22/2/07

MISSION REPORT

ON

EDITING AND PUBLISHING REPORTS ON THE PAN-AFRICAN PROGRAMME FOR THE CONTROL OF EPIZOOTICS

(DRAFT FINAL REPORT)

BY PROF ADRIEN BELEM (TECHNICAL EXPERT AND MISSION LEADER)

AND

LILY ADUKE (COMMUNICATION AND INFORMATION EXPERT)

gtz International Services

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List of Acronyms and Abbreviations

AC	Advisory Committee
ACM	Advisory Committee Meeting
ADB	African Development Bank
AFU	Administrative and Financial Unit
ALIVE	African Livestock Platform
ARIS	Animal Resources Information System
ASAL	Arid and Semi Arid Lands
ASF	African Swine Fever
AU-IBAR	African Union-International Bureau of Animal Resources
BVD	Bovine Virus Diarrhoea
CAH	Community Animal Health
CAHW	Community Animal Health Workers
CAPE Unit	Community –based Animal Participatory Epidemiology
CAR	Central African Republic
CBLT	Lake Chad Basin Commission
CBO	Community Based organizations
CBPP	Contagious Bovine Pleuro- Pneumonia
CIRAD –EMVT	Centre de Coopération Internationale en Recherche Agronomique pour le Développement – Département d'élevage et Médecine Vétérinaire
CIRDES	Centre International de Recherche-developpement sur l'Elevage en Zone Subhumide
COMESA	Common Market for Eastern and Southern Africa
CPD	Continuing professional development
CSU	Common Services Unit
CTTBD	Centre for Ticks and Tick-borne Disease
DFID	Department for International Development
DMU	Data Management Unit
DRC	Democratic Republic of Congo
DVS	Director of Veterinary Services
EC	European Commission
ECC	European Community Commission
EDF	European Development Fund
EISMV	École Inter Etats Science et Médécine Vétérinaire, Senegal
ELISA	Enzyme Linked Immmunosorbent Assay
ESS	Epidemiological Surveillance Systems
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FAO-GREP	FAO- The Global Rinderpest Eradication Programme
FEM	Final Evaluation Mission
FITCA	Farming in Tsetse Controlled Areas
FMD	Foot and Mouth Disease
GDP	Gross Domestic Product
GHA	Greater Horn of Africa
GIS	Geographical Information System
GTZ	German Technical Cooperation
HPAI	Highly Pathogenic Avian Influenza
IAEA	International Atomic Energy Agency
ILRI	International Livestock Research Institute

IZSTE	Instituto Zooprofilattico Sperimentale dell' Abruzzo e del Molise, Teramo, Italy
KAP	Knowledge, Attitude, Practice
KARI	Kenya Agricultural Research Institute
KVAPS	Kenya Veterinary Privatization Scheme
LAN	Local Area Network
LANADA	Laboratoire Nationale d' Appui au Développement Agricole, Côte d'Ivoire
LANAVET	Laboratoire Nationale Vétérinaire, Garoua, Cameroun
LNERV/ISRA	Laboratoire National d'Elevage et de Recherches Vétérinaires, Senegal
MOU	Memorandum of Understanding
MTR	Mid-Term Review
NAO	National Authorizing Officer
NGOs	Non Governmental Organization
OAU/IBAR	Organization of African Unity/ Interafrican Bureau for Animal Resources
OIE	Office International des Epizooties
OVI	Objectively Verifiable Indicator
PACE	Pan African Programme for the Control of Epizootics
PANVAC	Pan African Veterinary Vaccine Centre
PARC	Pan African Rinderpest Campaign
PCR	Polymerase chain reaction
PCU	PACE Coordination Unit
PEU	PACE Epidemiology Unit
PID	PACE Integrated Database
PP	PACE Programme
PPR	Peste de Petits Ruminant
QA	Quality Assurance
RAO	Regional Authorizing Officer
RCA	Republic of Central Africa
RCU	Regional Co-ordinating Unit
RP	Rinderpest
RVF	Rift Valley Fever
SADC	Southern Africa Development Community
SAHSP	Somali Animal Health Services Project
SERECU	Somali Ecosystem Rinderpest Eradication Campaign Unit
TA	Technical assistance/assistant
TADinfo	Transboundary Animal Diseases Information System
TCP	Technical co-operation project
TORs	Terms of Reference
UNESCO	United Nations Education, Scientific and Cultural Organization
UNIDO	United Nations Industrial Development Organization
VLPU	Veterinary Legislation and Privatization Unit
VSF	Vétérinaires sans Frontières
WPCE	Work Programmes and Cost Estimates
WRL	World Reference Library
WTO SPS	World Trade Organisation - Sanitary and Phytosanitary

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Executive Summary

A short term consultancy has been contracted by the German Technical Cooperation/International Service (GTZ/IS) – SATEC Développement International and the African Union – Inter-African Bureau for Animal Resources (AU/IBAR) with the main objective to compile, edit and publish the main documents, reports and lessons learnt from the Pan African Programme for the Control of Epizootics (PACE) Programme. Initially, this work was supposed to build upon the outcome of an earlier consultancy on PACE documentation. However, constraint of time has led to a concomitant execution of the two missions. Planned, initially for 20 days, the mission of editing and publishing the reports on PACE has been conducted for 27 days, at the PACE Coordination Unit in Nairobi.

The PACE programme, which was a major development programme in the field of animal health covered 30 African countries. It was originally planned to cover 32 countries but, because of their economic and political situation, Sierra Leone and Liberia did not continue in the programme. The programme was designed to last 5 years, from November 1999 to October 2004. However a mid-term evaluation (MTE), which was conducted in 2002 concluded that, as a result of the PACE Programme having suffered many delays in the first two years of its implementation, barely half the participating countries could have completed more than two years of their projected five-year programmes of capacity building. Therefore, the management of the programme has executed the recommendation of the MTE to extend the activities of the PACE Programme by two years. The PACE Programme is coordinated by the Inter-African Bureau for Animal Resources (IBAR) of the African Union (AU) ex-Organization of African Unity (OAU). A participatory approach has been adopted so that livestock farmers and animal health professionals are involved in implementing the programme. All animal product consumers, as well as the national economies of the participating countries have benefited from the PACE Programme.

The idea behind the PACE Programme was to build on the headway made in the campaign against Rinderpest conducted by the Pan African Rinderpest Campaign (PARC) from 1986 to 1999 to establish lower-cost national and continental epidemiological surveillance networks for the main animal diseases, provide the countries with the capacities needed to organize economically and technically justified control programmes and develop effective and sustainable distribution of veterinary products and services.

Establishment of epidemio-surveillance systems and networks

Epidemiological surveillance is a system based on systematic and continuous collection, analysis and interpretation of animal disease (or infection) data, allowing the health status and associated factors of given populations to be followed in space and time for use in the planning, implementation and evaluation of disease control measures. It satisfies the information requirements of accurate disease reporting, risk analysis and determination of animal health status, both for international trade as well as for internal decision-making. Surveillance data underpin the quality of disease reporting and provides the basis for accurate risk analysis. Such data are also essential to support claims for a particular disease/infection status. Taking into consideration the various wildlife populations in Africa, wildlife disease surveillance has also been addressed.

All PACE participant countries set up an animal disease surveillance system with a variable level of functionality. The establishment or strengthening of animal disease surveillance systems and

represented a priority area of intervention on which the PACE programme has invested a lot of efforts, notably through its epidemiology unit.

The efficiency of animal disease surveillance systems in countries has been measured through evaluation criteria also called performance indicators, which helped make an assessment of the state of operation of these systems in order not only to get a picture of the situation at a given point in time and an assessment of results achieved, but also to identify the strong points which can be built on and the weak points (critical points) to be corrected. As results the comparison of the average country scores enabled a general classification of the various national surveillance systems and countries themselves according to the status of the PACE activities implemented. Analysis of ESS status in PACE member countries showed differences in level of the implementation of ESS activities and of achievements. In general countries having carried out major activities of the PACE program are also those having the most efficient ESS and vice-versa.

Countries participating in the PACE programme had committed themselves to make sustainable the animal disease surveillance activities by progressively assuring their funding through national resources thus relaying EDF funding under the PACE programme, or even other donors. The challenge for the region collectively is to identify alternative ways of funding animal health systems on a sustainable basis.

Cost-Benefit Analysis of Epidemio-surveillance networks

The epidemio-surveillance systems or networks, as promoted since the 1990s by the PARC and later the PACE programme, serve a health-related purpose: secure the health of the national animal population through vigilance of veterinary services concerning exotic diseases (which are not found in the country) and through surveillance of epizootic and enzootic diseases (which appear irregularly, or regularly in a country's animal population). The studies conducted on the benefit of epidemio-surveillance systems has a general, economic as well as financial purpose : demonstrate the cost of maintaining an epidemiological surveillance system, and compare such a cost with the benefits that such ESS may generate through better control of one or more economically significant diseases.

Studies conducted clearly showed that there is no doubt that appropriate control of animal diseases and in particular an effective veterinary epidemiological surveillance, covering all really priority diseases (from an economic standpoint) is very beneficial for the countries, for their populations and for their public expenditures. When one adds to this specific fact the possibilities or opportunities of exporting livestock products (thanks to a better health status, recognized by the international community), or the impact of certain diseases on public health (rabies, brucellosis, tuberculosis, Rift Valley Fever), the return or benefit/cost ratio becomes even more positive, since there will be social and humanitarian considerations in addition to the economic considerations.

Technical and Managerial Capacity Built by PACE

AU/IBAR is the only organisation in Africa that has the mandate from the Heads of State and Government of AU member countries to respond to the problems of animal resources at a continent level. PACE has built technical and managerial capacity at the main office (IBAR/PCU) as well as regional and member countries' levels.

The on-going AU reform process has seen the creation of eight Portfolios/Directorates of the Commission of the African Union. The AU also encourages AU/IBAR to take a pro-active role in defining the possible future of the institution. As part of its contribution to the institutional development of AU/IBAR, PACE and CAPE made available resources to access external and mutually acceptable expertise to assist with the exercise of preparing a strategy paper on the possible direction for AU/IBAR's institutional development.

The Finance Agreement signed in 1999 with the EC included indicators at the level of its' specific objectives putting an emphasis for the PACE programme to achieve an increased capacity and a 'safeguarding of animal health against list A diseases'. Delivery and access to veterinary services is not explicitly mentioned at the level of specific objectives but it is assumed to be part of capacity building. To address the programme as a whole, since the PCU was in charge of assisting each country, it is important to notice that much capacity building effort has gone into strengthening of surveillance networks. Also, progress along the OIE pathway is a major indicator of effectiveness for PACE as a whole.

At the regional levels and more importantly at the Regional Coordination for West and Central Africa located in Bamako because the Regional Coordination for East Africa remained together with the overall Coordination Unit in Nairobi, PACE has done a lot in technical and managerial building. Here it can be taken account the case of PANVAC which now operating effectively with a substantive Director and budgetary provisions showing that PACE has contributed very significantly to the revitalisation of PANVAC. In addition, PACE has established a Rinderpest vaccine bank as a precaution against a re-emergence of the disease. A stock of 500,000 doses has been placed at the Botswana Vaccine Institute which takes care of its storage and quality assurance. And PACE has also established an emergency fund entrusted to the OIE through a convention signed in July 2001 between the AU-IBAR and the OIE. The fund is of Euro 500,000.

At countries' level, PACE has also accomplished a lot on veterinary services by organising training and working along the countries for the development of their private sector. A significant and useful output of the National Communication officers in collaboration with their epidemiology colleagues has been the publication of regular bulletins of the national epidemiology-surveillance networks. PACE has backed up the introduction of communication into the curriculum of veterinary students. However this did not become a permanent part of the curriculum but PACE in this action also helped to establish the association of Deans of Veterinary Schools. Furthermore, PACE has been supporting Continual Professional Development (CPD) training by the EISMV of private vets on business management e.g. by funding of workshops etc. Still at countries' level, other achievements of PACE with respect to building up technical and managerial capacity, are the improvement of linkages between the central veterinary institutions and livestock farmers, and also the strengthening and widening of laboratory diagnostic services.

Strengthening the Privatisation of Animal Health Delivery Services and the Involvement of Private Animal Health Worker in Diseases Surveillance

The OIE has relayed WTO agreements related to the global environment for trade in which exporting countries are clearly obliged to have National Veterinary Services able to produce reliable certifications meeting international sanitary regulations. The policy promoted by PACE/IBAR has clearly mentioned the different steps that should have been followed by African countries desirous to re-organize their National Veterinary Network (National Veterinary

adopted by PACE to address these activities was to establish the Veterinary Legislation and Privatization Unit (VLPU) to work in collaboration with the DFID funded CAPE project. Essentially the VLPU focussed on providing technical assistance to PACE countries to modernize their veterinary legislation to provide a legal framework for privatised veterinary services. CAPE, on the other hand, focussed on the promotion of the use of CAHWs to provide essential veterinary services in areas unlikely to be covered by conventional veterinary systems e.g. in conflict situations and remote ASAL areas. This included addressing issues of the legal status of CAHWs.

From the Final Evaluation Mission questionnaire survey, 20 countries stated that PACE had assisted in improving their private veterinary services including the use of CAHWs. This support included training and modernisation of veterinary legislation. Also, it is clear that a great deal of material to increase farmer awareness and strengthen linkages between the central and field levels has been produced under PACE. Much of this material has been of high quality. It appears, however, that the effectiveness of distributing this material has been variable. In addition, the potential for more widespread dissemination of good quality materials between countries has not been achieved as effectively as it could have been. In hindsight, the PACE programme should have made provision for systematic validation and archiving of awareness materials, and dissemination of examples of best practice for the benefit of all.

Recommendations from the 13 PACE Advisory Committee Meetings and PACE Policy Committees' Meetings

The implementation of the PACE Programme has taken cognizance of the lessons of the PARC. The main development theme of the PACE Programme was to build the institutional capacity of the OAU/IBAR and veterinary services in participating countries. Appropriate strategies have been developed and managed effectively to control epizootic diseases. This focus of the PACE Programme has included the promotion and development of partnerships between appropriate public sector and private sector stakeholders.

One important area that has been addressed early in the implementation of the programme was the co-ordination and management of the technical teams. Therefore, a Policy Committee has been put in place to devise animal health policies and strategies in Africa, to promote the exchange of information on policies and policy initiatives relevant to the PACE Programme and the OAU/IBAR and to have the important role of promoting the PACE Programme's political profile. It comprised representatives of institutions that have international mandates related to the control of epizootics and donors that are active in livestock development in Africa. The committee was supposed to meet three times during the life of the Programme but only one meeting took place.

The Advisory Committee (AC) acted as the technical advisory structure for the African Union/ Interafrican Bureau for Animal Resources (AU/IBAR) and the European Commission (EC). The Committee was entrusted with reviewing the progress of the Pan African Programme for the Control of Epizootics (PACE) every six months and recommending measures to ensure that activities of PACE were in line with the objectives. The Director General of the OIE presided over the meetings and PACE technical staff participated in these meetings as observers.

The Policy Committee but particularly the Advisory Committee has worked in following very closely the activities of the whole PACE programme and regularly issuing pertinent recommendations to all the units during the seven year life of the programme.

Progress and Achievements in the Surveillance and Control of Rinderpest, CBPP, and other diseases

Although the effects of JC-15 had been annihilated for the most part by the renewed outbreak of Rinderpest on the African continent, it must be recognized that since the PARC programme, major progress has been made that the PACE programme has strived to consolidate. Nowadays, clinical Rinderpest has virtually disappeared from the African continent and vaccination campaigns are rare. The only region of Africa (and probably of the world) supposed to still host the Rinderpest virus in a hypo-virulent form (i.e., with few symptoms and few casualties) is that of the Somali ecosystem in the horn of Africa.
90% of PACE participant countries have entered the OIE pathway by declaring their territory or part of their territory provisionally free of Rinderpest. Since May 2005, 16 countries have been declared free of the disease and 4 are recognized free of infection. 86% of the countries have developed their emergency plan and have submitted it to the AU-IBAR which has already approved 69.2% of those.

In Western and Central Africa, 12 countries (including one on a zonal basis) have been recognized as free of Rinderpest (disease) by the OIE (Benin, Burkina Faso, Côte d'Ivoire, Ghana, Guinea, Mali, Mauritania, Niger, Nigeria, Senegal, Chad, and Togo). Three countries have been declared free of infection since May 2005 (Benin, Senegal, and Togo). In Eastern Africa, 4 countries (including 2 on a zonal basis) are recognized as free of the disease (Eritrea, Ethiopia, Tanzania, and Sudan). Only Eritrea has gained the status of infection free country as of May 2005. In May 2006, 6 countries recognized free of the disease should gain the status of infection free countries. This also holds true for countries such as Burundi, Congo, Gambia, Guinea Bissau, Equatorial Guinea, and Rwanda, which can directly claim infection free stratus based on historical absence of the disease.

It must be pointed out that upon AU-IBAR's request, the epidemiologists of the PACE program bring some support to African states which are not members of the PACE program in the preparation of their dossier to be submitted to the OIE.

As for the Somali ecosystem, this region includes North-eastern Kenya, Southern Somalia, and Region V of Ethiopia, a particular strategy has been developed for the region and a *Somali Ecosystem Rinderpest Eradication Coordination Unit* (SERECU) under AU-IBAR supervision will coordinate its implementation. The unit, which comprises all actors/stakeholders in the area (national veterinary services, projects, NGOs and representatives of interested international organizations) will aid in strengthening the coordination of activities based on a joint intervention strategy. The European Union has funded a new animal health development project in Somalia whose objectives are in line with those of PACE.

Wildlife surveillance has continued normally in East Africa; as far as West and Central African countries are concerned, it has been agreed with the countries, because of the low animal population density, to adopt an ecosystem based approach and to set up a regional team. A training programme was implemented to that effect in Ghana in July 2005.

Based on the established epidemio-surveillance systems in PACE member countries, a strategy has been developed and applied with some success by the PEU to fight against other major animal epizootics such as CBPP, ASF, RVF, FMD, and HPAI by taking account the epidemiological situation, transboundary systems and socio economic conditions of the countries.

Progress of Research on CBPP, Rinderpest and PPR

On the advice of the Advisory Committee, the PCU contracted the National Veterinary Research Institute, Muguga to undertake a study of PPR vaccine to ascertain whether its use in cattle would provide cross protection against Rinderpest without interference with serological tests for Rinderpest antibody used to detect previous infection with wild Rinderpest virus. This work would validate the efficacy and safety of PPR vaccine if it becomes necessary to use vaccination in the Somali Ecosystem in the face of an outbreak of Rinderpest Lineage 2 in its last stronghold. The test protocol was written by AU-IBAR, technical support was supplied by Pirbright Laboratory and the test vaccine was supplied by CIRAD/EMVT. The results of the trial were not able to demonstrate significant protection of cattle against Rinderpest by the PPR vaccine. It could only be stated that the titration of the vaccine in cattle showed that there was protection but only at the highest dose administered (10^4 TCID50). However, the number of cattle involved was too small to give statistically valid data to evaluate its usefulness as a vaccine for Rinderpest.

The CBPP research project was divided into two main domains. The first one was to re-evaluate the efficacy of the T1 and T1sr vaccine strains and particularly to check if increasing the dose for the primary vaccination or by giving a booster dose two month after the first one would significantly induce the protection afforded (which is quite important in case of an emergency vaccination campaign). The final conclusion of the exercise is that, in the field, only yearly repeated vaccination campaigns are likely to give a satisfactory protection rate. In the case of an emergency it remains compulsory to install strict control of animal movement as it is likely that an emergency vaccination campaign in naïve animals will not induce sufficient protection to prevent the progression of the disease. The second study was to test the activity of antibiotic treatment for CBPP. A preparation of long-acting tetracycline (oxytetracycline) was used. The findings were similar on two occasions: treatment reduced the clinical signs and the mortality rate but did not succeed in clearing mycoplasmas from the affected animals. The MmmSC strains were re-isolated from these animals especially from the sequesters and the tracheobronchial nodes. Apparently this did not result from antibiotic resistance. This suggests that treated animals may shed lower quantities of mycoplasmas but may still play a role in the transmission of the disease. This is important and it will have to be taken into account in future control strategies.

Progress in the Control Of Highly Pathogenic Avian Influenza (HPAI)

In the last year of the extension phase of the PACE programme, outbreaks of Highly Pathogenic Avian Influenza (HPAI) had a major impact on project activities, particularly on those of the PEU and the Technical Assistants.
Since the beginning of 2006, HPAI has been diagnosed in seven PACE countries, out of 8 affected in Africa. Highly Pathogenic Avian Influenza (HPAI), caused by avian influenza virus subtype H5N1, has severely affected poultry production in Southeast Asia since 2003. The African continent recorded its first outbreak of HPAI in Nigeria in February 8, 2006 in domestic poultry. Since then Egypt, Niger, Cameroon, Burkina Faso, Sudan, Côte d'Ivoire and Djibouti, have reported outbreaks of the disease in domestic poultry. The threat of further spread in Africa is real and it could occur from the legal or illegal movement of poultry and/or poultry products, or potential interaction between domestic poultry with infected wild bird populations.

Control measures in PACE countries have been enhanced by the epidemio-surveillance and sampling procedures which the project has introduced and which has been extended to domestic and wild birds. It would not have been possible to deliver the surveillance and control measures for HPAI in the countries affected if the passive and active epidemio-surveillance systems already developed through PACE had not been in place.

At the 6th meeting of the Executive Committee of Alive, OIE, FAO and AU-IBAR formalized a Memorandum of Understanding on the installation of a technical framework intended to ensure a better co-ordination of their interventions, in particular with regard to the fight against HPAI in Africa. In line with this framework, a joint consultation between AU-IBAR, OIE and FAO and the regional economic communities has been undertaken in order to evaluate needs and prepare an action plan to prevent and control HPAI and avoid a possible pandemic.

Establishment of an Animal Resources Information System (ARIS) at Institutional and Country levels

As part of capacity building in collecting timely disease data for early warning and early reaction and also other animal resources data for generating information for planning and decision-making, PACE has developed an information management tool. The tool is called the PACE Integrated Database (PID) or Animal Resources Information System (ARIS) and plays a key role in animal resources management for sustainable development and regional integration.

The implementation of ARIS was welcomed with enthusiasm by Data Management officers (DMOs) and the software was used on a daily basis at the Coordination Units as well as in 28 PACE countries. However since diseases reporting to AU-IBAR and to OIE is a requirement and is considered among countries' priorities, the module for Passive Surveillance and Reports Generation was the most used. The module for human resources management and the one related to livestock economics was used only in a few countries (Kenya, Mali).

Besides ARIS, PACE has been supporting the establishment of an Information and Communication System (ICS) in AU-IBAR to improve the access and sharing of information with member countries and with International Institutions. PACE established and maintained a LAN with an e-mail system and mailing lists in IBAR. It has supported the development of a website, an insider news flash and currently the development of a digital library database. Under PACE a large amount of communication materials of various formats were also produced at the PCU level and in national components but the sharing of these materials is still limited. ARIS for its optimal use, needs to be a component of this overall ICS at IBAR and member countries. Within AU-IBAR Intranet system, ARIS and the library database will constitute interactive tools that will significantly facilitate the upload of data, reports and communication materials from member countries and vise versa. It is therefore to be seen as a great achievement for PACE to hand over a functioning and modern ICS to IBAR.

Achievements in Building-Up the Capacity for Communication

The main objective of PACE Information and Communication Unit (ICU) was to develop and introduce a sustainable information system to PACE and advise, facilitate, support, harmonise, catalyse and inform PACE Regional and National Coordination in appropriate data collection, transmission and analysis and information dissemination systems making use of appropriate Information and Communication Technology (ICT). Experiences acquired during the process and system established would be the basis for future IBAR information management system.

Besides the establishment of ARIS, the ICU, in order to achieve its objectives, has performed the following accomplishments: production and distribution of information resources materials such as CD-ROMs; revitalisation of the Pan African Animal Health Yearbook; harmonization of information management with international and regional organization; and production of maps supporting Rinderpest strategy.

The way forward

Many lessons have been learned from PARC and PACE, and these should be taken advantage of by incorporation into any future PACE programme. Areas proposed for future project support are:

- Further development of regional reference laboratories. In this respect the performance of Muguga has been criticised. Given the need for regional reference laboratories, it is proposed that, rather than discontinue its use, an assessment should be made of the feasibility of taking it over as a regional IBAR laboratory, similar to what has happened with PANVAC.
- A future donor support should, as well as disease control, have the following elements:
    - Socio-economics – to explore local disease avoidance and coping strategies used by livestock keepers.
    - Trade and marketing – for development of marketing strategies, particularly from disease free zones and quarantines.
    - Wildlife - Increased use of sentinel wildlife for surveillance.
    - Policy formulation – based on risk analysis and HACCP; with expertise on ISOs, SPS agreement, OIE Terrestrial Animal Health Code and Codex Alimentarius.
    - Vaccines - development of improved vaccines for CBPP, RVF and ASF.
    - SERECU - It is imperative that SERECU continues its activities with regard to surveillance activities in the Somali Ecosystem to ensure confirmation of final eradication of Rinderpest and to ensure emergency preparedness in case there is a re-emergence of the disease.

Since there may be disruption of epidemio-surveillance activities between closure of PACE and the start of a new project, resources allocated to the epidemio-surveillance of HPAI should also be used to maintain general active surveillance.

As there are differences in livestock systems and potential markets between the different regions, it is proposed that future regional programmes should be based alongside the soon to be established animal health centres in the economic regions. Thus, there can be more focussed projects which take into consideration particular disease and public health threats and regional opportunities for trade in livestock and their products.

1.0. Introduction

1.1. Scope and Context of the Consultancy

The German Technical Cooperation/International Service (GTZ/IS) – SATEC Développement International and the African Union – Inter-African Bureau for Animal Resources (AU/IBAR) contracted a short term consultancy with the main objective to compile, edit and publish the main documents, reports and lessons learnt from the Pan African Programme for the Control of Epizootics (PACE) Programme. Initially, this work was supposed to build upon the outcome of an earlier consultancy on PACE documentation. However, constraint of time has led to a concomitant execution of the two missions. Planned, initially for 20 days, the mission of editing and publishing the reports on PACE has been conducted for 27 days, at the PACE Coordination Unit in Nairobi. The team of consultant comprised of two experts:

- a technical expert, veterinarian, who was the mission leader; and
- a communication and information expert.

After meeting with the personnel of the PACE programme at the PACE Coordination Unit (PCU) in Nairobi Office, comprising mainly the Coordinator of the PACE Programme, the Technical Assistant as well as the heads of the different units to clarify the objectives of the mission, the consultants have reviewed the main documents of PACE to compile the relevant information. The team of consultants was requested to synthesise, edit and publish a document or booklets on:

- The sustainability of Epidemio-surveillance networks (ESN) established under PACE
- The cost-benefit Analysis of Epidemio-surveillance network
- The technical and managerial capacity built by PACE both at Institutional (IBAR/PCU), regional and member countries' levels
- Achievements on strengthening the privatisation of animal health delivery services and the involvement of private animal health worker in diseases surveillance
- The recommendations from the 13 Advisory Committee Meetings as well as the Policy Committee Meeting
- Progresses and achievements made in the surveillance and control of Rinderpest and CBPP
- Progress made in the control of HPAI
- Achievement on the establishment of an Animal Resources Information System at institutional and countries' levels
- Progress made on the research on CBPP and Rinderpest
- Achievements in building up the capacity for communication
- Draft PACE Final Report
- Prepare a booklet on PACE success stories
- Prepare a compendium on PACE National programmes
- Synthesis of PACE Financial Report

For a better presentation of the major work performed by the PACE programme, the team of consultants compiled the information according to the following format:

- a document on the major achievements of the PACE Programme compiled

- a booklet on the success stories of PACE
- a booklet on the PACE national components
- a booklet on the financial aspects of the PACE Programme

Due to the lack of time, and mainly because of the huge amount of documents produced by PACE to be consulted, the team of consultants decided not to study exhaustively aspects of PACE related to its personnel, the important materials, such as logistics, used to perform the different tasks.

The team of consultants also understand that his overall work, at the eve of the end of the PACE programme, scheduled for the 28 of February 2007, will be used for the Final Report of the PACE programme.

1.2. Overview of the PACE Programme

1.2.1. Inception of the programme

Sound animal health is a priority for the development of livestock farming in rural Africa where, despite meat imports in particular, the population does not get proper amounts of animal protein. Per capita consumption of animal products is already low, and is declining steadily (-28% in 30 years for meat). Moreover, the annual population growth in sub-Saharan Africa (SSA) remains at 2.7% whereas the increase in animal production is only 2.2%. Extensive traditional production systems, with limited growth potential, are also still widespread in SSA. A critical human dimension, therefore, compounds the economic problem. Animal diseases are among the main reasons for this shortage because of their direct effects on livestock – mortality, drops in production, among others. Furthermore, the current situation of health insecurity discourages investment in the sector and the traditional stock farmers respond to this insecurity by building up large herds that are often under-exploited and also impinge heavily on local natural resources.

In the last 25 years, however, there has been a marked change in production methods: ruminant herds have shifted to wetter regions and animal production systems have become more intensified and more closely incorporated with other rural and peri-urban activities. There is considerable potential for increasing livestock production in Africa through these 'new' systems. Creating a system to protect animal health promotes the development of all production systems and stock farmers' incomes. Health security is, therefore, a precondition for any programme or project aimed at intensifying production.

One of the most dangerous epizootic diseases is Rinderpest, which now only exists in three East African countries. Its eradication, which on the basis of past experience is the only sustainable option, is technically possible and complies with the rules laid down by the OIE. The Pan-African Rinderpest Campaign (PARC) was co-financed by the European Community (EC) from 1986 to 1999 contributed a great deal to improve health security by combating Rinderpest, one of the most devastating contagious diseases of cattle. PARC's positive results, confirmed by an independent evaluation in 1996/97, offered a firm basis for eradicating Rinderpest and controlling other major diseases. The PACE Programme intended to follow this course of action. The idea behind the PACE Programme was to build on the headway made in the campaign against Rinderpest to establish lower-cost national and continental epidemiological surveillance networks for the main animal diseases, provide the countries with the capacities needed to organize economically and technically justified control programmes and develop effective and sustainable distribution of veterinary products and services.

The PACE programme, which was a major development programme in the field of animal health covered 30 African countries. It was originally planned to cover 32 countries but, because of their economic and political situation, Sierra Leone and Liberia did not continue in the programme. The programme was designed to last 5 years, from November 1999 to October 2004. However a mid-term evaluation (MTE), which was conducted in 2002 concluded that, as a result of the PACE Programme having suffered many delays in the first two years of its implementation, barely half the participating countries could have completed more than two years of their projected five-year programmes of capacity building. Therefore, the management of the programme has executed the recommendation of the MTE to extend the activities of the PACE Programme by two years. The PACE Programme is coordinated by the Inter-African Bureau for Animal Resources (IBAR) of the African Union (AU) ex-Organization of African Unity (OAU). A participatory approach has been adopted so that livestock farmers and animal health professionals are involved in implementing the programme. All animal product consumers, as well as the national economies of the participating countries have benefited from the PACE Programme.

1.2.2. Objectives of the PACE Programme

The overall objective of the programme was to relieve the poverty of those involved in the livestock-farming sector (producers, service providers and consumers) in Africa by the improving animal productivity, trade and food security.

The specific objectives of the programme were:

- to strengthen national and regional capacities to assess the technical and economic aspects of animal diseases, and to generate appropriate programmes for their control
- to protect animal health in Africa against the principal epizootic diseases (list A of the IOE)

The expected results were:

1. In each participating country animal epidemiology services (information, diagnosis and follow-up) and services for the control of major diseases would have been reinforced.
2. Privatisation would have been better organised and epidemiology capacities would have been strengthened to the direct benefit of livestock farmers.
3. Rinderpest would have been eradicated from Africa and there would have been greater control over other epizootic diseases, in particular contagious bovine pleuro-pneumonia (CBPP).

A sustainable system would have been set up at pan-African level to co-ordinate national animal health systems and the fight against epizootic diseases.

1.2.3 Activities of the PACE Programme

The programme activities are divided into national components (67% of the programme's budget) and regional components - or common regional services - (24% of the programme's budget).

The national components

National component activities vary according to the individual situations in each country but they always fell under the following four headings:

- enhanced national capacity for analysis and action in the fields of epidemiology, socio-economics of animal health, communications and project management
- improved accessibility and distribution of veterinary services and medicines, based on developing a harmonized approach to the privatisation process and coherent links between public services and private operators
- fight against Rinderpest, based on halting vaccinations as soon as possible and on giving aid to countries to fulfil the OIE procedure for being declared "countries free from the disease", including active research into the disease, strengthening the surveillance network and setting up rapid response systems;
- Improved control of other epizootic diseases, particularly the Contagious Bovine Pleuropneumonia (CBPP), by drawing up epidemiological and socio-economic data enabling the states concerned to assess the advisability of future campaigns based on full cost recovery. Vaccine funds could possibly be made available for the most badly affected areas.

These components of the PACE Programme are all directed at building up the institutional capacity of national animal health systems. They aim to encourage national capacities for planning, implementation, monitoring and evaluation of interventions. A multiplier effect will be produced through regional and sub-regional meetings and is also one of the main responsibilities of the Co-ordination Units.

The regional components

The PACE Programme's Common Services support the implementation of activities at national level. They are based at the AU/IBAR's offices in Kenya and in the Regional Co-ordination Units. The Common Services include:

- An *epidemiology unit* that is the heart of the Programme. It includes a service with special responsibility for epidemiological monitoring of wildlife. Three sub-units dealing with the Rinderpest situation have been set in the following locations:
    - one in Nairobi for the area where Rinderpest is still endemic;
    - one in Bamako for the countries of West and Central Africa that have ceased anti-Rinderpest vaccinations and begun the OIE procedure;
    - one in N'djamena responsible for monitoring the western sanitary cordon which protects West Africa against possible re-infection from East Africa.

- A *communications unit* based in Nairobi with a sub-office in Bamako built up national expertise in this field. At the request of the other technical units it produces advisory back-up material at central level, it promotes the programme and helps to supplement the veterinary schools curriculum.
    - A *socio-economics unit* is responsible for developing appropriate instruments for socio-economic evaluation of diseases and devising projects for their control. These are then transferred to the sub-regional and national levels.
    - A *unit to back up the organisation of the veterinary services* (privatisation and use of husbandry auxiliaries). It is responsible for the legal aspects of the privatisation process, harmonization of approaches and negotiations with financial intermediaries, and also promoting the participation of husbandry auxiliaries ("paravets" and community-based animal health workers) in vaccination campaigns in remote or unsafe areas, under the supervision of veterinary doctors. Auxiliaries also take part in improving the distribution of veterinary

products and services in the more arid regions, and more generally in the process of privatising veterinary medicine. This aspect has been carried out in conjunction with other donors, such as the Department for International Development (DFID).

- A *financial unit* responsible for establishing real time analytical accounts for the financial control of the programme, accurately estimating the costs of activities to control diseases, and carrying out internal audits at regular intervals.
- Other common services include:
  - i) a data processing and analysis unit
  - ii) a follow-up/evaluation structure
  - iii) a policy committee and an advisory committee for the programme
  - iv) support for veterinary schools to alter their curriculum

The programme also supports the Pan African Vaccine Centre (PANVAC) (OAU centre for the quality certification of vaccines) and commissions scientific research institutions according to the needs identified, in particular for work on CBPP.

1.2.4. Organization and management

Operations of the PACE Programme

The PACE Programme has been operating in 30 of the 32 countries originally identified, and these various national capacity building projects have been given technical support and guidance by seven Common Services Units (CSU) located in the offices of the Inter-African Bureau of Animal Resources (IBAR) in Nairobi, and co-ordinated by the Regional Co-ordination Units in Bamako (for the West and Central African countries) and Nairobi (for the East African countries). The management of the programme is a complex and multifaceted arrangement, with different responsibilities lying in different places. The senior management structure of the Programme, however, comprises the Regional Authorizing Officer (RAO), who is also the acting Director of IBAR, a PACE Programme Coordinator (IBAR staff member) and a Main Adviser (European TA funded under the Regional TA component). This structure is supported by a European Financial Controller (also funded under the Regional TA component) and local support staff comprising an Accountant, Assistant Administration Officer and secretarial staff. Operational management has been the responsibility of the Director, the PACE Programme Coordinator (PC) and the Main Advisor TA who are all based at the headquarters in Nairobi.

The EC Delegation, through the Finance Section and the Officer responsible for the Programme (the Senior Rural Development Adviser in the EC Delegation Nairobi), has also played a significant role in management and administration of the PACE Programme. As the representative of the lead EU Delegation, the latter is responsible for approving all the Programme Work Plans (from both concentrated and the "deconcentrated" countries), and expenditure under the regional component, especially the various TA contracts.

PACE is a regional programme that includes the coordination and planning of PACE national programmes for which the Director of IBAR acts as the Regional Authorising Officer (RAO). The procedures entail the initial preparation of a Global Work Plan by the PCU including an indicative budget covering the entire five-year period for each country. The national components are financed through annual work plans based on indicative budget allocations to each country. Work plans are prepared by the national coordinators and submitted for approval to the EDF National Authorising Officers and to the Heads of the local EC Delegations and then to the Lead Delegation for consolidation. The Global Plans are also subject to advice from the Advisory

The consolidation of work plans aims to harmonize the PACE programme implementation in the various countries and allow for financial control of national components. Since the beginning of PACE, there have been eight consolidations, two each year in April and October for start of work plans respectively on 1 May and 1 November. Deadlines for transmission of WP proposals for analysis from national coordinators and for WPs approved and signed by the Regional Coordination unit were defined by the PACE RAO.

This process was designed to reduce the number of applications for approval, which otherwise could have seen 30 different countries applying individually. All work plans for both "non-deconcentrated" countries (about 25 or the bulk of the countries) and de-concentrated countries are consolidated for approval by the Lead Delegation. Subsequently, the WPs for the non-deconcentrated countries are sent to EU Brussels for issuing a "Secondary Commitment Number." This then allows the PCU (the RAO) to authorize National officers (NAOs) to advance 40% of the approved work plans. The national EC office then draws funds through its local office and claims for actual expenditure from Brussels after the year-end. For the newly created "deconcentrated" countries (Senegal, Mali, Ethiopia, Tanzania and Kenya), the Lead EC Delegation in Nairobi issues the Secondary Commitment number, instead of Brussels and authorises the National officers as explained above.

The main problem has been delays in the submission of national work plans, causing delays in mobilization of funds for several months after and the starting dates of activities in the work plans. In addition, under EU regulations, individual country work plans and budgets could not be approved and fresh funds released until the previous-but-one annual work plans are closed and unused funds returned. The task of financial control and expenditure is complicated by the use of several EU accounts stemming from different sources, such as the seventh and eighth EDF funds with differing regulations.

Co-ordination
The Co-ordination Units provided administrative and accounting support to the project. It also supported PACE vis-à-vis the African States in policy and regulation reforms, which were required for the successful conclusion and sustainability of the achievements of the programme. Close coordination and exchanges of information have been maintained Africa-wide and with OAU member countries to ensure consistency in the efforts to overcome animal diseases in the continent.

1.2.5. Financing and partners

The PACE Programme was funded by the European Union (EU). The PACE Financing Agreement (FA) was signed on 5 July 1999 by the European Commission and on 30 August 1999 by the AU-IBAR respectively. The total EC contribution was EUR 77 million: 72 million for the PACE Programme from November 1999 to October 2004 and EUR 5 million for the PACE Programme extension from November 2004 to February 2007.

The Fund Commitment of EUR 72 million was from seventh and eight European Development Fund (EDF) resources and the Fund Commitment of EUR 5 million was from ninth EDF resources.

A total budget of EUR 51,680,000 was allocated to the National component (30 countries) and a total budget of EUR 25,320,000 to the Regional Component (PCU, Regional Co-ordination Unit Service Contracts, Audits/Consultancies and Research).

Accounting systems were used for the financial implementation of PACE, PCU and SERECU while an Excel based monitoring system was used to control the overall financial execution of the PACE programme.
The Finance and Administration Unit included:

- A Head of Finance and Administration (who lead the Unit).
- An Accountant for PACE
- An Accountant for SERECU
- An Administrative Assistant
- A pool of three secretaries

The Head of Finance and Administration was also the Imprest Accounting Officer (IAO). The Accountant for PACE was the Accountant for the programme estimates of the PACE PCU. The SERECU Accountant also did the accounting of the financial execution of the service and grant contracts in PACE. The Financial Controller did not supervise the Finance and Administration Unit but operated as an adviser to the Head of Finance and Administration and was part of the PCU management team. The Financial Controller quality controlled the work of the Unit and undertook financial reporting.

The SERECU Accountant and the Administrative Assistant only joined the PACE Team at the beginning of 2006. This has been very positive and these additional resource persons provided the Financial Controller with improved access to information about programme implementation.

There was no Financial Controller at the RCU in Bamako. There was no need for additional financial control functions in Bamako but building EDF financial management capacity at regional level was an important issue that was underestimated in the design of the programme.

GTZ had a budget of EUR 7.9 Million over a period of four years. GTZ had four long-term TAs: one national TA in Sudan, two regional TAs in Bamako and one regional TA in Nairobi. They also provided short-term experts.

The overall programme is managed and co-ordinated by the PCU, based in AU-IBAR in Nairobi. The PACE Programme has included external and service contracts with organisations, such as GTZ/IS-SATEC, CIRAD, AGRER, FAO, and the IAEA. In addition, the other donors to the PACE programme are French Co-operation through the Ministère des Affaires Étrangères, the UK Government's Department for International Development (DFID), the Italian Government and the Swiss Government. The latter two funded part of the intervention in Somalia during the first phase of the programme. French Co-operation has funded two regional epidemiologists in the Bamako RCU, the first was from November 1999 to September 2003 and the second took up her appointment in February 2004. Although funded by French Co-operation, these experts have been an integral part of PACE and there has been complete complementarity between their activities and other activities funded by the EDF.

DFID funded the CAPE project from October 2000 to September 2004. The purpose of CAPE was *"to establish sustainable animal health services to control diseases that threaten the health and productivity of livestock reared by pastoralists in the Greater Horn of Africa"*. CAPE had two TAs and support staff based in AU-IBAR in Nairobi, as well as field staff in Uganda, Somalia and Ethiopia. Although working from its own budget (£ 5.426 million) and logical framework, it was planned that CAPE would collaborate with PACE in certain activities. Thus CAPE collaborated effectively with the

organizing participatory epidemiology workshops, devising disease control strategies and carrying out surveys of CAHWs in the Greater Horn of Africa. An important part of the PACE/CAPE collaboration, however, was in the area of privatisation and legislation.

Farmers and herdsmen as partners

The programme has involved, in particular through the use of a participatory approach and in first place farmers and herdsmen, whose wives are usually responsible for milk and small livestock production but who also traditionally own animals in their own right, in the second place animal health professionals, many of whom are already involved in a general process of privatization, and lastly all consumers of animal products. By setting up an appropriate framework to put animal health on a more secure footing, the programme has brought about the development of the sector by means of its internal dynamics. It has thus lead to an improvement in the income of livestock producers and the living condition of the population. Finally, although this animal health framework has not directly dealt with production, it did however represent a prerequisite for any development programmes in this sector.

1.3. Overview of PACE achievements

The overall objectives, the specific objectives, and the results expected from the activities conducted by PACE during the initial and the extension phases are all reported in Annexes 1 and 2, following the format of logical frameworks . Futhermore, a comparison has also been made in 2006 by the PCU of the achievements to the expected results, yielding percentages of success (See Annexes 3 and 4). This information which has been published in the Final Report of the Final Evaluation of the PACE will constitute the backbone of the following report. It is also relevant to notice that the expected output that we intend to present will constitute the memory of the seven year implementation of the programme.

2.0. Establishment of Epidemio-surveillance systems and networks

2.1 Purpose of Epidemiological-surveillance systems and networks

2.1.1 Definition and importance of epidemiological-surveillance networks

Epidemiological surveillance is defined as a system based on systematic and continuous collection, analysis and interpretation of animal disease (or infection) data, allowing the health status and associated factors of given populations to be followed in space and time for use in the planning, implementation and evaluation of disease control measures. It should satisfy the information requirements of accurate disease reporting, risk analysis and determination of animal health status, both for international trade as well as for internal decision-making. Surveillance data underpin the quality of disease reporting and provides the basis for accurate risk analysis. Such data are also essential to support claims for a particular disease/infection status.

Although epidemiological surveillance systems vary between countries, due to different administrative structures and state of infrastructure development, generally it was agreed that disease surveillance usually implies general, passive and active methods and the concept of participatory epidemiology. Surveillance systems are based on a central unit, laboratories and field staff, including livestock keepers and private veterinarians **(figure 1)**. The different types of surveillance are not always easily separable.

- Passive surveillance is based on reports of animal diseases by livestock keepers, community-based animal health workers (CAHWs), livestock traders, abattoir technicians and field agents of public or private veterinary services, etc. Consequently, it is impossible to know in advance the place, the number of cases and the nature of the disease. Passive surveillance is exhaustive (not restricted to a specific disease) and continuous. So, it is particularly relevant for early warning of disease epidemics.

- Active surveillance is based on active search for a specific disease (active data collection). Its objective is to detect the presence or absence of a specific disease or infection in a particular animal population. In this case, we know exactly the volume and the type of data, which are to be collected (e.g. the number of animals to be inspected and the number of sera to be collected are known in advance within the framework of RP active surveillance and serological surveillance). Active surveillance involves confirmation of the absence or presence of disease at a given time in the investigated areas. This is because the data is collected from representative locations (random sampling) or from target areas for which the risk has been identified (purposive sampling). Conversely, it can neither be exhaustive nor continuous.

- Participatory epidemiology means the use of participatory techniques for qualitative and quantitative epidemiological data collection within the communities, based on ethnoveterinary knowledge and oral history. This approach is based on techniques and methods such as participatory rural activities/appraisal. This strategy allows one to verify the information at the field level as well as the identification of the most appropriate intervention methods in the communities. In the case of PACE and particularly in the pastoral zones of PACE member countries, participatory epidemiology can be considered an appropriate activation technique for passive surveillance.

While these terms (active, passive, pathogen-specific and general) are useful for describing

data is more useful for the purposes of establishing standards and evaluating the quality of surveillance systems.

In the context of PACE, epidemio-surveillance is regarded as an integral part of an effective veterinary service. Many of the actions of an effective veterinary service need to be monitored in terms of effectiveness, efficiency and, ultimately, impact on the problem the action is designed to address. There is therefore a continuous process of intelligence gathering (surveillance) leading to policy development and resulting in corrective action. Analysis of the results and outcomes of the action ideally lead to the problem being redefined in which case the process begins again.

Taking into consideration the various **wildlife populations** in Africa, **wildlife disease surveillance** should be addressed. The Wildlife epidemio-surveillance is a new field of activities launched by PACE Programme in Africa. That why, it was necessary to precise the concept before bringing it to the field. This was done through training workshops mainly on wildlife epidemio-surveillance but also on wildlife game captures techniques. This can be done through consolidation of regional teams and working at an ecosystem level, pooling resources and sharing data of a transboundary nature. This has both scientific and practical benefits and would facilitate the preparation of OIE pathway dossiers for applications on freedom from diseases and therefore for infections.

Given the fact that in most African countries the system of husbandry is pastoralist and nomadic and this prevents effective movement control of livestock, and because of the "permeable" National borders in Africa and recognizing that animals within the region are under similar epidemiological conditions and risk of disease, AU-IBAR endorsed the concept of a regional approach to the control of transboundary animal diseases, and to facilitate progress along the OIE Pathway for Rinderpest as proposed by the PACE Programme through its epidemiology unit. This is optimal to ensure effective surveillance and control of disease. This involves any element from epidemiological surveillance of both wildlife and livestock populations, and coordinated approaches to satisfy international sanitary requirements for trade in animal and animal products, without the constraints of requiring animal movement control at national boundaries.

A regional approach of epidemiological surveillance and control of major transboundary diseases in Africa has been shown by the adoption of the strategy for the control of pleuro-pneumonia (CBPP) by PACE member countries in February 2004. This took into account epidemiological situation, socio-economic conditions as well as husbandry systems and different epidemiological zones; it aimed to reduce the incidence of CBPP in the endemic zones and to protect the free zones.

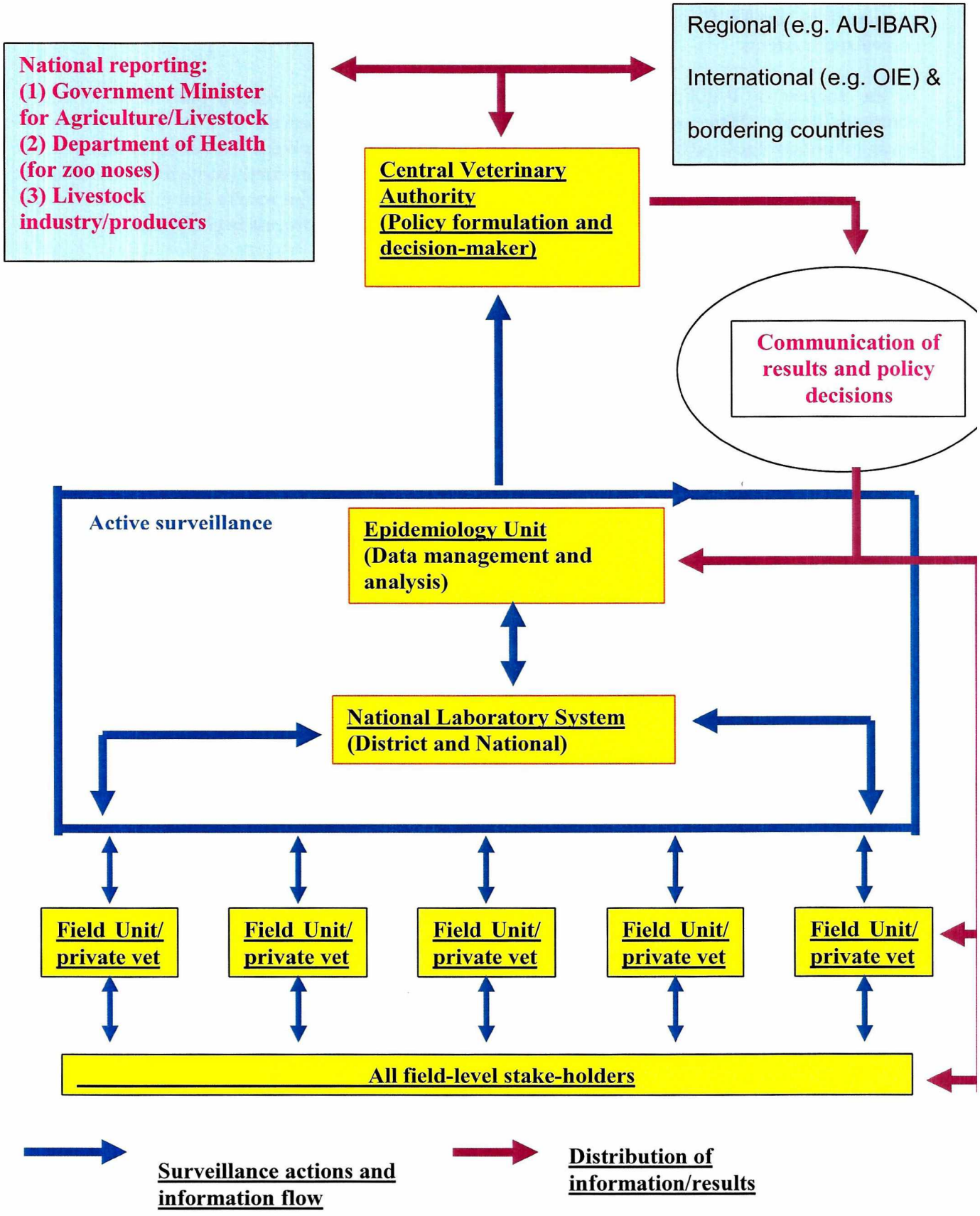


Figure 1: Simplified elements of epidemio-surveillance integrated into an effective veterinary service

2.1.2 Example of a Rinderpest surveillance system

The major components for Rinderpest surveillance would include the following: general disease surveillance, active surveillance and reporting, sero-surveillance and wildlife surveillance.



Figure 2: Components of a Rinderpest surveillance system

Passive surveillance

General disease surveillance functions within a routine national disease reporting system. It is a passive system which collates monthly reports on significant disease occurrence observed mainly by veterinarians during field work. Laboratory data generated as a result of routine activities may supplement the reports. Data collected at abattoirs through meat inspection also belong to the passive surveillance system.

General disease reporting systems should cover all OIE List A and List B diseases such as Rinderpest as well as any diseases of local significance.

Active surveillance

Active disease surveillance is intended to determine the occurrence of specific clinical syndromes. In the context of a RRinderpest surveillance programme, active surveillance would encompass a search for a syndrome associated with stomatitis and enteritis. Such a surveillance system initiates and maintains field level surveillance with the sole purpose of detecting this clinical syndrome in animal populations. Consequently, active disease surveillance is *not* a search for Rinderpest disease; it is a search for clinical syndromes associated with stomatitis and enteritis. The definitive diagnosis relies on laboratory investigation. An event requires reviewing if it has not been definitively categorised as either being Rinderpest or a confirmed differential disease diagnosis. A well functioning surveillance system should only have stomatitis-enteritis events in review classification as a transient category. Stomatitis-enteritis events that are not concluded would indicate a failure in the surveillance system.

If active disease surveillance is functioning correctly, outbreaks of diseases such as bovine viral diarrhoea (BVD), infectious bovine rhino-tracheitis (IBR) and malignant catarrhal fever (MCF) should be suspected, sampled, detected on the basis of confirmatory laboratory results and reported.

Sero-surveillance

Rinderpest sero-surveillance is a means of illustrating the presence of virus in a population by detecting specific antibody to Rinderpest in serum, however it does not distinguish between

infection with wild virus and vaccine virus, therefore limiting the specificity of this method. However, sero-surveillance may confirm the absence of Rinderpest virus in a population.

Wildlife surveillance

Surveillance of wildlife is applicable to those countries with a significant wildlife population capable of contributing to the maintenance of Rinderpest virus. Wildlife would then represent a non-vaccinated sentinel population.

2.2 Situation of Disease Surveillance in Africa before PACE

Priority programs are so many in countries that Governments have always faced the difficult task of choosing which ones to fund. For a crucial decision-making, they need to know what the benefits or returns to investment are before resources can be committed. A consequence of this is that many Governments have been unable to adequately fund animal disease prevention/control measures.

It is becoming clearer today, with all the experiences lived and the studies conducted, that there is a need for the establishment of an early warning or surveillance system that is capable of detecting disease outbreaks and containing them before they spread. Such a system involves a systematic and continuous collection, analysis and interpretation of animal disease (or infection) data. It allows the health and associated factors of given populations to be followed in space and time. It can also be used in planning, implementation and evaluation of disease control measures. More importantly, it is a requirement of the OIE Pathway for verification and grant of disease-infection-free status and is required by importing countries for the purposes of trade in livestock and livestock products.

In the context of globalisation, the development of epidemio-surveillance networks or the revitalisation of conventional epidemio-surveillance systems has become a priority for veterinary services in countries, which would like to take part in the international trade of animals and animal products. The existence of an effective epidemio-surveillance system constitutes one of the pre-requisites for applications to the OIE for confirmation of disease status. This is true not only for RP, but also for other diseases to which countries give priority.

Taking advantage of Pan-African Rinderpest Campaign (PARC) achievements, a fundamental objective of Pan-African Programme for Control of Epizootics (PACE) is to continue the establishment of effective epidemio-surveillance for animal diseases in 30 countries involved in the programme, as well as at continental level. Such surveillance is essential for an effective veterinary service in any country as is indicated by the requirement for adequate disease reporting (OIE, 2002). Thus without effective surveillance for important animal diseases, particularly those that affect trade in livestock and livestock products, human health or the economics of animal production, a veterinary service will not be considered reliable. Increasingly, the Office International des Epizooties (OIE) is providing a mechanism whereby member countries may apply for recognition of freedom from specific diseases, such as Rinderpest, foot and mouth disease (FMD), contagious bovine pleuro-pneumonia (CBPP) and bovine spongiform encephalopathy (BSE). In order to apply successfully it is necessary for the country concerned to demonstrate, irrespective of the requirement for individual diseases, that it has an effective veterinary service which, as already indicated, includes an effective surveillance system.

At the beginning of the activities on epidemiology conducted by the PACE programme in the participating countries in Africa, the PEU has taken account the capacities and requirements of individual countries and developed then adopted a strategy based on the following factors:

- An accurate understanding of the existing epidemiological capacities (including quantity and quality of personnel, infrastructure and budgetary allocations) within participating countries;
- An appreciation of the disease threats that face the various agro-ecological regions within the area covered by PACE;
- Practical possibilities for animal disease control in the PACE countries bearing in mind technological, financial, logistical and social limitations;
- Initiation and promotion of regional co-operation and mutual-assistance in the area of disease surveillance and control/eradication;
- Promotion of epidemiological, diagnostic and disease-control networks and programmes for neighbouring countries;
- Promotion of the necessity for and acceptance of quality assurance for laboratory services and disease surveillance and control activities;
- Initiation of research that will improve surveillance and control of important animal diseases in the area covered by PACE.

2.3 Establishment of Epidemio-surveillance Networks (ESN) under PACE in African countries

2. 3.1. Rationale and key elements of ESN

The establishment or strengthening of animal disease surveillance systems and reporting, in accordance with the *OIE Terrestrial Code* guidelines, health problems at country level, represents a priority area of intervention on which the PACE programme has invested a lot of efforts, notably through its epidemiology unit.

The surveillance of animal diseases in general or of a specific disease aims at recognizing the epidemiological situations of these diseases in order to prevent them or, failing that, to develop appropriate strategies in order to control and eradicate them. The surveillance activities are carried out in most cases by public veterinary service agents with the help of farmers, and involve in certain cases private veterinarians.

All PACE participant countries set up an animal disease surveillance system with a variable level of functionality.

The efficiency of animal disease surveillance systems in countries is measured through evaluation criteria also called performance indicators, which help make an assessment of the state of operation of these systems in order not only to get a picture of the situation at a given point in time and an assessment of results achieved, but also to identify the strong points which can be built on and the weak points (critical points) to be corrected.

The assessment is done according to a methodology developed by the PACE epidemiology unit which takes into account the organization in place, its animation, the equipment of the agents, the flow of animal health information and of course the operation of the diagnostic laboratory if there is one.

In general, the surveillance systems set up have a good organization resting on supervision bodies (steering committee and technical committee), a central unit and the actual field network

regional services. When this whole arrangement is placed under the supervision of the Directorate of Veterinary Services, one can consider that there is a genuine line of command facilitating the flow of animal health information. But this is not always the case, as in certain countries, the field agents are working under regional directorates that report to the Ministry of Agriculture. With this configuration, this creates command problems when implementing actions, mostly when handling rapid outbreak interventions. It must also be pointed out that the organization of surveillance systems is formalized in many cases by regulatory texts (ministerial order, for example).

The good operation of a network is mostly related to its animation or coaching, a job which mainly rests on the central unit. The latter is composed of at least two epidemiologists appointed respectively by the Directorate of Veterinary Services and by the laboratory. In the majority of cases, this unit is hosted by the Directorate of Veterinary Services and is also entrusted with managing the database. This team which constitutes the mainspring of the surveillance arrangement does not always have adequate means to successfully conduct the work entrusted to it and which is generally huge: development of surveillance protocols for diseases and survey forms, training and retraining of agents, field surveys in case of suspected outbreaks, animal health data recording and analysis, editing information bulletins, etc. In the course of ESS evaluations, it has turned out that animation could constitute a weak point that countries need to improve on.

PACE programme has contributed to improving the equipment of agents by funding the acquisition of vehicles, motorcycles, cold chain material, laboratory equipment and various other equipments. The delays noted in the acquisition of equipments because of a lack of familiarity with the managing procedures of EDF projects have gradually been curbed. Some countries have also received equipment through other projects that have generally improved the operationally of veterinary services. However, there are problems in covering recurrent costs (fuel, maintenance) for vehicles as well as motorcycles.

There are improvements noted in the flow of animal health information between the field and the central veterinary administration and from the latter to the laboratories. The reporting uses forms in line with the OIE requirements and is managed in a centralized computerized system based on the ARIS software (Animal Resource Information System), developed by the PACE programme. Apart from the traditional data transmission channels (monthly reports, warning bulletin), certain countries have set up an inter-connected network which makes possible instant flow of recorded information. The PCU encourages countries to go in this direction by fostering the funding of this type of investment during the last year of the PACE programme. There are still reporting problems however, particularly in those countries where the command line no longer exists.

In order to optimise network operation, the PACE programme has promoted the introduction of performance indicators (PI), which are qualitative tools for steering and verifying the adequate functioning of networks. Performance indicators are defined as a limited number of variables, gathered on a control board, which help continually assess the level of realization of priority activities of the network in order to facilitate steering. A regional network was organized by the PACE programme in August 2004 in Dakar (Senegal) to train epidemiologists on the use of these tools. The PACE epidemiology unit has published a guide for the development of performance indicators for evaluating epidemio-surveillance networks in two languages, English and French. This guide provide the central veterinary authority of a country with a mechanism to assure itself of the effectiveness of the ESS. The aim of this document is to provide guidance to

of the ESS. These guidelines are generic to ESS and do not address Rinderpest (RP) surveillance specifically.

2.3.2. Performance indicators

National and international programmes often have no quantitative measures of their surveillance activities and the absence of passive reports is often taken to mean the absence of disease without further inquiry. This leads to serious underestimation of disease prevalence or complete failure to recognise the presence of disease.

Performance indicators (PIs) constitute a set of questions and measures drawn up to assist heads of veterinary services (PACE national components and other projects), and the decision-makers, to monitor and assess the effectiveness of programs or epidemiological surveillance systems. In both human and animal health, indicators are usually based on the evaluation of the capacity of a surveillance system to detect at an early stage, the introduction of a specific disease in a country. In fact, they allow the assessment of the epidemio-surveillance system's reliability or functionality.

Performance is a composite of two deliverables: quantity and quality of outputs. The former is relatively simple to measure while quality is much more difficult and is prone to subjectivity. Surveillance as explained above and in Fig. 1 needs to be assessed as regards the outputs of both passive and active systems. Thus performance indicators should provide a measure of the quality and quantity of outputs by both the passive and active surveillance systems. It is important to understand that good quality outputs are not dependant upon any single organizational structure and those systems or networks that vary in structure may be equally effective.

The objectives of PIs development are not only the continuous evaluation (monitoring) and accurate evaluation (external evaluation) of the surveillance systems, but also the association of actors taking part in this system. Indeed, the development of PIs allows the structuring of the activities of surveillance by defining and organising into a hierarchy, the activities undertaken in the network. Performance indicators are a management tool to assist Veterinary services Authority to:

- Evaluate the present system of disease surveillance;
- Identify deficiencies in the system (diagnostic indicators);
- Determine needs and requirements to meet a predetermined level of surveillance (checklists);
- Provide information for making OIE declarations and applications;
- Provide transparency for trading partners.

To enable appraisal of the efficiency of established national ESS in PACE Member countries the PACE epidemiology Unit (PEU) has developed guidelines for the development of performance indicators to assess the said systems. These guidelines provide guidance to enable countries to develop also their own indicators for periodical evaluation of the capacity and functionality of the ESS for animal diseases.

The developed verifiable indicators were validated in the field through visits in countries to assess the established ESS. One of the recommendations of this assessment process is that to enable countries to use efficiently the guidelines provided by PEU, the established ESS have to be optimised. This has been done by defining crucial elements of surveillance systems to enable measurement of the functionality and reliability of these systems.

In order to evaluate the current status of national ESS the PEU has developed furthermore a methodology consisting of a semi-quantitative evaluation for assessment of ESS. The developed

methodology was based on guidelines for the development of performance indicators; the knowledge that regional epidemiologists and regional technical assistants have acquired regarding the national epidemiological surveillance systems, through missions to countries conducted by technical assistants; preliminary analysis of epidemio-surveillance in PACE countries, document presented at PACE annual coordination meeting held in Cotonou (Benin) in 2002, and information supplied by the country's progress reports. This methodology has been tested in all PACE regions.

As results the comparison of the average country scores enabled a general classification of the various national surveillance systems and countries themselves according to the status of the PACE activities implemented. Analysis of ESS status in PACE member countries showed differences in level of the implementation of ESS activities and of achievements. In general the ESS status in 20 evaluated countries can be summarized as follows:

- Overall scores showed minimal divergence between countries. The general average is around **2,12 /4**.

- Analysis showed clearly a correlation between the level of achievements of PACE activities (according to the four objectives) and the current status of effectiveness of the ESS in countries (Coefficient of Correlation is 0,855).

In conclusion, countries having carried out major activities of the PACE program are also those having the most efficient ESS and vice-versa.

With regard to the scores achieved by the ESS, the results reveal that 11 countries (out of the 19) have average scores, which are superior to 2,00/4,00, amongst which 5 have scores superior to 2,25. Even if one would be tempted to qualify this ESS as being of an acceptable level, there is still a major margin for improvement. The countries of this group are characterized by a certain socio-political stability, a decrease in major disease prevalence, demonstrated achievements in the surveillance of diseases, competent human resources and political support. In contrast, a group of countries (4 with an average lower than 1, 6/4, 0) require support and urgent efforts to achieve satisfactory results from their ESS. These countries will benefit from enhanced follow-up and support from the common services unit, especially the PEU, during the PACE extension. These countries owe their "poor" classification either to an overall lack of means, or to the lack of experience of ESS or to a lack of motivation and interest to conduct disease surveillance activities.

Between these 2 levels of ESS and of achievement are a group of countries known to have established ESS but which suffer from reduced functionality and achievements and other countries with ESS recently set up but making increasing impacts.

In general terms, there are 5 main areas of activities, which obtain scores superior to 2,0/4,0, demonstrating adequate implementation of the work, but which remain nevertheless to be strengthened and improved over the two coming years (extension of the PACE program). Three other are still insufficiently developed. These areas are:
- Establishment and functionality of ESS (2.51),
- Animation and incentive measures of the surveillance systems (2.30),
- Management of epidemiological data using PID/ARIS (2.27),
- Laboratory diagnosis (2.38),
- Communication and flow of zoo-sanitary information,

- Wildlife surveillance (1.86),
- Performance indicators (1.24)

The integration of partners (private veterinarians, livestock owners, livestock associations...) obtains a score of 2, 0/4, 0. This aspect is still insufficiently taken into account in numerous countries or just recently implemented. It is important to stress the need for efforts in this area, which is critical to functionality and reliability of ESS in the field.

The other themes have scores lower than 2, 00/4, 0 (below the average), but stay mostly above 1, 75 These can be divided into 2 sub-groups: the institutional aspect (national sanitary policies and legal/institutionalization of ESS) and the aspects related to the surveillance of other diseases than Rinderpest, development of performance indicators and wildlife surveillance. These two aspects should be addressed firstly by national components because their implementation is generally deficient, weak or even non-existent in concerned countries.

2.4. Achievements of PACE in Establishing Epidemio-surveillance Systems

After cessation of vaccination against Rinderpest countries are required to verify absence of the disease and ultimately the non-circulation of Rinderpest virus in their territory. Those activities can only be done if an effective epidemio-surveillance system (ESS) exists in the country. To ensure unanimity of purpose and approach a meeting of the PEU was held in Ouagadougou (Burkina Faso) in June 2001. The meeting demonstrated that further consultation within the group was necessary to develop an integrated approach and common understanding of the problems that confront the PEU. To carry the process forward a consultant (Dr Pascal Hendrikx) from CIRAD/EMVT (Montpellier, France) was appointed to assist in the drafting of a concept document outlining the principles and definitions by which the PEU would operate in future. The document was endorsed by the members of the PEU present at the second meeting of the Unit held in Abidjan (Côte d'Ivoire) in February 2002, and missions were undertaken with this as reference point to assist national epidemiology units establishing the ESS.
Since the beginning of the activities of PACE Program, 100% of member countries have established or revitalized their national ESS and to date all diseases surveillance systems are operational excepted in Equatorial Guinea.

To enable assessment of the improvements made to ESS, PACE had to develop the performance indicators, enabling countries to assess and monitor their surveillance systems including the laboratory capacity. The quality of surveillance and information systems as well as outputs of laboratories is vital to ensure efficient disease detection and control. Furthermore, institution of such measures will have limited impact unless they are sustainable in the longer term. For that reason mechanisms that take sustainability into account need to be taken into consideration during the extension period. To this end it was important to provide national governments with economic data for informed decision-making as well as sensitise them on the need for adequate financing to ensure that the ESS are sustainable.

Finally, the animal disease problems and threats that confront sub-Saharan Africa are complex and sometimes unique. Therefore considerable research is still required to develop effective monitoring and control/eradication strategies appropriate to the subcontinent.

An evaluation tool for the assessment of these surveillance systems or epidemio-surveillance networks aimed at identifying the strong and weak points of their functioning, applied at regular

The analysis presented is based on a semi-quantitative evaluation conducted in 2004, 2005, and 2006 drawing on information collected from national networks of 29 PACE countries, divided into three sub-regions in Africa (West, Central, and East Africa).

To facilitate the assessment of the operations of the epidemio-surveillance networks and their set up, an analysis grid composed of 67 criteria categorised under 11 thematic items was designed. The scores per country and per item are calculated as averages (out of 4) and histograms established per theme and per country.

In October 2005, based on the country scores, we were able to distinguish a leading group (13 countries out of 29), where surveillance activities were deemed satisfactory (a total score above 2.5 out of 4), with Kenya and Senegal in particular scoring > 2.75, and a group of 3 countries considered to have an inadequate level of implementation, with scores below 2 (Burundi, Republic of Congo and Rwanda).

In June 2006, a re evaluation of scores was done by weighting the criteria among themselves in order to distinguish « dynamic » parameters from more « structural » parameters in order to assess the effectiveness of the active functioning of these networks on the ground, particularly in the context of the presence/ threat of the Highly Pathogenic Avian Flu (HPAF) on the African continent since February 2006. This is in acknowledging the fact that the activation of these networks constitutes one of the key components of national prevention measures to be implemented by countries.

A second analysis was conducted, with the weighting of financial aspects, which are essential criteria for the sustainability of these systems beyond the PACE programme, with the basis for assessment being the financial assistance given (% of DP) by countries, for the running of national ESNs.

In conclusion, these two weighted analyses not only highlight the unquestionable dynamic and functional aspects of most African ESNs that have been developed with the support of PACE since 1999, but also demonstrate the fragility of these systems in the short term, should national finances be not forthcoming post-PACE in 2007. This is with a view to maintaining and even improving the level of efficiency of these epidemio-surveillance networks within the current context of the fight against the HP avian flu.

2.5. Sustainability of the Epidemio-surveillance Networks Established

Countries participating in the PACE programme had committed themselves to make sustainable the animal disease surveillance activities by progressively assuring their funding through national resources thus relaying EDF funding under the PACE programme, or even other donors. One must come to the conclusion that such commitment has yet to come true and that it remains a major challenge to meet in the majority of countries.

It is true that in all countries the government allocates veterinary services an operating budget supposed to cover network activities but the latter budget remains inadequate and cannot assure an efficient operation. In addition to the ordinary budget, certain countries have established additional (counterpart) funds that help purchase equipments and cover a portion of network activities but these funds are not sustainable and vanish with the end of external funding.

The task of officials of veterinary services must consist in sensitizing national decision makers on the interest and the economic benefits for countries to further invest in a sustainable manner in animal health in general and animal disease epidemiological surveillance in particular. The PACE

sensitization of political authorities on the one hand and by putting at their disposal any relevant information which could serve as selling point for total ownership of epidemiological surveillance activities at the end of the program. This is the reason why a study was conducted in three countries (Benin, Ghana, and Mauritania) to assess the funding of epidemiological surveillance networks set up with PACE support and the prospects of their being funded by national resources notably government budget. The report on the study is made available to countries.

Mechanisms to sustain epidemio-surveillance systems in PACE member countries

A fundamental requirement for adequately controlling or eradicating animal diseases and thereby gaining access to export markets is, for each country in the region, to possess an adequate veterinary service. A key component to this is an effective surveillance system for important animal diseases, particularly those that affect trade in livestock and livestock products, human health or economics of animal production, without which, veterinary service will not be considered reliable. Consequently, in the context of globalisation, the development of ESS has become a priority for veterinary services in countries with a need or desire to participate in international trade of animals and animal products.

Most governments unfortunately are facing major economic and financial problems and are finding it difficult to adequately fund veterinary services, and most veterinary services do not have a fund-raising strategy in place to correct this situation and hence either have no formalised plan or have ones that are unrealistic. The challenge for the region collectively is to identify alternative ways of funding animal health systems on a sustainable basis. As stipulated in the Financing Agreement, the first step is that countries have to increase gradually their financial contribution to the PACE programme so that after the end of programme (October 2006) they will take over full funding of all the epidemio-surveillance activities on a sustainable basis.

Based on fundamental elements of ESS given by PEU, the Economics Unit has evaluated the cost of some national surveillance systems and has established guidelines on-funding levels needed to sustain them. This was presented at a workshop jointly organised by the Economics Unit and PEU in Addis Ababa (Ethiopia) under the auspices of African Union (AU). The main objectives of this workshop was to present economic justifications for adequate funding of animal health programme; examine alternative fund raising strategies for financing of national surveillance systems and veterinary services in general; and examine the possibility of export-driven initiatives to promote investments in livestock production.

In an effort to make the surveillance systems more sustainable and provide an incentive to improve and adapt existing surveillance systems the PEU developed ideas, which would increase the justification of ESS. The focus was on developing export systems adaptable to African conditions. An external consultant appointed through the FAO contract of PACE assisted with the process. The PEU has advanced these concepts developed during the consultancy and has developed proposals around the issue of commodity-based trade that are being considered by the OIE.

Sustainability of a wildlife surveillance network has been a concern at the country level for a number of reasons and this was debated at workshop held in Dakar in August 2004. The participating countries took a decision there that this issue should be addressed through consolidation of regional teams and working at an ecosystem level, pooling resources and sharing data of a transboundary nature. This had both scientific and practical benefits and would facilitate such matters as preparation of OIE pathway dossiers for applications on freedom from disease or infection.

3.0 Cost-Benefit Analysis of Epidemio-surveillance networks

3.1 Reasons for Cost-benefit Analysis of Epidemio-surveillance Networks

Major campaigns have been undertaken in Africa to tackle animal diseases. These campaigns include the fight against Rinderpest by the JP-15 campaign from 1962 to 1976 and the Pan-African Rinderpest Campaign (PARC) from 1986 to 1999. In line with these two campaigns since 1999 is the PACE Programme, which will end in February 2007, after being executed in two phases. Studies on the economical impact of JP-15 or PARC have been conducted, in the case of PACE more studies have been done not only by the PACE Epidemiology Unit (PEU) but also by independent consultants. The studies concerned the economic impact of diseases like Rinderpest and Contagious Bovine Pleuropneumonia (CBPP), the establishment of animal disease surveillance, or of the cost of delivering livestock services and they were conducted either in a single country or in groups of countries.

The epidemio-surveillance systems or networks, as promoted since the 1990s by the PARC and later the PACE programme, serve a health-related purpose: secure the health of the national animal population through vigilance of veterinary services concerning exotic diseases (which are not found in the country) and through surveillance of epizootic and enzootic diseases (which appear irregularly, or regularly in a country's animal population).

Livestock, an activity with social, cultural, and religious impacts, is also an important economic activity, contributing significantly to the gross domestic product (GDP) of a significant number of developing countries. Thus, the establishment of this kind of system also has an economic purpose. While the maintenance of epidemiological surveillance systems certainly has a cost, the latter is much less compared to the cost required for the control of diseases when they break out in livestock herds. The economic losses caused by the death of affected animals, stamping out, compensation paid to farmers, the costs made because of health measures (establishment of sanitary cordons, quarantine, mobilization of police and armed forces, disinfection of premises, destruction of carcasses), vaccinations, etc. are considerable. The economic losses induced by indirect costs due to production losses in sick animals: lower milk production, lower egg production, weight loss, among others, is an additional cost.

Even though the preventive approach, of which the epidemio-surveillance system is the concrete manifestation, is generally considered as better than the curative approach *('better safe than sorry')*, there are few data to-date showing that this thesis is right.

This is awkward since one cannot justify, in terms of management of public funds, heavy and long term investments in the establishment and maintenance of surveillance systems, if they do not yield medium or long term benefits for the Government or for its citizens. Such benefits may include several aspects: fewer animals dying, fewer sick animals, hence fewer losses of milk, meat, eggs, honey, and therefore a better health status of children, fewer expenses to control outbreaks, fewer expenses to import animal products to compensate losses, sometimes fewer cases of human disease (when those diseases are transmissible to man like the recent case of HPAI with the H5N1 virus), etc...

The studies conducted on the benefit of epidemio-surveillance systems has a general, economic as well as financial purpose : demonstrate the cost of maintaining an epidemiological surveillance system, and compare such a cost with the benefits that such ESS may generate through better

This information is essential to the decisions of (i) African national governments to commit financial and human resources to the PACE program; (ii) the European Union (EU) which is the major funding institution of the PACE program; and (iii) other stakeholders such as non-governmental organizations involved in animal disease control in Africa. There is a need in convincing in the usefulness of pursuing the funding of these systems after the end of the PACE programme; this in the direct interest of securing animal health in the country in order to obtain an improved management of the costs incurred for the control of animal diseases.

3.2. The Benefits of Disease Surveillance

One must keep in mind that the two fundamental objectives in terms of animal health economics are: maximize the financial impact of the control or preventive method chosen (vaccination system, surveillance system), on the one hand, and minimize their financial costs, on the other hand. Any presence of a disease at a given prevalence (percentage of animals affected) corresponds to direct and indirect costs which may be converted into losses and which can be avoided, with more or less success, thanks to epidemio-surveillance. The efficiency of epidemiological surveillance applied to a disease and for a given species may be classically appreciated from direct or indirect losses avoided thanks to that surveillance. Such an approach requires data on:

3.2.1. The direct advantages of ESS:

- The morbidities (number of sick animals) and mortalities (number of dead animal) and therefore the losses of animal capital and production (meat/weight loss ; milk/ loss of lactation or drying up; animal traction/inability in terms of working days, etc.) which could have been avoided thanks to the ESS for a given species and the priority diseases;

- The savings made thanks to emergency control programmes or rapid intervention against the disease considered (vaccinations, treatment, sanitary police, etc.) which are no longer necessary or – at least- do not last that long (*early warning*).

3. 2. 2. The indirect advantages of ESS:

- The intermediate added value in the cattle sector and the animal sub-products sector (increased production of meat, milk, eggs, honey, and even agricultural production, through better use of animal traction and organic fertilizers) ;

- The (additional) benefits recorded in terms of trade balance (gains stemming from a decrease of imports and an increase of exports);

- Losses avoided in the area of public health thanks to the absence of human effects if the disease is considered a zoonosis (e.g. rabies, brucellosis, tuberculosis, bird flu…) or indirectly through better nutrition (animal protein) of the populations, particularly the most vulnerable categories: children and the elderly.

Thus, based on a comparison between a situation without disease and a situation with disease, the economic impact of the disease may be established.

3.2.3. The Ratio between Benefits and Costs of Surveillance

Assuming that ESS can guarantee the absence of disease or the reduction of its prevalence for a given proportion of the national or regional animal population exposed to its risk, the economic losses avoided thanks to ESS are weighed and assimilated with the benefits made thanks to the ESS. Thereafter the gains from ESS are compared against its costs in order to establish assessment criteria of the profitability of the ESS.

In that respect, an ***advantage / cost*** or ***benefit / cost*** ratio is computed and interpreted as profitable if it is higher or equal to 1. The higher this figure, the more profitable the intervention of the ESS is with regard to the reduction in losses caused by a given disease.

$$\text{Benefit/Cost} \geq 1$$

Given that passive surveillance covers in principle all livestock diseases, each benefit computed for a second or third disease will further increase the benefit / cost ratio.

This parameter may be computed using different measures. Of course one can take the entire set of benefits computed for a country and relate it to the entire set of costs of ESS computed for that same country. However, if one wishes to compare these ratios between countries with very different characteristics, it may be useful to convert costs and benefits to units which are comparable, e.g. km^2, the unit of cattle, the unit of poultry, or the *Unit of Tropical Livestock* (TLU) which helps standardize the 'volume' of livestock (in kg) in a country according to a conversion rate recognized worldwide.

3.3. Summary of Studies on Cost-Benefit Analyses on Livestock Diseases and Epidemio-surveillance Systems

3.3.1. Studies on Rinderpest

In 1971 it was estimated that the JP-15 campaign cost US$16.4 million with US$7.2 million (44%) coming from national governments and the remaining part from international donor institutions. An economic analysis of the JP-15 campaign in Cameroon, Chad, Niger and Nigeria showed that for 33 million vaccinations, the program spent on average, US$0.32 per vaccination.

In 1978, using mortality losses avoided, improved reproductive rate and improved productivity in meat and milk as benefits to evaluate the economic impact of the Rinderpest campaign in Nigeria, it was found that the benefit-cost ratio is 2.48 and the internal rate of return 48%. It was concluded that the campaign was not only economically viable, but it succeeded in educing mortality during outbreaks and in enhancing the capacity of veterinary services to control other major diseases.

In 1999, a study of the economic impact of Rinderpest control in a sample of ten sub-Saharan African countries, it was estimated an average cost of vaccination of 0.42 euros per cattle. For the 123 million cattle vaccinated in these countries, unit cost varied from 0.27 euros for Ethiopia to 1.71 euros for Cote d'Ivoire. Net benefits per cattle vaccinated averaged 0.38 euros, varying from 0.07 euros for Benin to 0.88 euros for Tanzania. Calculated benefit-cost ratios varied from 1:1.06 for Cote d'Ivoire to 1:3.84 for Tanzania with the estimated average return over the ten countries of 1.8 euros for each euro invested in the campaign. The internal rate of return was 11% for Cote d'Ivoire and 118% for Burkina Faso. Based on these indicators, the study concluded that the Pan African Rindepest Campaign (PARC) generated reasonable returns in each of the ten countries, producing sufficient benefits to at least pay back the initial investment. Benefits exceeded costs

by 50% in half of the countries. As a large-scale disease control intervention, PARC was thus a viable public investment.

3.3.2. Studies on epidemio-surveillance systems

More recently, studies conducted by the PACE programme (1999-2006) showed that disease intelligence information is essential for developing a cost-effective animal disease eradication program. A good epidemio-surveillance system can provide such information and make it possible to plan a selective low-cost intervention as opposed to a blind intervention using mass vaccination. Several of those PACE studies have clearly shown that investment in animal disease control is beneficial both from an economic and social standpoint. For example, for each € invested in Rinderpest control in ten (10) African countries considered in a study, there is a return of €1.83 and a net present value € 29.0 million. Similarly, investment in CBPP control in twelve (12) countries considered yields a return of € 1.95 and a net benefit of € 11.8 million.

In another study conducted by the PACE programme in 2005 in 4 countries involved in the programme, Benin, Ghana, Mauritania, and Senegal, it has been suggested that the studies on the gains of ESS were usually highly underestimated because they were computed for a single disease only which affected one species only, and although widely present, did not affect all countries to the same extent. Ideally, the advantages of an ESS should be measured against all priority diseases under surveillance, both in cattle and in other species.
Despite these limitations, the studies demonstrated that ESS was always beneficial for the 4 countries, even though not to the same extent, as the *benefit / cost* ratio demonstrated:
Benin : 1.9, Ghana : 1.0, Mauritania : 1.8, Senegal : 1.5. Investing in the control of animal diseases is therefore clearly beneficial.

In view of the benefits arising from surveillance, how much does it cost to put in place a functional surveillance system? An analysis of the cost structure of national surveillance systems in a sample of six (6) countries (Benin, Central African Republic, Cote d'Ivoire, Guinea Bissau, Tanzania and Uganda0 reveals that:

- Salaries account for 40 to 69% of the total cost of surveillance
- Travel allowances account for 14 to 23% of the total cost
- Transport accounts for 5 to 23% of the total cost
- Depreciation on equipment accounts for 4 to 12% of the total cost
- The unit costs of surveillance per veterinary livestock unit vary from €0.11 to € 0.71.
- The average unit cost per VLU for the six (6) countries is € 0.37.

These national surveillance systems are currently being funding jointly by the PACE programme and Governments. It is argued here that since Governments are already providing the largest share of the total costs of epidemio-surveillance systems, the remaining part is too small to constitute a financial burden on the Government and therefore should be factored into the budget of the Department of Veterinary Services (DVS). Surveillance is a regular activity of the DVS and therefore should be funded on a regular basis. Once this becomes part of the regular budget, it will be easy for the treasury to sustain its funding.

Other ways of sustaining funding of epidemio-surveillance systems is to incorporate the private sector in veterinary activities by providing sanitary mandates for surveillance to private veterinarians.

An epidemiological surveillance system has additional advantages beyond its economic superiority to indiscriminate mass vaccination campaigns in eradication programs. An active surveillance system improves the performance and image of the veterinary department by maintaining a continuous link between farmers, field workers and veterinarians in the centers. Improved and regular communication between stockowners and veterinary staff is essential for promptly identifying other key animal health problems and responding to them appropriately. An effective epidemiological surveillance system is also a requirement of the OIE Pathway for the verification of Rinderpest eradication (OIE,1999). Countries that cannot demonstrate that an effective surveillance system is in place that would be capable of detecting Rinderpest if it were present will not be awarded Rinderpest infection-free status for the purposes of international trade. As a result, epidemiosurveillance systems are a requirement for countries to reap the full economic benefit of Rinderpest eradication regardless of the intervention strategy used to eradicate the disease.

3.3.3. Studies on CBPP

Finally, a study has also been conducted on CBPP which is a disease of economic importance because of the high morbidity and mortality losses it causes to cattle. The financial implications of these losses are of great significance to both cattle owners and to the nation. Control of CBPP is therefore important as a way to salvage the losses and increase the incomes of cattle owners.

Before a control program is implemented however, it is important to evaluate the economic impacts of CBPP and determine whether a control program would be economically viable. This analysis was undertaken to evaluate the economic cost of CBPP and estimate returns to investments in its control in a sample of twelve countries (Burkina Faso, Chad, Cote d'Ivoire, Ethiopia, Ghana, Guinea, Kenya, Mali, Mauritania, Niger, Tanzania and Uganda). A spreadsheet economic model was developed in Microsoft Excel and CBPP epidemiological and economic data obtained from a number of field studies were used to model the impacts of CBPP under endemic and epidemic conditions.

Economic cost was evaluated in terms of the direct and indirect production losses attributed to morbidity and mortality plus the disease control expenditures. Production losses comprised of cattle deaths and reductions in beef, milk and animal power. The estimated monetary value of production losses averaged 2.3 million Euros per country for endemic CBPP and 3.8 million Euros for epidemic CBPP. Estimated economic cost averaged 3.4 million and 5.3 million Euros for endemic and epidemic CBPP respectively. Ethiopia, Kenya and Mali each incur economic costs in excess of 5 million Euros.

Benefit-cost analysis was used to compare the value of the incremental benefits with the value of the incremental costs in order to establish whether or not CBPP control is economically viable. Effective control of CBPP is economically viable with average net benefits that exceed 1.2 million Euros per country in the case of endemic CBPP and 2.3 million Euros in the case of epidemic CBPP. Indeed, control of CBPP during epidemic outbreaks has potential for greater benefits as the returns to investment are greater than those obtained from endemic CBPP.

3.4. Conclusion on the Cost-benefit Analyses of Appropriate Actions in Favor of Animal Health

In conclusion, there is no doubt that appropriate control of animal diseases and in particular an effective veterinary epidemiological surveillance, covering all really priority diseases (from an economic standpoint) is very beneficial for the countries, for their populations and for their public expenditures. When one adds to this equation the possibilities or opportunities of

exporting livestock products (thanks to a better health status, recognized by the international community), or the impact of certain diseases on public health (rabies, brucellosis, tuberculosis, Rift Valley Fever), the return or benefit/cost ratio becomes even more positive, since there will be social and humanitarian considerations in addition to the economic considerations.

4.0 Institutional (AU-IBAR/PCU), Regional and Member Countries Technical and Managerial Capacity Building by PACE

To be able to achieve its overall objective of contributing in African countries to poverty alleviation and development of livestock sector through the creation of an appropriate health security framework, PACE needed to build technical and managerial capacity at the main office, (IBAR/PCU) as well as regional and member countries' levels.

4. 1. Technical and Managerial Capacity Built at AU/IBAR and the PACE Coordination Unit level

4.1.1. Contribution of PACE to AU/IBAR's institutional development

Historical background
Creation of the Inter-African Bureau of Animal Resources originated from the African Rinderpest Conference of 1948. In 1951, a working group appointed by the Commission for Technical Cooperation in Africa (CCTA) recommended that a body, which would address all aspects of epizootic diseases in Africa be created. This led to the establishment of the Inter African Bureau of Epizootic Diseases (IBED) in the same year. In 1956, the functions of IBED were expanded to include other aspects of animal health and the subsequent re-naming to Inter African Bureau for Animal Health (IBAH).

With the formation of the Organisation of African Unity (OAU) in 1963, the Assembly of Heads of State and Government in 1964 decided that CCTA be integrated into OAU. This decision led to the formation of the Scientific Technical and Research Commission (STRC), which replaced the CCTA. As a specialized office of the OAU, the STRC took over IBAH in 1965. IBAH then became one of the sub-regional offices of OAU based in Nairobi. In 1969, the Directors of Veterinary Services recommended that the functions of IBAH be expanded to include animal production. This recommendation was endorsed by the Council of Ministers in 1970, and IBAH was re-named Iterafrican Bureau for Animal Resources (IBAR). The Organisation of African Union now African Union Inter-African Bureau for Animal Resources (AU-IBAR) is one of the specialised technical offices of the African Union (AU) under the Department of Rural Economy and Agriculture (DREA).

IBAR plays an important role as per the Treaty of the African Economic Community in promoting the development of animal resources so as to ensure food security and poverty alleviation in Africa. The objectives of IBAR under the OAU were to:

- Coordinate the activities of all OAU member-states in the field of animal health and production;
- Collect, collate and disseminate information in all aspects of animal health and production;
- Initiate, develop, and execute projects in the field of animal health and production; and
- Liase with the appropriate authorities of member states, regional groups, inter-governmental and international organisations;

Strategic positioning of AU/IBAR
Currently, AU/IBAR is the only organisation in Africa that has the mandate from the Heads of State and Government of OAU member countries to respond to the problems of animal resources at a continent level. This arrangement is expected to continue under the AU.

Challenges facing AU/IBAR

For the last three decades, IBAR has been seen as an African success story, attracting donor funds, providing technical and policy support to the member states, particularly state veterinary services. Currently, livestock sectoral issues are becoming increasingly complex due to major forces that include globalisation, rapid technology advances and increasing demands from stakeholders. Stakeholders have been become more vocal, influential and now demand to be involved in governance, priority setting, financing and evaluation of development interventions. This demands that IBAR be more client-focussed.

IBAR has to position itself to work more effectively with the Regional bodies e.g. IGAD, SADC, COMESA, EAC, IOC, ECOWAS and international bodies OIE, FAO, WTO etc.. IBAR will play a critical role in food security under the New Partnership for Africa's Development (NEPAD). There is therefore a need for IBAR to develop effective responses by having a clear vision of its direction, policy and strategy. Although the Council of Ministers define the broad mandate for IBAR, it is essential that IBAR pro-actively influences the strategic direction of the organisation by convincing the Ministers on the most appropriate strategy.

Organisational structure of IBAR

IBAR is headed by a Director, and has three sections of Animal Health, Animal Production and Livestock Projects. Support units to the three sections include Administration, Finance, Documentation, Library and Archives.

Restructuring of the AU and AU/IBAR

The on-going AU reform process has seen the creation of eight Portfolios/Directorates[1] of the Commission of the African Union. Working Groups will be set up to review the Regional Technical Scientific Offices and propose appropriate structures. Currently, Terms of Reference for the Working groups are under formulation. With specific reference to IBAR, the AU emphasised that in addition to animal health and livestock production, AU/IBAR's mandate could be broadened to include marketing, trade and food security.

The AU encourages AU/IBAR to take a pro-active role in defining the possible future of the institution. As part of its contribution to the institutional development of AU/IBAR, PACE and CAPE made available resources to access external and mutually acceptable expertise to assist with the exercise of preparing a strategy paper on the possible direction for AU/IBAR's institutional development. This paper outlines the proposed vision, mission, objectives, strategic options and organizational structure for AU/IBAR.

4.1.2. Contribution of PACE to the Development of its Coordination Unit

The Finance Agreement signed in 1999 with the EC included indicators at the level of its' specific objectives putting an emphasis for the PACE programme to achieve an increased capacity and a 'safeguarding of animal health against list A diseases'. Delivery and access to veterinary services is not explicitly mentioned at the level of specific objectives but it is assumed to be part of capacity building.

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[1] 1. Peace and Security; 2. Political Affairs; 3. Infrastructure and Energy; 4. Social Affairs; 5. Human Resources, Science and Technology; 6. Trade and Industry; 7. Rural Economy and Agriculture: and 8. Economic Affairs.

Capacity building

Increased capacity is specified to include technical and economic assessment of diseases and generation of control programs, both for the programme as a whole and for the national programmes. To address the programme, as a whole in this part of this document, since the PCU was in charge of assisting each country, it is important to notice that much capacity building effort has gone into strengthening of surveillance networks. Effectiveness of these networks is primarily measured by 'functionality' and performance indicators such as timely receipt of disease information, time needed to analyse samples and existence of emergency plans. Expressed in these terms, functionality has improved in most of the countries. Effectiveness of the surveillance networks was tested during the Meru outbreak in Kenya. As observed in the RP2 workshop of 2002 the outbreak was spotted and contained within a reasonable period of time.

With respect to capacity building in relation to veterinary services as such, the process of improving the delivery of veterinary services is long and complicated and there is some way to go still. Basic indicators in this respect are adequacy of regulatory framework (legislation) and improved accessibility to veterinary services through privatisation and promotion of CAHW's. Further specifications proposed by the Machakos workshop include the following:

- at least 50% of countries have adopted appropriate legislation
- at least 50% of vaccination is done by private veterinarians;
- epidemiosurveillance is included in the sanitary mandate;
- number of licensed retail outlets has increased, and
- 50% of livestock keepers receive veterinary services from private veterinarians.

Most of these refer to strengthening of the private sector. Effectiveness of private veterinary services, where they do exist, appears to be good, as observed, amongst others, in Ethiopia, Guinée, Mali and Southern Sudan.

At regional level, most of the effort has gone into the creation of a Pan-African Network for disease information, which has recently become operational. Several more years are likely to be needed to achieve the Machakos target of 60% of countries regularly submitting disease reports, preferably on-line.

A related activity has been the introduction of business training modules in the curriculum of veterinary schools. As with the direct training of staff, there is little information about the effectiveness of these activities in terms of actual use and application of the skills provided.

Safeguarding of animal health

With respect to actual safeguarding against list A diseases, the record is mixed. No major outbreaks, except the one on Highly Pathogenic Avian Infulenza (HPAI) disease, have taken place since the start of PACE but Rinderpest and ASF have occurred while CBPP is considered endemic in large parts of Africa. Reliable data on the incidence of list A diseases is scarce however (but some can be obtained from the OIE Bulletin).

Progress along the OIE pathway is a major indicator of effectiveness for PACE as a whole and for thrust 3 in particular. Two pathways can be distinguished –an 'accelerated' pathway and a slower, 'direct entry', pathway. The choice of pathway is left to individual countries. The earliest possible date to reach the end of the pathway and obtain certification of freedom of infection for West Africa is 2006 while for East Africa it is 2008. Direct entry would further postpone these

dates to 2009 and 2011 respectively. Finally, resources available under PACE appear to be insufficient as well. Whatever the pathway, the key requirement for certification is the existence of an effective surveillance and information network. As noted before, progress in this respect has been satisfactory; most of the networks are fully functional and effective.

Effectiveness of Other Units
At the level of the Coordination and Common Services units, effectiveness, as expressed by the number of national programmes operating effective epidemio-surveillance networks, eradicating Rinderpest and controlling selected major epizootic diseases, is limited.

Capacity building of overall PACE Communication
In the first few three years or so of PACE, considerable effort was put into institutional communication resulting in a range of outputs as follows:

- CD ROMs on Epidemio-surveillance and Rinderpest.
- Pan-African Animal Health Year Books (2003 and 2004) produced and distributed.
- PACE Newsletters in French and English.
- Setting up of the PACE website.
- A PACE Video documentary produced and distributed to national co-ordinators.
- PACE Press kit.
- Assistance to other projects within IBAR to produce outreach materials, e.g. FITCA, CAPE and IBAR itself.
- Video on livestock producers' views produced with CAPE.

Following the end of the Bamako TA's contract in February 2004, it was decided to transfer communication activities to individual national components which have established active communication units, and combine the Communication Unit with data management activities into a combined Information and Communication Technology Unit. As a result the PACE Co-ordination Newsletter stopped and it was decided to recruit additional staff to this new amalgamated unit as follows:

- Webmaster
- Data-management Assistant.

Since this transfer, according to comments from the PCU following the Final Evaluation Mission's presentation of the Aide Mémoire, institutional communication has remained very weak, with no clear strategy. This has resulted in a very low visibility and insufficient knowledge of PACE achievements during the programme's implementation. To address this weakness, an expert in communication has been appointed with the following planned key outcomes:

- A communication strategy.
- The development of a website for the institution (IBAR) and member states.

Thus the progress of institutional communication activities by PACE has been erratic and the overall efficiency has been poor.

4. 2. Technical and managerial capacity built at the Regional Coordination level

At the regional levels and more importantly at the Regional Coordination for West and Central Africa located in Bamako because the Regional Coordination for East Africa remained together with the overall Coordination Unit in Nairobi, PACE ha also done a lot in technical and managerial building. However, three areas are going to be exposed in this document: PANVAC, the vaccine emergency bank and the emergency fund.

4. 2. 1. Development of PANVAC

The Pan-African Veterinary Vaccine Centre (PANVAC) was set up in 1986 with FAO funding to certify the quality of veterinary vaccines produced and/or used in Africa and to develop quality norms in vaccine production. Originally operating out of two centres in Debre-Zeit (Ethiopia) and Dakar (Senegal), the Dakar Centre was closed in 1992 and activities were concentrated on Debra – Zeit. The European Union (through the PARC, then the PACE programmes) has supported PANVAC and in February 1998, the Ministers of Foreign Affairs of OAU member states meeting in Addis- Ababa decided to turn PANVAC into an OAU institution.

At the 7th AC Meeting of April, 2003, concern was expressed about the continuing absence of any significant activity of PANVAC relevant to PACE, especially as there was no other laboratory in the PACE countries that could provide the services attributed to PANVAC. This was followed up by the Director of AU-IBAR at the Conference of African Ministers of Agriculture in Maputo in July 2003, as a result of which a MOU was signed between AU and Ethiopia transferring responsibility of PANVAC to AU. The next step was the recruitment of the PACE Laboratory Expert to become Director of PANVAC working under the Director of IBAR.

Despite some problems over funding, by the 12th AC meeting in April 2006, the AC reported that PANVAC was now operating effectively with a substantive Director and budgetary provisions. Thus this process appears to have been carried out very efficiently, and PACE has contributed very significantly to the revitalisation of PANVAC.

4. 2. 2. Establishment of the Vaccine Emergency Bank and an Emergency Fund

With the cessation of Rinderpest vaccination throughout the PACE countries, cattle populations become increasingly susceptible to infection. This has been recognised by PACE who has established a Rinderpest vaccine bank as a precaution against a re-emergence of the disease. A stock of 500,000 doses has been placed at the Botswana Vaccine Institute which takes care of its storage and quality assurance. In addition PACE has established an emergency fund entrusted to the OIE through a convention signed in July 2001 between the AU-IBAR and the OIE. The fund was initially for Euro 2,000,000, but later reduced to Euro 500,000 in association with the preparation of the budget for the extension phase of PACE. This fund is for the rapid mobilization of essential resources in the event of reintroduction of Rinderpest virus to a fully susceptible cattle population, and its use would be subject to conditions that the country (ies) concerned set up a clearly defined emergency (intervention) plan against Rinderpest. In addition PACE funded a bank of Rinderpest vaccine in Lokichoggio in N.W. Kenya and in Khartoum (Sudan) in the final stages of the Rinderpest campaign in Southern Sudan (See 4.5.5). These PACE contributions to emergency preparedness against Rinderpest appear to have been implemented efficiently, although care is required to ensure that the vaccine bank is replenished when vaccine stocks expire as was noted in the PACE annual report of June 2002 to May 2003.

In April 2006, the 12th ACM recommended that Euro 350,000 be allocated for the purchase of HPAI vaccine. This recommendation was subsequently approved by the EC and the HPAI vaccine bank will be managed by the OIE.

4.3. Technical and Managerial Capacity Built at Country Level

Most of the work performed by PACE in building technical and managerial capacity was completed at member countries' levels. The following topics should be considered as key achievements of the programme.

4.3.1. Veterinary Services

4.3.1.1 Training

A major aspect of the PACE programme has been training at all levels from livestock farmers to senior professional veterinary staff. There have been many training interventions throughout the PACE programme. Assessing the training programme as a whole has posed certain difficulties because there was no single unit with responsibility for planning and co-ordination of training activities, and training interventions have been carried out within individual technical components.

No overall training needs assessment was carried out at the beginning of the project in order to outline a training strategy for PACE. However in Bamako in November 2001, a workshop was held to assess training needs for capacity building within the national components. The following training needs were identified:

- *Epidemio-surveillance*
- *Wildlife surveillance*
- *Communication*
- *Animal Health Economics*
- *Zoo-sanitary Data Management*
- *Privatization of Veterinary Services Delivery.*

PACE collaborated with CIRAD-EMVT of Montpellier, EISMV Dakar and ITC of Banjul in this exercise from which the following training modules were recommended:

- Training of National Co-ordinators in management of WP and financial resources as per EDF procedures. Co-ordinators were also to be trained on risk analysis and communication of project results.
- Training of national epidemiologists.
- Training of epidemiologists for Wildlife surveillance.
- Training in Data Management.
- Training of staff in charge of communication.
- Training in Privatisation related issues.
- Risk assessment training for national epidemiologists.

The first module for National Co-ordinators was not implemented at regional level as it was decided that this should be carried out at national level by EC local delegations and the National Authorising Officers. In addition to the above, there were many training courses and workshops carried out at National level, but these have not been documented by PACE.

The Mid Term Review recommended that training needs assessments be completed as matters of urgency but these were not carried out.

There is no doubt that the extensive training at all levels by PACE has impacted significantly on the project's progress. However, greater attention should have been paid to assessing training needs and devising a training strategy early in the project to ensure that all training requirements were covered. Had this been carried out, the weakness of training of national co-ordinators in management and EDF procedures in some cases might have been avoided. In addition, the lack of training in animal health economics was noted in the PACE Annual Report of June 2002 – May 2003, although this was addressed to some extent by two workshops in Sudan 2003 and Addis Ababa 2004.

At livestock farmer level, the overall strategy has been to train field veterinary staff to transfer information to livestock farmers on a range of disease issues. The strategy has been generally satisfactory, but it is apparent that the effectiveness of this training is variable from country to country. For example, farmers in Sikasso Region in Mali stated that training had reached only 50% of livestock farmers. By contrast, representatives of farmers' associations in Mamou in Guinea expressed satisfaction with the level of outreach to the livestock farmer members of their associations.

The technical knowledge of veterinary personnel, both public and private, is generally satisfactory and the PACE training programme has contributed to this. The greatest weakness in technical training and support has been in the software usage for the disease information systems. For example all information data that had been entered into the ARIS software in Mali has been lost and is having to be re-entered from original hard copies. Similarly the officer in Burkina Faso expressed having difficulties in using the ARIS software.

During the Final Evaluation Mission, it was noted that none of the National Co-ordinators interviewed had received training in management, and not all had received training in EDF procedures. The overall effectiveness of the PACE programme would clearly have been better had all the National Co-ordinators been properly trained in management and EDF procedures.

In addition, the potential for more widespread dissemination of good quality training materials between countries has not been achieved as effectively as it could have been. In hindsight, the PACE programme should have made provision for systematic validation and archiving of training materials, and dissemination of examples of best practice for the benefit of all.

4.3.1.2. Development of the Private Sector

The second result in the PACE Logical Framework is "Greater privatisation of veterinary services and public/private sector linkage in this field". To support the legal status of privatised veterinary services, one of the activities is the "harmonisation of legislative positions on the veterinary profession and veterinary drugs". These activities were refined in the extension phase with the following activities:

- Development of national guidelines for CAHW systems, legislative reform, development of licensing procedures for CAHW trainers and trainees, development of agreements with implementing agencies to ensure harmonised approaches and private sector involvement.

- Support to privatisation and veterinary legislation.

- Provide technical support to DVS and statutory bodies to strengthen their capacity to co-ordinate, regulate and supervise para-veterinary professional systems in accordance with OIE guidelines.

A complete chapter of this document as been devoted to the accomplishment done by PACE in the area of privatization of animal health delivery services as well as the development of an appropriate legislative framework and the involvement of private animal health worker in disease surveillance. Here, it is just relevant to recall that overall activity performed by PACE was dedicated to strengthening capacity at countries' levels.

4.3.1.3. Development of Countries' Capacity for Communication

It is clear from the Country visits during the Final Evaluation Mission that many communication activities have been carried out by the National PACE Communication units, albeit of variable quality from country to country. From interviews with farmers, the Mission was satisfied that the farmers had a good awareness of the importance of veterinary services available to them and their benefits, and also the importance of disease surveillance. A significant and useful output of the National Communication officers in collaboration with their epidemiology colleagues has been the publication of regular bulletins of the national epidemiology-surveillance networks. Several examples of these bulletins were seen by the Mission team who were impressed with their quality and content. It is noteworthy that PACE Mali has succeeded in sustaining the targeted publication of its bulletin EPIVET-INFO every three months, allegedly the only country to do so (closely followed by CAR with 21 issues by now). Unfortunately, the documentation and archiving of this material has been poor, and the sharing of best practice between PACE countries in this respect has not been sufficient.

It is noteworthy that according to the minutes of the 5th AC meeting, the Communications Unit had the task of promoting the "brand image" of PACE, and to help the veterinary schools to introduce training on communications into their curriculum.

Thus it is concluded that the overall efficiency of PACE's contribution to developing National Communication programmes has been satisfactory with the exception of the documentation and archiving of material.

4.3.2. Support to Veterinary Schools

Activity 2.1 in the initial phase stipulated targeted aid for veterinary schools. The Communication TA held meetings with the Deans of Veterinary Schools in Uganda and Senegal with a view to introducing training on communication into the curriculum. As a result the Communication Unit sponsored a pilot module on Communication training in the 4th Year of the Veterinary curriculum at the École Inter-Etats des Sciences et Médécine Vétérinaires (EISMV) in Dakar. However this did not become a permanent part of the curriculum. In fact the curriculum had already been modified in 1999 to include training in rural economics. This stemmed from the early 1990s when, because of the moratorium on recruitment into the public sector, it was recognised that training for private vets was needed. Thus it means that when students graduate they have some training in economics in preparation for working in the private sector.

In addition, the association of Deans of Veterinary Schools has now been established in order to undertake the curricula review in line with the current development and changes in the livestock sector.

Despite these developments, the AC recommended that further inputs into veterinary education institutes should not be pursued. Nevertheless, there was a further meeting in Addis Ababa in March 2004 of PACE with Deans and Directors of Veterinary Schools and Faculties in which there was an exchange of views and information. In addition PACE has been supporting Continual Professional Development (CPD) training by the EISMV of private vets on business management e.g. by funding of workshops etc.

4.3.3. Improving Linkages between Central Institutions and Livestock Farmers

With support from the Communication TAs in the first 3 years of PACE, National PACE Communication Units have continued to be active in strengthening collaboration between veterinary services and livestock farmers. The means vary from country to country e.g. In Guinea, the veterinary services work closely with Farmers' Sanitary Defence Committees who are an integral part of the epidemio-surveillance network. In Kenya, the Ministry of Agriculture's Agriculture Information Centre radio broadcasts play a key role in supporting the various farmer awareness and extension activities of the veterinary services. In CAR, a national radio broadcasts half hour weekly messages developed by the PACE country team. Farmers' associations are very active in West Africa, and the Final Evaluation Mission was satisfied that in the PACE countries visited, every effort was made to involve them in ensuring as far as possible that farmers were aware of veterinary activities in their area. A common complaint from PACE Communication units was that their budgets were too low and with more resources they could do more to increase farmer awareness.

Although the strengthening of these linkages has varied from country to country, it can be concluded that overall this aspect has been implemented efficiently. In Guinea, the PACE Communication Officer's post has now been integrated into the Government Veterinary Service Organogram ensuring that communication activities will continue there, but this may not be the case in other countries e.g. the PACE Communication officer in Senegal did not expect to continue his activities once PACE ends as he was not sure if funding would be available to continue his appointment in this role.

4.3.4. Strengthening and Widening Laboratory Diagnostic Services

The collaboration between AU-IBAR and the IAEA (International Atomic Energy Agency) which started during PARC continued under PACE by the appointment of a laboratory expert from IAEA in June 2001. Over the next 4 years the expert was extremely active in strengthening the laboratory diagnostic capacity within PACE countries by training and supervision of the provision of equipment and diagnostic reagents. The relevant logical framework activities for this component were as follows:

First Phase of PACE

- Training in diagnostics and other technical aspects needed for the networks.
- Continued research into vaccines and diagnostic and therapeutic tools.

Extension Phase of PACE

- Assure timely diagnosis assured by supporting both the regional and national laboratories with provision of materials and diagnostic kits.

- Improve the laboratory component of ARIS.

- Sustain diagnostic services by visiting and assisting countries in establishment of the required capacity for diagnosis of identified priority diseases, assisting in serological surveillance required for obtaining freedom from Rinderpest infection and continuing the laboratories Rinderpest-testing network.

The first year focussed in assessing the diagnostic capacity of national veterinary laboratories in PACE countries and assisting them with their work-plans. National PACE co-ordinators have involved their national laboratory personnel in drawing up their budgets for laboratory equipment and consumables. Consideration was also given to the designation of Regional Reference Laboratories. The laboratory expert collaborated closely with the Epidemiology Units to strengthen the diagnostic capacities needed for Rinderpest eradication and in support of the surveillance networks.

4.3.4.1. Regional Laboratories

A major input was the designation of three Regional Reference Laboratories to carry out Rinderpest diagnosis by serology, PCR, molecular characterisation and virus isolation. The Regional Laboratories are as follows:

- KARI – Muguga, Kenya
- ISRA - Dakar, Senegal
- LANADA - Bingerville, Côte d'Ivoire

A MOU was agreed between AU-IBAR/PACE and the Directors of the Institutions in charge of the Regional Reference Laboratories accepted by Directors of the institutions.

NB Garoua (LANAVET) in Cameroon was considered, but discounted because of communication difficulties.

Of concern throughout the PACE programme was the poor rate of processing and analysing samples for Rinderpest surveillance and diagnosis by Muguga. Although the expert monitored the situation and collaborated with the Director of KARI, the situation was never satisfactorily resolved and Muguga eventually lost its status as an International Rinderpest Reference Laboratory.

4.3.4.2. National Laboratories

Throughout his contract the laboratory expert visited National Laboratories, developed a database of their capabilities and co-ordinated training activities and the provision of diagnostic kits, reagents and equipment with special emphasis being placed on the laboratory support to the surveillance of Rinderpest, CBPP, African Swine Fever and Rift Valley Fever.

By the end of 2005, it was reported that the national veterinary diagnostic laboratories had received diagnostic equipment and their staff trained or retrained. All the PACE countries have a veterinary laboratory functioned and equipped (at different levels) for the diagnosis of Rinderpest with the exception of Burundi, CAR, Congo, Equatorial Guinea, Gabon, Rwanda and Somalia.

In general staff from the National laboratories of Guinea, Dakar, Burkina Faso, Mauritania, Mali, Kenya Rwanda, Tanzania and Uganda plus the Tenkodogo district laboratory in Burkina Faso visited are motivated and have benefited from training and provision of equipment and consumables under PACE. Because laboratory diagnoses are an essential component of disease

capacities of the laboratories in West Africa. For example it was reported in Senegal that although the submission rate of diagnostic samples was quite good in the first two years of PACE, thereafter it declined significantly. The basic statistics are shown in the following table.

Submission of diagnostic samples to the Central Veterinary Laboratory in Senegal via the Epidemio-Surveillance Network:

Table 1: Diagnostic samples to the Central Veterinary Laboratory in Senegal

Year	No. of Submissions
2001 (Aug. – Dec.)	101
2002	107
2003 (Jan. – April)	2
2003 (May – Dec.)	48
2004	Nil (Network ceased to function prior to the PACE Extension phase)
2005	9
2006 (Jan. – July)	14

Statistics were also provided for diagnostic samples processed in the Central Veterinary Laboratories in 2005 in Mali, Burkina Faso and Mauritania as follows:

Table 2: diagnostic samples processed in the Central Veterinary Laboratories in 2005 in Mali, Burkina Faso and Mauritania

Laboratory	Numbers of diagnostic samples processed in 2005
Direction du Laboratoire National d' Elevage, Ouagadougou, Burkina Faso	1,028 - for parasitology, rabies, bacteriology, autopsies and Brucella serology
Laboratoire Central Vétérinaire, Bamako, Mali	83 - for infectious diseases 727 – bovine brucellosis 6 – rabies heads 788 – other diagnostic samples (parasitology etc.)
Central Veterinary laboratory (CNERV), Nouakchott, Mauritania	169 – all diagnostic samples

Considering the significant livestock populations in these countries, these statistics represent under-utilisation of diagnostic capacities available.

It is concluded that the support to the Regional and National Laboratories by PACE to carry out the diagnosis and surveillance of Rinderpest and some other important epizootic diseases has been carried out efficiently. The problems at Muguga were beyond the scope of PACE to rectify. Within PACE countries in West Africa, however, there is under-utilisation of the diagnostic capacity available.

5.0 Strengthening the Privatisation of Animal Health Delivery Services and the Involvement of Private Animal Health Worker in Diseases Surveillance

The OIE has relayed WTO agreements related to the global environment for trade in which exporting countries are clearly obliged to have National Veterinary Services able to produce reliable certifications meeting international sanitary regulations. Unfortunately, in most African countries, Governmental Veterinary Services are not able to produce certificates that correlate well with the real sanitary situation on the field. On the other hand, the delivery of veterinary services is very often inconsistent depending on the parts of the countries. Furthermore, in some areas the services are clearly deficient. Considering at first the fact that most of the countries cannot any more afford to maintain an exhaustive organization of veterinary services with a national coverage, secondly considering the reality of many African ecosystems that require extensive farming systems, an alternative way of organizing the animal health management at a national level has to be adopted.

For many years OUA-IBAR has put a lot of effort into the improvement of animal production and eradication of major animal diseases from the African continent. This is now a new challenge for IBAR to promote an adapted policy for animal health in African countries that could both relieve the state economic burden and optimise the delivery of services. The stakes of the new concept are the enhancement of the quality of national veterinary services, in concomitance with the reliability of official certifications for animal products.

Several options could be sought, but according to the experience of many countries, the assignment of service delivery to a private sector financed by a normal commercial relationship between the provider and the customer seems still to be the most successful and economically viable way to act. For the last ten years, this strategy has been improperly called "privatization of veterinary services", when only the "business" facet of the veterinary activities was concerned. This has been the cause of a lot of misunderstandings and fears in governmental services that have led them to a reluctant attitude towards the concept itself.

The policy promoted by PACE/IBAR has clearly mentioned the different steps that should have been followed by African countries desirous to re-organize their National Veterinary Network (National Veterinary Services, according to the OIE terminology) by creating room for the private sector.

Many actors leading different strategies and following sometimes opposite stakes are intervening in animal production. The national policy is reconciling and seeking synergies between, upstream, vets, paraprofessionals[2] and farmers grouped in associations, and, downstream, taking into consideration the requirements of the consumers. The national policy is based on the following principles:

-Adopting a clear national policy at country level;
-Re-allocating the animal health manpower;
-Re-updating the legislative environment of animal health interventions.

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[2] **Para-professional (according to OIE definition)** means a person who, for the purposes of this Code, is authorised to carry out certain veterinary tasks (dependant upon the category of para-professional) in a country through a license from the veterinary statutory body, and delegated to them under the responsibility and direction of a registered or licensed veterinarian. The veterinary tasks authorized for each category of para-professional should be defined by the statutory body depending on qualifications and training, and according to need.

5.1. Assistance to PACE Member Countries in Strengthening the Privatisation Of Animal Health Delivery Services

PACE has decided to support the legal status of privatised veterinary services in order to achieve a "Greater privatisation of veterinary services and public/private sector linkage in this field". There was a need to "harmonise legislative positions on the veterinary profession and veterinary drugs". This was done through the following activities executed mainly during the extension phase:

- Development of national guidelines for Community-based Animal Health workers (CAHW) systems, legislative reform, development of licensing procedures for CAHW trainers and trainees, development of agreements with implementing agencies to ensure harmonised approaches and private sector involvement.
- Support to privatisation and veterinary legislation by providing technical support to DVS and statutory bodies to strengthen their capacity to co-ordinate, regulate and supervise para-veterinary professional systems in accordance with OIE guidelines.

5.1.1. Guidelines and Important Aspects Considered by PACE during the Harmonisation Process of Legislations on Veterinary Profession

In assisting the countries on setting up sustainable veterinary services the following guidelines have been very much used.

Designing a national animal health policy

- A clear policy has been adopted by the State that achieved a wide consensus among all the socio-professional groups.
- This policy has been in coherence with OIE criteria of quality for National Veterinary Services.
- The Ministry in charge of Agriculture was responsible of the design and enforcement of all aspects of veterinary policy, including veterinary drugs and veterinary public health.
- Introduction of the private sector even in official activities such as legal vaccination or sanitary inspection and certification has been a solid part of this policy (concept of *mandat sanitaire*[3]).
- As long as, among animal health workers, private vets (and they only) are an essential link of the national certification system (concept of *official veterinarian*[4]), a conducive

[3] The *mandat sanitaire* is now quite widely spread in many west African countries. It is a yearly renewable mandate given by the State to a private vet to fulfil tasks regulated by the animal health legislation. Fulfilling these tasks, the private vet, called a "*vétérinaire sanitaire*" (veterinary inspector) is considered as an official vet, with the official authority of government officer. The area of competency of the *vétérinaire sanitaire* is limited to his clientele and other places attributed by the State (ex slaughter houses, markets for meat inspection, etc...). According to the contents of his mandate, he can either practice official vaccinations, deliver official certificates, enact sanitary measures in collaboration with local authorities, etc... In the framework of his official mission, he can be paid either fully by the government, or partly paid by his client and subsidized by the government, of fully paid by his client.

[4] ***Official Veterinarian*** *(OIE definition)* means a veterinarian authorised by the *Veterinary Administration* of the country to perform certain official tasks associated with animal health and/or public health and inspections of *commodities* and, when appropriate, to certify to certain things in conformity with the provisions of Section 1.2. of this of the *International Animal Health Code*

and supportive policy has been adopted to foster their settlement in the field. They were the sole professional body holding the monopoly of veterinary practice, and they were seconded in this task by other animal health workers (paraprofessionals) from different level of ability, working under their strict responsibility.

Fostering a cost recovery policy for animal service delivery

- The principle according to which the consumer has to pay for what he has asked for has been adopted. However, the Government still subsidizes some occasional activities in order to orientate its sanitary policy. In remote or low potential areas, the *public good* has been an argument in favour of providing economic support to some private veterinary facilities.

Sharing tasks between governmental and private sectors

- A clear knowledge of "who is doing what" has been developed then widely broadcasted.
- The public sector remains responsible for designing and making the national animal health policy implemented. It has also a role of regulation and control of the animal health policy. It has, as much as possible, delegated some official tasks to the private sector through the *mandate sanitaire.*
- The private sector implements the national animal health policy and, unless otherwise stipulated by the national legislation in exceptional circumstances, has the monopoly of veterinary services provision, including veterinary drugs delivery.
- In low potential areas and where it is not economically viable for a private sector to exist, the State has offered **contract to private vets to support their presence at field level (*public good* function of the State).**

Re-focusing the activities of the government staff

- In the context of privatizing the animal health delivery, the governmental staff had withdrawn from the field in order not to compete with the private sector.
- A real re-structuring of Governmental Veterinary Services has been conducted.
- Governmental staff has been re-deployed in activities of organization, supervision and control (emergency plans, movements and transport of animals, animal welfare, control of smuggling and frauds on veterinary drugs and practice, food safety and quality process in animal products).
- The veterinary labs have for the first steps remained under the responsibility of governmental veterinary services. However, if the State decides to let them to the private sector, adequate subsidies have to be foreseen[5].

Organising the veterinary profession

- A high level veterinary statutory body (National Veterinary Board or council) regulate the veterinary profession in all aspects and particularly those related to the private practice. It remains independent from the State but commissioned by it to discipline the veterinary

[5] Veterinary labs are compelled to an obligation of high quality. Their role as a help for diagnosis and prognosis is essential in the decision-making process, and it is not desirable, according to the stakes and consequences of animal diseases, to subordinate their existence to the sole market law.

profession fortified with a real power to authorize or forbid the practice of vets. Private vets are majority representatives of the veterinary statutory body.

- This body has the duty to determine the different categories of paraprofessionals and to set the limits of their authorised activities. The paraprofessionals are registered and licensed to practice by this body.
- The national veterinary body is also responsible of the setting and monitoring of professional standards as well as prescribing continuing professional development (CPD).
- Veterinary associations have been created to lobby for the veterinary profession, when the Board is the sole guarantor of the professional quality and the ethic of the profession.

5.1.2. Overall Achievements in the Privatisation of Animal Health Delivery Services

The strategy adopted by PACE to address these activities was to establish the Veterinary Legislation and Privatization Unit (VLPU) to work in collaboration with the DFID funded CAPE project. Essentially the VLPU focussed on providing technical assistance to PACE countries to modernize their veterinary legislation to provide a legal framework for privatised veterinary services. CAPE, on the other hand, focussed on the promotion of the use of CAHWs to provide essential veterinary services in areas unlikely to be covered by conventional veterinary systems e.g. in conflict situations and remote ASAL areas. This included addressing issues of the legal status of CAHWs.

Unfortunately the VLPU and CAPE had difficulties in working together harmoniously which somehow has slowed down the execution of the activities. The 6th AC Meeting of October 2002 referred to VLPU and CAPE as sub-units within the Animal Health Service Delivery Unit, and commented on the difficulties of harmonisation of the two units. Similarly the MTR commented on the difficult working relationships between the VLPU and CAPE, and recommended that the VLPU should focus on a small number of countries that were making progress in the reorganisation of their veterinary services, and that CAPE should continue to assist countries in East Africa.

From the results of a questionnaire survey conducted during the 6th PACE Annual Co-ordination Meeting in Mombassa in June 2006, all countries allow private veterinarians to operate although their activities are restricted in Cameroon. Most countries also allow CAHWs or auxiliaries to work in the delivery of veterinary services, but always under supervision. The exceptions are Benin, Cameroon and Mali. In Mali there is a large cadre of trained technicians working in the delivery of veterinary services. Thus the role of the private sector in PACE countries is very significant and can be roughly divided into two categories as follows:

- Private veterinarians and other trained professionals (engineers) delivering services to meet PACE objectives e.g. participation in vaccination campaigns and official epidemio-surveillance programmes.

- Technicians, CAHWs and Auxiliaries delivering veterinary services under veterinary supervision.

From the Final Evaluation Mission questionnaire survey, 20 countries stated that PACE had assisted in improving their private veterinary services including the use of CAHWs. This support included training and modernisation of veterinary legislation.

Under PARC, funds were made available for use as guarantees against bank loans or credit to private veterinarians to develop or start up their veterinary businesses. This scheme has been continued under PACE in some countries. In 4 of the 5 countries visited in West Africa during the FEM (Guinea, Senegal, Burkina Faso, and Mali), 10 private veterinarians were interviewed, 5 of whom had taken bank loans under the scheme of whom 3 had failed to repay the loans. Reasons given for defaulting were inability to reimburse, but the impression given was that attempts to reimburse were not taken seriously as the banks used the guarantee funds for repayments. In Guinea Bissau, although a guarantee fund of about €20,000 has been deposited in the Banco da Africa for over 3 years under PACE for veterinary privatisation, no loans have been granted because of lack of confidence by the bank in the veterinary private sector. It is accepted by the Final Evaluation Mission that the number of private veterinarians interviewed was very small and cannot be regarded as a representative sample. As a follow up to these observations, the PCU has advised that in reality the levels of reimbursement have been very high in some countries (approaching 100% in Kenya and Uganda and 90% in Guinea) and over 50% in Senegal.

In Guinea a credit fund of GNF 100 million (worth approximately FCFA 25 million) was placed at the disposal of the bank (BICIGUI) which in exchange was committed to lending GNF 150 million GNF (or FCFA 37,5 million) to the private veterinarians. To date it has already loaned GNF 120 million GNF (FCFA 30 million FCFA) to 16 participants in the privatisation programme. New negotiations are in process for another phase of loan funds of GNF 100 million (to include 2 urban private veterinary practitioners in August 2006 in Conakry). *NB $1 Euro = GNF 6500 approximately.*

Of the 4 countries visited in East and Central Africa, the PARC loan guarantee scheme has been continued under PACE in Uganda and Kenya. In Uganda the scheme has facilitated the privatisation of 40 veterinarians, 30 of whom are still operating as private veterinarians. The scheme has been operated very successfully in Kenya, under the Kenya Veterinary Association Privatisation Scheme (KVAPS). The scheme started under PARC with a fund of Kshs 30 million (about € 375,000) and since 1994 more than 80 private veterinarians have benefited from the scheme and since 2003 there have been no defaulters. Applications for loans are strictly vetted by the KVAPS before passing to the Co-operative Bank, and borrowers are subjected to stringent conditions including having some basic training in business management. PACE was recently asked to carry out a short-term consultancy to study the suitability of transforming KVAPS into a micro-finance institution. The study was successfully carried out and its conclusions and recommendations are under evaluation of the Kenyan authorities. It was also reported that the scheme has worked well in Nigeria.

Thus the results have been variable, but the Kenya example has demonstrated that the scheme works very efficiently provided it is properly managed and monitored.

5.2. Establishment of Community-based Animal Health Delivery Systems under the Supervision of Veterinarians

5.2.1 Guidelines for organizing stockholders

- In order to diffuse the national health policy, the constitution of representative associations of stock holders has been fostered.

- These associations became the representatives of farmers in a tripartite dialogue between the governmental veterinary services, the private vets, and the stock holders.
- Some authorisations have been attributed to these associations for holding some categories of veterinary drugs.

5.2.2. CAHWs and auxiliaries involved in the delivery of animal health services

These were not included in the PARC/PACE loan/credit guarantee programme.

Over the last 10 years, there has been an increasing consensus that CAHWs or their equivalent can play a significant role in the delivery of veterinary services under certain circumstances, namely in situations where conventional veterinary systems cannot operate e.g. in conflict situations, remote ASAL areas etc. CAHWs by the nature of their background, may have limited education and so require careful supervision and strict restrictions on the veterinary tasks that they can carry out e.g. simple treatments, administration of vaccinations etc. The development of the role of CAHWs in veterinary services has been greatest in East Africa, but auxiliaries are also widely employed by veterinary services in certain West African countries. For example, in Guinea there is a significant cadre (estimated 10,000) auxiliaries linked closely with Farmers' Associations, and several hundred of these are employed by private veterinarians in the delivery of veterinary services. Thus the concept of CAHWs is relevant throughout the entire PACE region.

The CAPE Sub-unit was contracted by DFID and although part of its activities were planned to be linked to PACE by working closely with the VLPU, it appears that CAPE operated semi-autonomously and to its own logical framework. Its purpose was to establish sustainable animal health services to control diseases that threaten livestock in the Greater Horn of Africa, especially Rinderpest, and with EDF allocated funds, to carry out analysis/development of CAHW delivery systems in West Africa.

CAPE's final report could not be located by the PCU and so was not available to the Final Evaluation Mission. Thus the exact starting and finishing dates are not known, but CAPE was operational from 2000 through to the end of the first phase of PACE. CAPE was not active in the extension phase of PACE.

The difficulties of harmonisation of the activities of CAPE and the VLPU were noted in the MTR which recommended the following:

- The PCU and the CAPE team come up with a work plan indicating how CAPE activities and outputs are integrated into the national work plans. This can be based on the Somalia programme into which CAPE is totally integrated.

- The work of CAPE and VPLU would be more usefully co-ordinated on a geographical basis, and CAPE should continue assisting countries in Eastern Africa, co-ordinating its effort more closely with the VPLU.

Despite the problems, CAPE was very active in carrying out its PACE linked agenda, namely the strengthening of veterinary services through privatisation and community based animal health. It succeeded in bringing together veterinarians and animal health assistants to establish private veterinary practices for pastoralists in the Greater Horn (Ethiopia, Kenya, Somalia, Sudan, Tanzania and Uganda). This was achieved by training, knowledge sharing and advocacy and by

the end of its contract; CAPE had developed CAHW privatisation methodologies which were available to other countries.

It is concluded that the CAPE activities were implemented efficiently in the Greater Horn of Africa, although there is no indication that the development of CAHW delivery systems has been extended to West Africa as originally planned.

5.2.3. Strengthening of Awareness and Linkages between Central Authorities and Farmers

It is clear that a great deal of material to increase farmer awareness and strengthen linkages between the central and field levels has been produced under PACE. Much of this material has been of high quality. It appears, however, that the effectiveness of distributing this material has been variable. In addition, the potential for more widespread dissemination of good quality materials between countries has not been achieved as effectively as it could have been. In hindsight, the PACE programme should have made provision for systematic validation and archiving of awareness materials, and dissemination of examples of best practice for the benefit of all.

5.3. Assistance to PACE Member Countries to Harmonize Veterinary Policies and Legislations

5.3.1. Guidelines followed for the harmonisation of veterinary policies and legislations

Reviewing the veterinary legislation according to the OIE recommendations and international animal health code regulations

- In the context of the introduction of a private sector in animal health delivery, the national veterinary legislations were to be updated.
- The legislation were reviewed in consistency with the international criteria diffused by OIE in its *Animal Health Code* about the *quality of National Veterinary Services* and the concept of *official veterinary certifications.*
- The concept of *mandat sanitaire* given to private vets acting at field level as sanitary police and compensating for the unavailability of governmental vets has been fostered in every national veterinary legislation.

Establishing a conducive and appropriate legislation environment for private practice

- The legislation has privileged the establishment in rural areas of private vets, indispensable links of **the national official certification chain,** against paraprofessionals that cannot play the same official role.
- Monopoly of veterinary practice and veterinary drugs[6] delivery has been given to vets, but health and fair competition has been encouraged among private veterinarians (avoiding for example geographical monopolies).
- Any competition from governmental veterinary services towards private vets has been avoided.

[6] With however an exception for pharmacists that are allowed to retail veterinary drugs on veterinary prescription

- Different categories of paraprofessionals have been defined according to their training. Areas of activities of each category have been precisely defined, regulated and controlled.
- The intervention of paraprofessionals has been strictly regulated (see below).
- Illegal veterinary practice has clearly been defined. Any illegal veterinary practice from paraprofessionals, merchants, and whoever else is severely punished by law.

Regulating the intervention of paraprofessionals

- The legislation is authorizing different categories of paraprofessionals determined by the national statutory body.
- Each category of paraprofessional has a domain of activities authorized by the national statutory body according to their level of training and diploma. This domain of activity specifies the authorised veterinary treatments and usable drugs.
- Paraprofessionals are authorized to work solely under the direction and responsibility of a registered and licensed veterinarian.
- Paraprofessionals are registered and licensed by the veterinary statutory body on proposal of the responsible veterinarian. Licenses are renewed each year on request of the responsible veterinarian.
- Any animal health worker purporting to act out of the responsibility of a registered and licensed veterinarian cannot be considered as a paraprofessional. This is notably the case of community animal health workers intervening in remote areas out of real supervision of a veterinarian.

The use of non paraprofessional AHWs, or improperly supervised paraprofessionals (e.g. by government veterinary services devoid of means of convenience), represents a hazardous system that can jeopardize the quality of the whole national Veterinary Services. Direct consequences could affect the reliability of official certifications produced by the country and directly impede any exportation capability.

IBAR emphasised on the necessity for national legislations for animal health to be coherent with OIE Animal Health Code.

5.3.2. Legislative Framework Established by PACE

Possibly as a result of the difficult working relationship between the VLPU and CAPE sub-units, the VLPU component was terminated in February 2004. In the intervening period following the MTR, the VLPU focussed on Uganda, Guinea Bissau, Nigeria, Niger and Burkina Faso.

Despite the problems between the VLPU and CAPE, overall there was good progress in the development of modernised veterinary legislation to provide a legal framework for private veterinary services. From the results of the Final Evaluation Mission's questionnaire survey, of the 27 PACE countries that responded 23 stated that PACE recommendations had been incorporated into their amended veterinary legislation. These amendments and updating include:

- Delineation of practices allowed by veterinarians and non-veterinarians (engineers, technicians, CAHWs and auxiliaries).

- Regulations concerning mandates to private veterinarians to participate in government activities (e.g. vaccination campaigns, participation in surveillance programmes). This is particularly relevant in francophone West Africa.

- Control of veterinary pharmaceuticals.

Because a comprehensive analysis of the veterinary legislation in each of the PACE countries was beyond the scope of the VLPU, it recommended in the 2nd Annual PACE Report (June 2002 to May 2003) that a one month mission on legislation by an international expert be carried out for each country. This was not implemented.

Unfortunately, although there has been good progress in the elaboration of modernized veterinary legislation to support privatised veterinary services, much of this renewed legislation has still to be approved by respective parliaments. Thus of 11 PACE countries who modernised their legislation as a result of PACE recommendations and were examined in some detail by the Final Evaluation Mission (Guinea, Senegal, Burkina Faso, Guinea Bissau, Mauritania, Niger, Nigeria, Rwanda, Kenya, Tanzania, Uganda and Sudan), only in Niger, Rwanda and Tanzania has the modernised legislation been approved, although approval of the updated legislation in Guinea Bissau is expected very soon. In Mauritania, the elaboration of the existing legislation to include the working practices of veterinarians including private veterinarians, was promulgated in 2004 and the decree applications will be adopted soon.

Overall, the VLPU has operated efficiently. It is probable, however, that if the working difficulties had been overcome and the VLPU contract had been extended as originally recommended, the input by PACE into the modernisation of veterinary legislation would have been more significant.

6.0 Recommendations from the 13 PACE Advisory Committee Meetings and PACE Policy Committees' Meetings

6.1 Presentation of the Policy Committee for the PACE programme

Nature and role of the Policy Committee
The implementation of the PACE Programme has taken cognizance of the lessons of the PARC. The main development theme of the PACE Programme was to build the institutional capacity of the OAU/IBAR and veterinary services in participating countries. Appropriate strategies have been developed and managed effectively to control epizootic diseases. This focus of the PACE Programme has included the promotion and development of partnerships between appropriate public sector and private sector stakeholders.

One important area that has been addressed early in the implementation of the programme was the co-ordination and management of the technical teams. Therefore, a Policy Committee has been put in place to devise animal health policies and strategies in Africa, to promote the exchange of information on policies and policy initiatives relevant to the PACE Programme and the OAU/IBAR and to have the important role of promoting the PACE Programme's political profile. It comprised representatives of institutions that have international mandates related to the control of epizootics and donors that are active in livestock development in Africa. The committee was supposed to meet three times during the life of the Programme but only one meeting took place.

Duties and responsibilities of the Policy Committee and its members
The specific tasks of the Committee were to:

- Exchange information on the PACE Programme's various activities and other relevant initiatives in livestock development and other sectors.
- Define the policy guidelines of the PACE Programme on the basis of those adopted and recommended by African governments and donors that fund livestock development interventions.
- Recommend to the OAU/IBAR measures to improve the sustainable impacts of its projects, particularly the PACE Programme.
- By the end of each meeting, produce minutes for the information of Member States of the OAU, the Advisory Committee of the PACE Programme, the EC, EU Member States, other donors and organizations that have direct interest in animal health in sub-Saharan Africa.

Composition of the Policy Committee
Beside the staturary members of the Policy Committee, the Director of the OAU/IBAR might have invited observers or advisors to meetings of the Policy Committee.

***Regular members of the Policy Committee**

- Director, Organization of African Unity InterAfrican Bureau for Animal Resources (OAU/IBAR)
  Chairperson
- PACE Programme Co-ordinator *Secretary*
- European Commission (Delegation, Kenya & SCR, Brussels) *Member*

- Department for International Development (DfID, UK) *Member*
- French Co-operation *Member*
- German Technical Co-operation (GTZ) *Member*
- United States Agency for International Development *Member*
- International Fund for Agricultural Development (IFAD) *Member*
- World Bank *Member*
- Southern African Development Community (SADC) *Member*
- InterGovernmental Authority on Development (IGAD) *Member*
- Economic Organization of West African States (ECOWAS) *Member*

**Occasional advisors and observers:*

- International agencies
- State veterinary services
- Research and vaccine production institutions
- Non-governmental organizations (NGOs)
- Veterinary associations
- Veterinary faculties
- Livestock traders'associations
- Pharmaceutical industry

6. 2 Presentation of the PACE Advisory Committee

Nature and specific tasks of the Advisory Committee
The Advisory Committee (AC) acted as the technical advisory structure for the African Union/ Interafrican Bureau for Animal Resources (AU/IBAR) and the European Commission (EC). The Committee was entrusted with reviewing the progress of the Pan African Programme for the Control of Epizootics (PACE) every six months and recommending measures to ensure that activities of PACE were in line with the objectives.

The specific tasks of the Committee were to:

- review the proposed work plans of the PACE Programme's (PP) various components and recommend appropriate measures to improve the Programme's effectiveness and efficiency
- advise the PACE Coordination Unit (PCU) on co-ordination and management of the Programme's technical activities, and the national components of the PACE Programme, at a country by country level
- examine the strategy options of the PACE Programme
- examine the progress in the implementation of the PACE Programme biannually, based on reports submitted by the Director of the AU/IBAR and other relevant documents
- commission independent, complementary investigations that are directly relevant to the Programme's objectives (*i.e.* to clarify the status of certain diseases, the reliability of data, or to monitor or evaluate specific components of the Programme)
- assist the OAU/IBAR and the EU with the monitoring and evaluation of the PACE Programme
- evaluate the technical coherence and management capacity of the PACE Programme

possible financing

Composition of the Advisory Committee

The Director General of the OIE presided over the meeting. The members included representatives from:

- Office International des Epizooties (OIE, Paris), *Chair*
- Organization of African Unity InterAfrican Bureau for Animal Resources (OAU/IBAR), *Secretary*
- Delegation of the European Commission in Kenya, *Member*
- Service Commun Relex of the European Commission, *Member*
- Food & Agriculture Organization (FAO, Rome), *Member*
- International Atomic Energy Agency (IAEA) Joint Division of Animal Production & Health, *Member*
- World reference Center on CBPP (Centre International pour le Recherche Agronomique pour le Developpement, Departement d'Elevage et Medecine Vétérinaire Tropicale (CIRAD-EMVT, Montpellier), *Member*
- World Reference Centre on Rinderpest, Pirbright, *Member*

PACE technical staff participated in these meetings as observers. The Advisory Committee met twice a year.

6. 3 Recommendations from the first and only Policy Committee Meeting held

The first PACE Policy Committee Meeting was held on 20 March 2002, in Addis Ababa, Ethiopia. The following members were present:

- Dr. Jean-luc Francois, Attache de Cooperation, Addis Ababa, ETHIOPIA
- Dr. Ahmed E. Sidahmed, Technical Adviser, Focal Point Livestock & Rangeland Systems, Technical Advisory Division, Rome, Italy
- Mr. Dil Peeling, DFID Officer, London
- Dr. Bernard Rey, Rural Development Advisor, Nairobi, Kenya
- Dr. Cheneau Yves, Chief, Animal Health Service, FAO, Rome
- Dr. Mauro Ghirotti, Director, Dev. Cooperation Office of the Italian Embassy, Addis Ababa
- Dr Dr Jotham Musiime, the acting Director of AU/IBAR

The following persons made the welcome remarks:

- The representative of the Federal Republic of Ethiopia, Ministry of Agriculture
- The representative of the European Union in Ethiopia
- The representative of the Secretary General of the African Union

The following presentations were made:

- Review of the TORs for the PACE Policy Committee, by Dr Rene Besin
- Strengthening African Veterinary Services with Reference to Success Stories in Under-served Areas, by Dr Tim Leyland
- Towards Poverty-focused Policies, Legislation and Insitutions for Animal Health Service Delivery in Africa, by Dr Andy Catley

- Policies Related to the Control of Priority Animal Diseases in Sub-Saharan Africa, by Dr Gavin Thomson
- Polcies for Improved Livestock Development and Trade in Africa, by Dr Emmanuel Tambi
- Livestock Management, Production and its Environmental Impact, by Dr Daniel Bourzat

6.4 Recommendations from the 13 Advisory Committee Meetings

Below is a summary of the recommendations of the 13 meetings of the AC from 2000 to 2004.

6.4.1. The PACE Coordination Unit (PCU)

The PACE Advisory Committee meetings

During its deliberation, the PACE Advisory Committee (AC) made recommendations on various issues pertaining to the bi-annual meetings. A summary is given below.

The AC recommended that:

- ✓ representatives from the European Commission (EC) in Nairobi and Brussels to attend AC meetings because of the critical role of EC to the PACE Programme – (**1st 2nd 3rd ACM)**
- ✓ financial information supplied to the members during the meeting to be treated as an implementation report that highlights expenditures – **(3rd ACM)**
- ✓ meetings of the AC should be held Kenya and Mali to save time and resources **(3rd ACM)**
- ✓ the AC Chairman should invite observers to ACM to encourage transparency **(3rd ACM)**
- ✓ discussions during the AC meetings should emphasize accomplishments of the PACE Programme and the PCU should develop a standard matrix for evaluating each country's progress – **(3rd ACM)**
- ✓ future ACMs should be scheduled when work programmes and annual reports are being drafted so that the members can provide input **(5th ACM)**
- ✓ AU/IBAR should supply the AC with written progress reports and future plans **(5th ACM)**
- ✓ the Mid-Term Review recommended that the AC should be changed to a steering committee but the AC deferred the action – **(7th ACM)**
- ✓ the format of the ACM should change from a programme evaluation mission to a meeting for giving advise on planned activities and problem areas to maximize the members input to the PACE Programme **(7th ACM)**

General Administration (staff and technical capacity)

On general administration, staff recruitment and logistics, the AC recommended that:

- ✓ PCU should initiate a programme to address technical assistance according to the provision in the financing agreement of national programmes - **(1st ACM)**
- ✓ PCU should revise the general approach to coordinating the PACE Programme by developing and communicating the vision and the strategic framework of PACE activities - **(2nd ACM)**
- ✓ PCU should ensure that each of the specialized units maintains an appropriate balance in providing services to the PCU and PACE member states **(3rd ACM)**

- ✓ AU/IBAR should appoint a permanent director to facilitate better implementation of the PACE Programme and to encourage the recruitment of counterparts in PACE and PANVAC – **(4th ACM)**
- ✓ There is a need to ensure that PCU stays focused through effective leadership linked to matrix management approaches - **(4th ACM).**
- ✓ PCU should hire a consultant to develop a plan for incorporating the counterparts financed by PACE into AU/IBAR and for evaluating the long term human resource needs **(5th ACM)**
- ✓ there is need to develop office logistics including investment on electronic communications to improve performance (Government of Kenya, EU, and other development partners) – **(7th ACM)**
- ✓ the commitment of the EU and EC delegations in Nairobi to the PACE Programme should be sustained given the rapidly changing animal health situation in Africa and worldwide **(11th ACM)**

6.4.2. PACE Common Services

Regarding the PACE Units, the AC recommended that:

- ✓ PACE units should not focus on planned activities but to concentrate on the desired outcomes and develop performance indicators to measure these outcomes **(5th ACM)**

Administrative and Financial Unit (AFU)

- ✓ The AC supports the proposals of the Financial Controller on the reallocation of contingency funds for the implementation of the regional programme up to October 2004. He, however stressed the need for strict budgetary control and recommended early application of the proposed criteria that are prerequisites for the reallocation of these funds **(8th ACM)**
- ✓ The AC recommended that audit of national programmes are financed in all cases if this is required by the EU delegations and if resources are scarce then no audits must be done **(9th ACM)**
- ✓ The AC appreciated the clear outline of the approach of the Financial Controller as this will provide the PACE Programme with tools to optimize the use of funds on a daily basis and recommended that the Financial Unit be reinforced through the recruitment of additional staff (Financial and Administrative Officer and an Accountant) taking account of staff assessment **(10th and 11th ACM)**
- ✓ The AC noted the report of the Financial Controller and:
  - o emphasized the closure and decommitment of the work plans and programme estimate of the eight PACE member countries that are expected to finalize this process before the beginning of the second year of the extension from 1 November 2005
  - o recommended that the monitoring of the disbursement/financial situation of the funds allocation to the national components (programme estimates) to distribute balances to epidemio-surveillance activities in support of national countries **(11th ACM)**
- ✓ The AC indicated that final technical and financial assessments of the PACE Programme will be of great value to design future health policies and projects in Africa **(11th ACM)**
- ✓ The AC emphasized that the closure and decommittment of balances of funds from old contracts (including grant contracts with CIRAD and IAH/Pirbright and Technical

Assistant contract with FAO) *and decommitment of balances from contracts* and programme estimates must be given urgent attention **(12th ACM)**

- ✓ AC recommended that the PACE Proogramme uses all retrieved funds for priority activities to be determined by PACE/IBAR **(12th ACM)**
- ✓ If the new project for continuing SERECU activities is not approved by October 2006 then part of the retrieved funds could be used for financing SERECU and other regional and sub-regional coordination units in the framework of the regional health centres **(12th ACM)**
- ✓ The AC recommended that more weight is given to the criteria relating to the allocation of national budgets for sustainability of epidemiological surveillance systems (ESS) **(12th ACM)**

Data Management Unit

The AC recommended that:

- ✓ Use of TADINFO and LABINFO is considered when selecting software to support the PCU and national activities **(3rd ACM)**
- ✓ Performance indicators already developed for monitoring surveillance capabilities for Rinderpest should be extended for use throughout the PACE member states **(3rd ACM)**
- ✓ Laboratory quality assurance and accreditation programme initiated by the international Atomic Energy Agency (IAEA) should continue **(3rd ACM)**
- ✓ IT staff should focus exclusively on the data management objectives consisting of developing the disease surveillance, and the disease reporting modules for immediate deployment **(5th ACM)**
- ✓ The purchase by PCU of the Arc View licensed software for countries that have already been trained in the use of the programme **(6th ACM)**
- ✓ Software should be supplied to participating countries before members attend a training course **(6th ACM)**
- ✓ DMU continues developing the network but also consider time and resources required to maintain these facilities **(6th ACM)**
- ✓ one computer with appropriate operating system from the national budget for each country is purchased and centrally configured to DMU prior to distribution to member countries to help them with the implementation of PID **(9th ACM)**
- ✓ DMU is encouraged to proceed with the establishment of the second phase of Animal Research Information Systems (ARIS) without conducting any risk analysis at this stage **(10th ACM)**
- ✓ That diagnostics test results management module is included in the ARIS to allow coordination and harmonization of data on animal diseases **(11th ACM)**
- ✓ A common seminar is convened under the aegis of OIE, IBAR/FAO and FAO-IAEA Joint Division to discuss the complications of current information systems to harmonize them **(11th and 12th ACM)**

Economics Unit

The AC recommended that:

- ✓ Veterinary services of the PACE member states are encouraged to establish their own economics units to evaluate the economic impact of disease control in their countries **(3rd ACM)**
- ✓ The work plan should reflect a change in the primary focus of the Unit **(4th ACM)**
- ✓ If the unit is to adopt models after the analysis of national information then it may wish

- ✓ The Unit continues working with epidemiologists but it should adopt a more pragmatic approach and not slowed down by complexities **(5th ACM)**
- ✓ That a limited number of in-depth case studies, initially planned are pursued and success stories emphasized **(5th ACM)**
- ✓ The unit pursues the new approach to the economic evaluation of the cost of epidemiological surveillance networks and cost-benefit analyses of investing in the control of animal diseases **(6th ACM)**

The PACE Epidemiology Unit (PEU)

AC recommended that:

- ✓ the epidemiology component of PCU is put in place soon and PCU should present a detailed epidemiology strategy in line with accepted national standards **(1st ACM)**
- ✓ The PCU present a detailed epidemiology strategy in line with internationally accepted standards to the AC, including risk analysis and mitigation, laboratory support and quarantine methods, identification of market and movement patterns, strategic use of vaccines, animal identification, and so forth – **(1st and 3rd 5th ACM)**
- ✓ The epidemiology unit addresses the environmental impact of the proposed programme **(3rd ACM)**
- ✓ The PEU identifies countries with functioning national epidemiological capacities and use them as examples for success, for example, Chad, Mali, Senegal and Ethiopia **(5th ACM)**
- ✓ **Sanitary cordon:** the decision to abolish the sanitary cordon in Central Africa and to transfer the epidemiologist from Ndjamena to Bamako **(5th ACM)**
- ✓ surveillance should focus on disease syndromes and include these in national training exercises and capacity building **(5th ACM)**
- ✓ develop and focus on a shared vision in the management of transboundary diseases **(5th ACM)**
- ✓ the Head of the PEU to visit countries and hold discussions with PACE-country epidemiologists and Chief Veterinary Officers to better understand their strengths and constraints - **(7th ACM)**
- ✓ the PCU retain the services of wildlife epidemiologists and sustain the critical wildlife surveillance programme – **(7th ACM)**

Communications Unit

The AC recommended that:

- ✓ PCU should monitor and encourage the Communication Unit's efforts to reflect what is stated in the work plan **(5th ACM)**
- ✓ Communications Unit works closely with the Economics Unit to promote the message of 'sustainability' **(5th ACM)**
- ✓ The PCU develops clear priorities with the Communications Unit to define a new work programme in the framework of existing budget for the next six months **(6th ACM)**
- ✓ The PCU looks into the possibility of using the 900,000 Euros of the FA visibility budget to develop a web-site and to cover the cost of external communication **(6th ACM)**
- ✓ the unit prioritizes the activities of the work plan and reports these to the AC during the next meeting **(7th ACM)**
- ✓ the outputs of the PACE Programme on epidemio-surveillance is made available to veterinary schools without allocating additional resources **(7th ACM)**
- ✓ Communication unit develops and disseminates a document aimed at ensuring the

- ✓ *Lessons from PACE national projects:* AC recommended that:
  - The analysis that is already available on country assessment of the PACE elements such as, organization of veterinary systems and communications) is published
  - Other units initiate similar processes, for example, an assessment of epidemiological networks by PEU **(8th ACM)**
- ✓ PACE Programme devotes more resources in its communication strategies to inform governments and other stakeholders of the success stories of the programme **(11th ACM)**

The CAPE Unit

The AC recommended that:

- ✓ PCU should ensure that there is full integration of the activities of the new CAPE Unit component within the Veterinary Legislation and Privatization Unit (VLPU) **(3rd ACM)**
- ✓ OAU/IBAR ensures that CAPE Unit activities are fully integrated into the existing structures of the PACE Programme **(4th ACM)**
- ✓ The European Development Fund (EFD) resources are made available in the PACE budget to expand the role of community health workers in areas not covered by DFID **(4th ACM)**
- ✓ CAPE Unit and VLPU work together to ensure that the programmes are integrated and harmonized **(5th ACM)**

- *Export zones*: The AC recommended that:

- ✓ The proposal on export zones is redrafted and implemented because it may be the means to convince veterinary services about the value of serological surveillance networks **(6th ACM)**
- ✓ A consultant is appointed, in consultation with OIE, to study the possibility of the creation of such zones and ensure that they are compatible with OIE recommendations **(7th ACM)**
- ✓ On the consultant's preliminary report, the AC recommends that:
  - The study is extended to cover other potential markets, especially in western Africa
  - After the final endorsement by the AC, the report is made available to COMESA and SADC for endorsement
  - AU/IBAR liaises with OIE for mediation in case of importation or exportation disputes **(8th ACM)**
- ✓ PACE, FAO and OIE follow the recommendations of the meeting organized by OIE/IBAR/FAO in Cairo in September 2004 to address livestock and livestock products export and the creation of export zones and commodity-based trade **(10th ACM)**
- ✓ AU/IBAR, with support of the OIE Regional Representative for Africa undertakes new activities in compliance with the ATPS-SPS Agreement **(10th ACM)**

Veterinary Legislation and Privatization Unit (VLPU)

The AC recommended that:

- ✓ PCU staff covering animal health systems/veterinary services should review what has been achieved under PARC and build on them **(3rd ACM)**
- ✓ PCU staff carry out an analysis of the existing country's legislative work and administrative framework to determine the environment for work to control epizootics and support privatization **(3rd ACM)**
- ✓ The role of primary animal health care is evaluated and its development promoted in all

- ✓ an independent consultant is contracted to evaluate the impact of the reorganization of public and private veterinary services; the quality and availability of these services to livestock breeders; and sanitary mandates in Chad where the programme for private veterinarians has been on-going for several years **(5th ACM)**
- ✓ CAPE Unit and VLPU representatives should work closely to ensure that the programmes are integrated – **(5th and 6th ACM)**
- ✓ There is need to continue the strong support to PACE member countries at institutional level in the field of legislation, privatization of veterinary activities and training and organization of farmers in compliance with OIE standards – **(7th ACM)**
- ✓ all other units cross link and assist VLPU in the re-organization of the veterinary systems as this is the key element for strengthening veterinary services – **(8th ACM)**

.*Re-organization of veterinary services and privatization*

AC recommended that:

- ✓ The current situation is evaluated by an independent consultant to assess the quality and availability of services delivered to livestock breeders, sanitary mandates should also be evaluated **(5th ACM)**
- ✓ PEU prepares the AU/IBAR policy for animal health for submission during the next OAU Conference of Ministers **(5th ACM)**
- ✓ PCU/CS continue supporting community-based animal health workers (CAHWs) only in Rinderpest control until the conditions under which the serve are determined in their countries **(9th ACM)**
- ✓ The organizers of the seminar in N'djamena in 2006 that will address the issue of questionnaires to be used on compliance of veterinary services to international standards on quality and the role of farmers in surveillance invite chief veterinary officers from Africa to the meeting **(11th ACM)**

6.4.3.The African Union/Interafrican Bureau of Animal Resources (AU/IBAR)

- ✓ The AC was concerned about the decline in the size of professional staff of AU/IBAR and the delay in appointing a permanent Director, adding that the situation could have a negative impact on the implementation of the PACE Programme and also slow down the capacity of AU/IBAR to fill the posts of Technical Assistants created under the PACE Programme and the Pan African Veterinary Vaccine Centre (PANVAC). The AC emphasized that these appointments, according to the Financing Agreement, are necessary to sustain the PACE Programme **(4th ACM)**

Concerning AU/IBAR, the AC recommended that:

- ✓ A consultant is contracted to look at the modalities for incorporating the PACE Programme counterparts into AU/IBAR as part of a wider plan for evaluating the long-term human resources needs of AU/IBAR **(5th ACM)**
- ✓ AU/IBAR should supply the AC with written progress reports for the future before the meetings **(5th ACM)**
- ✓ AU/IBAR should contract an external evaluator to appraise PCU support staff to improve staff performance to international levels – **(7th and 8th ACM)**
- ✓ AU/IBAR should contract an external evaluator to appraise PCU support staff to improve staff performance to international levels – **(7th and 8th ACM)**
- ✓ AU/IBAR should be requested to confirm that it will maintain the essential personnel for the epidemiology part of animal health (4 officials) after October 2004 to ensure the future sustainability of IBAR, maintaining essential staff and appoint a permanent Director – **(8th ACM)**

- ✓ Functions within the terms of reference contained in the financial agreement between AU/IBAR and the main donor, and any warranted changes should be agreed upon between the two parties (9th ACM)

6.4.4. PACE National Programme Activities

National Level Activities

At the national level, the AC recommended that:

- ✓ PACE activities at national level should be launched urgently **(1st ACM)**
- ✓ critical milestones, criteria and performance indicators should be should by PCU as outputs and outcomes for subsequent meetings **(1st ACM)**
- ✓ PACE national programmes remain focused through effective leadership linked to matrix management approaches **(4th ACM)**
- ✓ a situational analysis of PACE national programmes is conducted to help IBAR and participating countries to start owning the programme **(4th ACM)**
- ✓ presentations made by country teams should focus more on activities of the country programme rather than coordination problems **(10th ACM)**
- ✓ more weight is given to the criteria relating to the evaluation of national budgets for the sustainability of epidemiological surveillance systems **(12th ACM)**

Project proposals

They AC also recommended that the PACE Coordination Unit (PCU) identifies critical areas in the project proposals that will lead to practical results. The AC recommended that all proposals should:

- ✓ timed and linked to the OIE pathway **(1st ACM)**
- ✓ contain a summary of information following the guidelines suggested by the EC **(1st ACM)**
- ✓ include national contributions, provided in a standard format that has been developed and supplied by PCU **(1st ACM)**
- ✓ be sent to the members, three weeks before the next meeting

On examining the project proposals, the AC recommended that:

- ✓ projects should be focused on outcomes and impact and are not activity driven **(1st ACM)**
- ✓ outcomes critical to achieving the overall objectives of the PACE programme are emphasized **(1st ACM)**
- ✓ describe appropriate involvement of the private sector and livestock farming communities **(1st ACM)**
- ✓ take account of cross-border ecosystems and provide evidence that issues arising from such ecosystems and the control of transboundary diseases **(1st ACM)**
- ✓ country proposals should be presented for formal consideration only after they have been fully endorsed by the PCU **(2nd ACM)**
- ✓ must include wildlife, disease monitoring and sero-surveillance activities, especially in their budgets proposals. **(2nd ACM)**
- ✓ Country project proposals from Ethiopia, Eritrea, Mali, Guinea Conakry, Senegal, Niger and Rwanda were accepted with minor modifications as discussed **(1st ACM)**

On analyzing the country proposals during the 2nd ACM, the members advised that:

- ✓ Proposals for Mauritania, Cote d'Ivoire, Togo and the Republic of Central Africa are accepted

- ✓ Proposals for Burkina Faso, Benin, Cameroon, Kenya, Chad and Tanzania are accepted with some modifications
- ✓ Chad should clarify certain issues before the proposal is accepted
- ✓ Uganda, Somalia and Sudan were not accepted as presented; they needed to be reviewed, changed and re-submitted to the AC
- ✓ Djibouti project should be given a high priority and will be reviewed during the next AC meeting
- ✓ Ghana, Gabon and Gambia need major review
- ✓ Nigeria, Guinea Bissau, Congo-Brazaville and DRC need to be developed further
- ✓ Burundi, Sierra Leone and Liberia could not be considered currently **(2nd ACM)**

Consolidated Country Work Plans and Cost Estimates

The AC recommended that:

- ✓ The PCU:
  - o Identifies alternative means for organizing the consolidation of country work programmes
  - o Explores the possibility of greater flexibility to respond to urgent project needs
  - o Strengthen the consolidated work plans and cost estimates to undertake monitoring and evaluation of the country work plans **(6th ACM)**
- ✓ The Kenya National PACE Programme's component of the fight against Rinderpest is crucial to the eradication programme and should be assisted to complete the consolidated work programme **(6th ACM)**
- ✓ PCU must encourage all countries to provide progressive reports to the epidemio-surveillance network as detailed in the financial agreement **(6th ACM)**
- ✓ PCU makes special effort to promote information exchange and regular dialogue and provide appropriate advice to assist countries preparing their work plans **(7th ACM)**
- ✓ PCU should evaluate the work plans to ensure that excessive and unrealistic budgetary forecasts are not included **(7th ACM)**
- ✓ The budget constraints for the regional component of the programme should be considered and priorities drawn to focus on essential activities **(7th ACM)**
- ✓ The Regional Authorizing Officer (RAO), the Financial Controller and the various common services (CS) are encouraged to streamline the commitment of resources for national work plans **(8th ACM)**
- ✓ Countries are provided with maximum figures before preparing their work plans **(8th ACM)**
- ✓ EU examines the suggested alternative consolidation process of the work plans and consults the 30 EU country delegations about it to access the potential alleviation of administrative burdens **(8th ACM)**
- ✓ A number of basic principles on the national projects monitoring table as a management tool should be considered if it is to become a key analytical tool for choices for the extension of the PACE Programme **(8th ACM)**

Project management

- ✓ The AC noted that a few countries had not shown any significant interest in the PACE Programme and recommended that:
  - o The Democratic Republic of Congo is given a deadline of a few months to resume epidemiological surveillance before the funds allocated to the country is withdrawn
  - o Provisions of resources from national components from certain countries are reconsidered, while Liberia and Sierra Leone are de-commissioned

- Funds for Equatorial Guinea, Gabon and Congo are kept at a minimum to allow them to progress along the OIE pathway for accreditation of freedom from Rinderpest and Rinderpest infection
- The corresponding application for drawing rights will determine the amounts available in each country during the extension and this is part of the rider to the financing agreement **(9th ACM)**

✓ The audit of national programmes be financed in all cases as required by the EU delegation **(9th ACM)**

Project evaluation

The AC recommended that:

✓ the expanded criteria for project evaluation should be finalized and used in all subsequent evaluations to harmonize standard being set by the PCU and the AC **(1st ACM)**

✓ the number of country programme evaluations presented during AC meetings should be more **(11th ACM)**

✓ appropriate consultants capable of carrying out evaluations are nominated and they could suggest appropriate tools to publicize the achievements of the PACE Programme and also highlight the positive experiences **(12th ACM)**

Performance indicators

AC recommended that:

✓ clear distinction is made between performance indicators that will be used to monitor progress at programme and at national levels **(1st ACM)**

Project implementation

The AC recommended that:

✓ National contribution for the implementation of the PACE Programme is emphasized and must be continually assured as one of the most significant factor for sustainability **(3rd ACM)**

✓ To analyze the PACE national programmes, it receives analytical reports of the same to help the PACE member countries to start owning the programme and find sustainable solutions **(4th ACM)**

✓ Training funds are allocated to initiate regional training activities **(4th ACM)**

✓ PACE addresses the low uptake of funds at national level **(4th ACM)**

✓ The PACE-led delegation and PCU ensures proper information exchange and regular dialogue to ensure rapid commitment and disbursement nationally **(6th ACM)**

✓ EC speeds up the process of committing funds **(6th ACM)**

✓ Cost/benefit analysis of the impact of PACE on improving animal disease control methods is implemented to demonstrate the interest of the sectoral approach adopted by the PACE Programme **(10th ACM)**

PACE research

The AC recommended that:

✓ Research needs should be identified and addressed immediately through the research identification meetings proposed by PCU. The following areas should be addressed:
- Research capacity building throughout the region
- Possibility of conducting research through linkage between world reference laboratories and African scientists on a revolving fellowship system **(1st ACM)**

✓ That research priorities developed for Rinderpest should also be done for contagious

proposals formulated on the two diseases should be submitted to world reference centres immediately **(3rd ACM)**

- ✓ PACE completes to complete the targeted research on Rinderpest and CBPP and the agreement with the Pirbright laboratory to perform Rinderpest research **(5th ACM)**

6.4.5. Control of Epizootics

Epizootic Diseases – general

The AC recommended that:

- ✓ PCU takes a proactive role in developing disease management strategies for the PACE Programme, in the sub-regionally and region, for example the strategy for the control of lineage II Rinderpest **(2nd ACM)**
- ✓ PACE stays focused on the diseases highlighted in the financial agreement (Rinderpest and CBPP) given the financial constraints but epidemiological surveillance of diseases with important trade implications can be conducted at country level **(6th ACM)**

Control of Rinderpest

- *Global Rinderpest Eradication Programme (GREP)*:
  The AC recommended that:
  - ✓ PCU should examine the portfolio of research needs prepared by GREP and the CBPP consultative groups **(2nd ACM)**
- *Action in Somalia and Sudan in relation to Rinderpest eradication:* The AC recommended that:
  - ✓ control and eradication of Rinderpest from Southern Sudan and Somalia should receive the highest priority and this should be reflected in the action plans and the allocation of resources. **(4th ACM)**
  - ✓ Regional reference laboratory for Rinderpest at KARI Muguga in Kenya should be financed to provide diagnostic support for these important Rinderpest surveillance activities **(4th ACM)**
- *Rinderpest lineage II:* The AC pointed out that recent outbreak of Rinderpest lineage II virus in Kenya provided a valuable test of how the PACE Programme has functioned in the face of an enteritis/stomatitis incident and recommended that:
  - ✓ A document discussing the risks from this mild form of the virus and the response to the incident is prepared and disseminated **(5th ACM).**

- *The Somali pastoral ecosystem and pastoral communities in the Kenyan provisionally Rinderpest disease free zone/ SERECU*
  The AC recommended that:
  - ✓ AU/IBAR views this as priority and allocates resources for Rinderpest eradication in Kenya, Somalia and Ethiopia **(6th ACM)**
  - ✓ PCU explores possible opportunities to speed up actions in the Somali Ecosystem and other areas of concern in Kenya **(6th ACM)**
  - ✓ Three strategies : Search, detection and elimination by vaccination; focused mass vaccination in areas of endemic maintenance; and risk-based vaccination are considered as a continuum of activities pending an improved understanding of the epidemiology of Rinderpest in the Somali ecosystem and recommended the participation of the PACE-Somalia and PACE – Kenya at the next AC meeting and the receipt of the mid-term review report of the PACE-Somalia project **(8th ACM)**

- ✓ Inputs from the Communications Unit are sought to produce the necessary information and publicity material on the Somali eecosystem and eradication of Rinderpest **(8th ACM)**
- ✓ using marker vaccines under the described strategies must also be based on results obtained in forthcoming studies addressing the efficacy of PPR vaccine against Rinderpest infection and the reliability of discriminatory assays **(8th ACM)**
- ✓ AU/IBAR needs to develop a funding strategy for the eradication of Rinderpest from the Somali ecosystem **(8th ACM)**
- ✓ A specific sub-project of PACE is elaborated and included in the programme of the extension as a first of a four year eradication programme in the Somali ecosystem, linked to PACE-Somalia and guided by AU/IBAR and FAO-GREP **(9th ACM)**
- ✓ An immunosterilization strategy using the currently approved Rinderpest vaccine and eventually the PPR vaccine, when approved, is started as soon as possible by accelerating the preparatory phase **(9th ACM)**
- ✓ elucidate the Rinderpest – like syndrome detected in Kenya and Ethiopia with expertise and diagnostic support and support for additional study, probably by FAO **(9th ACM)**
- ✓ accelerate the PPR trials and mobilize funds for the four-year Somali ecosystem programme **(9th ACM)**
- ✓ Rinderpest eradication is considered an international public good and should not be linked with cost recovery mechanisms and an external audit on the delivery systems should be conducted **(10th ACM)**
- ✓ samples collected during any survey in the Somali Ecosystem is sent to the OIE/FAO Reference laboratories (IAH, Pirbright, UK and CIRAD-EMVT, Montpellier, France) without delay **(10th ACM)**
- ✓ the justifications and the organization of the Somali Ecosystem Rinderpest Eradication Unit (SERECU) and its activities are endorsed **(10th ACM)**
- ✓ the PCU should complete the programme estimate and submit it to the EC delegation for endorsement to enable SERECU to start by 1 Nov 2005 **(11th ACM)**
- ✓ the contract to appoint the TA Epidemiologist to SERECU should be finalized **(11th ACM)**

- *Southern Sudan*: The AC recommended that:
  - ✓ A post-PACE programme on a mid-term basis is maintained to confirm the present free status of Rinderpest to avoid virus resurgence and circulation **(10th ACM)**
  - ✓ Financial support for the continuance of PACE activities in Sudan is secured **(10th ACM)**
- *Evaluation of country dossiers for freedom from Rinderpest*

Five PACE member countries were unable to submit their dossiers in time for evaluation and recommended that:

- ✓ The OIE Director General requests the Scientific Commission to accept an electronic evaluation of those dossiers by 15 November 2005 **(11th ACM)**

- *Rinderpest vaccine*: The AC recommended that:
  - ✓ Until a more acceptable vaccine is available, the PACE Programme initiates a research programme on the utilization of the PPR vaccine in cattle **(7th ACM).**
  - ✓ The stock of Rinderpest vaccine in PACE member countries are placed under government or PACE control **(7th ACM)**
- *Emergency response to Rinderpest*: The AC advised that AU/IBAR to:

- ✓ AU/IBAR develops an internal emergency response plan and also encourages all countries to design the same **(4th ACM).**
- ✓ AU/IBAR should develop an emergency plan for countries that do not have the National authority to prepare such a plan **(4th ACM)**
- ✓ PCU and OIE to develop an interim mechanism for an initial response in case of a Rinderpest outbreak in a country where there is no approved official emergency response plan **(4th ACM)**

- *Success of OIE pathway as Performance Indicator for the PACE programme:* The AC advised that:
  - ✓ countries that have advanced along the OIE pathway to freedom from Rinderpest disease or infection are encouraged to prepare the necessary reports to apply to the OIE for declaration of disease/infection freedom **(4th ACM)**
  - ✓ the possibility of using the progress along the OIE pathway as a performance indicator for the PACE programme should be determined during the mid term review **(4th ACM)**
  - ✓ other PACE units, in addition to the Epidemiology Unit, should include active support for assisting countries to progress down the OIE pathway to Rinderpest freedom **(4th ACM)**
  - ✓ the PACE Programme sends a document to the OIE suggesting changes to be brought to the OIE Teresstial Code **(8th ACM)**
- *Final eradication of Rinderpest*: The AC recommended that:
  - ✓ international donors community is urged to provide the necessary resources to implement a new project focused on ensuring the final eradication of Rinderpest **(12th ACM)**

Control of Bovine Pleuropneumonia (CBPP)

The AC recommended that:

- ✓ The PCU considers the possibility of assigning full-time for CBPP to one of the epidemiologist at the PEU, a greater coordination and the development of plan of action for progressive control of CBPP and research on CBPP vaccines and quality control programmes **(6th and 7th ACM)**
- ✓ Systematic studies on various strategies to control CBPP are carried out based on abattoir findings and the use of vaccines of proven vaccines and the creation of free zones with stringent norms complying with OIE and the results are discussed during the next ACM **(8th ACM)**
- ✓ Since CBPP will become one of the most important animal diseases to control in Africa after Rinderpest, each affected country should make an economic analysis of the control measures in the local context, considering cost-effectiveness and the general recommendations of the AC building on the established surveillance networks **(9th ACM)**
- ✓ Inter-laboratory system with quality assurances be created to verify the seological results of CBPP (**10th ACM)**

Avian Influenza

The AC recommended that:

- ✓ AU/IBAR works with within the FAO/OIE GF-TADS and Alive mechanisms to seek financial support for such activities as emergency preparedness, disease recognition and control of zoonoses, especially avian influenza **(11th ACM**)
- ✓ PACE should play a key role in the control of avian influenza by reallocating resources including emergency funds from OIE and contingency funds, nationally and regionally **(11th ACM)**

- ✓ Eu considers using part of the money pledged within Alive to top up the current funding to ensure regular supply of vaccines **(12th ACM)**

Marker vaccines

The AC:

- endorsed the recommendation by USAID that an independent evaluation of the available Rinderpest recombinant vaccine **(5th ACM)**
- recommended the need to raise awareness of regulatory authorities dealing with the issues, such as use of genetically modified organisms before a vaccination programme **(6th ACM)**
- is convinced that the issue of marker vaccines in veterinary is sensitive and has political consideration and the matter should await pending recommendation from GREP **(7th ACM)**

PPR Vaccines

The AC:

- ✓ noted that a consensus protocol for experimentation has been designed and agreed by FAO, IAEA, Centre International pour le Recherche Agronomique pour le Developpement, Departement d'Elevage et Medecine Vétèrinaire Tropicale (CIRAD-EMVT) and the World Reference Library (WRL) for Rinderpest at Pirbrigh and recommended that if the protocol is agreeable to the PCU, the experiment should be conducted soon at Muguga jointly coordinated by the WRL and CIRAD-EMVT with the assistance of two experienced veterinarians selected jointly by the Kenya Agricultural Research Institute (KARI) and AU/IBAR and the report is made available to all interested parties **(8th and 9th ACM)**
- ✓ recommended that homologous Rinderpest vaccine is used to control further outbreaks **(9th ACM)**
- ✓ recommended that the test of PPR as a marker vaccine for Rinderpest proceeds as planned **(10th ACM)**
- ✓ given the delays that in the scientific protocols designed for studies on possible use of PPR vaccines to protect cattle from Rinderpest and the withdrawal of KARI's designation to act as the executing institution for these studies, the AC recommended that all remaining funds allocated to the project are channeled through PCU and subsequently to Muguga and that KARI considers giving priority to the innocuity tests of PPR vaccines in cattle and OIE is made aware of the results by December 2005 **(11th ACM)**
- ✓ experimental trials on the use of PPR vaccines against Rinderpest are repeated because they are inconclusive, the management is strengthened, and funds made available for full time expert **(12th ACM)**

Epidemiological Surveillance

The AC recommended that:

- ✓ Veterinary services should focus on establishing regular and sustainable surveillance programmes that focus on the main epizootic diseases and can identify epidemics quickly **(2nd ACM)**
- ✓ The need for declaration to the OIE of List A disease status should be discussed as part of the objectives of the financing agreement **(2nd ACM)**
- ✓ some countries are identified for initiating a quality assurance programme for animal disease surveillance **(4th ACM)**

- ✓ PACE encourages countries that can submit their dossiers for recognition of freedom from Rinderpest to the OIE with their emergency preparedness plans **(6th ACM)**
- ✓ The PEU should produce a mutually agreed protocol for epidemiological surveillance and identifying the support that these networks will require **(6th ACM)**
- ✓ Countries adjust their operations to realistic levels during the remaining period of the PACE Programme to sustain epidemio-surveillance **(8th ACM)**
- ✓ Rinderpest testing networks are re-activated and that annual meetings are held to give regular updates in specific laboratory techniques and external quality assurance programmes in the serological testing of Rinderpest **(8th ACM)**
- ✓ Diagnostic samples for surveillance are submitted directly to the World Reference Laboratories for Rinderpest to minimize chances of degradation and contamination **(9th ACM)**
- ✓ PACE member countries requests their governments to ensure that relevant recommendations made during the recent workshop on epidemiological surveillance networks is implemented **(9th ACM)**
- ✓ On national and regional laboratory support for diagnosis and surveillance, the AC recommended that:
  - o AU/IBAR contact reference laboratories to produce reference materials for key diseases to be used in implementing the EQA exercise
  - o Every effort is made to persuade national authorities to invest in modern laboratory facilities and training programmes to achieve accreditation
  - o AU/IBAR fosters contacts with other development programmes assisting African laboratories, such as UNIDO in West Africa to request for assistance **(10th ACM)**
- ✓ That PCU highlights the role of farmers as key players in the surveillance of animal diseases **(11th ACM)**
- ✓ On cost benefit analysis and sustainability of epidemio-surveillance programmes, the AC recommended that:
  - o A consolidated but concise report on cost benefit analysis of animal disease surveillance and control is represented to AU ministers of agriculture during the meeting in Kigali, Rwanda in November 2005
  - o Future studies on cost benefit analysis by AU/IBAR and PACE include more countries and sub-regions
  - o A clear distinction is made between fixed costs and margina costs of epidemiological surveillance networks **(11th ACM)**
- ✓ The AC recommended that more weight is given to the criteria relating to the allocation of national budgets for sustainability of epidemiological surveillance systems (ESS) **(12th ACM)**

Wildlife surveillance

The AC recommended that PCU initiates the following activities:

- ✓ OAU/IBAR prepares letters to chief veterinary officers informing them of results of the AWVP **(2nd ACM)**
- ✓ Emphasizes the importance of wildlife surveys for assurance of freedom from Rinderpest to national authorities **(2nd ACM)**
- ✓ Ensures that PACE country proposals include wildlife, disease monitoring and sero-surveillance **(2nd ACM)**

Other recommendations of the AC are that:

- ✓ Wildlife surveillance continues as an essential component and a strong balance with livestock surveillance for practical epidemiological studies **(3rd ACM)**

- ✓ Mid-term review should examine possible approaches to continue wildlife epidemiology in the second half of the programme and also the extension of long-term technical assistance **(4th and 5th ACM)**
- ✓ Rinderpest surveillance in wildlife surveillance programmes in eastern and Central Africa is sustained until the end of the PACE Progamme **(6th ACM)**

Laboratory Support

The AC recommended that:

- ✓ Adequate provisions for regional and laboratory support must be ensured **(1st ACM)**
- ✓ Support to laboratories must be a strong component of the programme and countries lacking functioning laboratories must be encouraged to collaborate with neighbouring countries with these facilities to facilitate testing sera from sero-survei illance programmes **(3rd ACM)**
- ✓ Suspected Rinderpest clinical samples should be sent directly to the World reference Laboratory (WRL) for Rinderpest in the UK **(3rd ACM)**
- ✓ Countries should have sample submission kits from the Joint Division FAO/IAEA as part of emergency preparedness **(3rd ACM)**
- ✓ International specialised research and diagnostic laboratories should be used to sustain PACE objectives, especially submission of diagnostic samples to the WRL at Pirbright for Rinderpest or the Reference Laboratory at CIRAD-EMVT in France **(4th ACM)**
- ✓ PACE urgently determines viable alternative mechanisms to support regional laboratories in Kenya, Cote d'Ivoire and Senegal and that opportunities that are available through the IEA technical co-operation are maximised **(5th ACM)**
- ✓ PACE, through IAEA provides materials and equipment to meet the urgent deficit at the Muguga Regional Reference Laboratory for Rinderpest **(6th ACM)**
- ✓ A contractual arrangement between AU/IBAR/PACE and KARI is established to monitor performance **(6th ACM)**
- ✓ PACE establishes contingency plans to ensure that sera from sero-surveillance in Kenya, Somalia and Southern Sudan are tested immediately **(6th ACM)**
- ✓ Country support for diagnostic laboratories must continued and these should be monitored by PACE **(6th ACM)**
- ✓ **The** support of diagnostic laboratories continues to be considered in the national work plans **(7th ACM)**
- ✓ The PEU considers its future workplans, the implementation of quality assurance of diagnostics laborities, one of the guarantees of providing confident and reliable results acceptable by the OIE **(7th ACM)**
- ✓ PCU ensures that the terms of reference of the MOU between AU/IBAR and the three regional laboratories (KARI-Muguga; LANADA – Bingerville and ISRA-Dakar are respected by all parties and that these laboratories should develop emergency plans **(7th ACM)**
- ✓ AU/IBAR Director discusses the poor performance of the KARI-Muguga laboratory with the KARI administration and, possibly with the Minister of Agriculture and also insist that the facility adopts a proper code of conduct applicable to regional diagnostic laboratories **(8th ACM)**
- ✓ The Rinderpest testing network is re-activated and that annual meetings are held for regular updates on specific laboratory techniques and external quality assurance programmes in serological testing for Rinderpest **(8th ACM)**
- ✓ Diagnostic samples are submitted directly to WRL for Rinderpest to minimize degradation and laboratory contamination **(9th ACM)**
- ✓ Until Muguga laboratory is revitalized and the contract linking the three laboratories in

testing at a marginal cost and that Kenya should investigate the possibility of hiring vets for serological testing **(9th ACM)**

- ✓ National authorities should be persuaded to invest in modern laboratory facilities and training programmes to be accredited to accepted quality standards **(10th ACM)**
- ✓ AU/IBAR should persuade national authorities to invest in modern laboratory facilities and training programmes to achieve accreditation to accepted quality assurance standards **(10th ACM)**
- ✓ AU/IBAR should foster contacts with other development programmes assisting African laboratories, such as UNIDO in West Africa **(10th ACM)**
- ✓ Laboratories organize workshops at the national level to inform or train field staff about sampling procedures and submission of samples to diagnostic laboratories **(11th ACM)**

The Pan African Veterinary Vaccine Centre (PANVAC)

The AC recommended that:

- ✓ OAU/IBAR continues to work with donors to ensure that the Pan African Veterinary Vaccine Centre (PANVAC) remains viable so that it can continue fulfilling its critical support role to the PACE Programme **(2nd ACM)**
- ✓ An independent expert from Africa is appointed to investigate the suitability of other laboratories to perform quality control tests on vaccines **(7th ACM)**
- ✓ In view of the important role expected from PANVAC and sustainability of its activities, the AU/IBAR Director should nominate one of the senior scientists under the new IBAR programme to be the Director of PANVAC, but working directly under him **(8th ACM)**
- ✓ EU considers providing operational expenses until December 2005 in case budgetary provisions are not finalized by the AU and also explore the possibility of experts being involved in laboratory activities to benefit PACE and AU/IBAR **(10th ACM)**
- ✓ AU/IBAR secures funds for recurrent and operational expenses to strengthen PANVAC's technical mandate as the only institution in Africa set up to carry out vaccine quality assurance educating laboratory personal on quality assurance and adherence to good laboratory and manufacturing practices **(11th ACM)**
- ✓ A study is conducted, before the end of the PACE programme, for an ambitious project that will enable PANVAC to fulfil its commitments for 5 to 10 years **(12th ACM)**

6.4.6. Extension of the PACE Programme

On extension of the PACE Programme, the AC recommended that:

- ✓ a consultant is contracted to review the recommendations of the mid-term review (MTR) report in the light of the comments made by PCU, and design a possible extension of the PACE Programme **(7th ACM)**
- ✓ PCU to seek authority from the EU Commission to use the project's contingency funds to extend PACE Programme's regional activities to October 2004 (**7th ACM**)
- ✓ that AU/IBAR liaise with the donors to urgently appoint a consultant to examine the technical aspects of the PACE Programme and to submit a final report before the end of the year **(8th ACM)**
- ✓ AU/IBAR should, in consultation with the donor appoint another consultant to review the economic and financial situation of the PACE Programme and to design an extension plan including re-allocating resources based on country performance and priority activities for animal disease surveillance and control **(8th ACM)**
- ✓ in accordance with Article 3.5.3 of the Special Conditions of the Financing Agreement,

epidemiology part of animal health (4 officials) after October 2004 to ensure the future sustainability of AU/IBAR **(8th ACM)**

- ✓ the appointment of a permanent Director of AU/IBAR should be a pre-requisite for an extension of the PACE Programme **(8th ACM)**
- ✓ on capacity building in AU/IBAR, special attention should be given to full documentation of the achievements of the PACE Programme during the forst five years, before November 2004 **(9th ACM)**
- ✓ current status on privatization of veterinary services, strategies for Rift Valley fever (RVF), contagious pleuro pneumonia (CBPP), Rinderpest lineage II and community animal health policies must be considered as final products of the first phase of PACE **(9th ACM)**
- ✓ the AU/IBAR website and other publishing media are considered instrumental in disseminating the contribution of the PACE Programme to rural development **(9th ACM)**
- ✓ PACE allocates resources for expatriates and local staff within new priorities of the extension phase, i.e. surveillance networks and Rinderpest eradication and AU/IBAR finances epidemiology and data management to backstop these priorities **(9th ACM)**
- ✓ Reallocation of funds within the PACE Coordination Unit (PCU) and Common Services (CS) will be focused on the following:
  - main TA (2 years)
  - the Financial Controller (2 years)

  For the Somali Ecosystem:
  - Veterinary Epidemiologist (2 years)
  - Wildlife expert (1 year)

  Contracts for staff directly under AU/IBAR:
  - Regional Coordinator (Bamako 2 years)
  - Epidemiologist (2 years)
  - Data Management specialist (2 years)
  - Accountant (2 years)
  - Laboratory specialist (1 and a half years)
- ✓ Contracts from some TAs under the GTZ contracts are extended in collaboration with the countries and regions concerned **(9th ACM)**
- ✓ African experts who have acquired significant expertise during the first five years of the PACE Programme may be considered favourably by the AU for recruitment In 2004/2005 **(9th ACM)**
- ✓ Strategic products/outcome of the PACE Programme at the regional level should be highlighted in relation to an outreach policy **(10th ACM)**
- ✓ PCU should speed up the preparation of the emergency preparedness plan for Somalia and other countries **(10th ACM)**
- ✓ At the end of the validity of the Agreement, the EU accepts that the Rinderpest emergency fund remains available until the end of the GREP programme for Rinderpest accreditation that is expected to end in 2010 **(10th ACM)**
- ✓ FAO explores the possibility of providing similar emergency funds for the PACE Programme **(10th ACM)**
- ✓ The activities of the Policy Committee are linked to other initiatives on animal health in Africa, such as the African Livestock (ALIVE) platform, the EU Technology Platform on Animal Health and the FAO/OIE Global Framework for the Progressive Control of Transboundary Animal Diseases (GF on TADS) **(10th ACM)**
- ✓ The next meeting of the Council of Ministers responsible for livestock development in Africa be apprised of the animal health activities to serve as an incentive for the

organization of a major conference of donors for livestock development and the GT – TADS meeting in February 2006 **(10th ACM)**

- ✓ The post of political advisor for community-based animal health workers (CAHWs) is retained **(10th ACM)**
- ✓ Funds that were ear-marked for the main epidemiologist is made available and supplemented, through FAO, AU/IBAR Agreement to provide for an advisor under SERECU **(10th ACM)**
- ✓ Support for some experts under the GTZ service contract should be renegotiated by a common agreement between AU/IBAR and the EC delegation to maintain the necessary expertise during the extension period **(10th ACM)**
- ✓ The PACE Programme should implement the external evaluation of national components in selected countries because the final evaluation of the programme will be built on these outcomes **(10th ACM)**
- ✓ Two seminars, one dealing with the role of livestock breeders in the surveillance network on animal diseases and the second one based on an evaluation tool to assess the conformity of veterinary services in Africa with OIE standards, should be held under the aegis of the OIE/IBAR/FAO to reorganize veterinary services **(10th ACM)**
- ✓ The terms of reference (TORs) for the assessing personnel paid by EDF resources should be established jointly by EDF and AU/IBAR and be implemented immediately **(10th ACM)**
- ✓ that a cost/benefit analysis of the impact of PACE on improvement of animal disease control methods be implemented as soon as possible to demonstrate the interest of the sectoral approach adopted by PACE (**10th ACM)**
- ✓ AU/IBAR submits a strong and persuasive document on the importance of veterinary services in their role in early detection and rapid response to outbreaks of major trans-boundary animal diseases during the meeting of ministers responsible for livestock that will be held in Kigali, Rwanda in Oct/Nov 2005 (this is in light of the outbreak of the highly pathogenic avian flu) **(11th ACM)**
- ✓ The outcome of the Kigali meeting is communicated, by AU/IBAR during the WHO/FAO/OIE/World Bank Conference on avian flu in Geneva, Switzerland in 7-9 November 2005, and also to the EU Commission **(11th ACM)**
- ✓ That AU/IBAR makes an urgent request to donors including EC and EU member states for the preparation of a continental programme for strengthening animal health capacities, taking account of PACE achievements, recommendations from the evaluation and international recommendations on the OIE/FAO on avian influenza prevention and control strategies post-PACE **(12th ACM)**
- ✓ The ALIVE platforms prepares a request to donors to support AU/IBAR, regional animal health centres and national veterinary services in sub-Saharan Africa (SSA) post-PACE while awaiting the implementation of the new programme **(12th ACM)**
- ✓ AU/IBAR and regional economic communities make appropriate contacts with concerned countries to plan for subsequent national commitments post- PACE **(12th ACM)**
- ✓ AU/IBAR organizes a meeting within the framework of the General Assembly of ALIVE, scheduled for October 2006 in Nairobi, Kenya where a broader community of donors will be invited **(12th ACM)**

7.0 Progress and Achievements in the Surveillance and Control of Rinderpest, CBPP, and other diseases

7.1 Introduction

Animal production in most countries in Africa is affected by transboundary diseases, which are the principal causes of low performance of the livestock sector in Africa. The quality of livestock products and the respect of the international trade recommendation are the pre-requisites for many African producers to export their products and therefore increase their incomes. Therefore, there is need for implementation of adapted strategies to avoid the risks in terms of public health and access to international markets. This challenge implicates the importance to strengthen production systems, animal health and trade systems, which can be improved through effective disease control and an effective and adequate veterinary service with a functional epidemiological surveillance system. The later is a good indicator of the efficiency of the veterinary services in a country. The existence of an effective surveillance system constitutes one of the pre-requisites for applications to the OIE for confirmation of disease statusn, no matter which disease is considered.

Among the most important transbouandary epizootics affecting livestock in Africa, it is relevant to mention Rinderpest, CBPP, FMD, ASF, RVF, Newcastle disease and HPAI. Particularly, the eradication of Rinderpest has been a major objective of the PACE and it had been the only case for the two preceding projects, JC-15 : Joint Project 15 (1962-1976) and the PARC, the Pan-African Rinderpest Campaign (1986-1999). The control of Rinderpest on the African continent also fits into the world-wide objectives of the Global Rinderpest Eradication Program (GREP) coordinated by FAO and which aims at the world-wide eradication of Rinderpest by the year 2010.

7.2 History and Background of the Fight against Rinderpest in Africa

When Rinderpest was introduced to Africa in the late 19th Century, the pandemic killed up to 90% of cattle and other susceptible wildlife species. The disease has plagued the African continent since then due to the presence of large numbers of domestic and wild animals, the inadequacy of veterinary services, nomadic husbandry practices and insecurity. Concerted action to eradicate the disease, commencing with the "Joint Project 15", implemented by the OAU/IBAR in the 1960s and 1970s followed by the Pan African Rinderpest Campaign (PARC) in the mid 1980s and the Pan African Control of Epizootics (PACE) in the late 1990s, succeeded in eradicating Rinderpest from most of Africa with the exception of the so called mild strain of the virus in the "Somali Eco-system", an area of land that encompass South East Ethiopia, North East Kenya and Southern Somalia.

The Pan-Africa Programme for the Control of Epizootics (PACE) which is in its final phase (November 1999 to February 2007) was conceptualized to build on the headway made by the Pan African Rinderpest eradication programme (PARC) (1986 to 1999) in the campaign against Rinderpest. The PARC has lasted from 1986 to 1999 and has been co-financed by the European Community. Itself, the PARC has been a follow up of the Joint project 15 (JP15) (1962 to 1976) also aimed at fighting the Rinderpest in Africa. All those actions have already done a great deal to improve health security by combating Rinderpest, one of the most devastating contagious diseases of cattle.

Taking advantage of Pan-African Rinderpest Campaign (PARC) achievements, a fundamental

establishment of effective surveillance systems for animal diseases in 30 countries involved in the programme. Such surveillance is essential for an effective veterinary service in any country as is indicated by the requirement for adequate disease reporting (OIE, 2002). Thus without effective surveillance for important animal diseases, particularly those that affect trade in livestock and livestock products, human health or the economics of animal production, a veterinary service will not be considered reliable. Increasingly, the World Organization of Animal Health (OIE) provided a mechanism whereby member countries may apply for recognition of freedom from specific diseases, such as Rinderpest, foot and mouth disease (FMD), contagious bovine pleuro-pneumonia (CBPP) and bovine spongiform encephalopathy (BSE). In order to apply successfully it is necessary for the country concerned to demonstrate, irrespective of the requirement for individual diseases, that it has an effective veterinary service which, as already indicated, includes an effective surveillance system. Consequently, all applications for freedom from disease need to be supported by surveillance data. For this reason, in the context of globalisation the establishment of surveillance system has become a priority for veterinary services in countries, which would like to take part in the international trade of livestock and animal by-products.

In particular, Rinderpest eradication is a global objective and the African Union / Inter African Bureau for Animal Resources (AU / IBAR), through the Pan African Programme for the Control of Epizootics (PACE) has been for 7 years spearheading its eradication in the African continent.

7.3 Strategies for Fighting Rinderpest

At the beginning of the PACE programme, Rinderpest was still present in two endemic reservoirs in the cattle of pastoral communities: Rinderpest lineage 1 was in Southern Sudan and lineage 2 was in those parts of Somalia, Ethiopia and Kenya identified as the Somali Ecosystem. These could act as the source for epizootic extensions of the disease into normally free areas. In these conflict areas the disease attracted little attention and control operations were difficult to undertake.

At the end of the Pan African Rinderpest Campaign (PARC), the strategy of mass vaccination against Rinderpest was being discarded to be replaced by a programme of surveillance using techniques of participatory disease search and participatory epidemiology and by random sample sero-surveys. Where Rinderpest was diagnosed, localised, intensive vaccination campaigns (so called immuno-sterilisation) were undertaken. In conflict areas these were undertaken by CAHWs, trained and managed by NGOs, some of whom, in turn, were supported financially by PACE.

Besides the OIE pathway for which PACE is encouraging countries to follow, the programme has developed a certain number of activities contributing all to completely get rid of Rinderpest from the continent.

7.3.1 The OIE pathway for the status of freedom from Rinderpest infection

The 'Office international des Epizooties'(OIE) has developed a set of procedures for proving that a country is free from Rinderpest infection (the so called OIE Pathway). Countries are encouraged to follow the different steps of the OIE Pathway so that the possibility that occult reservoirs of Rinderpest infection remain is removed.

In Accordance with the Chapter 2.1.4 (Rinderpest) of *OIE International Animal Health Code*, Appendix 3.8.1 (essence of the system) and its article 3.8.1.2, there are two ways to get recognition of freedom from infection. The classical way consists of the following steps: provisionally free, freedom from

disease and then from infection. The short way, on the other hand, is only applicable in the case of freedom from disease and infection on historical basis.

The case where a country is recognised historically free

A country maybe recognized free from infection without formally applying a specific surveillance program when (i) there has never been an occurrence of the disease; or (ii) disease eradication has been achieved or (iii) the disease/infection has ceased to occur for at least 25 years, provided that for at least the past 10 years, and to the present:

- It has been a notifiable disease
- An early detection system has been in place
- Measures to prevent disease/infection introduction have been in place
- No vaccination against the disease has been carried out
- Infection is not known to be established in wildlife

These rules are applicable to PACE Countries, which had stopped vaccination against Rinderpest in 1979/1980.

Country where the last occurrence has previously happened between 10 and 25 years

For countries that have achieved eradication or in which disease/infection has ceased to occur between 10 and 25 years previously, in addition to the above-mentioned conditions, appropriate specific surveillance must have been applied to demonstrate the absence of the agent. This can be applied to PACE countries, which ceased vaccination against Rinderpest between 1979-1980 and 1994/1995.

Country with the last occurrence within the past 10 years

Countries that have achieved eradication within the past 10 years or in which the disease or infection has ceased to occur should follow the specific disease surveillance requirements or the general guidelines for surveillance outlined in the Terrestrial Code. This can be applied to the PACE countries, which stopped vaccination against Rinderpest in 1994/1995.

Through surveillance and reporting activities developed by PACE, and with help from PEU and PACE technical assistance to prepare dossiers for presentation to OIE, countries have been enabled to follow the OIE pathway to accreditation of freedom from disease and infection.

7.3.2 Other activities on Rinderpest eradication

In order to eliminate Rinderpest completely from the African continent and to contribute in setting a sustainable mechanism for opposing any serious threat to animal health, the PACE programme has adopted a very strong strategy made of different components. The organisation of the programme itself was designed to get close to the member countries and be able deliver immediate assistance in fulfilling the objectives. Beside the coordination unit established in Nairobi, Kenya, two regional units were created in respectively again Nairobi for the countries of east Africa and Bamako for west and central African countries. Due to the results of the previous fight against the Rinderpest and to the necessity to get a full benefit of this previous work, it was established a cordon sanitaire covering Chad, CAR and Southern Sudan to keep away any possibility of recontamination of the cleaned area.

7.3.2.1 Epedemio-surveillance networks (systems)

The epidemio-surveillance system and the network established in PACE member countries have been presented and widely discussed in other parts of this report. However since ESS has been one of the main strategic action undertaken by the PACE programme in combating Rinderpest and putting in place a solid barrier to help African countries react against the major epizootics, it was necessary to recall here the specific activities conducted.

To meet its objectives of enhancement of national capacities for delivery of epidemiological services, eradication of Rinderpest and assistance to member countries in the control of other major epizootic diseases, the PEU considered its first priority to be to establish or strengthen national disease surveillance systems. This has been achieved by utilising existing animal health delivery systems in each country for reporting disease information. These vary from country to country and at field level may comprise Government veterinary staff in stations in Districts (for example, in most East African countries), or auxiliaries at veterinary posts in prefectures reporting to Government or private veterinarians. In areas where there has been, or is, conflict, surveillance at field level may be undertaken by CAHWs and (as in Somalia) Livestock Professional Associations. Disease information collected by these individuals, is presented, either through monthly reports, or through disease incident reports, through a chain of communication, to regional, and eventually central veterinary authorities. This so-called passive surveillance system has been developed through training and communication strategies and by help with designing reporting formats relevant for each country.

In addition, PACE, guided by the PEU, has introduced and supported active surveillance whereby disease searching methodologies have been developed, using participatory techniques and random sample surveys. This has been achieved through development of mobile teams which travel from Headquarters, regional offices and veterinary laboratories. Also, with varying degrees of commitment and success between countries, collection of animal disease data is undertaken from veterinary laboratories, abattoirs and markets.

To assist and harmonise surveillance activities in the different countries PACE has undertaken much training and communication in disease surveillance. The epidemiologists have introduced a set of performance indicators which can be tailored to each country's requirements and allows them to monitor their surveillance activities. They also have designed a set of evaluation criteria which they can apply to assess and compare the surveillance systems of the different countries.

7.3.2.2 Emergency preparedness plans

One of the conditionality to access to Rinderpest emergency funds per financing agreement is that country should have an updated and approved by the Director of AU/IBAR emergency preparedness plan. To assist countries in development of contingency plans mission was undertaken by the OIE regional representative for Africa and the PACE Counterpart Epidemiologist in few countries from Western Africa for assessment of the current situation. Following this mission, a practical guideline for emergency preparedness planning was sent to countries in the region. From 11 to 15 February 2002 the workshop jointly organised by OAU/ IBAR/ PACE and IAEA on the emergency preparedness plan (EPP) and OIE pathway was held in Abidjan (Côte d'Ivoire). As a follow up of this workshop, all countries were requested to finalize their emergency preparedness documents and submit to OAU-IBAR for approval by March 2002.

In order to allow the PEU team to have a common opinion on an appraisal, an agreed document on criteria used by the PEU staff for appraisal of countries EPP was developed. This includes the following components:

- A legislative framework exists for enabling emergency responses outlined in the plan

submitted

- The document contains a coherent strategy (national policy) for dealing with the occurrence of Rinderpest and its eradication;
- At least a qualitative assessment of risk of Rinderpest incursion is contained in the document. This should be updated according to the new situation within the country or in the bordering countries
- A national disease emergency committee with the authority to act quickly and effectively is in place
- Rinderpest control expert team is trained and in place (available)
- An adequate plan for examination of Rinderpest suspect specimens and for serology is in place (capacity of national laboratory)
- A resource inventory (human, material and financial resources) is included in the document and is adequate for the strategies outlined
- There is provision for financing the strategies and actions outlined in the emergency plan including cost estimates of the scenarios envisaged incorporating the national and the regional (OUA/IBAR/PACE) funds available
- Means of communication are available between the principle role players involved in the emergency plan including plans for informing the general public
- A clear chain of command demonstrated between field operatives and central units exists (field, Director of veterinary service or other veterinary authority and laboratories)
- The emergency preparedness plan for Rinderpest should be approved by relevant national authority or should be submitted to the relevant national authority for approval)
- Realistic plans for access to a vaccine bank need to be included in the emergency plan
- Chronology of actions, which will be undertaken within the emergency situations (action plan)

To date, out of 26 countries, which have sent their emergency preparedness plans to PEU for comments, the Director of AU/IBAR has approved 12. A further six countries have finalised and submitted them to PEU for the Director of AU/IBAR approval.

For southern Sudan, in GoS-controlled areas, emergency preparedness planning was prepared through co-operation between GoS and FAO-OLS (Northern Sector). In SPLA-controlled areas, VSF-Belgium in co-operation with OLS (southern Sector) has developed an emergency preparedness plan.

Despite the failure to demonstrate persistence of Rinderpest in the Somali Ecosystem, a contingency plan and emergency preparedness is in place in case of a re-emergence of the disease in the Somali Ecosystem. 500,000 doses of thermostable Rinderpest vaccine are held for PACE at the Botswana Veterinary Institute and an emergency fund of 0.5 million Euro has been established under PACE and entrusted to the Office International des Epizooties (OIE) in Paris. This fund is to be used for control of a Rinderpest outbreak in a PACE country providing it has a national Rinderpest emergency preparedness plan approved by AU-IBAR and is progressing along the OIE pathway.

On the advice of the Advisory Committee, another strategy to deal with re-emergence of Rinderpest in PACE countries has been investigated: that was the use of PPR vaccine to provide cross protection against Rinderpest without interference with serological tests for Rinderpest antibody used to detect previous infection with wild Rinderpest virus. A vaccine trial at the

efficacy and safety in cattle of the PPR vaccine. The further trial recommended by the Advisory Committee to be conducted with support by a technical expert has not been able to be accomplished and should be pursued by SERECU.

7.3.2.3 Emergency Rinderpest vaccine stock

In order to prevent an eventual spread of Rinderpest in countries that have been declared provisionally free from the disease and to subsequently control any outbreak in the eastern African countries at risk and eventually where the disease is present, a strategy has been developed to establish a Rinderpest emergency vaccine bank. Therefore, the PACE Epidemiology Unit in relation with the PACE Coordination Unit (PCU) have initiated an advertisement in order to request all veterinary vaccine producing laboratories to present their bid for the supply of 500,000 doses of thermostable Rinderpest vaccines with the ultimate objective of establishing an emergency Rinderpest vaccine stock.

Applications were received only from Botswana Vaccine Institute (Pty) Ltd (BVI), Laboratoire National Vétérinaire (LANAVET), Kenya Veterinary Vaccines Production Institute (KEVEVAPI) and Laboratoire Central Vétérinaire du Mali (LCV). The PEU and the PCU have developed then some criteria to evaluate the bids received so far. The criteria and evaluations are presented in table 3 below.

Table 3: Criteria and evaluation

Supplier	*Quote received in time for consideration at the PACE Steering Committee Meeting*	*Able to supply thermostable vaccine immediately*	*Conditioning, storage and period of delivery*	*External Quality Control assessment*	*Price for dose (US $)*
Botswana Vaccine Institute	Yes	Yes	Delivery time: 48 hours-Storage free of charge	PANVAC 's accepted control	0.045
LANAVET	Yes	No (6 months)	Delivery time: 1 month	Batches do not always comply	0.0553 (approx., quote in FRF)
Kenya Veterinary Vaccine Production Institute	No	Yes	Delivery time: 2 weeks	Batches do not comply oftenly	0.0641 (approx., quote in KSH)
Laboratoire Central Vétérinaire Mali	No	Not stated	Delivery time: less than 10 days	Batches do not always comply	0.0346 (approx., quote in CFA)

In view of the above, it has been recommended that the Botswana Veterinary Institute (BVI) is the best suitable laboratory to supply the 500,000 doses of the thermostable Rinderpest vaccine to PACE. Therefore the PCU has been given the mandate to conclude the agreement for establishing a Rinderpest emergency vaccine stock with BVI. Consequently, this laboratory has been awarded the tender to produce and supply the thermostable Rinderpest vaccines to PACE when required. From January 2001, the emergency vaccine stock of 500,000 doses of thermostable Rinderpest vaccine was in place at the Botswana Veterinary Institute (BVI). The initial agreement in force was that, the BVI would store the vaccine and dispatch it to any destination in Africa on the request of the Director of AU-IBAR within 48 hours.

7.3.2.4 Emergency funds

An emergency fund of 0.5 million Euro is established under PACE and entrusted to the Office International des Epizooties (OIE) in Paris. According to the financing agreement the maximum

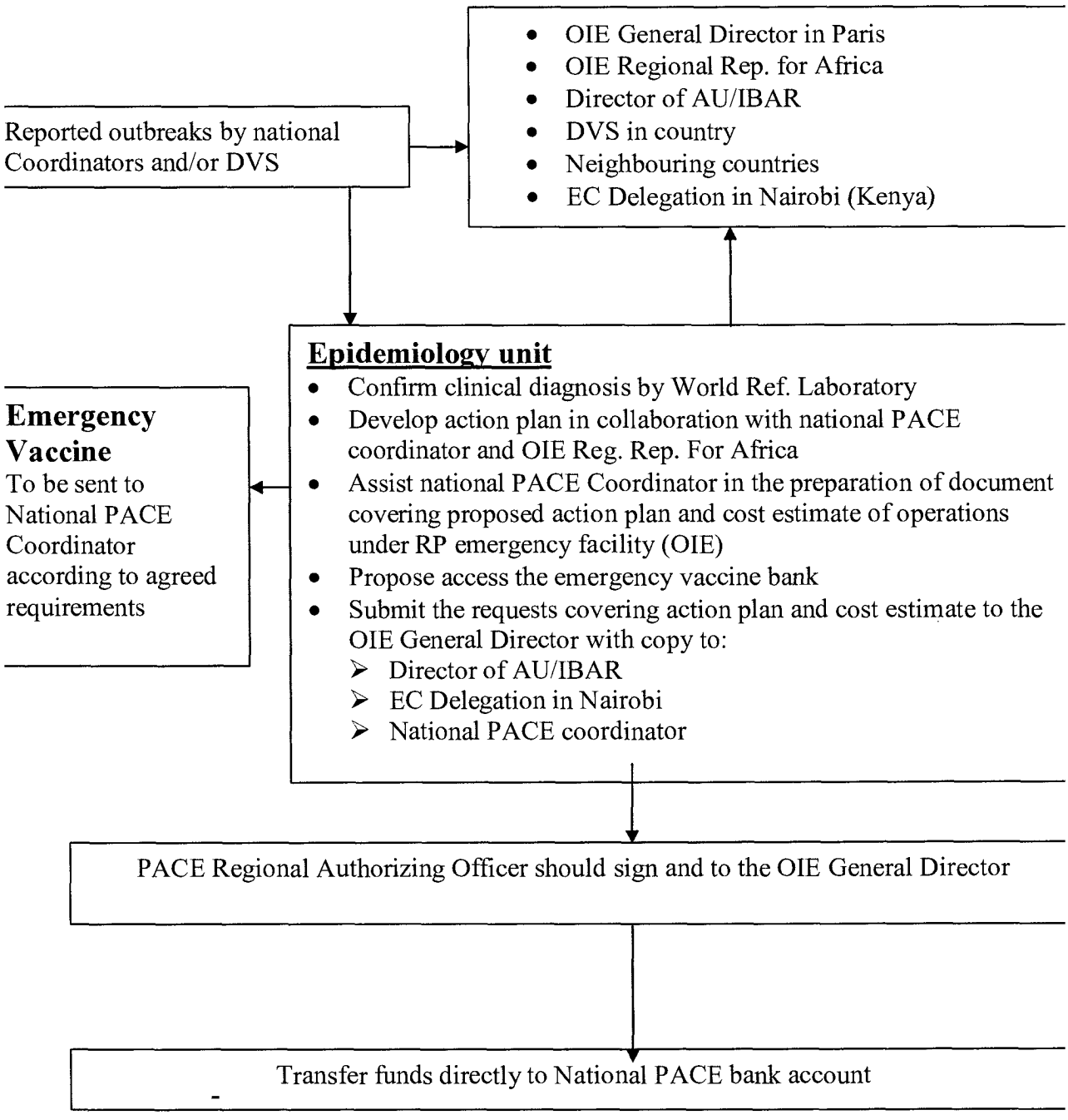
money in this fund would be used for the control of Rinderpest emergencies outbreaks in countries that satisfy the conditions listed below:

- Existence in the country of an updated national Rinderpest emergency preparedness plan approved by AU/IBAR
- Progress along the OIE pathway (cessation of vaccination against Rinderpest)
- To be adjacent to one of the known infected country

In terms of Section 1.2 of the agreement between the EC and the OIE relating to "the emergency fund for Rinderpest outbreaks", the OIE is obliged to assume responsibility for implementing and managing an emergency fund following the objectives and procedures as specified in the terms of reference, and in the specified budget breakdown through its own resources or by subcontracting labour or an NGO.

Given the fact that the OIE does not have the resources or expertise within the organisation to implement and co-ordinate the responsibilities described in Annex 1 of the Agreement it will therefore be obliged to subcontract outside consultants or an NGO. OIE and AU-IBAR have reached an agreement whereby all the responsibilities for investigating reported emergencies and planning and co-ordinating interventions would be delegated without financial implication to AU-IBAR. The plans and cost estimates developed by AU-IBAR through PACE would, however, need to be approved by the OIE prior to implementation. Once this approval is obtained funds would be released by the OIE. The envisaged process is demonstrated in Figure 3 as follows.

Figure 3: Rinderpest Emergency Response



7.3.2.5 Wildlife Surveillance

A specific and targeted surveillance of wildlife disease was considered necessary for the PACE programme and for progress towards eradication of Rinderpest virus based on expert opinion. Consequently, from July 2000 the wildlife component was organized within the Epidemiology Unit, with the two TAs. One for West and Central Africa based in Bamako (Mali), and another one for Eastern African based in Nairobi. The wildlife contract was held by CIRAD with technical assistance provided through a sub-contract with the Zoological Society of London to

implement the activities in East Africa. CIRAD was responsible for logistics, accounting and management of the TA's. The activities in Eastern Africa were carried out for the period up to 2004 under the authority of AU/IBAR-PACE, which provided full political and administrative support. The TA for West and Central Africa was moved to Nairobi in 2004 to focus activities on the remaining areas of concern for Rinderpest eradication (Central and Eastern Africa) based on decisions, which were taken in consultation with AU/IBAR HQ, Regional Coordinators and respective National Authorities.

One of the purposes of the creation of the wildlife component within PEU was to develop the national capacities, either to create national expertise in the field of wildlife veterinary medicine or to improve the already existing national expertise. In this line evaluation of training needs and capacity confirmed that wildlife veterinary teams were unlikely to be established in all countries and that a regional (team) approach to wildlife disease surveillance was the appropriate strategy.

The most valuable professional training for the National collaborators was in the field aspects of the work. The activities of the veterinarians require knowledge and experience of the target animals, their ecology and ethnology. Competent "bush craft" is essential for successful and safe working practices with the sometimes-dangerous species sampled. Successful immobilisation depends on this and competence in the application of appropriate veterinary techniques. Consequently, in most countries the National teams made up from the wildlife and veterinary authorities, were established and steering committees set up to facilitate cooperation between often different Ministries responsible for wildlife and livestock. Wildlife surveillance has been integrated into the National disease monitoring strategy, specifically for Rinderpest eradication and verification of absence according to the OIE pathway.

Since PACE has a major thrust for network development the creation of associations will ensure some sustainability outside of donor funded projects. A CD ROM was produced and disseminated to all PACE countries and relevant professional bodies.

In summary the wildlife component has significantly contributed to the completion of necessary surveillance work for countries on the OIE pathway, including clarification of anomalous serological results from Mauritania in warthog, Benin and Chad in buffalo and other species. Data from recently infected or risk zones; in Chad, CAR, Sudan, Ethiopia, Uganda and Tanzania, clearly showed that there was no circulation of Rinderpest amongst wildlife in these countries since the end of PARC. Work in Kenya confirmed re-emergence of Rinderpest virus in buffalo, both in Tsavo (1998-9) and Meru National Parks (2001). Recent surveys in one of the possible hotspots (area of endemic maintenance) for the remaining Rinderpest virus in 4 districts of north-eastern Kenya were completed for selected wildlife species and the data shows no evidence of Rinderpest antibody in animals born since 1998. During PACE, wildlife within the Somali Ecosystem in Kenya have been surveyed for Rinderpest on an annual basis (buffalo, warthogs, kudu and giraffes). It was this routine wildlife surveillance which led to the isolation of Lineage 2 Rinderpest virus from samples taken from African buffaloes in the Meru National Park of Kenya in October 2001. Discovery of this infection was a direct result of surveillance in wildlife conducted by the PEU Wildlife Specialist for Eastern Africa and the Kenya Wildlife Service. This appears to be the first occasion on which routine surveillance, rather than a disease report, has resulted in the detection of Rinderpest in Africa. It should therefore be considered a singular success for the PACE Programme. Despite continued yearly surveillance of wildlife in the Kenya part of the Somali Ecosystem, Rinderpest has not been seen again, further supporting a conclusion that the virus no longer exists. This is very encouraging and suggests that the virus circulation that remains might be very confined and possibly only in Somalia. This suggests the need for an intensive effort to isolate and destroy any remaining virus there, should it in fact

exist, before there is any chance of recurrence and further spread. It should be mentioned that the surveillance of wildlife (warthogs) for Rinderpest in Somalia and Ethiopia in 2005 and 2006 has failed. It is feasible that the final eradication of Rinderpest could indeed be achieved within the lifetime of PACE even if verification takes a few years longer.

Data have also shown the probable involvement of wildlife species in the epidemiology of *peste des petits ruminants* (PPR). Due to this fact and to the importance of maintaining a surveillance on the possible exchange of diseases among wildlife and domestic animals, a new project (Dryands Wildlife, Livestock and Environment Interface Project) is being put in place to be executed under IBAR through the UNEP GEF facility in Kenya and Burkina Faso. The final application for the main funding of new project has been completed since October 2004.

7.3.2.6 Action at the level of laboratories

The International Atomic Energy Agency (IAEA) and the Interafrican Bureau of Animal Resources (IBAR) of the African Union (AU) signed a collaborative agreement in 1999 on a strategy for an active partnership in the field of animal health and production. In recognition of IAEA's expertise in the diagnosis and monitoring of major epizootics, it was proposed to extend the partnership in animal disease diagnosis and to provide the necessary technical assistance to the PACE programme with particular reference to:

- Establishing and consolidating the diagnostic capacity for the major epizootics (Rinderpest, Peste des Petits Ruminants, Contagious Bovine Pleuropneumonia and Foot and Mouth Disease) based on nuclear and related techniques;
- Assisting with the monitoring of the national and regional control programmes for these epizootics;
- Establishing a diagnostic capability for the differential diagnosis of Rinderpest,
- Providing assistance to regional reference laboratories for the confirmatory and differential diagnosis of Rinderpest;
- Strengthening the cooperation between national and regional reference/service laboratories;
- Establishing a regional capability for the supply of reagents and disease diagnostic kits;
- Strengthening the cooperation and information exchange between AU/IBAR, IAEA and the national veterinary laboratories.

In this respect the International Atomic Energy Agency launched the Regional Project RAF/5/053 – Assistance to OAU/IBAR/PACE Programme for the Control and Eradication of Major Diseases affecting Livestock.
The main areas where tangible achievement have been made by the project are: capacity building by training, technology transfer and technical support to PACE Epidemiology Unit.

Together with the Counterpart Epidemiologist the laboratory expert recruited for the project assessed the diagnostic capacities of seven national veterinary laboratories (Ethiopia, Côte d'Ivoire, Senegal, Chad, Muguga, Mali & Cameroon) and made recommendations on what might be considered as regional laboratories/centers for AU/IBAR. The following laboratories Bingerville (Côte d'Ivoire), Dakar-Hann (Senegal) and Muguga-Karie (Kenya) were recognized as regional laboratories/centers for AU/IBAR for Rinderpest and *peste des petits ruminants*. Consequently A link has been established between PACE national veterinary laboratories and the PACE regional reference laboratories for Rinderpest and PPR, and several staff from PACE National laboratories have been trained in various techniques of diagnosis of animal disease.

The transfer of technology comprised of provision of training in relevant biotechnology techniques for African Scientists at ILBM/UCA (1 from Mali, 2 from Senegal, 1 from Nigeria, 1 from Cote d'Ivoire), provision of experts to assist the technology transfer and through the provision of funds for the procurement of appropriate equipment.
The PEU coordinated the validation exercise for the indirect ELISA for Rinderpest developed by University of California Davis (USA) in collaboration with *Institut Sénégalais de Recherche Agronomique (ISRA)*. The assay has been accepted by OIE in February 2004.

Technical assistance in the field of laboratory diagnosis of animal diseases was given to PEU and PCU. In line with this several missions were undertaken to PACE countries to provide assistance in site; guidance were given through exchange of messages with PACE national laboratories counterparts and PACE regional reference laboratories for Rinderpest and PPR. Based on information gathered from countries a document called "update on PACE national laboratories "was produced.

All laboratories in PACE member countries were visited and assisted in establishing the required capacity for diagnosis of identified epizootic diseases. All countries, which have been recognized free from Rinderpest disease and those that have sent to OIE their dossier for recognition of freedom from Rinderpest were assisted in the serological surveillance required for obtaining this status. For that reason, the laboratories Rinderpest-testing network was re-activated and the first annual meeting for regular updates on specific laboratory techniques and external quality assurance program in the serological testing for Rinderpest was held in Accra (Ghana) in September 2004.

Regarding the implementation of actions designed to performance of identified laboratories so as to facilitate effective surveillance for Rinderpest, CBPP, ASF and RVF, laboratories in PACE countries (only IAEA members) were assisted with procurement of diagnostic kits and laboratory reagents.

7.4 Progress and Achievements in the Surveillance and Control of Rinderpest

Since the beginning of the implementation of the PACE programme out of 30 countries members 94,4% have declared their territories or a zone of country provisional free from Rinderpest, and only two (6,6%) countries (Equatorial Guinea and Somalia) did not make any declaration. By May 2006, 20 PACE countries were recognized by OIE free from disease, 3 of them on zonal basis and 12 countries were recognized by OIE free from infection, 5 of them on an historical basis. To date only three (10%) of PACE member countries (Djibouti, Gabon and Somalia) did not yet prepare their dossiers for submission to OIE to be recognized at least free from disease countrywide or on a zonal basis. A more detailed situation on the eradication of Rinderpest is presented in the following paragraphs.

7.4.1 Situation in PACE member countries

Situation in the ex-cordon sanitaire

At the commencement of the PACE programme, a *cordon sanitaire*, involving Chad, CAR and Southern Sudan, of Rinderpest vaccination and surveillance in wildlife and cattle was established as a strategic buffer to stop spread of Rinderpest from Southern Sudan, westward into West Africa. Vaccine coverage in the *cordon sanitaire* never exceeded 30% wildlife data were negative for recent infection, and the infected zone in Sudan was confined to the east of the White Nile around Pibor. Therefore, a consensus was reached that the *cordon* was no longer appropriate. As

a consequence, the *cordon* was abandoned and vaccination against Rinderpest ceased in Chad at the end of March 2002, in southern Sudan in June 2002 and in CAR in 2003.

Situation in West and Central Africa

The eradication of Rinderpest from Africa and the verification of the absence of the infection remains the principal task of the PACE program in general and PEU particular. Consequently, The PACE Epidemiology Unit was assisting in the improvement of epidemiological surveillance systems and in the preparation of the dossiers for the application of freedom from Rinderpest. The OIE Pathway offers a number of alternatives for countries to progress toward the goal of freedom from Rinderpest infection. Therefore, the selection of the most approprite strategy is important.

Since most countries of West Africa have been free from Rinderpest for 10 years or more, the activities were focused on assisting countries to fulfill conditions required by the OIE pathway to verify the absence of Rinderpest disease and infection. Most of these countries focused their disease surveillance on pursuing the OIE pathway for the declaration of freedom from Rinderpest.

Countries in West and Central Africa have no longer reported Rinderpest outbreaks for 18 years. The focus in this region is therefore to verify the absence of the disease followed the by the verification of the absence of the infection.

Republic of Gabon declared itself provisional free from Rinderpest in 2006. CAR stopped vaccination against RP in the part of the *ex-cordon* in December 2003 and declared the whole country free from RP in February 2004.

Regarding the disease free status, the OIE Scientific Commission approved the dossier of Chad for recognition of freedom from disease countrywide in January 2006. Countries like Equatorial Guinea, Gabon and CAR are in process in finalization their dossiers to be submitted to OIE by the end of June 2006. Although Cameroon has prepared the dossier for recognition of freedom from disease, it was not submitted in time to OIE for consideration.

Burkina Faso, Congo, DR Congo, Ghana, Guinea Conakry, Guinea Bissau, Mali and Niger have applied for recognition of freedom from infection. The OIE Scientific Commission did not approve the dossiers of Ghana and Niger. However, it should be mentioned that The Gambia and Mauritania did not send in time their documents to OIE for recognition of the same status after PEU comments.

It is anticipated that eight (8) PACE countries in West and Central Africa will receive recognition of freedom from Rinderpest infection and one (1) from disease by May 2006.

The current situation of Rinderpest in Africa with regards to progress along the OIE pathway is depicted in map 1. The map show the progress made in West, Central and East Africa, and in non-PACE countries.

Situation in East Africa excluding the Somali eco-system (SES)

Kenya (zonal basis), Sudan and Uganda submitted their dossiers to OIE for recognition of freedom from disease, and the OIE Scientific Commission approved all in January 2006. Burundi and Rwanda applied for freedom of infection on an historical basis. The OIE Scientific Commission also approved these dossiers at its regular session held in January 2006.

It is anticipated that three (3) PACE countries in East Africa will receive recognition of freedom from Rinderpest disease and two (2) from infection by May 2006.

Table 4: Rinderpest status with regard to the OIE Pathway in PACE countries by May 2006

Country	Provisionally free	Freedom from disease	Freedom from infection	Comments
A. West and Central Africa				
Benin	1999	2003	2005	Congo, DR Congo and Guinea Bissau have applied for recognition of freedom from infection on an historical basis
Burkina Faso	1998	2003	2006	
Cameroon	1999			
CAR	2004			
Congo			2006	
Chad	2002	2006		
DR Congo	2003 (ZB)		2006	
Côte d'Ivoire	1997	2004		
Gambia	1990			
Gabon	2005			
Ghana	1997	2003		
Guinea Conakry	1996	2003	2006	
Guinea Bissau	2003		2006	
Mali	1997	2003	2006	
Mauritania	1999	2003		
Niger	1999	2003		
Nigeria	1998	2004		
Senegal	1997	2003	2005	
Togo	1996	2003	2005	
B. East Africa				
Burundi	2003		2006	Burundi and Rwanda have applied for recognition of freedom from infection on an historical basis
Ethiopia	1999, enlarged 2004 (ZB)	2005 (ZB)		
Eritrea	1999	2004	2005	
Djibouti	2003			
Kenya	2004 (ZB)	2006 (ZB)		
Rwanda	2003		2006	
Tanzania	1998	2005		
Sudan	2004	2006		
Uganda	2002	2006		

***Source**: OIE, April 2006*

7.4.2 Situation outside PACE member countries

The issue of the situation of progress along the OIE Pathway in non PACE countries was discussed at the first consultative meeting of African Directors of Veterinary Services organized by AU-IBAR on 21st May 2005 in Paris (France). The participants to this meeting recommended that countries in West and southern Africa (Liberia, Sierra Leone, Zambia, Angola and Mozambique) that have not yet submitted their dossiers for freedom from Rinderpest infection on historical basis, should speed up the preparation of their dossiers, including emergency preparedness plans, to be submitted to the OIE by August 2005. In line with this recommendation Zambia made the application. Mozambique is currently in process to do so with

technical assistance of AU-IBAR. The OIE Scientific Commission has approved the dossiers of Egypt and Zambia at its meeting held in January 2006.

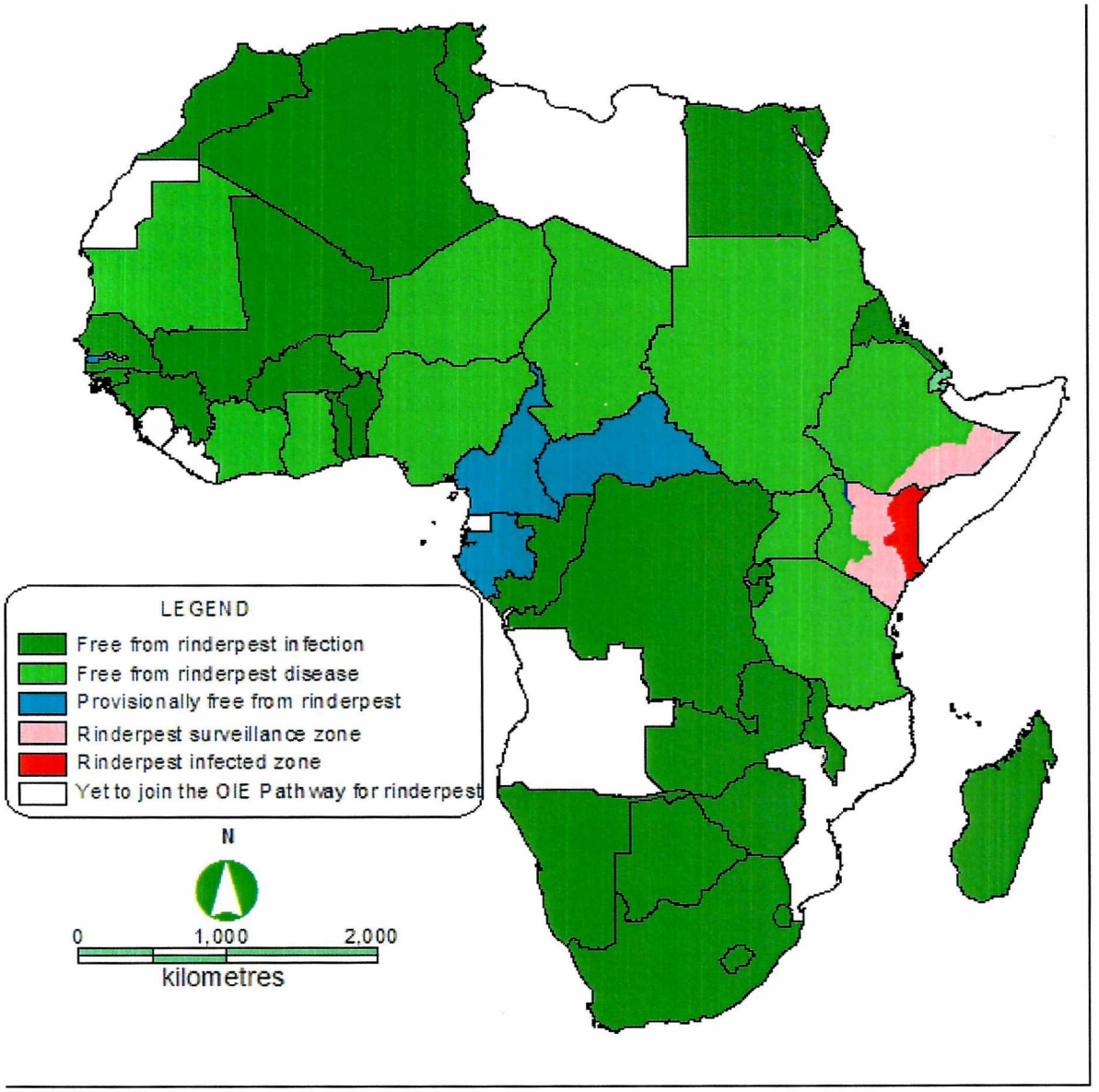


Fig 4: Status of Rinderpest in Africa with regard to the OIE Pathway by May 2006

7.4.3 Case of the Somali Eco-system and the Southern Sudan

Somali Eco-system (SES)

The Pan African Control of Epizootics (PACE) which started in 1999 and is in this final stage succeeded in completing the eradication of Rinderpest from most of Africa with the exception of the so called mild strain of the virus in the "Somali Eco-system", an area of land that encompass South East Ethiopia, North East Kenya and Southern Somalia.

Rinderpest virus, detected in Somali Eco-system in 1996, caused mild disease in cattle and a severe syndrome in African buffaloes, lesser in kudu, and other bovine antelopes e.g. the eland.

cattle plague. It is therefore imperative that this mild virus infection be eradicated from the Somali Eco-system.

The potential for livestock production in the Somali Eco-system, that has more than seven million cattle, is huge but is generally underexploited and the sector is also seriously undervalued due to various factors of which livestock diseases including Rinderpest have a major impact. Other factors affecting productivity include poor livestock husbandry practice and management, poor nutrition both in quantity and quality and poor marketing infrastructures. The importance of the livestock sub-sector and its potential contribution towards eradication of poverty and food security of households constitute a legitimate case for more attention in terms of resource allocation and investment.

The region termed the "Somali Eco-system" [SES] is presumed to harbour the last foci of Rinderpest in the world. Apart from the disease risk posed by these foci there is also a considerable negative economic impact on the market value of livestock with consequent adverse effect on the livelihoods of the pastoralist communities.

The African Union / Inter African Bureau for Animal Resources / Somali Ecosytem Rinderpest Eradication Coordination Unit (AU/IBAR/SERECU) operating under the PACE programme is seeking to develop a harmonized and coordinated surveillance and Rinderpest eradication strategy to achieve "freedom from Rinderpest" in the SES, and by extension the three countries of Ethiopia, Kenya and Somalia which are involved (see Map 1), in line with OIE guidelines. In accordance with the epidemiological situation, the SES is more specifically defined as 27 woredas in Region V of Ethiopia, the surveillance and infected zones of Kenya, and Southern Somalia. The presumed persistent infection is due to lineage 2 Rinderpest virus that causes only mild or no disease at all in cattle, while causing moderate to severe disease in susceptible wildlife populations.

It is considered that creating a sustainable Animal Health Delivery System (AHDS) in the SES, which is expressly designed to supply the quality and quantity of livestock services as required by the pastoralist livestock keeping communities, will be the most cost-effective way to achieve AU/IBAR/SERECU disease surveillance and Rinderpest eradication aims. The approaches to strengthening the delivery of AHDS in the SES will have some elements in common but there will also need to be some country specific approaches in recognition of the differences in Veterinary Delivery systems existing on the ground in each of the three countries.

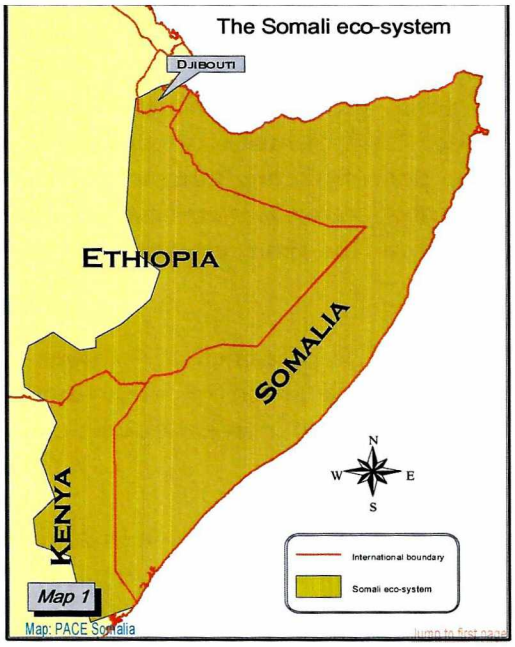


Fig 5: Geographical location of Somali ecosystem

A strategy for the final eradication of Rinderpest from the SES is dependent upon a critical break-point decision being made as to the Rinderpest status of the ecosystem. To date, the results from Ethiopia and Kenya do not suggest Rinderpest virus endemicity. While in Somalia, particularly in Gedo, Middle Juba and Lower Juba, there has been persistence of sero-positivity in cattle which however has significantly decreased from 17% (Gedo 17%, Lower Juba 16.98%, Middle Juba 15.99%) in 2002/03 to 1.7% (Gedo 5.1%, Lower Juba 1.6%, Middle Juba 3.6%) in 2005, .6% (Lower Juba .4% and Middle Juba 2.3%) in February 2006 and 1% (Gedo 2.6%, Lower Juba 1.2% and Middle Juba 2.9%) in June/July 2006. As reported earlier, the sero-positivity is clustered in specific regions (Bardheere and El-Wak districts in Gedo Region and Saakow and Buale districts in Middle Juba Region). In all the three regions, higher prevalence was mainly among the older animals (2-3 years) as opposed to the younger animals (1-1.5 years).

Between February 2006 and now, in all the wildlife sera (380) collected in the whole of the SES part of Kenya and in Lower Juba Region of Southern Somalia, no Rinderpest antibodies have been detected.

The evidence gathered so far neither confirm nor refute the presence of virus circulation in the ecosystem. Accordingly, the following actions were agreed upon at the just ended 3rd Cross-border workshop:

a) Teams made up of representatives of the 3 countries, AU-IBAR and FAO follow up immediately (within October 2006, weather and security allowing) all sero-positive sites and contiguous areas of the neighboring countries. The surveillance will embrace sampling in both livestock and wildlife as well as applying participatory appraisals using an agreed upon checklist.
b) Specific team composed of country epidemiologists, AU-IBAR and FAO be convened immediately to analyze all available data (historical & current) and complete by middle of November 2006

c) Declaration of provisional freedom from disease for Somalia to await actions in a) and b) above.

All this may suggest that, by the end of the PACE programme, some provisions be found to pursue for a little while the activities in the area of the SES.

Southern Sudan
For more than a decade, Rinderpest in Sudan had been largely contained within a small number of cattle-keeping pastoral tribes in southern Sudan and from accounts by veterinarians and livestock owners, cattle belonging to the Murle pastoralists of southern Sudan were affected by Rinderpest in late 2000 and into 2001. Intensive surveillance efforts by FAO and PACE led to the belief that the disease observed could be the last focus of infection in Sudan. An intensive vaccination programme of the Murle and associated Jie herds achieved a high coverage and the disease was eliminated as confirmed by subsequent epidemiological investigations. The last Rinderpest vaccination ceased in 2002 and subsequent investigations provide no basis for belief that Rinderpest is still present in Southern Sudan.

The exercise to control Rinderpest in its final stages in Southern Sudan was co-ordinated from Lokichoggio in north west Kenya through government, FAO and 13 NGOs engaged in a humanitarian aid programme (Operation Lifeline Sudan) of UNICEF by three veterinarians paid by PACE, controlling CAHWs who were trained at Lokichoggio by PARC or by CAPE during PACE. A vaccine bank was established in Lokichoggio paid for by PACE. Samples and sera were analysed at Muguga with some laboratory inputs paid for by PACE. Co-ordination meetings were organised at Lokichoggio through PACE which brought together animal health services from both southern and northern Sudan.

In 2003 - 2005, the NGO Vétérinaires Sans Frontières (VSF) Belgium was contracted by PACE to continue surveillance activities in southern Sudan, including in wildlife, supported by the PACE regional TA. After October 2005 VSF Belgium's activities were supported by humanitarian aid until a new contract with PACE started in May 2006, which, together with Sudanese Government Veterinary Services, enables Rinderpest surveillance activities to continue.

7.4.4 Conclusion on the Rinderpest status in Africa and particularly in PACE member countries

Although the effects of JC-15 had been annihilated for the most part by the renewed outbreak of Rinderpest on the African continent, it must be recognized that since the PARC programme, major progress has been made that the PACE programme has strived to consolidate. Nowadays, clinical Rinderpest has virtually disappeared from the African continent and vaccination campaigns are rare. The only region of Africa (and probably of the world) supposed to still host the Rinderpest virus in a hypo-virulent form (i.e., with few symptoms and few casualties) is that of the Somali ecosystem in the horn of Africa.
90% of PACE participant countries have entered the OIE pathway by declaring their territory or part of their territory provisionally free of Rinderpest. Since May 2005, 16 countries have been declared free of the disease and 4 are recognized free of infection. 86% of the countries have developed their emergency plan and have submitted it to the AU-IBAR which has already approved 69.2% of those.

In Western and Central Africa, 12 countries (including one on a zonal basis) have been recognized as free of Rinderpest (disease) by the OIE (Benin, Burkina Faso, Côte d'Ivoire,

been declared free of infection since May 2005 (Benin, Senegal, and Togo). In Eastern Africa, 4 countries (including 2 on a zonal basis) are recognized as free of the disease (Eritrea, Ethiopia, Tanzania, and Sudan). Only Eritrea has gained the status of infection free country as of May 2005. In May 2006, 6 countries recognized free of the disease should gain the status of infection free countries. This also holds true for countries such as Burundi, Congo, Gambia, Guinea Bissau, Equatorial Guinea, and Rwanda, which can directly claim infection free stratus based on historical absence of the disease.

It must be pointed out that upon AU-IBAR's request, the epidemiologists of the PACE program bring some support to African states which are not members of the PACE program in the preparation of their dossier to be submitted to the OIE.

As for the Somali ecosystem, this region includes North-eastern Kenya, Southern Somalia, and Region V of Ethiopia, a particular strategy has been developed for the region and a *Somali Ecosystem Rinderpest Eradication Coordination Unit* (SECECU) under AU-IBAR supervision will coordinate its implementation. The unit, which comprises all actors/stakeholders in the area (national veterinary services, projects, NGOs and representatives of interested international organizations) will aid in strengthening the coordination of activities based on a joint intervention strategy. The European Union has funded a new animal health development project in Somalia whose objectives are in line with those of PACE.

Wildlife surveillance has continued normally in East Africa; as far as West and Central African countries are concerned, it has been agreed with the countries, because of the low animal population density, to adopt an ecosystem based approach and to set up a regional team. A training programme was implemented to that effect in Ghana in July 2005.

7.5 Progress and Achievements in the Surveillance and Control of CBPP

Situation of CBPP in Africa

Contagious bovine pleuro-pneumonia (CBPP) became a focus of PACE because it was regularly reported by the epidemio-surveillance systems of member countries and it was perceived to be the most serious animal disease problem facing the tropical regions of Africa now that the effects of Rinderpest had been overcome.

Based on a regional approach, and taking into account the epidemiological situation, transboundary systems and socio economic conditions, a strategy for CBPP control has been developed by the PEU and adopted by some countries. This includes:

1. Annual vaccination for five years with external quality control of vaccine.
2. Participatory evaluation of impact of CBPP.
3. Slaughter of clinically infected animals.
4. Surveillance.
5. Movement control.

With regard to areas free from CBPP PEU recommended:

1. Verify the absence of CBPP by active surveillance including serological investigations and abattoir surveillance.
2. Ensure a strict control of cattle movements (domestic and cross-border).

The epidemio-surveillance systems, improved diagnostics, communication programmes and economic studies introduced by PACE have improved awareness of CBPP and knowledge of its prevalence and impact. Few countries, however, have taken up systematically the CBPP control programme recommended by the PEU and CBPP continued to be a major proble e.g. in Mauritania despite a compensation system farmers continue to be suspicious about CBPP vaccination and only 19% of the national cattle herd was vaccinated in the most recent campaign. Exceptions in West Africa are:

- Senegal, where vaccination stopped in 2005 and the last outbreak of CBPP was in 1977. Risk of re-entry of CBPP is from Mali and Mauritania, and Senegal is in the process of signing a zoo-sanitary agreement with these countries to control livestock movements. CBPP surveillance will continue with herd surveillance and in 30 abattoirs and slaughter points. Senegal is declaring itself to OIE to be provisionally free from CBPP in order to proceed along the OIE Pathway.

- Guinea, where the country has been divided into four epidemiological zones as follows:

    - Disease free zone - no vaccination.

    - Disease free zone but under surveillance – vaccination stopped 4 years ago.

    - Buffer zone (combination of surveillance, annual vaccination and stamping out of clinical cases with two rounds of ring vaccination).

    - Endemic zone (annual vaccination without sero-surveillance but stamping out of clinical cases).

These measures are in line with OIE guidelines.

In East Africa, Tanzania has good surveillance for CBPP, including abattoir surveillance, and is pursuing annual vaccination against CBPP on a zonal basis. In Uganda, there is also good surveillance, and there are follow-up vaccination campaigns, with cost recovery, where the disease is diagnosed or there is trace-back from an abattoir. In Kenya, a zonal policy has been adopted for CBPP control:

- Disease free zone without vaccination and slaughter of clinical cases.

- Surveillance zone without vaccination.

- Buffer zone and infected zones where free vaccinations of $T_1$44 are given bi-annually.

Ethiopia has appointed an epidemiologist supported by PACE to implement CBPP surveillance and control.

CBPP has only recently been introduced to Eritrea through cattle imported from Ethiopia. A control programme has been formulated in collaboration with FAO and PACE, and support for it has been gained from Government for its implementation. A workshop on CBPP has been undertaken and staff are ready to commence a control programme, but its planned implementation through PACE has not happened because of lack of approval of the work plan.

While it has taken small advantage of the PACE programme, Rwanda has implemented a highly successful CBPP control programme in which the entire cattle population was vaccinated five times in three years with $T_1$44 vaccine. Rwanda has the advantage of having a small, mainly sedentary, cattle population with a good road network. Nevertheless it has succeeded in eliminating CBPP and is safeguarding its CBPP-free status through stringent movement control, particularly of imported cattle.

PACE activities to fight CBPP

Since the beginning of the programme, PACE Coordination Unit organised two workshops on CBPP control strategies: one held in Addis Ababa (Ethiopia) in November 2001 and the second held in Accra (Ghana) in February 2003. The objective of the two workshops was to update countries delegates on recent development around CBPP, analyse the problems related to the disease and evaluate practical options for effective approaches to its control. Finally the aim of the workshops was to develop, in close collaboration with veterinary services representatives, a rational and integrated policy and reliable, practical and applicable strategies against CBPP in PACE countries that are based on a regional approach

These first two workshops did not, however, reach clear implementable conclusions. In order to scientifically support the findings and recommendations made at both workshops, another workshop was organised therefore in Nairobi in May 2003. At this third workshop only technical aspects were evaluated through recent modelling and simulation activities conducted in Southern Sudan, Tanzania and Ethiopia. This technical workshop aimed at building on the outcomes of the two first workshops and, in particular, to consider technical issues that have been highlighted by two modelling studies.

Recognizing the fact that there is indiscriminate and uncontrolled use of antibiotics in the field for treatment of CBPP, and accepting that there is insufficient scientific knowledge on the effectiveness of antibiotics in the treatment of this disease. In addition to the recommendations of this workshop AU/IBAR-PACE commissioned a study of CBPP epidemiology that accessed indigenous knowledge of pastoral communities to construct mathematical models. Sufficient understanding has accrued from this study to suggest that new paradigm for CBPP control using antibiotics should be investigated. Consequently, a strategy was developed aimed at generating scientifically valid data on the issue of antibiotic treatment of cases of CBPP and the problem this may create by increasing the proportion of carriers (lungers) among recovered animals. The study on the impact of the use of antibiotics against CBPP was commissioned by PACE in laboratories in Côte d'Ivoire, Mali, Nigeria, and Ethiopia. The results of this study seem to indicate that antibiotics improve the clinical condition of infected cattle but do not eliminate the infection.
Efforts to improve the control of CBPP in the PACE countries continued and culminated in the recommendations of the final PACE workshop on this disease held in Conakry (Guinea) in February 2004. The results of this workshop included an agreed strategy based on a regional approach and taking into account epidemiological situation, socio-economic conditions as well as husbandry systems, the proposed strategies aim at the reduction of the incidence of CBPP in the endemic zones and the protection of zones where the disease is not currently reported.

The PEU has produced therefore a CD-ROM containing the recommendations from all PACE workshops on CBPP and also major presentations made at those workshops by various experts.

7.6 Situation of Other Major Animal Epizootics

7. 6.1. African swine fever (ASF)

African swine fever (ASF) is a lethal disease of domestic pigs caused by a unique virus indigenous to Africa that evolved in a cycle requiring infection of wild suids (mainly warthogs) and argasid ticks. The ASF virus population is heterogeneous, comprising lineages that are, generally, distributed in distinct geographic locations.

Control or eradication of ASF is hampered by the lack of an effective vaccine against ASF. The other problem with the control of ASF in Africa is that in most regions where the disease is currently a problem, effective movement control in respect of pigs and pork is very difficult, if not impossible, to achieve. Traditional pig-keeping in Africa is perceived as an important constraint for the control of African swine fever (ASF). Free-ranging, scavenging pigs are at greater risk of infection for various reasons. In areas where the sylvatic cycle of ASF occurs between argasid ticks and warthogs (and possibly other wild suids), the risk of contact with the natural vectors of the virus is increased. The combination of these two factors renders effective management of ASF extremely problematic.

From the above it is clear that a simple solution to the question of effective control or eradication of ASF from the coastal belt of West/Central Africa is not available. Conversely, means whereby the effects of ASF can be limited are urgently required if food security and a source of cheap and acceptable animal protein for the region is to be secured. In order to assist PACE concerned countries to address the issues a workshop was jointly organised by OAU/IBAR-PACE and FAO on ASF in Lomé (Togo) in October 2001. At this workshop it was concluded that the problem needed to be addressed at the regional level because the countries of the region are afflicted by a common problem that circulates among them. The PEU, has recognized that African Swine Fever (ASF) is an important transboundary disease, particularly in Western Africa. Any country in the region that fails to control ASF effectively exposes pork producers in the country concerned to unacceptable financial risk and also provides a source of infection for neighbouring countries.

The workshop was followed up by a development of a strategic document prepared by the PEU in collaboration with a FAO consultant. The proposed strategy document underlined the following activities that could be considered to assist with the future control/eradication of ASF in western Africa.

Pig production
Free-range pig production systems are incompatible with effective ASF control in western Africa. Therefore, one way of limiting the effect of this disease in the region would be development of regional and national programmes that encourage commercialisation of production within enclosed systems. Once pigs are confined on a continuous basis, control of ASF becomes relatively simple.

Short-term measures to improve surveillance and control
In the coastal countries of West/Central Africa that are currently free of the disease, rapid detection of ASF when it occurs needs to be the cornerstone of any strategy against the disease. This is vital because all these countries are at high risk of having the infection introduced across their borders from infected countries in the region. Rapid detection is dependent upon:

- an effective epidemio-surveillance system or network
- a competent diagnostic laboratory
- co-operation of the pig farmers/owners

These aspects are part of the current PACE Programme, supported by the IAEA for the laboratory component. All countries have been provided with finance to affect the first two measures (in some cases with inputs provided by the FAO).

If ASF is detected soon after introduction, it should be possible for the infection to be "stamped out" because the number of animals involved would be small. Conversely, once the infection has spread, "stamping out" becomes difficult and, usually, unaffordable.

Epidemiological investigations
There are two obvious lines of investigation that are likely to bear fruit, *viz.* (i) basic studies into the transmission parameters of the infection where domestic pigs are involved and (ii) those aimed at understanding how the infection remains endemic in specific localities in Africa. These localities include adjacent areas of Malawi, Mozambique and eastern Zambia, Angola, parts of Uganda and DRC, and adjacent areas of Senegal and Guinea Bissau.

7. 6.2. Rift Valley fever (RVF)
Rift Valley fever (RVF) remains an impediment to livestock exports from the Horn of Africa to the Arabian Peninsula but AU-IBAR and a number of international and regional organizations have developed initiatives to address the problem. PACE has conducted a regional workshop on Rift Valley fever (RVF) and the PEU has assisted the OIE to redraft the OIE Terrestrial Animal Health Code to redefine circumstances under which trade in animal commodities can be sourced safely from "non-free areas". The revised chapter also permits the use of vaccine to protect animals intended for trade as long as it is not administered within three weeks of the animals being slaughtered. Revision of the chapter should assist PACE countries in the Horn of Africa to resume their livestock export trade.

7. 6.3. Foot-and- Mouth Disease (FMD)
In Eastern and Western Africa it is clear from information gathered by the PEU in PACE countries that FMD is a growing problem for both livestock producers on the ground (even in some extensive systems) and for trade. Still according to PEU, the disease seems to be escalating in Eastern Africa. PACE has increased awareness of the disease through the epidemio-surveillance system and introduction of diagnostic tests in national laboratories to diagnose and serotype FMD outbreaks. However, there is concern and lack of understanding about the role of wildlife in propagating outbreaks in cattle. To this end, sera from the PACE activities in wildlife were to be sent for FMD serology to Pirbright IAH for testing. Once the results are received the likely serotype distribution in wildlife in the East, West and Central African region will be mapped and association with known cattle sero-types completed. This will assist countries in development of their FMD control strategy.

The PEU has instigated investigations of FMD outbreaks, particularly in Sudan, where sero-types A, O, C, SAT1 and SAT2 were found to be prevalent.

According to the Minutes of the 24th Livestock Co-ordination Meeting held in Lokichoggio, October 2003, in the last 5 years 45 different outbreaks were recorded in southern Sudan. In 9 of these outbreaks the virus involved is recorded as having been identified. This data shows that sero-types A, O, C, SAT1 & SAT2 are prevalent in the region. However, it seems that this information is based largely on serology that is unreliable for establishing prevalence of viral types where two or more occur together in a locality and the data should therefore be interpreted with caution. Nevertheless, these are the same sero-types prevalent in other regions of Eastern

Africa where findings of the PEU have recently shown that FMD is an escalating problem. Therefore, the situation current in southern Sudan seems to be part of a clear trend in Eastern Africa. Therefore, the PEU identified that a regional counter-strategy for FMD is an urgent requirement.

7.6.4 Rabies

PACE has provided no direct inputs into strengthening the control of rabies which is reported as one of the major infectious disease problems in Mauritania.

8.0 Progress on CBPP, Rinderpest and PPR Research

The Financing Agreement of the PACE programme stipulated that the FAO World Reference Laboratory for Rinderpest based at the Institute for Animal Health, Pirbright (in the UK) would co-ordinate the research programme for Rinderpest and PPR. Since the PACE program was based on capacity building and sustainability, it was felt that wherever possible the research should be carried in laboratories to be identified in Africa. However, due to the lack of facilities in many African Laboratories some of the work had taken place in Reference Laboratories such as IAH, Pirbright or CIRAD EMVT, Montpellier. The final stages of validation and adaptation to local conditions have taken place in African Laboratories whenever possible. The advantages of this approach has been to strengthen the collaborative links and technology transfer between the reference laboratories and the regions where Rinderpest and CBPP are still of concern.

Consequently, the following World Reference Laboratories for Rinderpest and PPR (Pirbright Laboratory, Institute for Animal Health, UK and CIRAD/EMVT, Montpellier, France) and for CBPP (CIRAD/EMVT) were awarded grant contracts according to proposals that they have submitted for funding (for each disease) in respect with budget allocated in the financing agreement.

To strengthen the success of the Pan-African Rinderpest Campaign (PARC), and achieve the complete elimination of the Rinderpest virus from the continent and control of CBPP, initially there were identified research needs as per PACE financing agreement signed between AU/IBAR and EU:

- Use of PPR vaccine to protect ruminants against Rinderpest
- Study of cellular immune response induced by Rinderpest and PPR
- Study of Rinderpest mild strain in cattle sheep and goats,
- Validation of pen-side test
- Research on CBPP

8.1. Use of PPR Vaccine to Protect Ruminants

On the advice of the Advisory Committee, the PCU contracted the National Veterinary Research Institute, Muguga to undertake a study of PPR vaccine to ascertain whether its use in cattle would provide cross protection against Rinderpest without interference with serological tests for Rinderpest antibody used to detect previous infection with wild Rinderpest virus. This work would validate the efficacy and safety of PPR vaccine if it becomes necessary to use vaccination in the Somali Ecosystem in the face of an outbreak of Rinderpest Lineage 2 in its last stronghold.

The test protocol was written by AU-IBAR, technical support was supplied by Pirbright Laboratory and the test vaccine was supplied by CIRAD/EMVT. Pirbright Laboratory was to finance the study from its Grant contract with PACE. However, an audit of PACE Kenya concluded that PACE money given to Muguga was not justified and the PCU was instructed not to further finance Muguga. Nevertheless, the vaccine trial went ahead, financially supported by Pirbright, but it was found that Pirbright Laboratory did not have the €78,000 in its Grant contract needed to support the trial though it had been approved by the EU Delegation as a no cost extension as requested. Also, Muguga overspent this budget on the trial.

The results of the trial were not able to demonstrate significant protection of cattle against

After receiving results of the trial, the Advisory Committee recommended that a second trial with more animals and testing the use of larger doses of vaccine should be done at Muguga and that the trial should be supervised by Pirbright Laboratory and by an external manager. However, work has not commenced on the trial because the final budget for the work has not yet been received by the PACE Programme and been approved by the Delegation.

8.2. Study of Cellular Immune Response Induced by RP and PPR vaccines

The research programme which was eventually approved and undertaken in March 2003 appears to have changed from that originally proposed in that the key outputs were to be:

- Development of improved highly specific and sensitive assays to assist in the serological surveillance of Rinderpest, capable of differentiating antibodies to Rinderpest, PPR and vaccine strain viruses.

- Development of specific diagnostic tests to be able to differentiate serologically PPR from Rinderpest.

- Development of a multiplex PCR for the diagnostics of Rinderpest and BVD in one tube.

- Development of marked vaccines, which would similarly allow distinction of vaccinated animals from those, infected with either RPV or PPRV using the currently available serological tests.

A consortium of three institutions has carried out the research activities namely:

- Institute for Animal Health, Pirbright Laboratory (project co-ordinator) to carry out the work on the marked Rinderpest vaccine and the improved serological tests for Rinderpest (in collaboration with the FAO/IAEA Agriculture and Biotechnology Laboratory, in Austria).

- CIRAD-EMVT (France) for the PPR marked vaccine and the PPR serological tests (in collaboration with the FAO/IAEA Agriculture and Biotechnology Laboratory, Austria).

- FAO/IAEA Agriculture and Biotechnology Laboratory (Austria) for the tests to differentiate RP from stomatitis-enteritis syndrome and the transfer of the different tests developed within the consortium to African laboratories.

The Project Co-ordinator (Pirbright Laboratory) asked for a 'no cost' extension to the project to cover the PPR vaccine experiment and allow completion of other research objectives. The work at Pirbright Laboratory has been divided into work packages, results of which are described below:

Work Package 1: Development and validation of improved serological tests for Rinderpest virus to differentiate the serological responses to different Rinderpest virus lineages.

The use of peptides to distinguish different lineages was explored. For this, the hypervariable C-terminus of the N gene was sequenced from 15 different strains of Rinderpest virus which included several representatives from each lineage.

The predicted amino acid sequence derived from nucleotide sequence data was used to design regions that contain residues that are unique to each lineage and could therefore be used as potentially lineage specific antigen. A series of peptides were then generated but initial trials with these peptides in ELISA gave problems. It was very difficult to completely solubilise several of the peptides which meant that a precise quantitation of the concentration of the peptides was not possible. This in turn made it very difficult to carry out a truly comparative study of these peptides as one could never be sure of the exact amount of peptide present in each well of the ELISA plate. Unfortunately none of the peptides designed from vaccine sequence responded specifically to vaccine sera in these preliminary trials.

It was then decided to express a longer region of the hypervariable region for each lineage in a bacterial expression to see if they could distinguish between the vaccine and each of the lineages. The work to produce the expressed proteins was completed but as the second instalment of money has not been paid, pending submission of proper financial accounts, there was no means to employ a person to complete the work.

Work Package 2: Trials of the Rinderpest marker vaccine in Kenyan cattle.

Several candidate marker vaccines were produced using reverse genetics technology to introduce marker proteins into the existing vaccine. These candidate vaccines were to be tested in cattle at Muguga.

Instead of testing the recombinant vaccines it was decided at a PACE Advisory Committee meeting that the PPR vaccine should be tested in cattle to see if it could give cross-protection against Rinderpest. Titration of the vaccine in cattle showed that there was protection but only at the highest dose administered (10^4 TCID50). However, the number of cattle involved was too small to give statistically valid data to evaluate its usefulness as a vaccine for Rinderpest, and at the 12th Advisory Committee meeting in Mali it was agreed that a second trial with larger numbers should be carried out and a budget approved. This second trial has been budgeted for in the PE7, but due to a delay in receiving Pirbright/Muguga accounting for the first trial, it has not yet started.

8.3. Research on CBPP

In view of the limited budget available for the CBPP project, as compared to all of the possibilities for research, a careful selection of priorities was established and validated by a group of African Scientists during an AU-IBAR consultative meeting. The following research programme which could have short-term results that may have rapid application at field level was proposed:

- Define the dose of T1sr and T1/44 microorganisms that is capable of providing a significant level of protection against challenge.

- Determine a vaccination strategy that provides durable protection.

- Set up a database of candidate genes contributing to the phenotypic differences between strains, which could potentially be applied to develop improved vaccines against, and

- Develop tools for detection of chronic carriers of CBPP.

A grant contract was given to a consortium of three main institutions to carry out the research activities namely:

- CIRAD-EMVT to carry out bacteriological and immunological studies; characterization of the animals; use of immunological tools for the selection of potential new vaccines and development of T-cell lines specific for *Mycoplasma mycoides* var *mycoides* small colony MmmSC; screening of the MmmSC antigens; development and immunological screening of potential new CBPP vaccines by expression of MmmSC antigens in suitable vectors.

- IZSTE for immunological studies.

- ILRI for chemotherapy trials; follow up of vaccinated animals; immunological study and analysis of cellular immunity in immunized cattle.

- Moredun Research Institute, UK development of a pen-side test that will allow the rapid detection of CBPP cases in the field.

- KARI, Kenya for boosting effect of revaccination, chemotherapy trials; follow up of vaccinated animals; clinical observation of experimental animals; use of PCR.

Dose/effect vaccine trials were to be done at LANAVET Laboratory, Cameroon and antibiotic trials were done at LANAVET and KARI, Kenya.

Results obtained are described below:

The CBPP research project was divided into two main domains.

The first one was to re-evaluate the efficacy of the T1 and T1sr vaccine strains and particularly to check if increasing the dose for the primary vaccination or by giving a booster dose two month after the first one would significantly induce the protection afforded (which is quite important in case of an emergency vaccination campaign).

These two objectives were performed by the partners in Cameroon and Kenya respectively.

The experiment in Cameroon went well but, unfortunately, it showed that increasing the dosage did not induce a very significant increase of the protection rate.

The experiment in Kenya did not go so well. It was not the fault of the experimenter, as it was obvious that the disease was properly transmitted from the donor group to the other groups (in contact and vaccinated). The problem was that the mortality in the control group was very limited. Hence it was difficult to measure the exact protection afforded by the different vaccines or vaccination procedures. When looking at the number of affected animals and the lesion scores it seems again that giving a booster vaccination did not increase significantly the protection rate.

The final conclusion of the exercise is that, in the field, only yearly repeated vaccination campaigns are likely to give a satisfactory protection rate. In the case of an emergency it remains compulsory to install strict control of animal movement as it is likely that an emergency

vaccination campaign in naïve animals will not induce sufficient protection to prevent the progression of the disease.

The second study was to test the activity of antibiotic treatment for CBPP. A preparation of long-acting tetracycline (oxytetracycline) was used. The findings were similar on two occasions: treatment reduced the clinical signs and the mortality rate but did not succeed in clearing mycoplasmas from the affected animals. The MmmSC strains were re-isolated from these animals specially from the sequesters and the tracheobronchial nodes. Apparently this did not result from antibiotic resistance. This suggests that treated animals may shed lower quantities of mycoplasmas but may still play a role in the transmission of the disease. This is important and it will have to be taken into account in future control strategies.

The research activities concerned first the characterization of the immune response of recovering animals. This part of the work was performed at ILRI, Kenya. Their results confirmed that recovering animals were developing an immune response involving CD4+ cells and production of interferon gamma.

CIRAD/EMVT focussed on the detection of virulence associated genes and their targeted inactivation by the use of OriC plasmids. Unfortunately they were able only to get an homologous recombination with an insertion sequence but not from the other gene that had been selected. The reasons for this failure were only understood after obtaining results of sequencing a closely related strain: M. mycoides subsp. mycoides LC.

The comparisons between the two fully sequenced genomes showed that MmmSC lacked a number of functional genes that are involved in recombination processes (recgenes). This opens new avenues for the inactivation of MmmSC strains although it will render this task more lengthy and cumbersome.

8.4. Validation of Pen-side Test for CBPP

Field tests to validate a pen-side test for anti-CBPP antibodies which utilises antigen coated latex beads were undertaken in Tanzania and Mali. However, results of the tests revealed that the pen-side test requires further development, especially to achieve better reproducibility.

8.5. Research on Other Epizootic Diseases

Even though no other research activity has been able to be conducted on the other major epizootic diseases affecting animals in Africa such as FMD, ASF, RVF, HPAI, it is important to notice that equipments received in some reference laboratories as well as training received by few African laboratory professionals could easily be put in use for further such research.

9.0 Progress in the Control of Highly Pathogenic Avian Influenza (HPAI)

Most emerging and reemerging diseases such as the highly pathogenic avian influenza (HPAI) can result in catastrophic production losses, negatively affect food security, disrupt trade in animal products and in addition, in the case of zoonotic diseases, be harmful to human health. Their control is therefore necessary in order to safeguard development activities.

Indeed, bird flu is an infection caused by an influenza virus of various types including the influenza type A virus. The latter is divided into sub-types namely, the H5 and H7 strains. Bird flu affects almost all bird species, be they domestic or wild. It can be highly contagious, especially among chicken and turkeys, and may result in high mortality rates, particularly in the commercial breeding sector. Domestic ducks, among which infection is very often asymptomatic, could play an important role in spreading the virus, as they are silent reservoirs of infection. To date, wild birds, particularly swans and ducks, have been found to be carriers of the type A virus (H5N1) in 15 European countries namely Austria, Bosnia-Herzegovina, Bulgaria, Cameroon, Czechoslovakia, Croatia, Denmark, Great Britain, Greece, Hungary, Italy, Poland, Slovakia, Slovenia, Sweden, Switzerland and Czech Republic.

Recently research results published in scientific journals demonstrate the high adaptation potential of the H5N1 virus to humans with the risk of genetic mutation which is so serious that direct human to human transmission could lead to a severe epidemic in the regions affected, and even cause a global pandemic.
The adaptation of the virus to man can be done in two ways: either by its progressive mutation or its combination with a human viral strain. The combination could occur in an intermediary host such as pigs or in humans in the case of co-infection. A combined strain or one that has mutated could acquire the capacity of inter-human transmission. The risk of propagation may then become significant, given the lack of immunity in the world's population to the new viral strain.

In the last year of the extension phase of the PACE programme, outbreaks of Highly Pathogenic Avian Influenza (HPAI) had a major impact on project activities, particularly on those of the PEU and the Technical Assistants.
Since the beginning of 2006, HPAI has been diagnosed in seven PACE countries, out of 8 affected in Africa. Highly Pathogenic Avian Influenza (HPAI), caused by avian influenza virus subtype H5N1, has severely affected poultry production in Southeast Asia since 2003. The African continent recorded its first outbreak of HPAI in Nigeria in February 8, 2006 in domestic poultry. Since then Egypt, Niger, Cameroon, Burkina Faso, Sudan, Côte d'Ivoire and Djibouti, have reported outbreaks of the disease in domestic poultry. The threat of further spread in Africa is real and it could occur from the legal or illegal movement of poultry and/or poultry products, or potential interaction between domestic poultry with infected wild bird populations.

9.1. Human Cases of HPAI globally and in Africa

According to the data collected by FAO (EMPRES, 2006) the World Health Organization (WHO) has recorded a total of 231 human cases of bird flu (H5N1) that have led to 133 deaths in 11 countries since 2003 (map 1). Most of human HPAI cases described in Asia (195 cases with 116 deaths); Europe (8 cases with 5 deaths); Middle East/Caucasus (14 cases and 6 deaths) and Africa (14 cases with 6 deaths). In all these cases the origin of infection is contact with sick or dead animals, or with their excreta. However, the possibility of human contamination following close and repeated contacts within family groups was cited in approximately twenty episodes in Azerbaijan, Cambodia, Indonesia, Thailand, Turkey and Vietnam. Nevertheless, this possible inter-human transmission remains limited and has not resulted in a secondary community

In Africa, Egypt declared 14 human cases with 6 deaths and Djibouti declared one case with no death. The WHO confirmed all these cases. They comprise the first human H5N1 cases on the African continent.

9.2. HPAI Status in Africa

Ten years in the past before the Asian crisis the following countries reported to OIE the case of avian influenza: Egypt (1965); Morocco (1983); Swaziland (1988); Niger 1995) and Central African Republic (1996). However, it was mentioned anywhere that the outbreaks were caused by HPAI virus and how the disease was eradicated.

South Africa (2004) and Zimbabwe (2005) reported the outbreaks caused by H3N2 virus in ostrich's populations. The disease has been eradicated stamping out.

Nigeria

In Africa, the first case of the HPAF was recorded in Nigeria. The outbreak occurred in Jaji (Igabi, Kaduna State) on an industrial farm with layers, and some ostriches and geese. The latest information on Nigeria from the OIE dated April 6, 2006 indicates the existence of 61 confirmed outbreaks of bird flu (H5N1) in 14 States, particularly in the northern part of the country. Today, information on the current status of the disease in Nigeria shows that the virus has infected 14 States and there are said to have been 85 outbreaks (cf. map 1). No single human case has been reported since the first outbreak in poultry. Quoting Nigerian authorities, the OIE specified that the owner of the first infected farm had treated his poultry with antibiotics before the diagnosis was confirmed. Proof of the presence of the highly pathogenic viral strain was confirmed by tests conducted in the reference laboratory of the OIE and FAO, located in Padova, Italy.

A suspected outbreak of AI was reported on a farm in Kakara village, Gezawa LGA, Kano State to the Veterinary Officials on May 15th, 2006. The report showed that the farm had a poultry population of 18,000 layers and 273 geese with a workforce of seven. Farm records indicate that the farm lost 200 birds on May 13th and 250 birds on May 14th before the State Veterinary Officials were informed. 11 samples were collected from the farm and sent to NVRI, The laboratory results showed that the samples tested positive for HPAI.

Egypt

Besides Asia, Egypt, which is the most densely populated among Arab State, is the country most affected by the H5N1 virus in the world. The first time, the H5N1 virus was detected in seven diseased dead hens found in houses, as opposed to poultry farms, situated in three regions of Egypt: four in Cairo, two in Guizeh and one in Minya, 220 kms in the south in February and the first human case was reported on March 18, 2006. The five victims of the disease comprise women who had slaughtered and treated the diseased poultry. A diagnosis of the cases reported, conducted by the Animal Health Research Institute (national laboratory) and the Marine Medical Research Unit no.3 (NAMRU-3) confirmed the presence of H5N1 virus strain.

So far the total number of governorats where infections had been reported is 21 governorats. The following governorats where infections had been previously reported did not experience further outbreaks: Cairo, Qalubiya, Luxor City, Qena, Beni Suif, Aswan, Damietta, Ismailia, Giza, Kafr El-Sheikh, Al Behira, Daqahliya, Sohag, El-Fayyoum, Alexandria, Suez, Minufiya, Gharbiya and Assuit.

Niger

An avian flu outbreak caused by the highly pathogenic sub-type H5N1 virus occurred in Magaria commune (Zinder region). Magaria commune borders Kano State, Nigeria. The presence of HPAI sub-type H5N1 virus was confirmed in this commune in poultry and domestic ducks at three traditional farms The first case was reported on February 13, 2006 and it was confirmed only on February 27,2006 that confirmation was made by Padova laboratory in Italy. Niger therefore is the second country in sub-Saharan Africa, after its neighbour Nigeria, to have been affected by the mortal viral strain of bird flu.

On May 2006 Niger confirmed another outbreak of HPAI virus subtype H5N1 in three villages (Boko-Maigao, Najiko and Tabadama) in Gabi commune, Maradi region. The outbreak started on 25th April 2006 in which a total of 530 chickens died. All of them were backyard poultry.

Cameroon

A bird flu outbreak caused by the highly pathogenic sub-type H5N1 virus was reported on three domestic duck farms in the Doualaré area in Maroua, Diamaré Department, in the extreme Northern Province, which borders Nigeria and Chad. The disease started on February 21st, 2006 and was confirmed on March 11th, 2006 and communicated OIE on March 12th, 2006. It all began when the owner of small duck farm in Maroua town (county seat of the Extreme North Province) realized that some of his poultry had died. He immediately informed the local services of the Ministry of Livestock. After analyses carried out in Cameroon and confirmed by the Institute Pasteur in Paris, a case of the highly pathogenic H5N1 bird flu virus was detected for the first time in the country. Instructions were issued for the other ducks on this farm, which in fact were only 25 in number, to be killed and for whole area to be disinfected. Therefore, Cameroon is the fourth country to officially have been infected by the mortal virus after Nigeria, Egypt and Niger.

Burkina Faso

On April 12th, 2006 Burkina Faso informed the OIE of a bird flu outbreak linked to the highly pathogenic H5N1 virus, confirmed in a campsite in Gampela, Saaba Department, Kadiogo Province, affecting guinea fowl. Samples were taken on March 2nd, 2006 on 7 guinea fowl after the death of 130 guinea fowl on March 1st, 2006. The reference laboratory for the Newcastle disease and avian flu in Padova, Italy confirmed the outbreak. According to the report by the Director General of Livestock in Burkina Faso, the disease commenced on March 1st, 2006. Ever since, the health authorities have implemented the counter plan to fight the epizootic.

An additional three outbreaks of HPAI H5N1 were confirmed positive on May 19th, 2006 in Ouagadougou, Sabou and Bobo Dioulasso in backyard settings located at the edge of the main road towards Côte d'Ivoire. This changes to 4 the number of outbreaks avian flu recorded in the country. Control measures were put in place immediately and culling started on May 22nd, 2006.

Sudan

The H5N1 bird flu virus was detected for the first time in Sudan on several farms in the capital of Khartoum and Gezira State in the central part of the country. Several tens of thousands of poultry died. The Bureau of FAO for the Middle East confirmed that analyses conducted in a public laboratory in Khartoum confirmed the presence of H5N1 virus.

Cote d'Ivoire

Two highly pathogenic bird flu outbreaks were recorded in Abidjan (Marcory Anoumabo and

traditional free range birds, raised in a poultry-run and one sparrow hawk. The LANADA's (National Laboratory for Agricultural Development Support) Central Veterinary Laboratory in Bingerville did diagnosis. Of the 72 samples sent to the reference laboratory corresponding to 14 samples from the entire country: Bondokoukou, Korhogo, Bouaké, Abidjan, Bingerville, in Abidjan District, where deaths were suspected to have been linked to the disease by the national laboratories (LANADA and Institute Pasteur), it was confirmed that the sparrow hawk in Treichville had indeed died of bird flu. The suspicion that ducks as well as the layers in Bingerville died of bird flu was confirmed.

According to the OIE, the H5N1 virus infected seven hens and nine ducks raised in poultry-run, as free-range birds. In summary, only Abidjan District was hit by the flu at the level of wild birds as well as traditional hens.

Djibouti
Djibouti confirmed the presence of bird flu on its soil when it announced that the H5N1 virus had infected one person. A patient (sample taken on April 27 from a person exhibiting flu symptoms) and three poultry tested positive for the H5N1 virus. The World Health Organisation (WHO) confirmed this human case in Geneva. According to Dick Thompson, the WHO spokesman, a little girl aged two years was infected by the virus but is still alive. Djibouti is thus the first East African country and the eighth on the continent where the H5N1 virus has been detected.

9.3. Threat of the HPAI for African Countries

Among diseases threatening African continent due attention should be made to highly pathogenic avian influenza as this disease causes high mortality among poultry population which is the biggest source of income in rural areas. Taking into consideration that the mechanism of a rapid and vast dissemination of the disease both nationally and internationally is not yet understood, and after analysing the threat to Africa from this disease and its impact on efforts towards poverty alleviation in the continent, AU-IBAR as the technical office of the African union mandated to address all animal health issues has taken the lead in preparing the continent against HPAI.
It is also relevant to recall that in Africa systems for effective disease surveillance for both animal and human health are weak. The capacity of Veterinary Services to ensure early detection and rapid response to outbreaks in livestock is limited. Moreover, the public health systems are inadequately prepared to cope with outbreaks of human cases in many African countries and this is of great concern. Besides infection from wild, migrating birds, traditional marketing systems in the region have played a major role in disease occurrence and spread. A factor adversely affecting control activities has been poor co-ordination between national and local authorities; basic control measures, such as restriction of animal movements, quarantine, closing of poultry markets in affected areas, and border controls have not been fully implemented and there has been little awareness regarding the risks of HPAI and the protective measures that should be taken.

Insufficient financial and logistic resources, weakened veterinary services, lax border controls on animal movements, conflicts and inappropriate governance constitute an environment where the spread of the HPAI and other transboundary animal diseases could be highly facilitated. Therefore, countries of the continent must be considered as facing a high risk of becoming infected with HPAI. The impact of outbreaks of HPAI through loss of poultry production capacity and consequences of control actions are likely to be worse than in any other part of the world. Moreover, the risk of the disease becoming endemic in domestic poultry or wildlife has to

be considered as a threat for the future. The continent could equally become a reservoir for the virus from where re-emergence of the disease could pose a recurrent risk at global level. The probability of having the virus mutating and starting a human pandemic is also a distinct possibility. The rapidly evolving HPAI situation therefore necessitates an adaptation of the global strategy to fit African specificities. An assessment of needs and gaps so as to seek donor assistance to contain the outbreaks and to protect peoples' livelihood and public health, therefore critical.

This epidemiological situation brought AU-IBAR, OIE and FAO to reconsider the proposed strategy for prevention and control of HPAI in Africa. The first step taken was the convening of a conference on HPAI in Nairobi, Kenya in September 2005 to review the disease situation and assessment of the risk factors underlying possible introduction of the disease into the continent. Among other things the meeting recommended the formulation of an AU-IBAR strategy for the prevention and control of the disease. The strategy that was subsequently developed in line with the FAO/OIE global strategy for the progressive control of highly pathogenic Avian Influenza has been adopted by the Conference of Ministers responsible for Animal Resources in Africa at Kigali in 2005. The strategy aims at preventing introduction of AI into unaffected regions of Africa or minimizing the socio-economic and public health impacts in those countries that are already infected.

9.4. Actions Undertaken by PACE to Fight HPAI

Control measures in PACE countries have been enhanced by the epidemio-surveillance and sampling procedures which the project has introduced and which has been extended to domestic and wild birds.

It would not have been possible to deliver the surveillance and control measures for HPAI in the countries affected if the passive and active epidemio-surveillance systems already developed through PACE had not been in place.

The main control measures that have been applied are:

- Stamping out, involving destruction of affected and in-contact birds at affected locations by incineration followed by compensation of poultry keepers.
- Stamping out and ring vaccination.
- Active epidemiological surveillance of poultry farms and sampling poultry and wild birds for submission to reference laboratories.
- Disinfection of infected premises and fomites.
- Restriction of animal movements, quarantine, closing of poultry markets in affected areas and border controls.
- Quarantine of infected and suspicious farms.

Through workshops, the PEU and TAs, in co-ordination with other inputs, for example, regional FAO TCPs, have introduced:

- Early warning and outbreak investigation protocols and reporting based on the OIE guidelines.
- Technical capacity to diagnose HPAI in PACE countries' laboratories.
- Analysis of HPAI surveillance and diagnosis data through national epidemiology units developed by PACE.
- Exchange of information through PACE's regional networks.

- Public information materials on HPAI through Communication Units developed by PACE.
- HPAI surveillance and control strategies disseminated to PACE countries at meetings and workshops.

Specific activities undertaken by PACE in relation to HPAI control:

- 12 regional meetings have been organized to get a co-ordinated international management of the crisis caused by the disease.
- 28 missions have been carried out by PEU epidemiologists and TAs to provide technical support to countries with outbreaks and to assist uninfected countries with preparation of national emergency preparedness plans.
- 15 technical information packages have been published on the disease and its management.

Since the beginning of HPAI epidemics in PACE countries there have been the following developments:

- Bans on imports of poultry and poultry products from infected countries have been introduced.
- Emergency preparedness plans have been elaborated.
- Surveillance in domestic and wild birds is ongoing.
- Memoranda of Understanding have been made between AU-IBAR and ADB so that funds for control of HPAI are available for eight countries in West and Central Africa.

At the 6th meeting of the Executive Committee of Alive, OIE, FAO and AU-IBAR formalized a Memorandum of Understanding on the installation of a technical framework intended to ensure a better co-ordination of their interventions, in particular with regard to the fight against HPAI in Africa. In line with this framework, a joint consultation between AU-IBAR, OIE and FAO and the regional economic communities has been undertaken in order to evaluate needs and prepare an action plan to prevent and control HPAI and avoid a possible pandemic.

9.5. Lessons Learnt from Crisis Management of HPAI in Africa

Priority actions planned within the framework of emergency plans by countries should focus on mobilizing public opinion and various stakeholders on the national and regional scene, capacity building in the area of early diagnosis with a view of accelerating the implementation of control measures, and increase the rapid response capacities in case of outbreaks. The effectiveness of these measures could be significantly strengthened through simultaneous actions in all countries of the same sub-region. For this to materialize, measures need to be taken to avoid sending out samples late to reference laboratories for confirmation of diagnosis.

The first bulwarks against the avian flu lies in the ability to make a quick diagnosis of the disease so as to rapidly respond (setting up a crisis committee, chain of command and communication, protection materials, resources and culling plan, means of transport, availability of human vaccines, biosafety, etc.). To achieve this, it is essential to have an effective system for system for the early detection of the disease (surveillance, effective monitoring of movement of birds and their products both within countries and at their borders) and to have equipment to analyze samples in order to identify the presence of the virus. This implies a level of organization that

exists in few African countries. On the other hand, finding dead birds is a common occurrence in African villages. Poultry on farms are often victims of diseases, such as the Newcastle disease, which do not elicit a lot of worry since they do not represent any danger to Man. This, of course, is not conducive for the detection of an outbreak of bird flu. All this requires a sensitization campaign for both rural and urban populations.

One of the key problems is that in general poultry farming is traditional, which makes confinement practically impossible as farmers rarely have hangars and leave their poultry free. This contributes to the dangerous spread of the avian flu in Africa with the possibility of the virus mutating. This explains why even after culling, it is necessary to comb out all these villages to ensure that no bird was forgotten. It is then essential to implement the culling of the diseased birds and all those found within a perimeter of a several kilometers, to quarantine, or to enclose farm poultry for purposes of protection.

Culling involves compensation for farmers whose poultry are often the sole source of income. It is for this reason that the organization of compensation for farmers should be well structured (compensation plans, availability of human and financial resources in the country). In addition, populations need to be convinced of the reality of compensations by receiving cash payments.

10.0. Establishment of an Animal Resources Information System (ARIS) at Institutional and Country levels

10. 1. Nature, Importance and Role of ARIS

The Interafrican Bureau for Animal Resources (IBAR) is a technical organ of the African Union (AU) in charge of coordinating all animal resources issues throughout the continent. The vision of the Bureau is to be the vehicle for the AU to develop an appropriate and independent expertise in the areas of Animal Resources and Production for the alleviation of poverty of those involved in livestock farming and food security in member states. Among the core functions of IBAR, collecting, collating and disseminating information on all aspects of animal health and production across the continent, ranks high. It has implemented successful projects such as the Pan African Rinderpest Campaign (PARC) between 1986 and 1999, as a result of which a devastating cattle disease is eradicated from Africa except for very few remaining foci. IBAR is rounding up the implementation of another project called the Panafrican Programme for the Control of Epizootics (PACE) targeting the final eradication of Rinderpest, the control of major epizootics and creating capacity of disease surveillance in member states and at continental level, among others.

As part of capacity building in collecting timely disease data for early warning and early reaction and also other animal resources data for generating information for planning and decision-making, PACE has developed an information management tool. The tool is called the PACE Integrated Database (PID) and plays a key role in animal resources management for sustainable development and regional integration.

As in any sphere of modern life, information is becoming crucial for planning, decision-making and monitoring activities in animal resources sector. African livestock keepers need swift action against multitude of diseases, which affect the health or threaten the live of their herds and flocks. Some of those diseases are even zoonoses and can therefore also threaten public health. Countries may loose also their lucrative international livestock market due to the presence of certain diseases. Veterinary Services in these countries, therefore, need timely data for early warning to take appropriate measures in time.

Information plays important role also in prioritising economically or socially important diseases for research or control purposes and also to make rational resource allocation. These days where transparency and accountability are orders of the day, reporting disease situation to international organisations and keeping informed consumers, importers and exporters and the general public is of paramount importance. International certification for freedom from disease is only possible if countries can show verifiable indicators, for which information again is crucial. Hence, an animal resources information system fulfilling these requirements is needed at different levels.

10.1.1 Challenges in establishing an efficient information system

One has to know that there are several applications to manage information in the animal resources sector. These databases mostly developed for a specific office or a country address issues related to animal health or production or marketing, etc. However, a tool, which brings all these together for holistic approach and analysis, is lacking. Moreover, very few of these applications can be shared on Local Area Network (LAN) to enable different users entering data, analysing or just browsing. With current trends, technical people and decision makers can't sit

and wait till information management staff members process their request while they themselves can do it on the fly.

It appeared imperative in the case of PACE to have an application, which serve both at country and regional or continental level with smooth data flow between different levels. In such way countries can visualise zoo-sanitary situations in their neighbouring countries and take appropriate measures in timely manner. An application catering for regional integration requires, at least, two major facilities. These are Internet connection facilities to browse what has been stored on a central server (provided that the database is web enabled) and multi-language facility, if countries in the region use different languages. Here, the same database with all the data gathered from the regional, should be able to operate in different languages and automatically switch among on another.

With fast development of ICT, there is also proliferation of undesirable effects such as destruction or misuse of data or application. Hence, data and application safety and security should be maximised and access levels (rights) to these resources scaled based on the role of the user in the institutional set-up.

10.1.2 The PACE Integrated Database alias ARIS

To reach its goals, it was necessary for PACE to design an application with the facilities listed before. The PACE Integrated Database (**PID**), is a result of this effort and the application was launched at the end of October 2002. The PACE Integrated Database (PID) was named Animal Resources Information System (**ARIS**) later on due to its capacity to manage various animal resources related data. ARIS is perceived as the adequate response to needs of National Veterinary Services for a comprehensive Information System. It is an information management tool based on Oracle for the storage, transfer and analysis of animal resources data and sharing information generated from these. Unlike other zoo-sanitary databases, ARIS has modules to capture and manage data/information related to:

a. Animal Health:

- Passive surveillance and Disease reporting,
- Outbreak emergency reporting,
- Abattoirs surveillance,
- Active surveillance of major TADs

b. Veterinary Institutional Management

- Animal Health Infrastructures & equipments
- Human resources (number and distribution of public & private professionals…)
- In-built performances Indicators to monitor and evaluate veterinary services

c. Livestock Production, numbers, Trade and Economics

- Population, spatial distributions…
- Production
- Trade of animal and animal products

Thus with the use of ARIS, national animal health authorities can make adequate decisions, plan and organise control programmes in line with the availability of their human and material resources. There is a facility of integrating different data from animal resources sector which

occurrence with livestock numbers in a given area). This approach of integrating data from different sections of Animal Resources ministries or departments is meant to avoid duplication of databases and fragmentation of data and information from these.

Out of 32 member states of the PACE programme, 20 are francophone or use French as working language while 12 make use of English. Hence, the first version of PID runs simultaneously in French and English. A dynamic translation method used to design the application allows users to switch between languages on a single database or run one language but print report in another. This is particularly handy for neighbouring countries with different official/working languages (e.g. Ghana and Cote d'Ivoire). The PACE programme has successively worked since 2002 on two versions of the application. The second version is made available on Internet. The Web enabled version allows authorised users to enter data online and browse data/information of neighbouring or other countries in the network. Summary information can be extracted regularly from the database and posted of the IBAR's website for the general public. The second version also includes Portuguese as an additional language. The PID developed in this way will be gradually transferred to IBAR to support the information collection, collation and dissemination core function of the institution. Continuous upgrade of PID and technical support provision to member countries in this regard will be the responsibility of IBAR in the near future.

On a regular basis (once every one, three or six months), countries are sending data via INTERNET to AU-IBAR HQ system. Only validated data are transferred and nobody at AU-IBAR HQ is able to make any change on it. If any modification is required on data already sent to Nairobi, then only a national administrator is able to change the data directly on AU-IBAR system. These restrictions are considered important since data ownership belongs to the country and not to AU-IBAR. Furthermore, ARIS II gives much greater flexibility on data extraction and offers the possibility to adapt to new diseases, especially for the Active Surveillance.

Data contained in databases is a valuable institutional resource, which should be kept from unauthorised users and those with bad intentions. Hence, data safety and security is increasingly becoming an issue while selecting databases. Two tier of security is available in ARIS: firstly only authorised users can get access to the database through secured user ID and password. Secondly, there is a scalable security feature whereby authorised users are given certain level of rights, from only viewing data tables to entering data or modifying and even deleting them. The Database Administrator (DBA) is an assigned person in the institution controlling the way the database is used and give or deny right of access to selected data tables or all. Although not yet fully automated, data backup and restore feature of ARIS coupled with the features mentioned above meet current demands of secure database.

10.1.2.1 Compatibility with other applications

One of the major concerns of many users is how to integrate their historic data contained in previous databases to the new one. Furthermore, data from one system should be easily transferred to others and vice versa for different reasons. Hence, easy data import and export facility becomes mandatory. The Sequential Query Language (SQL) ARIS is built on allows easy data import from other databases. Export of data from ARIS to integrate these to another application or conduct further specialised analysis is also possible.

The first version of ARIS has a facility to compile the Status Report 3 (SR-3), the monthly disease report countries used to submit to the OIE. The facility further allows sending the report as e-mail attachment if Internet connection exists. Ghana, Cote d'Ivoire, Uganda and Guinea Bissau

reporting system this facility has now become redundant. However, IBAR plans to create an interface between ARIS and the World Animal Health Information System (WAHIS) to enable member countries report to the OIE in the required format and time from their national ARIS database. Cooperation with the OIE in this regard is required. In this way, countries continue using ARIS for their national information management needs without failing to report to international and regional organisations.

10.1.2.2. Decentralised Information Management

ARIS is based on decentralized information management philosophy. Each administrative level (district, province, national, etc.) where ARIS is installed is self-sufficient to enter and analyse its own data and generate information, without waiting for central offices to send feedback. Sending feedback on regular basis has been the weakest link in information management in the past. Non-aggregated electronic raw data entered at lower levels is extracted and compressed automatically for transferring to immediate higher level, where a simple operation uploads it to ARIS at that level. The Data Communication Package of ARIS is specifically designed to cater for extracting, transferring and uploading data at different administrative levels. The time devoted for entering piles of paper data received from lower levels is now freed for focusing more on analysis, and increases efficiency by using less data entry personnel. Some African countries have taken steps in installing ARIS not only at national level but also at immediate lower levels. Examples include Sudan and Nigeria (at State level), Tanzania (at Veterinary Investigation Centre level), Kenya (at Province level).

10.1.2.3. Information sharing

One of the benefits the Information and Communication Technology (ICT) provides is the ease and speed with which information is shared among different users, not only those in close proximity but also at different geographical locations. ARIS complies with this ICT development was designed to suit both single user and multiple users. In multi-user environment, where ARIS is installed on central server and users access it through the Local Area Network (LAN), different staff members working for different sections of Ministries or Departments of Animal Resources may have different tasks. Some of these may be assigned to enter data, others to look in its consistency and validation, while some others analyse and generate information. Senior staff may have time only to look at results of analysis. There is no limitation in the number of concurrent users in multi-user environment of ARIS as long as sufficient licenses for Oracle, the database engine ARIS is built on, are available. Countries where a Server-client based (multi-user) ARIS is being used include Senegal, Uganda and Kenya.

10.2 Implementation of ARIS at Institutional Level

The implementation of ARIS was welcomed with enthusiasm by Data Management officers (DMOs) and the software was used on a daily basis in 28 PACE countries. However since diseases reporting to AU-IBAR and to OIE is a requirement and is considered among countries' priorities, the module for Passive Surveillance and Reports Generation was the most used. The module for human resources management and the one related to livestock economics was used only in a few countries (Kenya, Mali).

Twenty eight of the 30 PACE countries have installed ARIS and are using it in their Headquarters. Four countries are entering surveillance data into the FAO programme Tad Info as well and of the six countries not using ARIS, one (Rwanda) is using Tad Info only, one

(Eritrea) is using Access only, Ethiopia is using an Access database which was customised during PARC, and three countries (Equatorial Guinea, Burundi and Djibouti) appear not to be using electronic information systems. Kenya has already introduced ARIS at regional level.

Some countries are analysing the data generated in ARIS using geographical information systems (GIS), such as Arc View and MapInfo to map their surveillance information, Access, Excel and statistics programmes such as SPSS.

ARIS has been developed in Oracle by the PACE Data Management Unit, the programming being done by a commercial company based in Nairobi. It is installed and backed up by the Unit, now merged with the Communication Unit. ARIS can record monthly reports, outbreak reports, results of active surveillance, national livestock resources as well as human resources in animal health delivery services. It can report on the efficiency of the disease surveillance system in a country using the performance indicators developed by the PEU. The programme does not have a GIS component but can export data in a format that can be imported into commonly used GIS programmes. It can also generate pre-programmed reports on animal health and production through the database and edit them in two languages (French or English). The Portuguese version is also foreseen.

Not only has the Data Management Unit developed and introduced ARIS, it has also established a Local Area Network in IBAR and has undertaken livestock disease and resources mapping using GIS. It has undertaken training and preparation of manuals on the use of the software it has developed. The Unit has also re-launched the PACE/IBAR website.

The transition ARIS made from PID to its present status and its integration to IBAR removes all doubts that it is a project based database and phases out with PACE. IBAR will ensure the smooth operation, technical support and continues upgrade of ARIS.

10.3 Situation at Country Level

The introduction and implementation of ARIS in PACE countries faces problems. The main problems are related to the weak institutional capacity to handle complex databases such as ARIS, the lack of streamlined disease reporting compatible with ARIS requirements and the inability of ARIS to manage data in a user-friendly manner. Potentially, ARIS is a very powerful tool, but like all developing IT systems, it has its teething problems. Thus it appears to be an unfinished product which needs continuing support and development. An additional constraint is the lack of appropriate computers with sufficient capacities (even at headquarters) in most PACE countries.

Since the official launching of the PID at the end of October 2002, installation and configuration of the database and training have been conducted in a total of 28 countries. Over 100 staff members in these countries, involved in information management and Epidemiology, received training of trainers' course. Some countries (e.g. Sudan and Uganda) have already conducted training of staff members operating at field level.

Four African and three expatriate experts were intensively trained in the implementation of PID to provide technical support to countries whenever this is required. The four African experts, permanent staff members of the veterinary services, are drawn from different parts of the continent one from Eastern Africa, one from Central Africa and two from West Africa. These experts have implemented PID in their neighbouring countries and are providing technical supports. This initiative of cross-border experience exchange between African countries through

these experts is much more sustainable than the time-bound technical assistance received from expatriate experts recruited under PACE. The regional technical assistants attached to the West and Central African regional coordination office of PACE located in Bamako, Mali has contributed enormously to the implementation of PID in African countries and deserve recognition.

ARIS is implemented in 28 out of 30 PACE member countries. According to a questionnaire administered to these countries 64.3% of countries where it was installed use the database on day-to-day basis while the others require better computing facilities or re-installation and refresher courses. The same questionnaire revealed that ARIS is the only database used in 51% of the responding countries, while alone or combined with other databases, ARIS is used in 93% of these countries.

10.4 Conclusion and the Way Forward on ARIS

The feed back received from users both at IBAR and countries' levels following a three-year testing phase, is that ARIS is indeed an all-compassing and very useful information system for Livestock Institutions in Africa. It was unanimously acknowledged that ARIS is the response to needs of African Veterinary Services for an Animal Resources Information system and therefore it should receive the required attention and support to enable the optimal use of all its modules at AU-IBAR and in member countries. A simplified and user-friendly version of ARIS will significantly enhance the flow of information from AU countries to regional and international bodies.

In addition a lot of resources were already invested in developing, implementating and building up the capacity for ARIS. Countries have also customised their field forms to fit ARIS. Thus stopping the support towards ARIS improvement would result into a great loss with a rather negative impact in the field.

Besides ARIS, PACE has been supporting the establishment of an Information and Communication System (ICS) in AU-IBAR to improve the access and sharing of information with member countries and with International Institutions. PACE established and maintained a LAN with an e.mail system and mailing lists in IBAR. It has supported the development of a website, an insider news flash and currently the development of a digital library database. Under PACE a large amount of communication materials of various formats were also produced at the PCU level and in national components but the sharing of these materials is still limited. ARIS for its optimal use, needs to be a component of this overall ICS at IBAR and member countries. Within AU-IBAR Intranet system, ARIS and the library database will constitute interactive tools that will significantly facilitate the upload of data, reports and communication materials from member countries and vise versa. It is therefore to be seen as a great achievement for PACE to hand over a functioning and modern ICS to IBAR.

IBAR and member countries can make an optimum use of ARIS and the Information and Communication system only if they possess adequate IT capacity and Internet connection. Countries are currently at different levels as far as ITC is concerned, some with a fairly good speed internet connection and even an intranet and others with a yet very basic IT tools. In addition the new reporting format to OIE (WAHIS) requires each country to access the database

online and enter its zoo-sanitary data. This new reporting procedures requires countries to have a reliable internet connection as any interruption would mean loss of data entered and the need to re-start data entry again. Likewise ARIS II will be web based and thus disease reporting to IBAR will be done via internet connect to IBAR Server. Countries will also need adequate ITC capacity to access documents on IBAR website and database library but to also upload country reports, newsletter and other relevant documents.

It is critical to emphasis the fact that ARIS, TADInfo and WAHIS are complementary information systems with different focus each. There is no conflict, no competition and no need for exclusion whatsoever.
However this does not seem to be very clear to users'of these databases in the field and the fact that the OIE, FAO and AU-IBAR did not yet work out a harmonized format for diseases reporting has made the matter even more confusing. Database management officers often have to enter the same information many times to comply with different reporting formats.
Countries must be free to use TADInfo or ARIS or both to meet their needs for a zoo-sanitary database or a broad animal resources management tools. But a uniform reporting format to OIE needs to be developed whatever the programme used. What is needed is to improve communication between these three systems and with countries databases. This can be done using a Web Service to extract data under a standard universal format (XML). Thus instead of asking countries to fill in specific reporting forms or to access a database on the web and upload their reports, it's up to the reference organisation (OIE, FAO, IBAR to which an authorization to access the web service is given) to access the data of a given country and download the information needed.

The setup of Regional Centres for Animal health where OIE, FAO and AU-IBAR are represented towards the harmonization and compatibility of respective databases/information systems.

11. 0 Achievements in Building-Up the Capacity for Communication

11.1. Missions of the Information and Communication Unit (ICU)

The Information and Communication Unit (ICU) is a newly formed Unit of PACE coordination during the extension phase. Its main components are the Data Management Unit (ICU) and the Communication Unit. The ICU of the Pan African programme for the Control of Epizootics (PACE) is one of the Unit established at the beginning of the Programme in 2000, with the main objective of creating and enhancing information management capacity, in particular the establishment of system for managing disease surveillance information. This is in line with three of the four thrusts of PACE and form an integral part of the core functions of the Interafrican Bureau for Animal Resources (IBAR) of collecting, collating and disseminating information on all aspects of Animal Resources. Detailed report on the structure and function of the ICU as well as its achievements and problems faced for the first phase of PACE implementation (June 2000 to October 2004) was compiled as hard copy and in an interactive electronic form on a CD and presented to the Programme Coordination Unit.

Even though communication is obviously a mandate of all PACE units, the epidemiology and the communication units of the programme were more involved in the achievement of this goal for the whole.

The Global Plan of PACE has attributed great importance to the capacity of data management and communication at AU/IBAR. It has recruited a Data Management Officer, who together with assistants set up computerised system for gathering and analysing data from PACE member countries. It is to be recalled that information collection, collation from and dissemination to OAU member states is one of the four main objectives of OAU/IBAR. This is believed to remains as one of the core activities of the restructured AU/IBAR. However, during PACE lifetime, there was no section or department of OAU/IBAR and later AU/IBAR handling the mentioned activity. Hence, PACE through its ICU filled this vacuum.

The main objective of ICU was to develop and introduce a sustainable information system to PACE and advise, facilitate, support, harmonise, catalyse and inform PACE Regional and National Coordination in appropriate data collection, transmission and analysis and information dissemination systems making use of appropriate Information and Communication Technology (ICT). Experiences acquired during the process and system established would be the basis for future IBAR information management system.

In order to achieve its objectives, the ICU has used the following strategies:

1) Lay foundation for the establishment of a sustainable animal health & production information system, which makes use of modern ICT and approaches enabling IBAR to prioritise, plan, make decisions, advice users and monitor activities related to animal resources.
2) Provide information on the epidemiology of Rinderpest in member countries by creating appropriate data collection methods from national veterinary services, CAHW/NGOs & other sources.
3) Collect data and generate information, which enables PACE to monitor activities of member countries geared towards the final eradication of Rinderpest and their progress along the OIE pathway.
4) Collect and analyse baseline, epidemiological and economic data on major livestock diseases

5) Assist member countries to build capacities to establish/strengthen the management and dissemination of information on animal health and exchanged it with neighbouring countries.
6) Harmonise and standardise collection of data and management of information related to animal production and health with international and Regional organisations (i.e. OIE, FAO EMPRES, FAO RADISCON, SADC) operating in Africa.
7) Build capacity of staff working for national programmes in areas of information management and create eventually an African network of animal health information.
8) Foster a cross border information management skill transfer between member countries.

11.2. Achievements at the Coordination and Regional Units' Levels

11.2.1 Information needs of PACE identified

Before planning any data collection or processing activity, clearer idea about information needs should be established. At the beginning of the PACE the type of information needed by the different Units of PACE Regional Coordination and National Programmes was identified. It is clear that lack of data/information is a problem for planning or making decision. However, having enormous amount of data/information of all kind, beyond the capacity to manage or irrelevant or obsolete to the pursued objective is equally a problem. With the objective of assessing information needs, a checklist of information was prepared and circulated among different Units in August 2000. Similarly, eight PACE member countries were visited to establish the level of information management and information needs during the Programme implementation.

11.2.2 ARIS designed, updated and developed

One of the main tasks of the ICU was to establish an information system for PACE, which can later serve as basis for IBAR's information system. Adequate information management tool is key to achieve this task and the Unit has started looking for database, which fulfil this objective in earnest. The Unit attempted to avoid reinventing a wheel by making inventory of available databases for the animal resources in general and animal health in particular. Among the candidates, TADinfo, an Access based database developed by United Nation (UN), Food and Agriculture Organization (FAO) was closely examined for suitability for the PACE programme. The DMO visited the headquarters of FAO in Rome, Italy and held discussions with staff members in charge of TADinfo. Similarly, he visited Centre de coopération internationale et recherche agronomique pour le development – Department d'élevage et de médecine vétérinaire (CIRAD-EMVT) in Montpellier, France in quest for the French version of TADinfo. The mission, which took several days, assisted to compare PACE requirement with the facilities TADinfo has. As has been detailed in the mission corresponding report, there were several requirements of PACE the Access based TADinfo cannot meet. Some of these included the Network facility for multi-user environment, Dynamic Multi-lingual facility and *intelligent* data entry system.

The DMO was informed that problems reported on the Access based TADinfo were already identified by FAO, which is working on an improved Java Version and this would be available in short period of time. The ICU took further step in mobilising a consultant in identifying information needs of the Programme and whether those needs can be satisfied by TADinfo or not. Even if the needs are met partially, the consultancy can recommend what should be included in the design and development of the Java version of TADinfo. The ICU with the assistance of the PACE Epidemiology Unit (PEU) worked for more than six months in drafting the terms of reference for the consultancy, get the approval of the Delegation of the European Commission in

Kenya, inviting consultants for proposal and short-listing and evaluating candidates, etc. The expenses for this consultancy were planned to cover under the Epidemiology component run by FAO. By the time the right candidate was identified and the final report submitted to FAO for consideration, the later declined to accept the financial proposal of the candidate and the consultancy was eventually cancelled.

With the consultancy cancelled, there was no alternative other than waiting for the promised Java Version of TADinfo and this dragged for about 18 months. By the end of 18 months waiting, which accounts for 30% of PACE lifetime, the ICU proposed the development of new database instead of continuing waiting for the Java Version of TADinfo. The proposal was accepted by PACE Programme Coordination Unit (PCU). The idea of designing and developing a brand-new database following the requirements of PACE already identified was elaborated and presented to the fifth PACE Advisory Committee Meeting (ACM) held in Bamako Mali, between 10 and 12 April 2002. The ACM later recommended the design of the database with gated approach and present results to the sixth ACM.

Proposal for the design of the database, initially called PACE Integrated Database (PID) was drafted and circulated among PACE Regional and National Programmes for comments. Valuable comments and ideas were gathered and used during needs assessment phase of the design. A suitable local company was identified for programming and the first version of the database was ready in just three months period for testing. Staff from ICU, PEU and PACE Kenya received training on the operation and use of the database. The final product, PID, was presented to the sixth ACM held between 9 and 12 October 2002 in Nairobi, Kenya. The ACM congratulated the ICU in producing the database within the recommended timetable and suggested the continue developing the remaining modules of the database.

The Animal Resources Information System (ARIS), uses an Oracle engine to store, transfer and analyse animal resources data and integrates animal production and marketing modules with animal health and veterinary service delivery modules. It is a multi-user, multi-level and multi-lingual application with modern information management concepts. The application runs on different platforms (processors and Operating Systems) and has different levels of scalable security features. The conceptual design of the application allows currents trends of decentralised information management, empowering lower administrative levels to analyse their own information without the need to wait for higher levels to send feedback. Likewise, it takes boring and repetitive data entry task off the shoulders of national staff, overwhelmed by enormous amount of data coming from most districts in countries in paper or unsuitable digital formats, by providing automated uploading facility of raw electronic data from districts in compatible electronic formats.

The application through technical support contract was continuously upgraded and problems identified fixed. For the purpose of implementation in member countries, the ICU has produced Installation Guide and Users Manual as well as training notes in English and French languages. Brochures and a poster on ARIS were also produced in both languages. During implementation, each PACE National Programme received Oracle and ARIS CDs, Installation Guide and User's Manuals and training notes.

11.2.3 Information management capacity built at AU/IBAR

During the last five years, IBAR in general and PACE in particular have undergone significant shift from paper based information management to digital age. This was possible by the introduction of networked computing facilities and improved Internet connectivity. Data safety

ICU staff in database operation and administration and GIS was another area given priority regarding capacity building in information management.

11.2.3.1 Establishment of a local area network (LAN)

The initial phase of LAN establishment at PACE/IBAR was handled by the PCU. This initial phase was completed by May 2000 and ICU took over the PCU this task as it was established in July 2000. The LAN Administrator was officially appointed as of January 2001. The LAN consisted of a Server with 18 GB hard disk space and a hub with 24 connection ports and similar amount of workstations. From the size of the hub and the 25 Licenses of Windows NT 4.0 (the Operating System for the Server) one can assume that the original plan was to host about 24 users on the LAN.

However, the ICU developed LAN Improvement Proposal (document available) and involved other projects implemented under IBAR to share the facility and the cost it implies. Although most of the LAN expenses are still covered by PACE, the LAN facilities are shared by all IBAR permanent staff and those employed by different programmes and projects. At the time of writing this report, the LAN involves two Servers (an exchange Server and a high capacity data Server), Three 24 connection ports hubs on the fifth and sixth floor of the office and 72 client machines connected. Inventory and specification of the equipment and Protocol of Connection is provided in Annex I. The establishment and continues upgrade of the LAN is one of the many PACE achievements contributing to build ICT capacity of IBAR, as prior to this, there was no LAN in the institution.

The establishment and continues upgrade of the LAN is one of the many PACE achievements contributing to build ICT capacity of IBAR, as prior to this, there was no LAN in the institution.

11.2.3.2. Data safety and security

While implementing electronic information management, one of the first concerns is safety and security of the corporate data and information. The Server houses ARIS and Navision (an IBAR accounting application) in addition to various valuable files and folders. Keeping these resources from unauthorised users and from Virus infections is the task ICU was exercising for the past few years. The Unit purchased McAfee Antivirus and subscribed to Licenses for two years, renewing as required. Firewall and content filter were other safety measures proposed but due to mainly financial problem couldn't implement as yet. To avoid data/information losses, daily incremental and weekly full backup of files was instituted at the beginning and currently better backup methods are introduced using Raid 5. The Unit contemplates off-site storage of backup tapes to maximise data safety and security.

11.2.3.3. PACE Intranet

For efficient use of the LAN facilities, ICU proposed and implemented a PACE Intranet project. The main purpose of the project is to create a home page, which integrates PACE Filing system and other resources such as staff movement, scheduled activities, databank, databases and virtual library. The system allows easy navigation of resources and searching of files on the Server. Although the final product, the PACE Intranet, was developed and how it works was demonstrated, lack of staff member in charge of running it day-to-day made impossible its implementation. (Documentation and the application are available).

11.2.3.4 Internet lease-line and VSAT

The availability of reliable Internet connection is mandatory for a Programme like PACE implementing activities in 32 African countries and working with various international organisations and partners. Hence, connectivity was taken seriously since the beginning of the Programme. To this effect a 32 Kbps analog lease line was secured in 2000 from Africa on Line, a contract later transferred to UUNET. Similar to the LAN, the Internet connection expanded to other sections and projects of IBAR, for which the Internet's connection bandwidth was insufficient. Hence, the ICU proposed solutions to improve Internet connectivity. The two alternative solutions were to upgrade to digital lease line (Kenstream) or to establish a two-way satellite connection using the Very Small Aperture Technology (VSAT). The Unit researched extensively and concluded that upgrade to digital lease line improve connectivity to certain degree but since this solution still rely on the monopolised gateway (Jambonet) couldn't provide adequate solution. The two-way satellite connection using VSAT overcomes this bottleneck. However, delay in securing permit for uplinking data and initial investment on equipment are the major drawbacks of this alternative. This matter was discussed with management and the later alternative got approval. The Programme and eventually IBAR have now a permit to download or upload data using direct Satellite Links from the Communication Commission of Kenya (CCK). This can be expanded to voice (telephone) and video any time. From different companies tendered for the service, AFSAT Communications Kenya Ltd. was awarded the contract to deliver Small to Medium Enterprise (SME) service plan with Shared Uplink upto 256 kbps and Shared Downlink upto1.5 Mbps.

PACE and eventually IBAR have now a permit from the Communication Commission of Kenya (CCK) and acquired the necessary equipment and contract to download and upload data using direct Satellite Links. This includes cheaper telephone links (Voice on Internet Protocol-VoIP) and Video Conferencing.

By the time of writing this report, the ICU was working on securing additional permit to transmit Voice over Internet to improve substantially on the quality and cost of international telephony. The system, known as Voice over Internet Protocol (VoIP), will benefit PACE in getting improved quality telephone communication and reduced cost.

11.2.3.5 Domain name registration and standardization of e-mail addresses

The ICU was instrumental in the registration and renewal of domain name for the institution. More recently, it is in a process of changing the old Domain Name of OAU-IBAR.org to AU-IBAR.org

Likewise, the haphazardly created e-mail addresses of staff members of PACE, IBAR core staff and those of other projects was standardised to the system used by most organisations, name followed by surname and the domain (i.e. name.surname@oau-ibar.org). The advantage of this standardised system is that person who would like to communicate a staff member of the institution need to know the name and surname of the contact person and the domain in a consistent manner.

11.2.3.6. Staff Training

One of the steps taken to create capacity in information management at the continental office is to train staff members of the ICU in database management and administration as well as in Geographical Information System (GIS). In line with the design and development of ARIS, the DMO, LAN Administrator and the half time data entry clerk[♣] received a one-month training on

Oracle. The counterpart Epidemiologist and the Epidemiologist from PACE Kenya joined the three staff members later for training on the operation and use of ARIS.

In addition to Oracle, the DMO received refresher course on ArcView GIS, including the Advanced and Spatial Analyst modules for a period of three weeks. The Data Management Assistant has also received an in-house training on the operation, use and trouble –shooting ARIS. Capacity created in this way was used in the implementation of ARIS in different countries and run regional trainings. Staff members of the Unit also attended different seminars in areas of ICT, such as VSAT and the use of ICT in development.

11.2.4. Information Resources Materials Produced and Distributed

With the objective of unlocking information contained in paper documents and allow wider information sharing, The ICU mobilised two consultants in 2001 to sort valuable paper documents from PARC implementation, scanned these and produced interactive CD-ROM. The CD-ROM runs using an Internet browser and had search facility. This first material named PARC and PACE Information Resource CD-ROM Volume I, had also Global Plan and Annual Work Plan and Cost Estimate (AWP & CE) of PACE Regional and National Programmes. The CD-ROM served to fill the gap of lacking Website for information dissemination and beyond to share information with anybody with a computer, which has a CD-ROM drive. A second volume of this CD-ROM was produced in 2002 with more information including country baseline data and contact address with interactive map of countries.

11.2.5. Disease Reporting Improved

One of the main objectives of IBAR is to collect, collate and disseminate information related to animal resources. Monthly disease occurrence constitutes the bulk of data collected from AU member states. Data collected from countries in this way is compiled, analysed and Information generated is published on Pan African Animal Health Yearbook.

The ICU soon after its establishment took over this task as contribution of PACE to IBAR's capacity building. Incoming disease reports were very few in number during the year 2000 and 2001. The Unit through presentations at different meetings and others means, created awareness among AU member states on the importance of reporting in transparency, accountability and fulfilling international obligations. Acknowledgment of receiving monthly reports and quarterly disease reporting monitoring letters on the status of reporting were introduced. A combined effect of these yielded good result, increasing reporting rate and geographical coverage of reporting. Although it appears as if reporting started to decline in 2004, many reports are still expected and the final figure will definitively increase. This has been seen during the previous years where many countries tend to delay in reporting and the final figure is known only after full submission by all the countries months after the end of the year.

In addition to increased in reporting rate and wider geographical coverage of reporting, more and more countries are shifting from paper based reporting to electronic filing of reports as e-mail attachments. The growth observed would assist in speeding up reporting, improve also on the quality of reports and assist in speeding up data entry.

Efforts made by the ICU have also contributed to increased number of reporting to the OIE. The disease-reporting rate to the OIE from African countries rose from 60.1% in 2000 to 90.5% at the end of 2003, an increase over 30% in three years time. For the details refer to chart 3.

11.2.6. Baseline Data on Animal Resources and Veterinary Service Delivery Gathered and Published

With the objective of establishing the status of Rinderpest eradication in PACE member countries and gathering baseline data for the entire continent, two rounds of questionnaires were developed and administered. Information gathered in this way also helped planning technical support each country requires from PACE Common Services. The first questionnaire, prepared with the PEU in 2001, focussed on baseline data and progress made in Rinderpest eradication. The main target was PACE member countries. This questionnaire had the following six main components.

- General information about the country, estimated number of livestock per species, production system, role of livestock in national economy, budget for livestock services and contact persons
- Structure of veterinary services, number of personnel and disease management
- Number of vaccinations conducted against Rinderpest per year, last date or Rinderpest outbreak and vaccination stoppage and stage along the OIE pathway for the eradication of the disease
- Status of data management and communication activities
- Status of Community Animal Health Workers
- Wildlife

Fifteen of the then 28 countries (53.6%) actively participating in PACE responded this questionnaire and the compiled information was included in both volumes of the CD-ROMs and distributed.

The second questionnaire was administered to all AU member countries and focused mainly on the following information:

- The role of livestock in national economy
- Name and address of ministry in charge of livestock
- Name and address of veterinary authorities
- Veterinary human resources
- Livestock estimates per species
- Veterinary education centres
- Number of Foot and mouth disease (FMD) outbreaks
- FMD virus serotypes identified in each country during 2003.

The response rate to the questionnaire administered in November 2003 was just above 53%, making it difficult to get a complete picture at continental level. Compatible data from other sources (PACE Global plan, OIE and FAO) were used to complete the picture. Results of this analysis were published on the Pan African Animal Health Yearbook.

11.2.7. Publication of Pan African Animal Health Yearbook Revitalised

Data collected by AU-IBAR from countries is analysed and published on Pan African Animal Health Yearbook. This Yearbook is distributed as feedback to the data sources and sharing disease information among AU member states. The experience continued for many years but there were gaps during the 1990'ties. The last issue of the Yearbook was published in 1998. The

first issue was published at the beginning of 2003 after a gap of five years. This first Yearbook published by PACE ICU included the temporal and spatial distribution of major diseases in Africa during the year 2002. It also contains ranking of diseases by number of outbreaks, cases and deaths. The second issue of the Yearbook was published at the beginning of 2004 with more information on baseline data of the animal resources and veterinary service delivery gathered in 2003. Contact addresses of veterinary and animal resource authorities and list of veterinary teaching institutions across the continent were other types of information contained in the Yearbook.

For better information sharing, several copies of these issues were produced and widely circulated. Mailing list of veterinary and animal resources authorities in AU member states, veterinary teaching institutions, veterinary laboratories, development partners and other stake holders was compiled and copies of the books sent to their addresses. Moreover, copies of these issues were distributed at different meetings.

The ICU also applied for and secured the International Standard Serial Number (ISSN) for the hard copy publication of the Yearbook. There are two separate ISSN for the English (1811-007X) and the French (1811-0088) language publications.

11.2.8. Steps in Harmonizing Information Management with International and Regional Organizations

One of the tasks the ICU proposed and actively engaged in was the harmonisation of data collection and reporting procedures with other international and regional organisations. Often countries find it difficult to report to several international and regional organisations on regular basis using different forms, even when the type of data remain more or less the same. To avoid this reporting burden on member states, the ICU was looking into possibilities of harmonising and where possible automating the production and submission of reports from these countries to the organisations. In line with this, ARIS has incorporated a facility which allow countries to generate the monthly disease occurrence report to OIE, commonly know as SR-3, and where Internet connection is available directly send this report by e-mail. This facility is currently used by Cote d'Ivoire, Ghana and Uganda.

With the view of harmonising information management, the first contact was made with the OIE, especially now that the Organisation is planning to introduce new information system as of January 2005. During the first contact in July 2004, it was agreed that regional organisations keep collecting more detailed type of data while OIE will focus on global issues with spatial resolution at second administrative level and temporal resolution ranging between a month and six-months.

11.2.9. Maps Supporting Rinderpest Strategy in Eastern and Central Africa Produced

The ICU had planned and implemented during the second year work programme compiling epidemiological data and update Eco-zone maps of Eastern and Central Africa. The purpose of this information is to assist reviewing current Rinderpest eradication strategy in the Region. Information on cattle numbers, movement patterns, most recent Rinderpest outbreaks and strategies followed by countries in the then two suspected foci in the Eastern African region and the *Cordon Sanitaire* as well as the adjust areas is compiled and presented as maps. A total of six maps with specific information and an additional one combining information from the previous six have been produced using GIS software, MapInfo Professional 5.5. Data collected from the questionnaire circulated to member countries, PACE Global plans of national components

Digital Chart of the World (DCW) and some specific sources were used to compile the following maps.

Map 1 General Map of the area - This map depicts general features of the Eastern and Central Africa. It is a combination of a 3 dimensional (3D) map of the area under consideration with political boundary and capital cities of countries.
Map 2 Density of cattle - Estimated number of cattle at the second administrative level (regions or provinces) was collected from most countries and entered to MapInfo for dot density mapping. Cattle population at sub-national level was not available for Djibouti and Central African Republic (C.A.R.). Hence, national figures were used to map the density.
Map 3 Cattle movement patterns - Three patterns of cattle movements, those for transhumance, trade and rustling are mapped.
Map 4 National parks and Buffalo distribution - This map depicts the distribution of wildlife parks and the density of buffaloes in the area under consideration. The sources of cartographic data are ADS (1995) whereas the density of buffaloes was taken from African Antelope Database (1998).
Map 5 Recent Rinderpest outbreaks - Data on most recent rumours, suspected or confirmed outbreaks of Rinderpest were gathered from the questionnaires circulated, lists of outbreaks compiled by PARC Epidemiology Unit and other sources such as consultancy reports from CAPE.
Map 6 Rinderpest zonation map - This is a map displaying different zones created by countries to make declaration of their Rinderpest status to OIE.
Map 7 Combined Information - as the name suggests, this is a map with most of the information put together (different layers overlaid one on top of another).

11. 3. Achievements at PACE Country Level

11.3.1. Two regional trainings on data management, GIS and PID-ARIS conducted

The ICU, with assistance of the Regional Coordination Office for West and Central Africa and the PEU, has organised and conducted two rounds of regional training on data management, GIS and PID (ARIS) for information management officers/Epidemiologists from PACE countries. The first round of training was conducted at Banjul; The Gambia in September/October 2002 and the second one took place in Nairobi in May 2003.

The first round of training at Banjul, The Gambia was conducted in collaboration with the International Trypano-tolerant Centre (ITC) for information management officer from West and Central Africa PACE member countries. Sixteen participants from 15 countries attended the training. PACE National Programmes from Cote d'Ivoire, Nigeria, Democratic Republic of Congo and Congo Republic were not able to send their staff members, therefore failed to benefit from the training. The ITC provided eight computers for training (two trainees sharing a machine). Software needed for the training, such as Microsoft Access, ArcView, Oracle and PID (ARIS) were installed before starting the training. Experts from Centre de Suivi Ecologique pour la Gestion des ressources naturelles, Dakar, Senegal trained participants on general concepts of GIS, data acquisition, input and output (GPS, Scanning and digitising) using ArcView. With passive and active surveillance data supplied by the ICU, the trainers have delivered practical application of database and GIS during the second week. Participants were trained on the operation and use of different modules of PID. They were also able to use the language of their choice to exercise data entry, analysis and report generation from the application.

The second round of regional training was planned for Eastern African PACE member countries in Nairobi, Kenya from 5 to 16 May 2003. Invitation to the training were sent to Kenya, Sudan, VSF Belgium implementing PACE in southern part of Sudan, Somalia, Ethiopia, Eritrea, Uganda, Rwanda, Tanzania and Nigeria. The original venue selected for this training was the International Livestock Research Institute (ILRI). However, as the computers for training at ILRI were found to have less capacity for installing and instructing Oracle and PID, the venue of the training had to be changed from ILRI to Software Technology Ltd. by keeping ILRI's instructors for the GIS components. Here each trainee was allocated a computer and the training environment was much more appropriate as the venue is an Oracle approved training centre. A total of 12 trainees drawn from Uganda (2), Somalia (2), Sudan (2), Tanzania (1), Eritrea (1) and Kenya (4), attended the training.

Trainees had hand on experience of different terms used in relational database, how to create table and how to run basic Sequential Query Language (SQL) using Oracle 9i. The last two days of the first week of the training were devoted to PID. Here, background and vision of PID, navigating the database and its components, data entry, importing data to PID, running query and generating reports, exporting data for mapping purpose and data exchange between different sites where PID installed were covered. An extra two Saturday mornings were used to train staff members from PACE Uganda, Eritrea, Tanzania and Sudan on PID installation. The DMO delivered training on PID. Two experts from ILRI covered the theoretical and practical aspect of GIS. Main contents included data capture methods including system configuration and use of GPS, definition and components of Arcview, loading and displaying data, querying data, selecting and editing records, geo-processing and spatial analysis and finally linking PID to Arcview for mapping.

11.3.2. PID (ARIS) implemented in 28 PACE member countries

The ICU was not only successful in achieving the design and development of an information management tool PID-ARIS in a very short time, but also managed a speedy implementation of it in target countries. Out of the 30 member countries of PACE, PID-ARIS was implemented in 27 countries in just under 2 years period.

Training of trainers

The speedy implementation of PID-ARIS was made possible by the strategy designed to train African experts from PACE member countries and Regional Technical Assistants (RTA) from PACE Regional Coordination Office for West and Central African and involve these in the implementation process. Four African experts (one from Central, one from Eastern and two from West Africa) were trained intensively on the installation, configuration, trouble shooting and operation of the application. Two of these experts were later deployed to implement PID-ARIS in neighbouring countries. This is also part of the cross border experience exchange among African experts. There was problem to further use these experts as the logistic of mobilizing them became tedious; especially the financial management of the missions was too complicated.

Out of the three RTA trained on the implementation of the application two were instrumental in installing, configuring, troubleshooting as well as training staff in its operation and use. The two RTA managed to implement PID-ARIS in about 11 countries and provided technical support in many others. Efforts these TAs made in improving the application by identifying and promptly reporting problems and gathering comments on best ways of operation as well as their inputs in

French and Portuguese language components are valuable and the DMO would like to acknowledge their contribution and thank them.

Installation of PID (ARIS)

As has been mentioned in section 2 of part 2 of this report; PID-ARIS is a multi-user and multi-level database. In other words, it can be shared over a LAN allowing access to several users simultaneously and it can be installed at different administrative levels in countries with automated electronic data transfer between lower and immediate higher levels. Initially, Ethiopia, Ghana, Kenya and Senegal have showed interest for the multi-user type installation. However, because of old and low specification Servers it was not possible to install in any of these countries. Uganda is the first country to make use of the multi-user application with three users connected to ARIS on the Server. Kenya and Ghana are on the final stage of achieving this.

The multi-level facility PID-ARIS provide is used currently in Sudan and Nigeria where the application is installed in different States and Federal Veterinary services with automated electronic data communication between the two levels. Ethiopia, Kenya and Tanzania also are contemplating to introduce this system, as it helps to decentralise information management and takes data entry burden from staff members at Central units freeing most of their time for analytical tasks. Although there is a gradual move towards the two above-mentioned benefits PID-ARIS provides, currently, most of the countries have the stand-alone type of installation.

Ninety-one senior staff sensitized

At times; countries are confronted with several databases to choose from for information management needs. For senior staff involved in decision-making process it is necessary to know what the information management tool provides, its strength and weaknesses. That would enable them to take informed decision. With this objective, a brief presentation on the objectives of PID-ARIS, its components and facilities it has and the vision in the near future has been organised and delivered in each country to top animal resources and veterinary authorities. These briefings were sometimes attended by state ministers for animal resources in countries like Sudan and Uganda.

Close to 140 staff trained on the use of PID-ARIS

The installation of PID-ARIS was followed by training of staff members of each National Programme engaged in information management, epidemio-surveillance and communication. An average of three to four participants per country took part of these trainings. The training mainly focussed on different ways of navigating ARIS, data entry, query formulation and report generation from major modules of ARIS, particularly the Passive Surveillance and Active Surveillance. Ways of printing or saving generated reports in different file formats or sending these by e-mail were another component of the trainings. Particular emphasis was also given to how the OIE monthly disease report (SR-3) is generated and sent automatically from ARIS. Finally, they were exposed to the Data Communication Package of ARIS and ways on how to extracted data and send to the next level.

Provision of hardware and software

As part of PID-ARIS implementation in PACE member countries, PACE National Programmes were supplied with Oracle CDs needed to run the application and the Installer CD of PID-ARIS. This was possible because of prior arrangements of purchasing licenses of five multi-user and 29 stand-alone versions of Oracle 8i. The availability of these CDs enable countries to re-install the application in case of problems without waiting for technical support from the ICU. Moreover,

countries do not require purchasing additional license for Oracle to run any application in the near future, as this already is made available to them by ICU.

One of the major constraints faced during PID-ARIS implementation in countries is the obsolete computing facility most of these have. As a large-scale relational database, Oracle requires good processing speed and memory, which most of the computers in countries lack. Countries which updated their computers at the beginning of PACE did not face such problems. Lack of adequate computer for the installation of PID-ARIS has slowed down the implementation process and took more mission days than expected, in some cases without any success. To ease this problem, the DMO has proposed the purchase of computers centrally where PID-ARIS is installed and configured before shipping to countries. This approach solves the problem and reduces mission days lost in search for adequate computer and shorten the installation process, freeing most of the time for training and troubleshooting. Although the request was to purchase these computers from the Regional budget, it was decided to ask National Programmes to cover the expenses. This made most countries to shy away from the entire process and only five countries requested the purchase of computers on their behalf and effect the installation and configuration of PID-ARIS centrally. These countries are Cameroon, Cote d'Ivoire, DR Congo, Guinea Bissau and Mali. Dell Optiplex GX 270 desktop computer, with Pentium 4, 3.2 GHz processing speed and 1GB RAM with Windows XP Professional Operating System (French Version) was purchased for each of these countries. The installation and configuration of PID-ARIS is now completed waiting for shipment.

11.3.3. Direct technical support provided to a total of 28 countries

The ICU, through its staff members or other experts provided technical support to 28 PACE national programmes (out of the total 30) during the five years of PACE implementation. The condition and time were not appropriate to deliver direct technical support to Burundi, Djibouti and Equatorial Guinea. The DMO has covered 19 of these countries at least once. In addition to direct technical supports through missions, national programmes were assisted over phone, by e-mail and ordinary mail as required. The technical support included implementation of PID-ARIS, training of staff members in the operation and use of the application, troubleshooting of PID-ARIS, training in GIS, assistance in identifying computing needs, support in international disease reporting, etc.

12.0 Way Forward

The PACE project, besides delivering the last rites to Rinderpest in Africa, has developed animal disease epidemio-surveillance systems with electronic data storage and processing, to 30 countries across western, central and eastern Africa. These have already been tested by the emergence of HPAI in some of these countries. Parts of these surveillance systems are fully sustainable, particularly the passive surveillance components, more vulnerable are the active surveillance mechanisms developed by PACE, which are particularly needed by many countries to continue along the OIE pathway to declaration of freedom from Rinderpest infection. Also vulnerable after PACE is the information system (ARIS) which the project introduced. If it is to be useful and sustainable, it needs further development and support.

While it may be argued that countries in the regions covered by PACE should now be fully responsible for maintenance of their epidemio-surveillance systems, this is not correct with regard to transboundary animal diseases. Major transboundary diseases such as CBPP and FMD may have only a limited economic impact in some of the countries where they are endemic. However, they are a threat to other countries in the region which may not have the diseases present in an endemic situation so that their impact is much greater when outbreaks occur, and also their actual or potential trade in livestock may be threatened by these diseases (eg. CBPP is absent from Senegal and Western Guinea but endemic in neighbouring countries). It is noteworthy, however, that an agreement is in process between ministers of Senegal, Mauritania and Mali to mitigate the spread of CBPP within these countries. Essentially transhumant animals crossing borders should have vaccination certificates, especially for CBPP. Mauritania is a major supplier of small ruminants to Senegal and Côte d'Ivoire as they are very popular. There is also movement between Mali and Mauritania. The potential for these diseases to spread between continents (recent examples are FMD and HPAI) mean that their continued existence also presents a global threat. The continued functioning of these epidemio-surveillance systems to provide on time and updated information on where the transboundary diseases persist, and to give early warning of emerging transboundary diseases, is therefore very important.

While PACE did much to introduce epidemio-surveillance systems and to monitor their performance and effectiveness, with some exceptions (Rinderpest, HPAI, and to a lesser extent CBPP), less was achieved with regard to control and eradication of transboundary diseases. If the epidemio-surveillance systems are to be sustainable, and Governments are to continue to appreciate their usefulness, the next steps are to harness them to appropriate disease control and eradication programmes which are adequately funded.

12.1 Lessons Learnt

Many lessons have been learned from PARC and PACE, and these should be taken advantage of by incorporation into any future PACE programme. These are summarized as follows:

Management and Finance

There is a need to increase capacity and human resources in relation to Administration and Finance. AU-IBAR needs to be institutionally strengthened, including management and organisational development, in order to become more operational.

Training and Communication

It is strongly recommended that training and communication at all levels are properly planned and implemented from the outset. The outputs should be properly documented and archived, both as hard copies and, where appropriate, electronically so that examples of best practice can

be made available to all countries. Communication should be recognised as an important and essential component to ensure that visibility within the international community is satisfactory.

Privatization and legislation
PARC and PACE have demonstrated that the availability of guarantee funds as security for bank loans and credit can operate successfully provided there is proper management with appropriate conditions. In situations where there is a role for private veterinarians, a similar scheme should operate. Special consideration should be given to those countries that did not benefit from PARC or PACE guarantee funds, namely Ghana, Togo, Benin, Congo, Cameroon, Gabon and CAR.
Evaluation and if necessary, updating of veterinary legislation is an essential component. In view of the extensive updating of legislation under PACE which will take a few years before the benefits can be properly evaluated, it is recommended that the legislation should be reviewed prior to introducing further amendments.

Sharing of best practice between countries
Steps should be taken to record examples of best practice within countries that can be used by other countries. These could include:

- Training and communication materials.
- Effective tutors and trainers.
- Laboratory expertise.
- Epidemiological (including wildlife) expertise.
- Data management expertise.

In this context, consideration should be given to introducing the concept of "twinning" countries, an approach that has operated successfully in the recently expanded European Union. Thus a country that has demonstrated best practice could be twinned with a country that has been less successful in that area. Examples of best practice demonstrated in PACE are as follows:

- Guinea - Integration of livestock farmers with veterinary services in the delivery of veterinary services
- Senegal – Epidemio-surveillance
- Kenya – Management of guaranteed funds as security against bank loans to private veterinarians
- CAR - Communication (newsletter, radio, posters) and training tools (exhaustive handbook for epidemiosurveillance agents)
- Research

The research component of PACE has produced results, but more effort should be made to transfer results of research to the field. For example, though Pirbright Laboratory has candidate recombinant marker vaccines for Rinderpest control, testing of them in cattle has not been facilitated and their further development has been halted. Useful results from CBPP research have not yet been introduced to CBPP control strategy and more could be done through written and oral presentation of research findings to PACE and other stakeholders.

Information Systems and Epidemio-surveillance
The ARIS information system has establishing its value but requires further development.

Potential for additional Animal Health activities to follow PACE

Rinderpest is undoubtedly a very serious transboundary disease, and its final eradication will have immeasurable benefits to not only cattle owners of Africa, but to many other regions of the world in which Rinderpest continued to be a major disease hazard until quite recently. Consideration of control of other transboundary diseases will pose new, and in many respects, more difficult challenges to that involved in Rinderpest control and eventual eradication. The following could be considered the most important transboundary diseases in PACE countries today:

Cattle	–	CBPP, FMD, Rift Valley Fever
Sheep and goats	–	PPR, Rift Valley fever, FMD
Pigs	–	African swine fever
Horses	–	African horse sickness
Poultry	–	HPAI, Newcastle disease

The systems of performance indicators and evaluation criteria which have been developed are useful tools to monitor the effectiveness of the epidemio-surveillance networks. A mechanism should be found for their sustainability. This may be achieved through more purpose driven surveillance, with specific objectives which are derived from results of economic analysis showing the potential for positive financial benefits which can provide the incentives decision makers need to support the systems financially.

Economics and marketing

Selection of candidate transboundary diseases for targeted surveillance should take into consideration how their control or eradication will affect market access for livestock commodities to other African countries and to international markets.

The economic importance of the diseases should be assessed at various levels: livestock keeper, domestic, and regional and international export.

Areas for future donor support

The evaluators fully recommend further donor support to consolidate and build on the achievements of PACE. Areas proposed for future project support are:

- Further development of regional reference laboratories. In this respect the performance of Muguga has been criticised. Given the need for regional reference laboratories, it is proposed that, rather than discontinue its use, an assessment should be made of the feasibility of taking it over as a regional IBAR laboratory, similar to what has happened with PANVAC.

- A future donor support should, as well as disease control, have the following elements:

    - Socio-economics – to explore local disease avoidance and coping strategies used by livestock keepers.

    - Trade and marketing – for development of marketing strategies, particularly from disease free zones and quarantines.

    - Wildlife - Increased use of sentinel wildlife for surveillance.

- Policy formulation – based on risk analysis and HACCP; with expertise on ISOs, SPS agreement, OIE Terrestrial Animal Health Code and Codex Alimentarius.

- Vaccines - development of improved vaccines for CBPP, RVF and ASF.

- SERECU - It is imperative that SERECU continues its activities with regard to surveillance activities in the Somali Ecosystem to ensure confirmation of final eradication of Rinderpest and to ensure emergency preparedness in case there is a re-emergence of the disease.

Since there may be disruption of epidemio-surveillance activities between closure of PACE and the start of a new project, resources allocated to the epidemio-surveillance of HPAI should also be used to maintain general active surveillance.

As there are differences in livestock systems and potential markets between the different regions, it is proposed that future regional programmes should be based alongside the soon to be established animal health centres in the economic regions. Thus, there can be more focussed projects which take into consideration particular disease and public health threats and regional opportunities for trade in livestock and their products.

12.2 Regional Approach and the Role of the new Regional Animal Health Centres

There are major differences between regions with regard to their animal disease control priorities. For example, eastern Africa needs to develop export markets for its livestock and their products. This it cannot do from areas where certain transboundary diseases are present. On the other hand, western African producers of livestock already have a large market for livestock and livestock products, particularly in coastal urban centres such as Lagos, which currently does not impose restrictions with regard to presence of disease. Here, the more important issue may be to improve rural livelihoods of livestock keepers through improving the health, and hence the productivity of their livestock. Also, with regard to livestock production, transboundary diseases can produce devastating epidemics (such as African Swine Fever in coastal areas of some countries) and their control is an important reduction of risk to rural livelihoods.

It is recommended, therefore, that follow up activities to PACE should be targeted to a more regional (and therefore epidemiological) approach. In this context, consideration must be given to the role of the 4 Regional Animal Health Centres to be established by IBAR/FAO/ OIE in Nairobi, Bamako, Tunis and Gaborone covering identified Economic Zones of Africa. These Centres will, if they receive adequate funding and resources, be able to provide much of the technical, administrative and logistic support that would be prerequisites to any follow-up activities to PACE.

The recommendation should also mention that the current initiatives such as Alive and the joint FAO/OIE Framework for the Progressive control of transboundary animal diseases (GF-TADs) will be essential to support Africa in the control of animal diseases.

The Memorandum of Understanding (MoU) signed on 25 April 2006 between AU-IBAR, OIE and FAO to establish Regional Animal Health Centres in the four identified Economic Zones is primarily to co-ordinate and harmonise strategies for the monitoring and evaluation of HPAI control. Thus, the following areas of intervention are particularly with respect to HPAI

The MoU proposes that OIE will:

- Audit and evaluate national veterinary services to help Governments and donor agencies target their investments in the field of animal health.
- Disseminate animal health information and train national OIE delegates and their staff to become focal points for information on animal health, wildlife diseases, and veterinary medicinal products and vaccines.
- Assist in improving animal disease notification systems.
- Assist with harmonisation of disease surveillance and control.

FAO will:

- Investigate the role of migratory birds in epidemiology of HPAI;
- Train in laboratory diagnosis and support regional networks of laboratories and epidemiological surveillance teams.
- Network and exchange data and information.
- Support feasibility studies for national and regional investment programmes.
- Provide technical assistance at Centre and national level to support development of national and regional HPAI control strategies.

AU-IBAR will:

- Strengthen epidemiological surveillance in poultry and wild birds, including in countries and zones not yet affected by HPAI.
- Monitor and evaluate control measures (stamping out and vaccination campaigns.
- Support the development of national and regional HPAI control strategies.
- Harmonise emergency response plans.
- Validate applications from countries seeking emergency funding from AU-IBAR.
- Support the development of control programmes for transboundary diseases, co-ordinate them, and assist with provision of the necessary training.
- Monitor regional laboratory networks and assist with training in diagnosis and quality assurance.
- Provide a technical secretariat responsible for HPAI prevention and co-ordination of responses in the face of outbreaks.
- Support the setting up of emergency response funds aimed at assisting countries in managing HPAI crises.

Together, the three organisations will:

- Define HPAI control strategies.
- Prepare investment programmes for sustainable strengthening of national veterinary services.
- Prepare a regional avian influenza control programme.

It is the considered view of the Final Evaluation Mission team that the Regional Animal Health Centres should not be restricted to strengthening the control of avian influenza. Infectious disease priorities fluctuate and although there is no question of the current importance of avian influenza, the situation could be radically different in a few years time. It is recommended that the Centre should be designed and staffed to support the control of major livestock infectious diseases in general, with immediate priority being given to avian influenza.

Considering the different animal health priorities of East Africa and those of Central and West Africa, the Final Evaluation Mission recommends that as a follow-up to PACE support should be given to development of the animal health programmes of the Regional Animal Health Centres of Nairobi and Bamako. Such support would:

- contribute significantly to the strengthening and development of the Centres;
- broaden their commitment to control and eradication of other important transboundary diseases, in addition to HPAI;
- assist with further strengthening AU-IBAR capacity to co-ordinate animal health activities in the regions covered by the PACE programme.

In preparation for such an initiative it will be important to identify in each area those diseases which:

- Are of actual and potential trade significance.
- Reduce, or threaten rural livelihoods.
- Are of actual or potential public health significance.

It is recommended that for each of the two Regions to be covered by the proposed Regional Animal Health Centres for Western/Central Africa and Eastern Africa a feasibility study is carried out to:

- Identify target diseases that are significant in terms of their impact as outlined in the categories above.
- Assess which of these diseases could be subjected to a programme of control/eradication by the strengthened veterinary services within the PACE countries, in particular taking advantage of the improved epidemio-surveillance networks.
- Recommend which disease(s) should be targeted for a regional control/eradication programme.
- Propose a work programme for a project in each region which will continue the functioning of the epidemio-surveillance systems and undertake a programme of control/eradication of the targeted diseases: the programme should be designed to complement and harmonise with the activities of the proposed new Regional Animal Health Centres[‡].

In carrying out the feasibility study, as well as giving due consideration to the improvements of livelihoods and increasing potential for trade, any approved disease control programme will also continue to support the epidemio-surveillance systems that have been developed by PACE and give them validity, as has been demonstrated recently with the outbreaks of HPAI.

Areas of expertise required through technical assistance to support the new initiative might include, for example:

- Veterinary epidemiology.
- Livestock economics and socio-economics.
- Livestock Marketing including WTO SPS regulations.
- Communications skills.
- Data management skills.
- Project management skills.

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Annexes

Annex 1. Logframe for Initial Phase of PACE

		OVIs	Sources of verification	Assumptions
Overall objective	Combating poverty among those involved in livestock farming by improving productivity			
Specific objectives	Strengthening capability (at national and regional level) to assess the technical and economic aspects of animal diseases and generate appropriate programmes for their control Safeguard animal health in Africa against major epizootic (List A) diseases	Quantity and quality of epidemiological reports and animal health programmes Eradication of rinderpest in Africa No. of outbreaks of other epizootic diseases	Periodic reports from countries involved, OIE and OAU/IBAR	Improvement in market for animal products Financing of additional programmes to tackle other selected epizootics
Results	Re-inforcing animal epidemiology services (information, diagnostics and follow up) and control of major diseases in participating countries Greater privatisation of veterinary services and public/private sector linkage in this field Rinderpest eradicated from Africa; greater control of other epizootic diseases, esp. CBPP At pan-African level, sustainable co-ordination of national animal health systems and arrangements for tackling epizootic diseases set up	Veterinary stations supply relevant information Establishment of national epidemio-surveillance networks (NESN) Analysis of samples collected Vaccination rate achieved by various agents (private, auxiliaries, public) Demand for treatment and drugs satisfied, within rules established by law and practice No. of outbreaks and losses Rapid and co-ordinated reaction to any outbreaks of rinderpest Projects for combating animal diseases submitted for financing Information genuinely transmitted to OAU/IBAR Co-ordination Unit Establishment of harmonised NESN and reaction arrangements	Reports from national components and summaries from OAU/IBAR Co-ordination Unit Technical unit consultation reports Reports from individual enquiries National component activity reports OIE reports Technical unit consultation reports Project docs Annual OAU/IBAR and programme reports	Minimum local safety conditions and access to difficult areas Continued AU support for IBAR AU member countries continue to recognise its role in co-ordinating actities for livestock development in Africa

Activities			
	Assistance for drawing up inventories of local epidemiological situations Establishment of an epidemiological surveillance network in each country Developing expertise on economics of animal health Veterinary surveillance of wildlife Development of methods of communication at national level; animal health training for stockfarmers Allocation of vaccination funds to private vets Development of arrangements for distributing care and vet drugs thru' husbandry auxiliaries in remote areas Training in diagnostics and other techniques needed for the networks, improvement of private vets' training in management and communication Targeted aid for vet schools Campaigns for active, clinical and serological research into rinderpest Assistance with following OIE pathway for presently rinderpest-free countries until they are declared "free from infection" Harmonised and synchronised vaccination campaigns in countries with cordons sanitaires and in countries where disease is endemic (using husbandry auxiliaries in remote areas) Continued research into vaccines and diagnostic and therapeutic tools Harmonisation of legislative positions on the vet profession and vet drugs Establishment of a pan-African epidemiology network Integration of the various epidemiological surveillance networks in Africa (IBAR, OIE, FAO) Development of an animal health and animal economics database (OIE/IBAR) Continuous environmental monitoring of four regions considered typical examples of trad. husbandry	Cost of programme (million €) National components 53 Common Services 17 Consisting of: Epidemiology (5.4) Communication (1.8) Economics (0.54) Help with privatisation (0.54) Husbandry auxiliaries (0.45) Financial monitoring (1.95) Data processing (0.36) PANVAC (0.9) Research (1.3) Advisory committee (0.27) Other monitoring (0.18) Vet Schools (0.27) Reviews/evaluations (including environmental monitoring) (0.8) Co-ordination (3.24) Contingencies (2.0) Total 72.0	Enforcement of legislative texts Veterinary costs fully covered Each individual country will lay the basis for preserving the co-ordinated network of epidemiological surveillance developed thru' PACE programme Continued support for the process of privatising veterinary medicine

Annex 2. Logframe for PACE Extension

	INTERVENTION LOGIC	VERIFIABLE INDICATORS	SOURCES OF VERIFICATION	ASSUMPTIONS
OVERALL OBJECTIVE	Reduction of poverty and enhanced food security amongst rural communities through sustainable improvements in animal production and productivity and increased trade in livestock and livestock products			
SPECIFIC OBJECTIVE	1.Eradication of rinderpest and control of other epizootic diseases 2.Strengthen of surveillance of other major diseases to provide required information for policy formulation of their control as prerequisite for access to global livestock markets			Funds available for national and regional components and countries contribution mobilized.
RESULTS	1.Committed eradication of rinderpest in the Somalia ecosystem	Participatory fieldwork leads to sampling of fresh cases, and to info on recent occurrences Design of a practical and affordable eradication strategy by Dec 2005 Eradication project proposal submitted to donors by Feb 2007	Viruses finger printed by WRL Strategy document Donor correspondence	Donor funds can be found to pursue RP eradication after PACE Agreement on national CAH fieldwork funding and co-ordination.
	2. Verified rinderpest eradication in countries through achievement of the OIE Pathway's freedom from disease and then from Infection	At least 15 dossiers submitted and found acceptable by OIE by 2007.	OIE Animal health status reports.	Governments support epidemiological surveillance work. Laboratories adequately equipped to perform the analysis
	3. Reinforcing of animal epidemiology services and control of major diseases in the participating countries	All countries have their established ESS functional	Reports on performance appraisal of ESS Mission reports	Mechanisms for the sustainability of ESS developed
	4. Development of national policies for economically affordable strategies for the control of priority diseases developed	PDIA trainers trained and selected teams active by June 2005 Economic impact assessment studies	Reports on workshops Study reports	Improvements in economic outputs and in communication strategies and outputs
	5. Strategies developed for gaining greater access to livestock markets.	Sites of pilot projects on export zones identified	Documents are available	National Gov'ts accept policy on restructuring and promotion of private sector services
	6. The programme is implemented in accordance with the approved work plan.	Work plans are rafted, approved and implemented according to the established planning.	Signed work plans Progress reports	Improved programme management and simplification of administrative procedures.
	7. The PACE National Programmes receive support to implement their national programmes and are subject to monitoring and evaluation.	National WP are analysed and technical and budgetary framework documents are drafted for year 1 and Year 2 on the extension. A final report is drafted.	Framework document signed by the RAO and the lead-ECD in Kenya. Final report	

CTIVITIES	1.1.Implement SERECU (*Somali ecosystem rinderpest eradication co-ordination unit).*
	1.2.Improve surveillance of mild rinderpest by improving and implementing participatory disease searching, incorporating private veterinarians, CAHWs and veterinary paraprofessionals, carrying out targeted serological surveillance to delineate zone of mild rinderpest and pperforming annually targeted wildlife surveillance in the Somali ecosystem
	1.3.Assure timely diagnosis assured by supporting both the regional and national laboratories with provision of materials and diagnostic kits
	1.4.Strengthen collection and analysing data from Somali eco-system
	1.5.Assist in information gathering and analysis for developing strategy for Somali-eco-system
	1.6.Define required interventions with regard to CAHS through assessment of the delivery systems in the three countries in the Somali ecosystem
	1.7.Stimulate continuous dialogue between countries and the PACE by co-ordinating surveillance and control activities through establishment of national and regional taskforces and organising regular meetings of the established rinderpest Somali ecosystem co-ordination body
	1.8.Develop a regional follow-up project to finalize the eradication of rinderpest and seek donor funding.
	1.9.Monitoring of the activities of the Somalia Ecosystem Rinderpest Eradication Co-ordination Unit (SERECU)
	2.1.Improve surveillance for rinderpest by incorporating private veterinarians, veterinary paraprofessionals, performing wildlife surveillance in line with the requirements of the OIE based on regional approach.
	2.2.Improve national and international disease reporting.
	2.3.Enhance emergency notification of diseases
	2.4.Improve the laboratory component of ARIS
	2.5.Facilitate policy initiatives to support integrated veterinary service delivery in support of rinderpest eradication
	2.6.Assist countries in the preparation of OIE dossiers for recognition of freedom from disease and infection.
	3.1.Improve epidemiological surveillance systems in PACE member countries by continuing the performance appraisal of surveillance systems initiated in West Africa on the basis of the guidelines developed by PEU in all PACE member countries and assisting countries in developing their owns PIs and implementing the adopted common indicators in Dakar 2004.
	3.2.Sustain diagnostic services by visiting and assisting countries in establishment of the required capacity for diagnosis of identified priority diseases, assisting in serological surveillance required for obtaining freedom from rinderpest infection and continuing the laboratories rinderpest-testing network.
	3.3.Implement training programmes to improve epidemiology capacities in countries.
	3.4.Support national and regional laboratories to perform the tasks of sero-surveillance and diagnosis by re-establishing laboratory network for serological protocols, analysis of results and follow-up investigation work and implementing external quality assurance of national laboratories
	3.5.Develop of national guidelines for CAHW systems, legislative reform, development of licensing procedures for CAHW trainers and trainees, development of agreements with implementing agencies to ensure harmonised approaches and private sector involvement.
	3.6.Develop and improve further ARIS and implement in all PACE member countries
	4.1.Re-asse animal diseases priorities by determining relative diseases priorities using participatory impact assessments method, improving epizootic disease control strategies (linked to market opportunities), undertaking cost-benefit analysis studies for a limited number of priority diseases and meta-analysing the costs and benefits of national ESS in a number of countries taking into consideration characteristics of the local livestock and livestock products markets.
	4.2.Create capacity in modem data analysis and information management at IBAR and in PACE member countries
	4.3.Improve disease reporting rates within PACE member countries and from these to international organizations
	4.4.Harmonize data collection and reporting procedures with international organizations
	4.5.Support to privatisation and veterinary legislation
	4.6.Attain wider information sharing capacity by improving communication methods
	4.7.Provide technical support to DVS and statutory bodies to strengthen their capacity to co-ordinate, regulate and supervise para-veterinary professional systems in accordance with OIE guidelines.
	5.1.Develop strategies for gaining greater access to livestock markets by developing capacities on understanding of epidemiological issues associated with trade in livestock and livestock products such as Diseases free zones (DFZs), export zones, export systems and commodity based-trade, identifying sites for pilot projects to establish export zones or commodity-based trade and seek funding for them and developing methods for credible and internationally acceptable for livestock costs/ benefits of national surveillance systems in a number of countries taking into consideration characteristics of the local livestock and livestock products markets
	5.2. Give support to the reorganisation of veterinary services in line with OIE standards
	6.1.Establishment of a functional project team for the implementation of the PACE extension
	6.2.Draft a technical and budgetary framework document for the national components.
	6.3.Identification, planning and organisation of specific activities
	6.4.Liaison with International and regional organisations
	7.1.Monitoring of national components/programmes
	7.2.Evaluation of national components/programmes

Annex 3. Comparison by PCU of Achievements and Logframe Expected Results – Initial Phase of PACE

Expected Results (from Logframe)	OVI	ACHIEVEMENTS (2006)	% SUCCESS
1. Reinforcing of animal epidemiology services (information, diagnostics and follow up) and control of major diseases in the participating countries	Veterinary stations supply the relevant information	Sanitary information sent by countries to the OIE and to PACE increased progressively until 2004, touching 80% of reporting over the year. Following the changes in the reporting procedures of the OIE (now bi annual instead of monthly) reporting rate dramatically dropped to less than 10% for the first semester of 2006. Training courses organised for PACE reference laboratories and selected national programmes on ELISA and PCR techniques and quality assurance	75
	Establishment of National Epidemiosurveillance networks	All PACE countries established functional epidemio surveillance systems	100
2. Greater privatisation of veterinary services and public/private sector linkage in this field	Analysis of the samples collected	Sampling was conducted in the framework of the OIE pathway for rinderpest and in case of suspicion of notifiable diseases. Data and perfomance on the ration of analysis done vs samples collected and sent to the lab vary from country to country. The return of information from the labs to the vet services inthe field is always a major issue	75
	Vaccination rate achieved by the various agents (private, auxiliaries, public)	Mandatory vaccination against rinderpest was progressively halted. Last vaccination in Chad (2002) Kenya (2003). Private services were satisfactorily involved in the vaccination exercise representing sometimes more than 50% of the animal vaccinated. Sanitary mandates were issued to this purpose in most of the countries (especially in Western Africa). Trial undertaken on the use of PPR vaccine as a marker vaccine to protect cattle against rinderpest	75
	Demand for treatment and drugs is satisfied, within the rules established by law and practice	A huge variability in the achievement of this result was noted, mainly due to geographical constraints and limited human resources. Cost recovery for vet treatments is widely introduced and accepted by livestock owners. The commerce of veterinary drugs is in the hands of the private sector, even if in some cases there is an unfair competition with public services. Propoer legislation ruling the veterinary profession and the delivery of veterinary services has been promulgated and/or updated in all PACE countries. The privatisation process initiated by PARC was continued but results are not always encouraging, being	60

Expected Results (from Logframe)	OVI	ACHIEVEMENTS (2006)	% SUCCESS
		often linked more to drug selling and official vaccination campaigns than to the mere veterinary practice.	
. Rinderpest eradicated from Africa; ;reater control of other epizootics diseases, specially CBPP	Number of outbreaks and losses	Outbreaks ocurring are promptly reported and relevant actions taken with a reasonable delay. Examples of FMD, rinderpest suspicions, avian influenza. The disease is virtually eradicated, suspicions existing only in the Somali ecosystem. Specific programmes for the control of CBPP are drafted in most countries. A workshop held in 2003 in Guinea detailed the guidelines for the control and eradication strategy of CBPP at national level. The strategy has been widely accepted and set up in most of the countries.	90
	Rapid and co-ordinated reaction to any outbreaks of rinderpest		
ł. At pan-African level, Sustainable co-ordination of national animal-health ystems and arrangements for tracking pizootic diseases set up	Projects for combatting animal diseases submitted for financing	Some countries (e.g. Uganda, Sudan, Burundi, Cameroon, Chad, Guinea) drafted after PACE projects aimed at continuing the activities carried out during PACE and consolidate the achievements of the programme. All countries have been sensitised to prepare and submit animal health related projects.	75
	Information genuinely transmitted to AU/IBAR Co-ordination Unit	PACE PCU is receiving regular progress reports. The specific situation of all countries ais updated at least twice a year during the AC meetings. Few countries whose PE is not running or approved, or that have specific management problems have not issued regular reports	85
	Establishment of harmonised National Epidemiological Surveillance Networks and reaction arrangements	See comments for result 1. Moreover, PACE organised regular technical harmonisation meetings aimed at harmonise animal health startegies on transboundary diseases among neighbouring countries	100

Annex 4. Comparison by PCU of Achievements and Logframe Expected Results – PACE Extension

Expected Results (from Logframe)	OVI	ACHIEVEMENTS	% SUCCESS
1. Committed eradication of rinderpest in the Somalia ecosystem	Participatory fieldwork leads to sampling of fresh cases, and to info on recent occurrences	Introduction of PDS in order to understand rinderpest epidemiology in the SES. 2 serosurveillance campaigns carried out in the 3 countries involved, including surveys on wildlife. Some delay accused due to the late start of the SERECU initiative	90
	Design of a practical and affordable eradication strategy by Dec 2005	Due to the delay in the commencement of SERECU, the strategy was discussed and agreed with some delay and only recently endorsed by the parties. Some refining work will be done	90
	Eradication project proposal submitted to donors by Feb 2007	Not yet fully implemented: a follow on project is under discussion and preparation with the collaboration of further potential partners	50
2. Verified rinderpest eradication in countries through achievement of the OIE Pathway's freedom from disease and then from Infection	At least 15 dossiers submitted and found acceptable by OIE by 2007.	Through surveillance and reporting activities developed by PACE, and with help from PEU and PACE technical assistance to prepare dossiers for presentation to OIE, countries have been enabled to follow the OIE pathway to accreditation of freedom from disease and infection so that currently, twelve countries have been accredited as being free from infection and nine have been accredited as free from disease, The remaining countries have started on the OIE Pathway by stopping rinderpest vaccination and declaring themselves to be free from rinderpest (including the three countries with territory in the Somali ecosystem, on a zonal basis).	100
3. Reinforcing of animal epidemiology services and control of major diseases in the participating countries	All countries have their established ESS functional	Completely achieved, Burundi and Rwanda are the last countries where the ESS is put in place	100
4. Development of national policies for economically affordable strategies for the control of priority diseases developed	PDIA trainers trained and selected teams active by June 2005	Economic studies on the impact of animal diseases and the cost/benefit analysis of the control of major animal diseases (CBPP, RP) carried out in a sample of 7 PACE representative countries. Economic studies on the impact of Avian Influenza ongoing	
	Economic impact assessment studies		100
5. Strategies developed for gaining greater access to livestock markets.	Sites of pilot projects on export zones identified	Pilot studies undertaken in Kenya and Sudan. Further information are still needed; benchmarks settled	75

Expected Results (from Logframe)	OVI	ACHIEVEMENTS	% SUCCESS
. The programme is implemented in ccordance with the approved work plan.	Work plans are drafted, approved and implemented according to the established planning.	Difficult to quantify the implementation of each national PE so far. If we consider the number of countries executing at least a PE during the extension phase, the ratio is 24/29	80
. The PACE National Programmes receive ıpport to implement their national rogrammes and are subject to monitoring nd evaluation.	National WP are analysed and technical and budgetary framework documents are drafted for year 1 and Year 2 on the extension.	Totally achieved, 3 technical and budgetary frameworks implemented	100
	A final report is drafted.	Not yet implemented	0