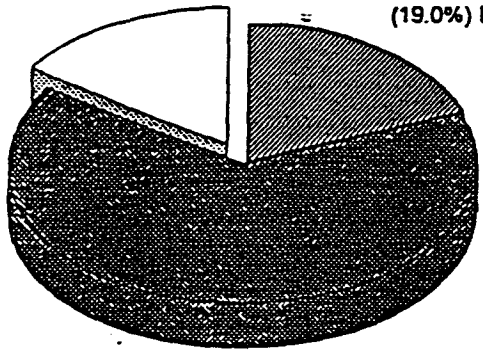
Evolution of retail prices in Côte d'Ivoire



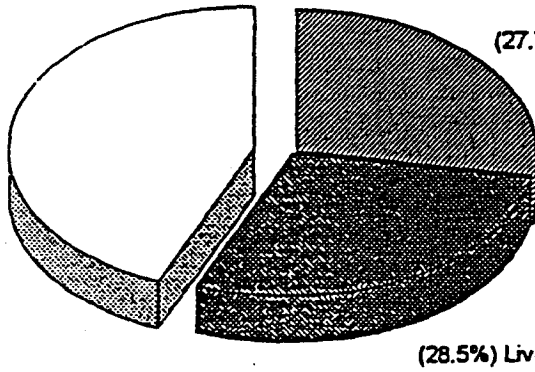
	80	81	82	83	84	85	86	87	88	89	90
ice	1164	1187	1205	1176	1127	1104	1029	934	930	906	885

Holtzman, J.S. and N.P. Kulibaba, Livestock Marketing and Trade in the Central Corridor of West Africa. Bethesda, Maryland, 1992

1980



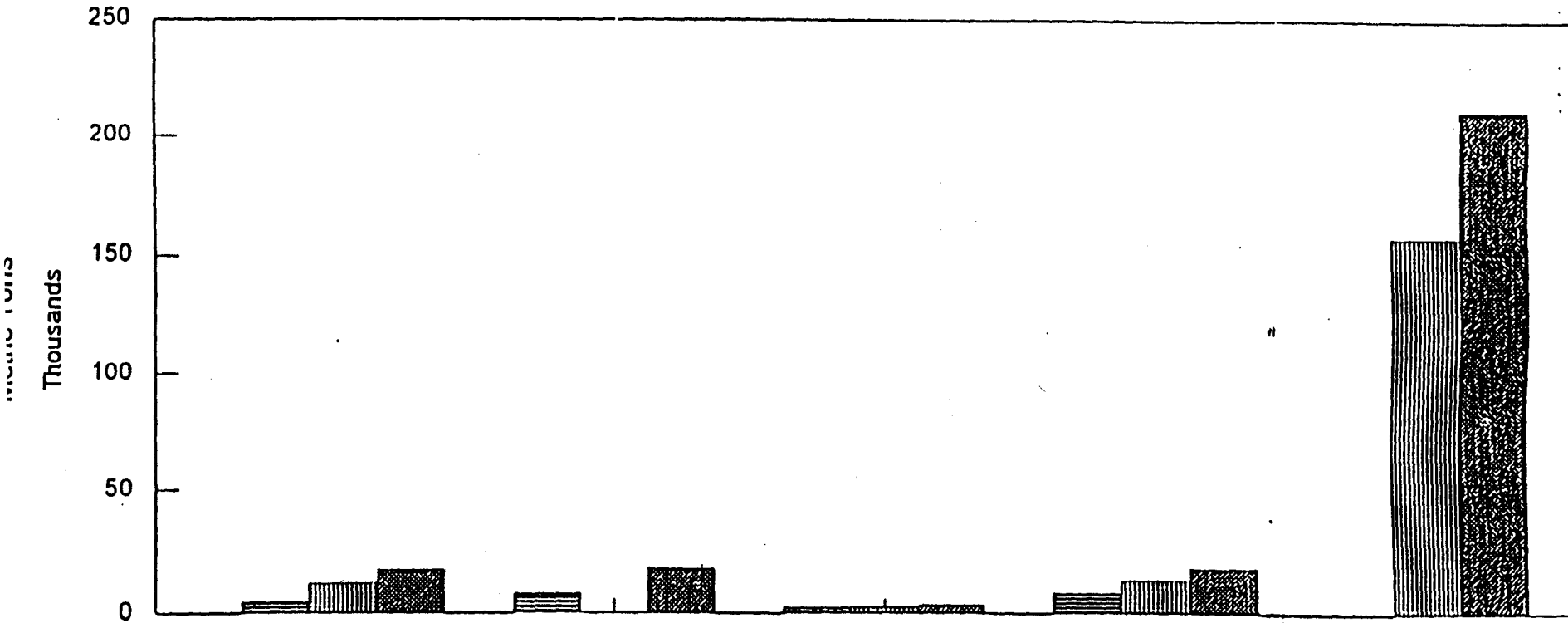
1990



Source: Holtzman and Kulibaba, op.cit.

Annex 5

Evolution of beef production in selected West African coastal countries



	Côte d'Ivoire	Ghana	Togo	Bénin	Nigeria
	4800	7900	2500	8498	
	12100		2882	13450	158000
	17660	18000	3463	18320	211000

lational statistics as shown in: Ministère de la Coopération/ France, SOLAGRAL, et al., Politiques de erce extérieur des produits d'origine animale en Afrique de l'Ouest et du Centre. September 1993.

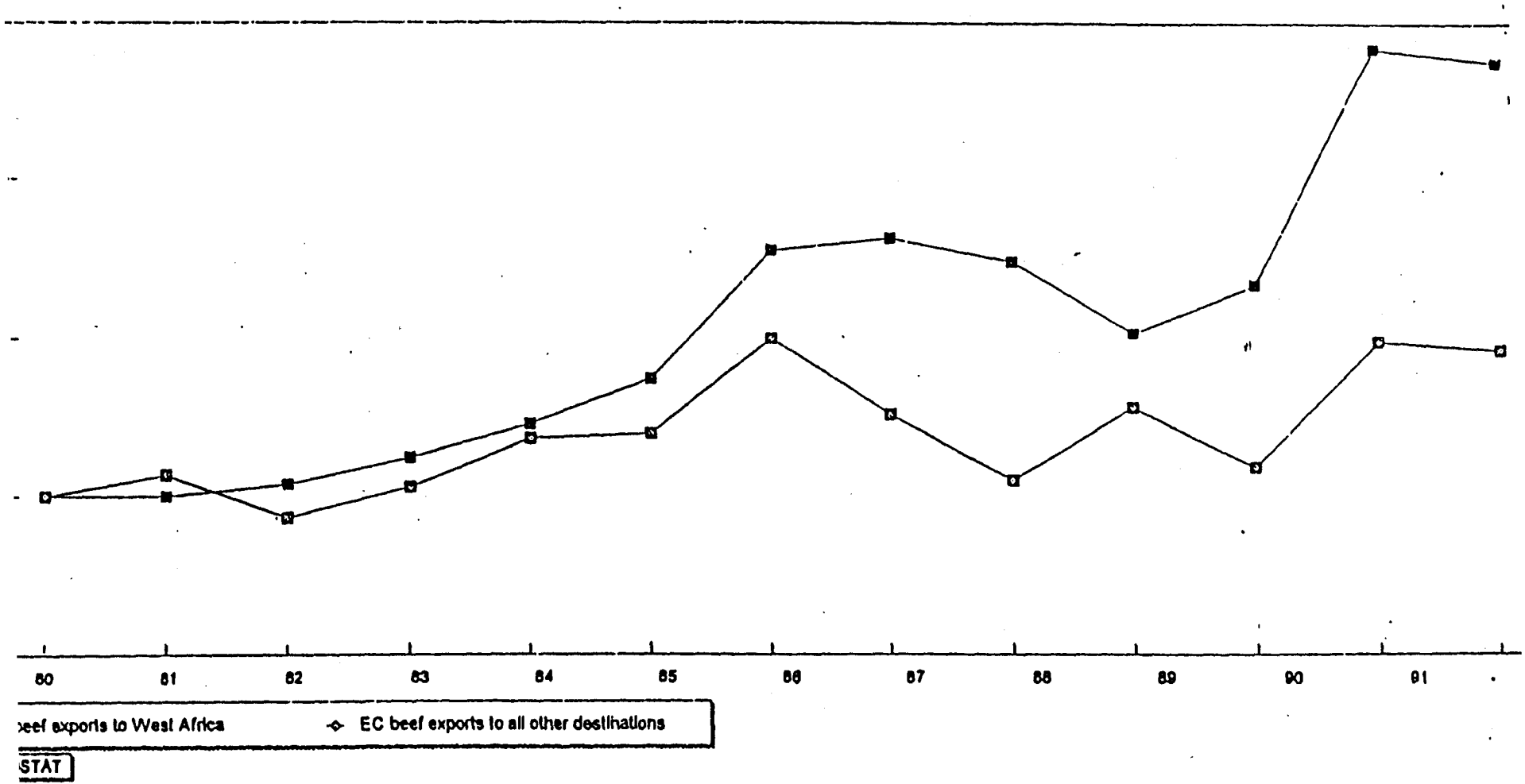
Annex 6
Evolution of the consumption of animal products from different sources in six West African coastal countries

	1980		1990	
	Kilo per head and year		Kilo per head and year	
Meat	8.5	100%	5.9	100%
of which regionally produced	8.2	96%	5.1	86%
of which imported from outside the region	0.3	4%	0.8	14%
Fish	11.5	100%	12.1	100%
of which regionally produced	5.1	44%	6.9	57%
of which imported from outside the region	6.4	56%	5.2	43%
Total animal products	20.0	100%	18.0	100
of which regionally produced	13.3	67%	12.0	67%
of which imported from non African sources	6.7	34%	6.0	33%

Six West African Coastal countries: Côte d'Ivoire, Ghana, Togo, Nigeria, Cameroon, Benin.
Source: Ministère de la Coopération/ France, SOLAGRAL et al., op. cit.

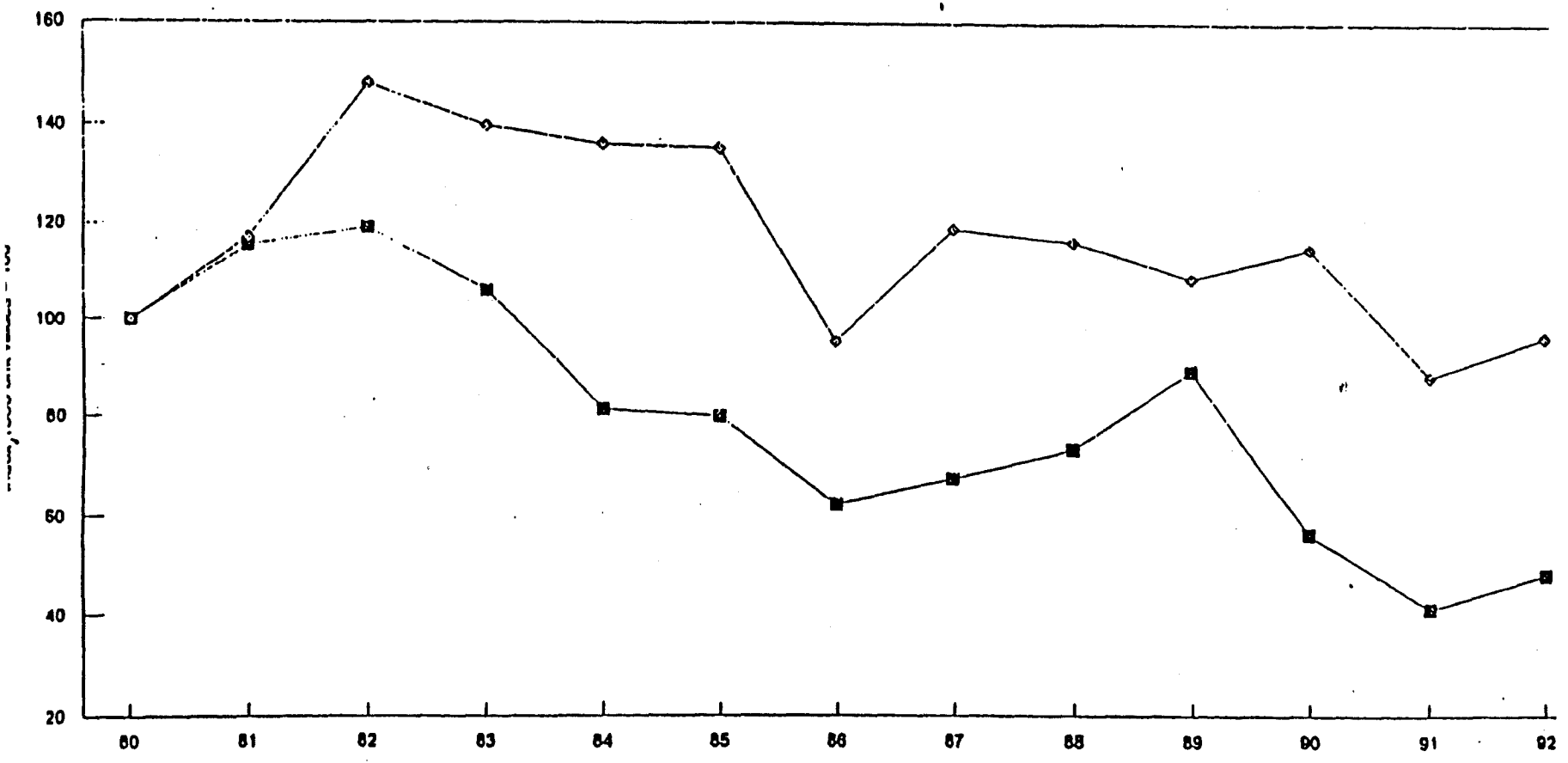
Annex 7a

Evolution of EC beef exports to West Africa and to all other destinations



Annex 7b

Evolution of unit values of EC beef exports to West Africa and to all other destinations



Unit values of EC beef exports to West Africa

Unit values of EC beef exports to all other destinations

ource: EUROSTAT